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PROGRAMME

and

ABSTRACTS

for the

SEVENTH 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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SEVENTH SYMPOSIUM

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"ADVANCES IN THE STUDY OF THE SYDNEY BASIN"

26th May to the 28th May, 1972

Convenor:
DR. K. H. R. MOELLE
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)

559.4405

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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FOREWORD

Several years have elapsed since the First Newcastle Symposium was convened and in these years interest in the Sydney Basin does not seem to have waned. It is hoped that discussion and the sharing of ideas stimulated at the previous Symposia have led to the filling in of some gaps in our knowledge of the Basin.

This year, it is a privilege and an honour that Sir Garfield Barwick, Chief Justice of the High Court of Australia, should consent to be the Keynote Speaker.

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 and 1971 Symposia on the same theme were published separately in the following two years, whilst the present booklet contains the abstracts for this year's Seventh Newcastle Symposium together with the title of the Keynote Address.

Fourteen 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 four-yearly intervals from 1970.

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

S. ST.J. WARNE

A. S. RITCHIE

PROGRAMME

FRIDAY, 26th MAY, 1972

9.00 a.m. - 5.00 p.m. — REGISTRATION (First Opportunity)
Foyer of Department of Geology

2.00 p.m. - 5.30 p.m. — EXCURSION.
NOBBY'S TUFF, MURDERING GULLY.
Co-ordinator: Dr. C. F. K. Diessel
The University of Newcastle.

SATURDAY, 27th MAY, 1972

8.30 a.m. - 9.00 a.m. — REGISTRATION (Second Opportunity)
Foyer of Department of Geology

Morning Technical Session:
Science Lecture Theatre H01
(at the rear of Chemistry Building)
Chairman: Professor E. O. Hall,
Deputy Vice-Chancellor,
The University of Newcastle.

9.00 a.m. - 9.05 a.m. — Opening of Seventh Newcastle Symposium — Welcome

9.05 a.m. - 9.45 a.m. — GEOLOGICAL AND GEOPHYSICAL ASPECTS OF RECENT DRILLING IN THE CENTRAL SYDNEY BASIN
Dr. G. H. Packham) The University
Mr. D. W. Emerson) of Sydney

9.45 a.m. - 10.25 a.m. — THE WEATHERING OF A SILTSTONE
Dr. D. J. Swaine,
C.S.I.R.O. Division of Mineralogy.

10.25 a.m. - 11.00 a.m. — Morning Tea — Department of Geology.

11.00 a.m. - 11.30 a.m. — THE SYDNEY BASIN - ANOTHER LOOK
Mr. K. G. Mosher,
C.R.A. Exploration Pty. Ltd.

11.30 a.m. - 12.30 p.m. — KEYNOTE ADDRESS. LANDSCAPE CONSERVATION AND REHABILITATION IN A HIGHLY DEVELOPED REGION
The Rt. Hon. Sir Garfield Barwick, G.C.M.G.
Chief Justice of the High Court of Australia.

12.30 p.m. - 12.40 p.m. — Chairman: SUMMARY OF MORNING SESSION and VOTE OF THANKS TO KEYNOTE SPEAKER.

12.40 p.m. - 2.00 p.m. — Lunch — Department of Geology

Afternoon Technical Session:

Science Lecture Theatre H01
(at the rear of Chemistry Building)
Chairman: Dr. T. G. Callcott
Senior Principal Research Officer,
The B.H.P. Co. Ltd.

2.00 p.m. - 2.40 p.m. — PETROGRAPHIC VARIATIONS OF THE WONGAWILLI SEAM COAL, N.S.W.
Dr. K. K. Sappal, Western Australian In-Institute of Technology.

2.40 p.m. - 3.20 p.m. — RANK VARIATION OF COALS IN THE SOUTHERN COALFIELD AND ITS GEOLOGICAL SIGNIFICANCE
Mr. A. J. R. Bennett, Dr. M. Shibaoka, Mrs. M. Smyth, C.S.I.R.O. Division of Mineralogy

3.20 p.m. - 4.00 p.m. — ON STRUCTURAL INVESTIGATIONS IN THE MACQUARIE SYNCLINE, N.S.W.
Dr. K. H. R. Moelle & Miss G. P. Hallinan
The University of Newcastle.

4.00 p.m. - 4.30 p.m. — Afternoon Tea — Department of Geology

4.30 p.m. - 5.10 p.m. — ASPECTS OF THE SEDIMENTOLOGY AND PALAEONTOLOGY OF THE CRANKY CORNER BASIN, N.S.W.
Mr. G. R. McClung[1], Mr. C. Herbert[2] and Dr. R. Helby[2]
[1] The University of New England
[2] N.S.W. Geological Survey, Department of Mines.

5.10 p.m. - 5.20 p.m. — Chairman: Summary of Afternoon Session

7.00 p.m. for 7.30 p.m. — Sherry followed by Symposium Dinner in the Department of Geology.

SUNDAY, 28th MAY, 1972

Morning Technical Session:

Science Lecture Theatre H01
(at the rear of Chemistry Building)
Chairman: Mr. G. Rose,
Director, N.S.W. Geological Survey,
Department of Mines.

9.45 a.m. - 10.25 a.m. — A SYNTHETIC SEISMOGRAM FROM THE DURAL WELL, SYDNEY BASIN
Mr. P. Harman[1], Mr. D. W. Emerson[2] and Mr. M. Smith[2]
[1] The B.H.P. Co. Ltd.
[2] The University of Sydney

10.25 a.m. - 11.00 a.m. — Morning Tea — Department of Geology

11.00 a.m. - 11.40 a.m. — JERVIS BAY — A COLLAPSE STRUCTURE ?
Mr. R. F. Twist, Array Pty. Ltd.

11.40 a.m. - 12.20 p.m. — GLENDONITES: FURTHER INVESTIGATIONS
Dr. G. S. Gibbons) N.S.W. Institute
Mr. J. L. Gordon) of Technology

12.20 p.m. - 12.30 p.m. — Chairman: Summary of Morning Session

12.30 p.m. - 2.00 p.m. — Lunch — Department of Geology

Afternoon Technical Session:

Science Lecture Theatre H01
(at the rear of Chemistry Building)
Chairman: Mr. D. Haldane,
General Manager, The Newcastle Wallsend Coal Company Pty. Ltd.

2.00 p.m. - 2.40 p.m. — ON THE NORTH-WESTERN MARGIN OF THE SYDNEY BASIN
Dr. G. W. Rudd, The University of Newcastle.

2.40 p.m. - 3.20 p.m. — STRUCTURAL AND THERMAL ANALYSES IN THE 'BURNING MOUNTAIN' AREA, N.S.W.
Professor C. D. Ellyett and Dr. K. H. R. Moelle, The University of Newcastle.

3.20 p.m. - 4.00 p.m. — Afternoon Tea — Department of Geology

4.00 p.m. - 4.40 p.m. — THE NOWRA AND MUREE SANDS
Dr. B. C. McKelvey & Mr. G. R. McClung
The University of New England

4.40 p.m. - 5.00 p.m. — Chairman: Summary of Afternoon Session and close of Symposium

LANDSCAPE CONSERVATION AND REHABILITATION IN A HIGHLY DEVELOPED REGION

Keynote Address by
THE RT. HON. SIR GARFIELD BARWICK, G.C.M.G.
Chief Justice of the High Court of Australia

GEOLOGICAL AND GEOPHYSICAL ASPECTS OF RECENT DRILLING IN THE CENTRAL SYDNEY BASIN

G. H. PACKHAM and D. W. EMERSON
The University of Sydney

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The results of a preliminary eight hole coal drilling program in the Dural - Spencer - St. Albans region are presented. The data from the South Colah, Spencer, Frederick and St. Albans holes are discussed with respect to lithologies, stratigraphy, depositional environments, coal intersections and qualities. The holes were drilled beyond 2,700'. The north western bores intersected coking coal seams, the thicknesses of which varied between 2.25 feet and 15.9 feet.

The coal measure sediments intersected in the drill holes comprise:

(a) A lower sequence in which sandstones are mostly thin; shales, dirty coals and thin tuff beds are common. The beds appear to be lenticular. Evidence of salinity (indicated by burrowing) is common.

(b) An upper sequence in which sandstone and conglomerate are the dominant rock types. The sandstones appear to be sheet-like bodies. The coals are cleaner and burrowing in the finer sediments is rare.

In the three northern holes the change of facies occurs above a persistent tuff bed 50 to 60 feet thick in the St. Albans and Frederick holes and only about 5 feet thick at Spencer where its top is an erosional junction against pebbly sandstone. A 25 feet thick tuff bed in the South Colah hole is probably the same horizon. The economically most important seam found in the region occurs low in the upper sequence.

Environmentally the lower unit is almost entirely deltaic ranging from bay to upper delta plain deposits. One possible point bar sequence is present in the South Colah hole. The upper unit is mainly fluvial, probably deposited by braided streams but some point bar and deltaic deposits are present in South Colah. Evidence of salinity is found in South Colah and Frederick. The sediments of the upper sequence appear to have come into the region from the northeast.

Geophysical electrical and nuclear well logging data are analysed with regard to lithologies, bed boundaries, coal evaluations and formation characteristics. Previously recorded seismic reflection isochron data are discussed with reference to coal measure recognition and as an aid to the location of exploratory drill holes.

THE WEATHERING OF A SILTSTONE

D. J. SWAINE
C.S.I.R.O. Division of Mineralogy

During excavations near Liddell, some of the siltstone weathered rapidly when exposed to atmospheric conditions. Representative samples of fresh siltstone and weathered siltstone were obtained, and a bore core of the underlying sandstone was available. A chemical and mineralogical examination was carried out to ascertain the nature of the rapid breakdown of the siltstone.

The chemical compositions of the various samples showed that the weathered siltstone is lower in calcium, carbonate CO_2, organic carbon, total sulphur and sulphate than the siltstone. The sandstone has low contents of organic carbon, total sulphur and sulphate. Pyrite determinations showed 1 - 1.5% FeS_2 in the siltstone, compared with 0.05% or less in the weathered siltstone and sandstone.

The organic carbon in the siltstone is similar to bituminous coal. The main feature of the results for trace elements is the difference in boron concentrations which indicated freshwater conditions for the sandstone and brackish conditions for the siltstone.

Mineralogical and x-ray diffraction examinations showed that the major components of the rocks were quartz and feldspar, with lesser amounts of muscovite and kaolinite. Dolomite was detected in the siltstone and sandstone samples, but not in the weathered material. Gypsum was seen in the weathered zone, typically in horizontal layers. Careful microscopical examination showed that pyrite, mainly framboidal, occurs ubiquitously in the siltstone matrix.

The results are explained by the oxidation of the pyrite during weathering. Any sulphuric acid produced then reacts with the carbonate minerals forming sulphates which are ultimately seen mainly as gypsum. It is considered that the framboidal pyrite, which has a large surface area, would oxidise rapidly when exposed to water and air. Bacterial action would enhance oxidation also. In addition, the coaly organic matter would be oxidised, but it is not possible, at this stage, to state whether the organic matter enhances the oxidation or retards the oxidation of the pyrite.

Hence, the rapid weathering of the siltstone is brought about by the oxidation of the pyrite and coaly organic matter; this in turn leads to the breakdown of carbonate minerals disseminated throughout the rock. The situation for the siltstone exposed to atmospheric conditions has been described, but the siltstone in situ is a different matter. This question will be discussed and optimum conditions for minimising oxidation will be outlined.

THE SYDNEY BASIN — ANOTHER LOOK

K. G. MOSHER
C.R.A. Exploration Pty. Ltd.

PETROGRAPHIC VARIATIONS OF THE WONGAWILLI SEAM COAL, NEW SOUTH WALES

K. K. SAPPAL
W.A. Institute of Technology

The variations in the maceral and mineral matter content of the Wongawilli Seam Coal, sampled at Nebo, Huntley and Wongawilli collieries are discussed. The Wongawilli Seam is a unit of the Permian succession of the Illawarra Coal Measures in the southern part of the Sydney Basin.

The maceral and mineral matter variations in the working section of the seam are plotted as micropetrographic profiles. The petrographic variations of the seam can be attributed to the varying environment of coal deposition in this part of the basin.

RANK VARIATION OF COALS IN THE SOUTHERN COALFIELD AND ITS GEOLOGICAL SIGNIFICANCE

A. J. R. BENNETT, M. SHIBAOKA and M. SMYTH
C.S.I.R.O. Division of Mineralogy

In the Southern Coalfield, the degree of coalification increases gradually towards the centre of the Sydney Basin, that is towards the north east. Recent research, both in Australia and overseas confirms that the coalification process depends predominantly on the temperature to which coaly material has been raised in the past, as well as the duration of maximum burial. This temperature is dependent on both burial depth and contemporaneous geothermal gradient.

The degree of coalification is in general higher in the Southern than in the Northern Coalfield, but the present day thickness of Triassic sediments covering these Permian coals is greater in the north, even though post-Hawkesbury sediments such as the Wianamatta Group cannot be found there. Two possible hypotheses are suggested for these differences in rank; (1) the geothermal gradient is, or has been in the past, steeper in the Southern Coalield, and/or (2) a greater thickness of post-Hawkesbury sediments was originally deposited in the Southern rather than in the Northern Coalfield.

It is possible to determine maximum values for a geothermal gradient either past or present by determining the rank of coal seams or lenses occurring over a large vertical interval in deep bore cores. Reflectance of vitrinite is one of the most reliable parameters of coal rank, and is particularly useful in this case since it can be determined on very thin lenses of coal, several of which have been obtained from the Narrabeen and Hawkesbury Sandstones.

Using the reflectance data for many coal samples obtained from several deep bores in the Sydney Basin, the validity of these two suggested hypotheses for coalification in the Southern Coalfield will be discussed.

ON STRUCTURAL INVESTIGATIONS IN THE MACQUARIE SYNCLINE, N.S.W.

K. H. R. MOELLE and G. P. HALLINAN
University of Newcastle, N.S.W.

Studies of structural phenomena in the Macquarie Syncline reveal a geometrical and symmetrological interdependence of non-diastrophic and diastrophic structures.

The rock masses forming the overburden and the floor of the exploited coal seams are anisotropic and it is suggested that they can be divided into structural domains.

Computer analyses of bore-hole data have been made because of the interdependence of structural features of different origin.

Polynomial trend surfaces are fitted and an adequate representation of the structure can be achieved using a considerably reduced number of data.

Probable fault-zones can be delineated.

The model can be used as a predictor of structural configurations.

ASPECTS OF THE SEDIMENTOLOGY AND PALAEONTOLOGY OF THE CRANKY CORNER BASIN, N.S.W.*

G. McCLUNG[1], C. HERBERT[2] and R. HELBY[2]

[1] University of New England
[2] Geological Survey of New South Wales

The Cranky Corner Basin is located to the north of the Hunter Thrust immediately adjacent to the Lochinvar Dome. Although the thrust was intermittently active throughout the Permian it has not appreciably affected apparently continuous deposition of a sequence from Upper Carboniferous into the Lower Permian. The Lower Permian sediments in the Cranky Corner Basin appear to be a condensed analogue of the classical Dalwood Group in the Hunter Valley. Slee (1968) divided the Dalwood Group of the Cranky Corner Basin into four formations. Data presented here have been obtained from studies of a 248 ft., fully cored hole — D.M. Cranky Corner No. 1 drilled as a stratigraphic well by the New South Wales Department of Mines. This bore intersected Slee's middle Dalwood Group formations — the upper portion of the Branch Creek Formation** and the overlying Cranky Corner Sandstone**.

The Branch Creek Formation (150 ft. — 247 ft. 10 ins.) is composed of bioturbated, interbedded dark siltstone and fine sandstone containing a benthonic fauna. Intermittently intense bioturbation, lack of sedimentary structures (possibly resulting from bioturbation), fine grained sediments with delicately preserved polyzoa together with articulated brachiopods suggest a very low energy, shallow marine environment of deposition.

Grading upwards from the Branch Creek Formation, the Cranky Corner Sandstone is composed of fine sandstone at the base, which becomes increasingly coarser towards the top of the section. Bioturbation is less intense although bedding structures are still not well defined. Near the base of the formation the fauna consists of complete, articulated small brachiopods with occasional gastropods. This assemblage is gradually replaced in higher parts of the formation by large thick shelled pelecypods. A sequence of pelecypods is apparent in which progressively higher zones show a gradation from environments in which the pelecypods are preserved in their living position to zones of totally fragmented pelecypods and finally into a non-fossiliferous sandstone. The Cranky Corner Sandstone thus grades from low energy sedimentation below wave base interference upwards into higher energy conditions until finally a possible surf zone concentration of fragmental pelecypods is reached, just below actual beach conditions.

Invertebrate fauna occurs throughout the core. Two distinct faunas can be differentiated, each confined to specific environments of deposition. The lower fauna is encountered in the Branch Creek Formation and the lower part of the Cranky Corner Sandstone. It is dominated by brachiopods with small bivalves and gastropods and differs from the overlying "Allandale" fauna (Runnegar, 1969) in its specific content. This fauna is tentatively called the "Lochinvar Fauna", since it has a number of species in common with the rather impoverished faunas known from the Lochinvar Formation. It is presently the oldest Permian assemblage recognised in eastern Australia. The upper fauna from the Cranky Corner Sandstone is dominated by large numbers of **Eurydesma** and **Deltopecton** and is considered to be equivalent to faunas from the Allandale Formation (Runnegar, 1969).

Plant microfossils occur throughout the sequence and although assemblages are more abundant and diverse in the lower part of the sequence a subdivision on palynostratigraphic grounds is not warranted at this time. The assemblage compares closely with the upper portion of palynological stage 2 of Evans (1970).

The occurrence of a stage 2 microflora with "Allandale faunas" in the Cranky Corner Sandstone necessitates slight modification of the currently accepted range of this microflora.

Integration of vertical profile analyses and other studies suggest that the Branch Creek Formation and the Cranky Corner Sandstone form a conformable, upward coarsening sequence which represents a single regressive phase of sedimentation. The occurrence of two distinct faunas in this regressive sequence infers that sediments containing these faunas in other areas may well be lateral equivalents.

* Published with permission of the Under Secretary, Department of Mines, N.S.W.

** Formalisation of the formation nomenclature is as yet incomplete. These names should therefore be regarded as manuscript names.

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EVANS, P. R., 1970. Upper Carboniferous and Permian Palynological Stages and their Distribution in Eastern Australia. Simposio internacional sobre Estratigrafia y Paleontologia de Gondinana Mar del Plata, Argentina, pp. 41-54.

RUNNEGAR, B. N., 1969. The Permian Faunal Succession in Eastern Australia. **Spec. Publs. geol. Soc. Aust., 2,** pp. 73-98

SLEE, K. J., 1968. The Geology of the Cranky Corner Basin N.S.W. Unpubl. thesis University of Newcastle.

A SYNTHETIC SEISMOGRAM FROM THE DURAL WELL CENTRAL SYDNEY BASIN

P. G. HARMAN, D. W. EMERSON and M. J. SMITH

The Dural South No. 1 oil well was drilled by Shell Development Australia Pty. Ltd. on an apparent seismic structural closure in the Central Sydney Basin. The well penetrated Triassic and

Permian sediments, reaching a total depth of 10,050 feet. The Permian sequence included many coal seams of the Newcastle and Tomago Coal Measures. The thickness of the seams varied between 1 and 20 feet and the major reflection events on the seismic reflection record sections have been attributed to their collective effect.

To determine the nature of the primary seismic event generated by the coal measures, the Schlumberger sonic log from the upper sequence (to 5,417 feet) of the Dural South No. 1 well was digitised at intervals of two feet; the interval transit times converted to velocities at 1 millisecond increments of two way travel time, and the corresponding synthetic seismogram developed using the programs and facilities of Geophysical Services International. This paper presents the downhole sonic logs, the calculated spike reflection coefficients and the resulting synthetic seismogram, which is compared with the stratigraphic succession penetrated by the hole, and the original reflection record sections from nearby seismic profiles.

In a further evaluation of the use of the seismic reflection method in coal exploration, other synthetic seismograms are described briefly.

JERVIS BAY — A COLLAPSE STRUCTURE?

R. F. TWIST

Array Pty. Ltd.

Geophysical evidence indicates that Jervis Bay is underlain at relatively shallow depth by a plug of igneous material. Subsurface evidence reveals that extrusion occurred during depositional breaks in Nowra Sandstone time. Structural and various tensional features, particularly on Beecroft Peninsula, would suggest subsidence of the bay area over the top of the plug.

GLENDONITES: FURTHER INVESTIGATIONS

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

A previous (1969) contribution showed that glauberite, of which glendonites are pseudomorphs, can form only in the presence of sulphate brines. Experiments showed that such brines might form in areas of intermittent glaciation; but the use of glendonites as indicators of palaeoclimate assumes that no other feasible mechanisms exist. For example, brines might form by:
a) ultrafiltration and diffusion,
b) ion exchange,
c) oxidation of pyritic muds.

A series of experiments are under way to investigate the possible significance of each of the above processes. Results to date indicate:

1) As now constituted, the shale which forms the matrix to glendonites has a definite but limited ion-exchange capacity for sulphate radical. It is certainly not adequate to provide

high sulphate concentrations in connate solutions, although the capacity may have been much higher in the original sediment (e.g. if zeolites had been present).

2) Diffusion through an open-pore membrane (parchment) can readily increase the SO4 : Cl ratio in residual liquid. This effect is noted even at very low SO4 : Cl initial ratios, and continues beyond a ratio of 2:1. At the same time the residual-liquid salinity may increase (ultrafiltration effect) if a pressure gradient is maintained.

3) Oxidation of pyrite in the presence of water appears to be self-limiting beyond about pH eq. 1, but if H+ is neutralized (e.g. by Na2CO3 in solution) high sulphate concentration can be achieved. The extent to which this can occur through presence of solid CaCO3 (e.g. fossil shells) is being further investigated, as is the ultimate sulphate concentration attainable.

The results to date strongly suggest that the special sulphate brines necessary to form glendonites may be produced by processes other than intermittent glaciation.

ON THE NORTH-WESTERN MARGIN OF THE SYDNEY BASIN

G. W. RUDD

University of Newcastle

Studies carried out on the jointing in the Permian Shoalhaven Group and the Illawarra Coal Measures near Rylstone indicate four major joint sets and two minor sets. Joint sets I and II are approximately perpendicular to one another and strike NO5deg.W and N85deg.E respectively. Joint sets III and IV strike approximately N70deg.E and N30deg.W. Joint sets V and VI strike approximately N20deg.E N70deg.W, bisecting the angles subtended by sets V and VI.

The angular relationships between joint sets III, IV, V and VI and also the nature of the joints indicate that the four sets were probably formed as a result of a regional compressive stress acting in a direction of N70deg.W. This compressive stress probably acted in the late Cretaceous or early Triassic Period and initiated the uplifting of the basin.

Joint sets I and II in the Permian sediments have the same strike as the "bc" and "ac" joints in the underlying folded basement rocks. Variations in the strike of the joints in the basement is reflected in the overlying Permian sediments. Examination of the unconformities shows that joints in the basement have actually propogated upwards across the unconformity, into the overlying Permian sedimentary rocks.

The mechanism for the upward propogation of the joints is conjectural and could be the result of two or three processes.

STRUCTURAL AND THERMAL ANALYSES IN THE 'BURNING MOUNTAIN' AREA, N.S.W.

C. D. ELLYETT and K. H. R. MOELLE
The University of Newcastle

Structural and thermal investigations have been carried out over the past six months in the 'Burning Mountain' area near Wingen, N.S.W.

Apart from the well-known 'chimney' just east of Wingen some other areas with abnormally high temperatures were detected using an airborne infrared remote sensing scanner and were subsequently verified by fieldwork and measurements on the ground.

The heat-flow to the surface from the subterranean source occurs along fracture planes which lie in the 'bc'-plane of the regional anticlinal structure. In addition some of the basalt outcrops also show notable heat excess.

The collapsed zones on the surface reveal fractures and displacements along the chief symmetry planes of the anticline.

THE NOWRA AND MUREE SANDS

B. C. McKELVEY and G. R. McCLUNG
The University of New England

Palaeocurrent directions in the mid-Permian Nowra Sandstone exposed throughout the southern part of the Sydney Basin indicate a southerly source suggesting deposition by longshore currents. Wherever examined the Nowra Sandstone is solely marine and only very limited lateral facies change is apparent. In vertical profile complete sections through the Nowra Sandstone suggest in most cases only a transgressive phase of sedimentation is preserved. The provenance and dispersal history of the Nowra Sandstone contrasts with those of the Hunter Valley Muree Formation although both units are continuous in the sub-surface of the Sydney Basin.