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PALYNOLOGICAL STUDIES IN THE LONGREACH, JERICHO, GALILEE, TAMBO, EDDYSTONE & TAROOM 1:250,000 SHEET AREAS, QUEENSLAND

by

P.R. Evans

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ABSTRACT

Palynological evidence of the age of rocks above metamorphic and igneous basement in the Galilee, Longreach, Jericho, Tambo, Springsure, Eddystone and Taroom 1:250,000 Sheet areas is presented and reviewed. Data from surface and subsurface sections in the Adavale/Drummond, Garlilee, Eromanga and Surat Basins are included. Apart from the Devonian of the Adavale Basin, which is outside the areas discussed, few palynological data are yet available from sediments underlying the Upper Carboniferous Unit C1 fluvioglacial Joe Joe Formation. Previously recognized subdivisions of the Joe Joe Formation of Upper Carboniferous and Lower Permian age, Units C1 - P1b, are recognizable across the Galilee Basin, although Units C1 - C2 are restricted to the southerly regions. In contrast, the succeeding coal bearing sediments associated with Unit Plc are confined to more northerly and westerly parts of the basin. The last Permian cycle of sedimentation, during the P3-4 period extended unconformably across the Galilee Basin, with changes from marine to mon-marine facies and some degree of onlap taking place from the east. The lower Triassic extends across the region, although the basal divisions, Trla and Trlb, are not present or are poorly preserved. Unit Tr2a at Jericho contains acritarchs indicative of ephemeral brackish or marine conditions of deposition. Subdivision of the Middle - Upper Triassic is possible. The Jurassic of the Eromanga Basin rests unconformably on older deposits. The distribution of Unit J1 seems to indicate that facies changes from arenites to finer grade sediments seems to occur at the base of the Jurassic in the Tambo Sheet area. The acritarch horizon at the base of Unit J2 in the Surat Basin has not been detected in the Eromanga Basin; the Nebine Ridge appears to coincide with the western limit of its extension. This horizon is divisible on the basis of the vertical distribution of its component species into two parts, of which the higher overlies the Boxvale Sandstone Member, and the lower lies within or below the Member. Both zones are still identiable within the Evergreen Formation where the Boxvale Sandstone Member is not developed. The succeeding Jurassic Units J3 - J6 are not fully discussed, although evidence that indicates the correlation of formations above the Adori Sandstone in the Eromanga Basin and an horizon within the Injune Creek Beds in the Surat Basin and is summarized.

INTRODUCTION

The area covered by the Galilee, Longreach, Jericho, Tambo and Eddystone 1:250,000 Sheet areas (Plate 1) was geologically mapped by joint Bureau of Mineral Resources and Geological Survey of Queensland surveys in 1964 (Exon and Kirkegaard, 1965; Mollan et al., 1965). Palynological studies of samples from several deep wells and seismic shot holes in the area had been carried out by that time, but, to assist the survey, samples from seismic shot holes, shallow drill holes, water bores and a few outcrops were subsequently examined. Recently, samples from AODANL* Jericho No. 1, in the Jericho Sheet area were studied in order to assist the operating company to analyze the well section.

The object of this report is to summarize the data from these sources, and to outline some of the stratigraphic relationships which may be derived from them.

The Springsure area is outlined in Plates 1 and 2 but detailed comment on the palynology of samples from the area are incorporated in other papers and will not be repeated here.

SOURCES OF INFORMATION

The localities of sections from which samples have been examined are indicated in Plate 2. Amoseas Westbourne No. 1, on the Augathella sheet, Phillips-Sunray Etonvale No. 1 on the Adavale Sheet and BMR 46/54 (Taroom) core hole on the Taroom Sheet are also plotted, because their sections and palynomorph content are relevant to the discussion.

Galilee (F55/10)

The geology of the western two-thirds of the Galilee Sheet area was mapped by Vine et. al. (1965). The only samples from this area which have been examined for their palynological content were taken from Exoil Galilee No. 1 Well (Playford & Evans in Pemberton, 1965). The writer's contributions to that study are repeated and amplified here, the observations being summarized in Table 4.

Longreach (F55/13)

The geology of the Longreach Sheet area has been described by Vine et al. (1965). Eisenack & Cookson (1960) and Cookson & Eisenack (1960) described the microplankton *Gonyaulax helicoidea*, *Trichodinium pellitum* and *Canningia colliveri* from "Longreach Drill Co.'s Balmoral Well, No. 1 on 'Padua' property at 100 ft.", which they regarded as "Aptian" in age. It is uncertain whether this represents one of the company's wells Nos. 5 and 6 (Balmoral), as listed by the Geological Survey of Queensland (1960). Observations on samples from ODNL+ Maranda No. 1 were reported by

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* Alliance Oil Development Australia No Liability
\+ ODNL = Oil Development No Liability

Evans and de Jersey (in Hare & Associates, 1963a) and de Jersey et al. (1963) and on FDNL[+] Alice River No. 1 by Hodgson (in Hare & Associates, 1963b). Various reports by de Jersey, Evans, Hodgson and Playford are available on LOL[☆] Saltern Creek No. 1, LOL Hulton No. 1 and LOL Marchmont No. 1 (in Mott & Associates, 1964a, b, and c respectively). Evans (1964) summarized the stratigraphical implications of these and other observations, relating to the Upper Carboniferous and Permian. Attention has since been paid to the Triassic sections of the Maranda and Alice River wells and new observations are listed in Table 2.

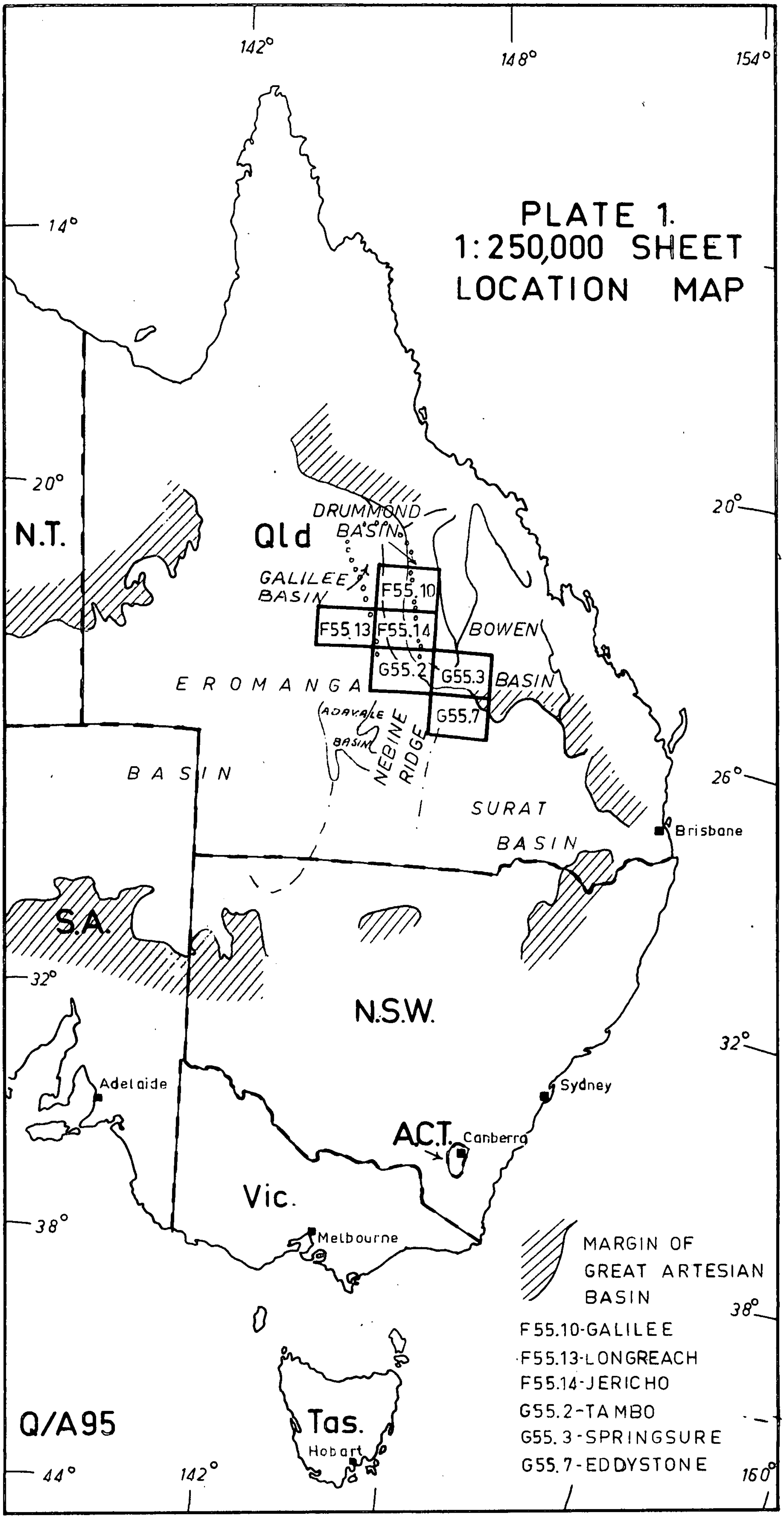
Jericho (F55/14)

Vine et al. (1965) mapped the western two-thirds of the Jericho Sheet area. Of several outcrop samples collected by the field party, only GAB 1745A proved to be fossiliferous. Spores and pollen grains observed in this and in samples from the Namco Bore and Test Bore are listed in Tables 1 and 2. The fossil content of a number of shot hole samples from a seismic survey carried out for Alliance Oil Development Australia N.L. (Namco International Inc., 1964) are listed in Table 3. The contents of samples from shot points B160, B164, and B168, which yielded a number of Upper Jurassic Spores, although field mapping indicates that the samples were from Triassic rocks, are not included in Table 3, as an error in sample labelling is presumed to have occurred. Only one deep well, AODANL Jericho No. 1, has yet been drilled in the area. Observations and determinations from Jericho No. 1 by the writer appear in the well completion report (Benedeck, 1965), but the observations are repeated in Table 5. Additional samples of cuttings from Jericho No. 1 have since been examined. They are noted on Plate 4 and discussed in the text as necessary.

Tambo (G55/2)

Exon & Kirkegaard (1965) mapped the geology of the Tambo Sheet area up to the base of the Precipice Sandstone during 1964 and mapped the remainder of the sheet in 1965. Two deep wells have been drilled in the area. Palynological interpretation of the first, SPL* No. 1 (Birkhead) was attempted by Evans (1961, 1962), but in view of more recent work a third revision is necessary and included here. Fossils extracted from particular samples from the Upper Carboniferous and Permian sections of the well are listed in Table 1. New observations on the Triassic of the well are listed in the text as necessary. The other well, Amoseas[++] Boree No. 1 was examined by Evans and de Jersey (in Gerrard, 1964b), but additional information collected by E.A.

+ FDNL = Farmout Drillers No Liability
☆ LOL = Longreach Oil Limited
* SPL = South Pacific Propriety Limited.
++ Amoseas = American Overseas Petroleum Limited.



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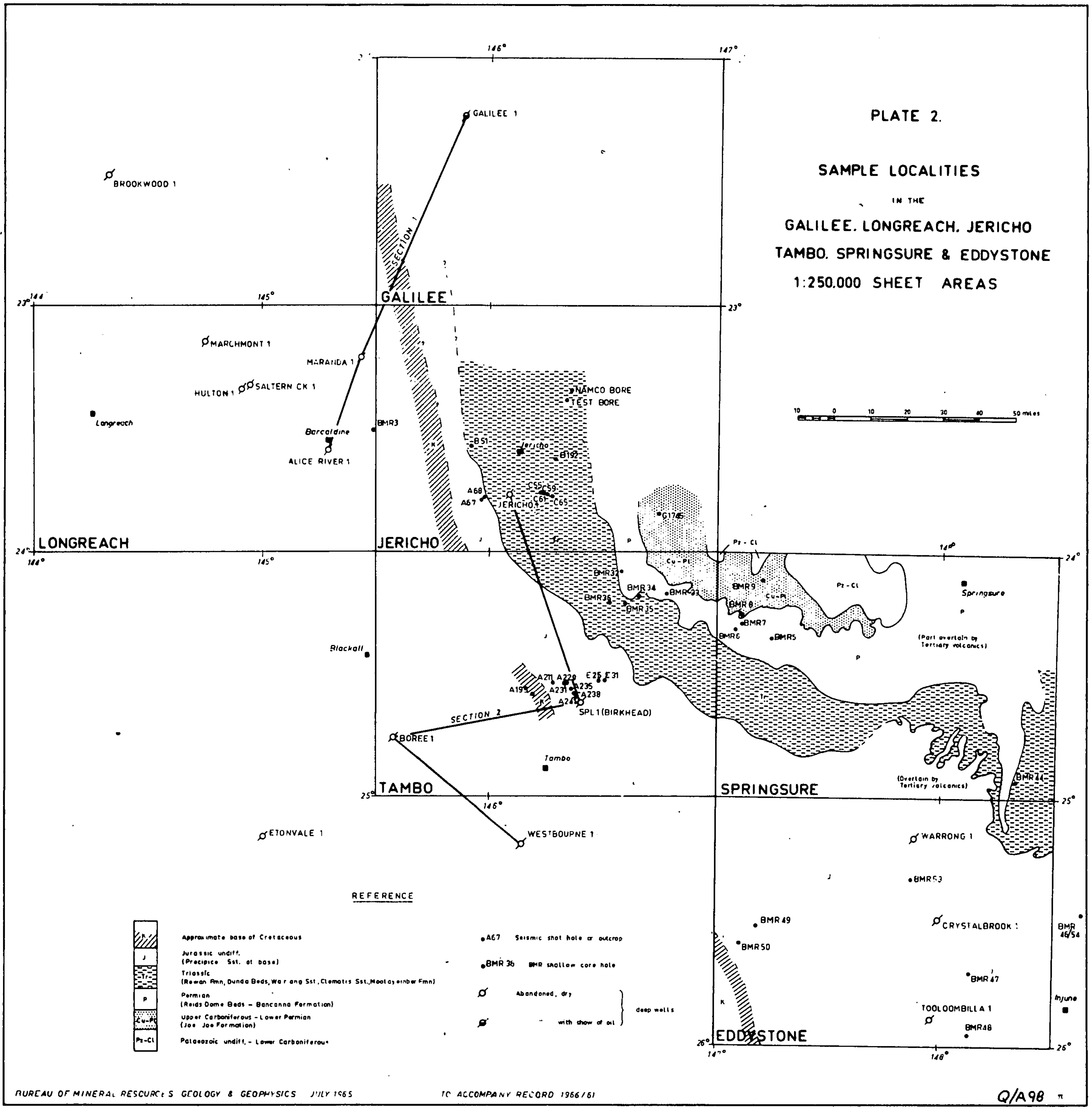
PLATE 2.
SAMPLE LOCALITIES
IN THE
GALILEE. LONGREACH. JERICHO
TAMBO. SPRINGSURE & EDDYSTONE
1:250.000 SHEET AREAS
50 miles
GALILEE
LONGREACH
JERICHO
TAMBO
SPRINGSURE
EDDYSTONE
GALILEE 1
BROOKWOOD 1
MARCHMONT 1
MARANDA 1
HULTON 1
SALTERN CK 1
Longreach
Barcaldine
ALICE RIVER 1
BMR3
SECTION 1
NAMCO BORE
TEST BORE
B51
Jericho
B192
A68
A67
JERICHO 1
C55
C59
C61
C65
G176
BMR37
BMR34
BMR33
BMR36
BMR35
BMR9
BMR8
BMR7
BMR6
BMR5
Pz - Cl
Cu - Pl
Springsure
(Part overlain by Tertiary volcanics)
Blackall
A211
A229
E25
E31
A199
A231
A235
A238
A241
SPL 1 (BIRKHEAD)
SECTION 2
BOREE 1
Tambo
(Overlain by Tertiary volcanics)
BMR44
ETONVALE 1
WESTBOURNE 1
WARRONG 1
BMR53
BMR 49
BMR50
CRYSTALBROOK 1
BMR 46/54
BMR47
Injune
TOOLOOMBILLA 1
BMR48
REFERENCE
Approximate base of Cretaceous
Jurassic undiff. (Precipice Sst. at base)
Triassic (Rewan Fmn, Dunda Beds, Warang Sst, Clematis Sst, Moolayember Fmn)
Permian (Reids Dome Beds – Bandanna Formation)
Upper Carboniferous – Lower Permian (Joe Joe Formation)
Palaeozoic undiff. – Lower Carboniferous
A67 Seismic shot hole or outcrop
BMR 36 BMR shallow core hole
Abandoned, dry
with show of oil
deep wells
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Hodgson and the writer are incorporated below. Likewise observations additional to those listed by Evans (in Gerrard, 1964a) on Amoseas Westbourne No.1 (to the south of the Tambo area) are added to the present text. No outcrop samples from the Tambo area have been examined, but selected shot hole samples from a seismic survey by American Oversea Petroleum Ltd., near Birkhead well, the stratigraphic position of which may be identified in terms of formation mapped by Woolley (Day & Tweedale in Hill & Denmead, 1960) have been studied (Appendix 1). Results from SP 243 - 249 are now rejected because they cannot be reconciled with field observations. Five shallow drill holes were sited in pre-Jurassic sediments of the Tambo area in 1964 (Exon & Kirkegaard, 1965), samples of which have been examined; the results are presented in Tables 1 and 2.

Springsure (G55/3)

Samples from one of the shallow hole BMR 44, drilled during 1964 in the Springsure area, have been examined: they were taken from the base of the Rewan Formation, but proved to be barren and no further reference is made to them. Shallow drill holes in the western half of the Sheet area are plotted in Plate 2, and located in the composite section in Plate 5, to emphasize their positions relative to holes located in the Tambo area.

Eddystone (G55/7) & Taroom (G55/8)

The Eddystone Sheet area was mapped by Mollan *et al.* (1965). Comments on the palynology of AAO* Hilloran No.1, Glentulloch No. 1, Kildare No.1, and Westgrove Nos 1 - 3, in the eastern Eddystone area, are to be found in the well completion reports (Mines Administration Pty., Ltd., 1962 a-d, 1963a-d). They deal mostly with the Permian sections in the Denison Trough of the Bowen Geosyncline and are not considered any further at present. More recent studies of Planet Warrong No.1, Crystalbrook No.1, and Tooloombilla No.1 were compiled by Evans & Hodgson (1965). Shallow holes BMR 47, 48, 49 and 50, representing much of the Middle and Upper Mesozoic of the Eddystone area, have been examined, mainly in connection with rocks of that age in the Surat Basin, which is still in progress. Comprehensive fossil lists from these samples will be compiled at a later date. The shallow holes BMR 46/54 (Taroom) were sited just east of the Eddystone area, but are considered below, because of their microplankton content and its relationships to the Boxvale Sandstone Member of the Evergreen Formation.

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* AAO = Associated Australian Oilfields N.L.

STRATIGRAPHY

The area includes sediments deposited in a series of basins formed during Upper Palaeozoic and Mesozoic times, and it is convenient to discuss the stratigraphy both in terms of the basins of deposition as well as the sedimentary sequence.

Drummond and Adavale Basins

The Drummond Basin was thought by Hill (1951, 1957) to have formed in Devonian and Lower Carboniferous times (up to the Ducabrook Formation). Hill & Denmead (1960) and Mollan et al. (1964) pointed to a common structural configuration between the unconformably overlying Upper Carboniferous - Lower Permian (Joe Joe Formation) and beds of the Drummond Basin, and left open the question whether the Joe Joe Formation should be considered to be part of the Drummond Basin or of some other structural unit. Reynolds (1965) included the Carboniferous - Lower Permian succession in the Drummond sequence. However, regional studies by Vine et al. (1965) clearly indicate that the mid-Carboniferous unconformity separating the Upper Carboniferous - Lower Permian Joe Joe Formation from the underlying Devonian Lower Carboniferous sequence is widespread, that the Joe Joe Formation was the initial deposit in the Upper Carboniferous - Lower Mesozoic downwarp of the Galilee Basin, and that the Drummond Basin is best regarded as a Devonian - Lower Carboniferous structure, as originally defined.

Heikkila (1965) thought that the configuration of the Adavale Basin, buried below the Mesozoic Eromanga Basin, and defined by geophysics, attained its final shape through a "Late (?) Carboniferous" orogney, after the Buckabie Formation had been deposited. Reynolds (1965) extended this definition by including within the Adavale Basin a sequence of "Lower Permian" beds, which lie unconformably between the Buckabie Formation and the Upper Permian. However, as the "Lower Permian" of the Adavale area (in Phillips-Sunray Etonvale No.1) correlates with an Upper Carboniferous part of the Joe Joe Formation (unit C1), it is better to restrict the Adavale sequence to the Buckable Formation and below, and to consider that the movements which ended deposition in the Adavale Basin were of mid - Carboniferous age, similar to those which ended downwarp of the Drummond Basin.

Although both are structurally complex, the Drummond and Adavale Basins apparently developed over similar periods of time, and, for the few observation points discussed below, there is no evidence or need to suppose that they were separate depositional areas. For the present purposes, the basins are treated as one.

Sections examined within the Drummond and Adavale Basins are as follows:-

Palynologically Undertermined Age

Only three wells in the area, LOL Hulton No.1, LOL Saltern Creek No.1, and ODNL Maranda No.1, finished in rocks which might be regarded as basement to the Adavale and Drummond Basins. Maranda No.1, for example, ended in phyllites and quartzites, though by Vine et al. (1965) to be Lower Palaeozoic in age. No palynological studies of these "basement" sections have been made, or would be worthwhile, on account of the rocks' metamorphosed state.

Amoseas Westbourne No.1 finished in dard, steel-grey, indurated shale, with calcareous bands and disseminated pyrites, dipping in excess of 40° in Core 11, 4684-87 ft. which Gerrard (1964a) compared with the Devonian of SPL No. 1 (Birkhead), exemplified in Core 5, 5136 ft. De Jersey (1962) and Evans (1962) obtained spores from the Birkhead Devonian, but the Westbourne core yielded only carbonized residues, without spores. The lithology of the basal shale appear to be closer to that of the Timbury Hills Formation, which forms effective basement to many wells further east, rather than to the Devonian at Birkhead and Boree. Sediments referred to the Timbury Hills Formation in AAO Pickanjinni No. 2 (M.E. White, pers. comm.) in the Surat Basin, and in AFO* Purbrook No.1 (Woods, in Mines Administration Pty Ltd, 1963d) in the Bowen Geosyncline have yielded Devonian plant remains. If all rocks ascribed to the Timbury Hills Formation are of Devonian age, considerable change in induration and attitude must take place across a zone between the western Tambo and eastern Eddystone and Springsure Sheet areas. The apparent contrast in attitude between pre-Permian rocks of Boree and Westbourne may be an expression of this change. Alternatively, the basal Westbourne section could be pre-Devonian.

Lower - (?) Upper Devonian

Lower or Middle Devonian sediments of the Adavale Basin were encounted in the Boree and Birkhead Wells. Gerrard (1964b) supposed that the arkose at the base of Boree No.1 was as old as Silurian, although there is no substantiating palaeontological evidence from the section. De Jersey (in Gerrard, op. cit.) was unable to extract recognizable

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* AFO = Associated Freney Oil Fields N.L.

microfloras from c. 21,7967-77 ft., and c.22,8231-40 ft., in the succeeding sandstone and carbonate section, below the halite "Boree Formation", but Jones (in Gerrard, op.cit.) identified conondonts of probable Lower Devonian age within them. De Jersey extracted an abundant, well preserved, and diverse microflora from c.17, 6206 ft., including Archaeotriletes and Ancyrospora, concluding that it was of Lower or Middle Devonian age, possibly younger than sections below about 8000 feet in PS* Etonvale No.1, i.e. to lithological unit D3 or younder in the Etonvale Formation (Lewis & Kyranis, 1962; Haekkila, 1965). De Jersey (in Gerrard, 1964b) recorded a small microflora from c.10, 4776-88 ft., in Boree No.1, which, because of the presence of Chomotriletes sp., thought to be basal Upper Devonian in age, comparable with D2 horizons of the Etonvale Formation. Heikkila (1965) compared the varicoloured sandstone - shale section, above the "Boree Formation" in Boree No.1, with units D1-2 of the Etonvale Formation, and the Buckabie Formation, allowing it to be as young as Upper (?) Devonian, a view still consistant with the palynological evidence.

De Jersey (1962) recognized a Devonian microflora in SPL No.1 (Birkhead), c.5, 5136-41 ft, which included Archaeozonotriletes and abundant Radiaspora sp., which by their state of preservation compared with spores in unit D2 of the Etonvale Formation (Lewis & Kyranis, and Haekkila, opera cit.) Evans (1962) recognized "(?) Pre-Permian" spores on the basis of their state of preservation from cuttings at 5000-02 and 5035-45 feet in the Birkhead well, which should now be regarded as Devonian in age. Although positive evidence of Devonian spores above this level in the Birkhead well is lacking, (in spite of a study examination of a number of cuttings samples, which consisted mostly of cavings), the top of the Devonian is taken on lithological and electric log evidence at about 4450 feet.

These observations leave some doubt about the correlation between the Birkhead and Boree Devonian, but they favour the suggestion that the carbonate sequence at Birkhead may at least be younger than the "Boree Formation".

In both wells, the Devonian is unconformably overlain by Upper Carboniferous strata of the Joe Joe Formation.

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* PS = Phillips Petroleum Co., - Sunray DX Oil Co.,

Upper Devonian - Lower Carboniferous

About 600 feet of rocks containing undertermined Apiculati spp. and Laevigati spp. spores of possible Devonian or Lower Carboniferous age, and compared by G. Mollan with the Lower Carboniferous Raymond Sandstone of the Drummond Basin, were encountered in Planet Warrong No.1 in the Eddystone area (Evans, & Hodgson, 1965).

Playford (in Pemberton, 1965) identified Upper Devonian and possibly Lower Carboniferous spores in Galilee No.1, Cores 36-38, 9325-9936 feet, cut from un-named quartzose sandstones, dark shale and siltstones with minor brown shales, entered at 9320 feet and continued to total depth 11,175 feet. Playford recognized, among others:

C. 36, 9325 feet

Convolutispora
Densosporites
Stenozonotriletes

which he thought represented an Upper Devonian or Lower Carboniferous age.

C. 37, 9446 feet

Emphanisporites
cf. *Geminospora lemurata* Balme
Hymenozonotriletes cf. cf. *H. scorpius* Balme & Hassell
Planisporites sp. cf. *P. furfuris* B. & H.
Spinozonotriletes sp. cf. *S. carnarvonensis* Balme
Stenozonotriletes sp. cf. *S. extensus* Naumova
Verrucosisporites sp. cf. *V. nitidus* Playford

of Upper Devonian age.

C. 38, 9936 feet

Convolutispora cf. *C. fromensis* B. & H.
Granulatisporites frustulentus B. & H.

also of Upper Devonian age.

Jericho No.1, below the Upper Carboniferous unit C1 beds of the Joe Joe Formation, entered multicoloured sandstones, shales and conglomerates likened by Benedek (1965) to the Ducabrook Formation and hence presumed to be Upper Devonian or Carboniferous in age, although no palaeontological evidence for this assumption is available. Below 8870 feet, Jericho No.1 entered sandstone with thin beds of argillite overlying at 9044 feet granitoid conglomeratic rock regarded by Benedek (*op. cit.* p. 22-23) as undetermined pre-

Carboniferous. However, N. Exon (pers. comm.) has pointed out that c.26, 9139-914 feet described as partially vitric-crystal tuff (Benedek, op. cit., Ap. 1, p.5), resembles a common lithological type in the Middle Devonian Silver Hills Volcanics of the Drummond Basin.

Neither Galilee No. 1 nor Jericho No.1 reached a metamorphic basement or entered section similar to the early and mid-Devonian of the Adavale Basin. Whereas the sediments encountered presumable correlate at least in part with the Buckabie Formation of the Adavale Basin, their depositional and structural relationship to the early and mid-Devonian remains to be tested.

With the exception of the problematic basal section of Westbourne No.1, the Devonian - Lower Carboniferous discussed is everywhere overlain by the Upper Carboniferous - Lower Permian of the Joe Joe Formation after a regional unconformity representing an as yet ill defined interval of mid-Carboniferous time. This is the period of non-deposition and folding in the Drummond and Adavale Basins, prior to initiation of the Galilee Basin.

Galilee Basin & Bowen Geosyncline

Whitehouse (1955) briefly used the term Galilee Basin to indicate a depression of Permian - Lower Mesozoic age west of the Drummond Basin. Hill (1957) noted that after an "epi-Ducabrook phase" of movement, the slightly folded Telemon and Drummond region was added to the positive Anakie High, around the southern flanks of which the succeeding Permo-Carboniferous strata were deposited; the negative area extended widely westward on to the craton as the incipient Great Artesian Basin, and at the same time (epi-Ducabrook) the Bowen Basin (Geosyncline) was initiated to the east of the Anakie High. Vine et. al. (1965) reintroduced Whitehouse's term Galilee Basin for Hill's "negative area", recognizing it as a basin formed during a phase of spasmodic downwarp during Upper Carboniferous to Triassic times. Thus defined, the Galilee Basin is a westerly counterpart to the Bowen Geosyncline, as previously envisaged by Whitehouse and Hill. The area of major downwarp of the Galilee Basin is west of the Drummond Basin, and is to the Drummond Basin what the Bowen Geosyncline is to the Yarrol Basin, on opposing sides of the Aakie High.

Upper Carboniferous - Lower Permian

Palynological divisions of the Upper Carboniferous and Permian sections in the north-eastern Eromanga Basin, particularly in the Longreach area, were outlined by Evans (1964b). The probable limits of these divisions in Maranda No.1 and Alice River No.1 are re-illustrated in Plate 3. The flora encountered in the outcropping Joe Joe Formation is discussed in another paper (Evans & White, MS), but the relative positions of sections, from which these macro - and microfloras were obtained are indicated in Plate 5. Other sections in the region, from which palynological data are available are as follows:-

Unit C1.

Evans (1962) referred SPL No.1 (Birkhead), Core 4, 3600 feet, to an "early Permian" age. Re-examination of this core led to recognition of the assemblage listed in Table 1. Because of its content of Kraeuselisporites sp. 35, Vallatisporites sp. 37, and aff. Dictyotriletes sp. 43, common Punctatisporites sp. 7, and an apparent lack of striate saccate pollens, the core is considered to be of a unit C1 age. This age is extended to the interval 3400-4450 feet in which Grissett (1957) recorded sandstones and conglomerates of mainly volcanic material, and the boundaries of which are chosen from the electric logs.

A unit C1 assemblage occurred in Boree No.1, Core 8, 4355 feet (Evans, in Gerrard, 1964b), redetermined here as:

Punctatisporites gretensis (sp.5)
Calamospora sp.4
Retusotriletes diversiformis (sp.6)
Punctatisporites sp. 7
Perinotriliti sp.10
Verrucosisporites sp. 173
Verrucosisporites cf. sp. 171
Verrucosisporites sp.30
Vallatisporites sp. 37

The assemblage is distinguished by the apparently complete absence of saccate pollens. It was unfortunately previously referred to unit P1a, a maunscript name used prior to recognition of the full sequence as it stands at present. The assemblage closely resembles what is now recognized under the term unit C1 (Evans, 1964b).

Unit C1 (Cont'd)

Typical C1 assemblages were noted in Galilee No.1, between Core 23, 6167 feet, and core 29, 7973 feet (Table 4). Preservation of the microfossils was moderately good and saccate pollens abundant is core 23. In contrast, preservation was poor and saccate pollens represented only by a fragmentary specimen of (?) Potonieisporites neglectus (sp. 192) in core 25, and rare Monosaccites sp. 44 and Parasaccites sp. 190 in cores 27 and 29. The relatively abundant Punctatisporites sp. 7, and rarity of saccate pollens in core 25 compares with the proportions of these froms at the base of C1 in Maranda No.1, core 24, 6384 feet. However, as the next lower sample, core 27, in Galilee No.1, yielded only saccate fossils, it is evident that strongly variable environmental influences prevailed in unit C1 times. There is a gap of over 1300 feet between core 29, 7973 feet of unit C1 age and the next palynologically dated samples, the Devonian/ L. Carboniferous core 36, 9325 feet, but the base of C1 in Galilee No.1 is provisionally taken at the apparent base of the Joe Joe Formation, at 9320 feet. However, from consideration of sample positions and thickness of section, it may be that beds somewhat older than the typical unit C1 in the outcrop Joe Joe Formation are present in Galilee No.1.

Unit C1 was recognized is Jericho No.1, between core 7, 4000 feet, and core 10, 5080 feet. The available samples from core 10, 5080-85 feet, consisted of much slickensided chocolate brown mudstone, and grey sandstone and siltstone. The chocolate brown mudstone component has the impression of being derived from the reddish sediments typical of the underlying Ducabrook Formation, an impression perhaps supported by the presence of a complete and well preserved specimen of Leiozonotriletes naumovae which is a characteristic Upper Devonian species in Western Australia, among an otherwise unit C1 microflora of aff. Dictyototriletes sp. 43, Kraeuselisporites sp. 35 Perinomonolites sp. 10.

Unit C1 grades up into unit C2 in Maranda No.1 and Alice River No.1, and presumably does so, although sampling is not sufficient to clearly show it, in the Jericho and Galilee wells. At Birkhead, Boree, in outcrop on the Fairview Anticline, along the plunging axis of which core holes BMR 7, 8 and 9 (Springsure) were drilled, and in Etonvale No.1, unit C1 is unconformably overlain by late Permian (P3-4) sediments.

Units C2 - Pla

Unit C2 was initially recognized from spore associations in Maranda No.1 and Alice River No.1, and unit Pla in Maranda No.1, and they serve the purpose of expressing a relatively major change from the C1 assemblages with Cardiopteris to the widespread Plb assemblages with Glossopteris. Beds no older than Pla overlie basement quartzite and granite in Saltern Creek No.1 and Brookwood No.1 respectively (Evans, 1964b). Two other localities, outcrop GAB 1745A in the Jericho area, and Jericho No.1, core 6, 3583 feet, may possibly be added to this list, although the determinations are most uncertain. GAB 1745A yielded aff. Dictyototriletes sp. 43, Rugulatisporites sp. 22, and Vallatisporites sp. 37, which are typical of unit C1, but which range into Pla. It lacked Punctatisporites sp. 7, and Calamospora sp. 4, which are almost always found in C1; it has relatively common Parasaccites spp. and Monocolpates sp. 164, which has not yet been found in C1, although it becomes increasingly common in units Plb and Plc. Jericho No.1, core 6, also yielded a characteristically C1 assemblage (Table 5), but it contained Klausipollenites sp.82 which at Maranda makes its first appearance in Pla.

Unit Plb

The succeeding unit Plb, as recognized in the Maranda and Alice River wells, is marked by a continuing abundance of monosaccate pollens, an increasing content of striate and non-striate saccate pollens, the absence of spores such as Vallatisporites sp. 37 and Rugulatisporites sp. 22, common in units C1 - Pla, the introduction of new forms, including Verrucosisporites pseudoreticulatus (sp. 68) Balme & Hennelly, Marsupipollenites triradiatus (sp. 164) B. & H., and aff. Protohaploxypinus goraiensis (sp. 187) Lele. Other horizons identified with Plb occur in Galilee No.1, core 15, 3829 feet, and Jericho No.1, cuttings, 1980-90 feet. In both instances, they are associated with varve-like sediments comparable with elements of the Joe Joe Formation, which appear to be conformable with the underlying sections.

Of the wells discussed at present, only in Maranda No.1 is unit Plb succeeded by unit Plc. Elsewhere Plb is overlain by unit P3-4, separated by an hiatus of regional extent across the Springsure Shelf and Galilee Basin.

Unit Plb (Cont'd)

Collectively, the fluvioglacial sediments of Upper Carboniferous - Lower Permian units C1 - Plb age are very widespread, and thick in the Galilee Basin. However, as previously noted (Evans, 1964b), the older, C1-2 sediments are restricted to the southerly parts of the basin, and the younger, Pla-b deposits overlap basement in the Longreach area and to the north of Brookwood, and do not exist in the southerly parts of the basin. This northerly migration of sedimentation in earliest Permian times is further reflected by the apparently even more restricted area of deposition in Plc times in the north-western portions of the basin, as outlined below.

Lower Permian

Units Plc - P2

No information concerning Plc in the Galilee Basin additional to that summarized by Evans (1964b) is at present available, except that, whereas it exists in the Longreach area (Marchmont, Saltern Creek, and Maranda), and to the north in the Muttaburra area in Brookwood No.1, it is absent in the Galilee and Jericho area. Small pockets of Reid's Dome Beds, equated with Plc, have been identified in the Springsure and Tambo areas (Mollan et al., 1964; Exon & Kirkegaard, 1965), but they are not present in the Birkhead, Boree or Etonvale wells.

Development of Plc coincides with the initial growth of the Denison Trough, when the thick deposits of the coal-bearing Reid's Dome Beds were formed. No corresponding trough is yet known to have formed in the Galilee Basin, and, unless the structures, on which the Galilee, Birkhead, Boree and Etonvale wells were drilled, were forming during Plc times, with deposition around their flanks, sediments of Plc age are confined to more northerly and westerly parts of the Galilee Basin. There was a general shrinkage in the area of deposition during this period.

Lower - Upper Permian

Units P3a - P3-4

The marine Permian of the Denison Trough has been subdivided on the basis of spores and microplankton into units P2 and P3, the latter being subdivided into units P3a to d. Satisfactory definition and the stratigraphic significance of unit P3a are still matters of discussion, dependent on interpretation of field and sub-surface data, but the base of P3b, taken at the

Lower - Upper Permian (Cont'd)

Units P3a - P4 & P3-4

introduction of Dulhuntyispora parvithola (sp. 123) (B. & H.) and associate forms, such as Anapiculatisporites ericianus (sp. 115)(B. & H.) and Acanthotriletes uncinatus (sp. 114) B. & H. is easily recognized. Unit P3b commences near the top of the Aldebaran Sandstone in the Denison Trough. It contains characteristic microplankton and is overlain by unit P3c, a swarm of the acritarch Baltisphaeridium sp. 360*, found at the base of the Black Alley Shale. Unit P3d, characterized by a species of Veryhachium, occupies the rest of the Black Alley Shale, but has not been identified west of the Denison Trough in the Bandanna Formation. Unit P4 lacks microplankton at most points, and is marked by a proliferation of striate, disaccate pollens and rare spores. Apart from this eventual change in abundance of major groups, in the absence of microplankton, only a few potential divisors of P3 and P4 are yet known. Evans (1964b) was thus forced to define the unit P3-4 (= P3b + P3c + P3d +P4) in order to express the palynology of sections in the Galilee Basin, above the Joe Joe Formation and Reid's Dome Beds.

The lateral changes apparent from P3b to P4 in the east to P3-4 in the west are depicted in Plate 5, the acritarch horizons, first noted subsurface, are now identifiable in outcrop. Acritarchs of P3b age occur in BMR 1 (Springsure) and BMR 5 (Springsure), showing that marine or brackish conditions extended at least as far west as Mantuan Downs at the time. Spores from the base of BMR 6 (Springsure) in the Colinlea Sandstone are also no older than P3b. BMR 6 entered the top 150 feet of the Colinlea Sandstone, but the remaining 300 feet of that formation, near BMR 6, remains palynologically unsampled. Mollan et al. (1964) remarked on the lithological similarity between the lower Colinlea Sandstone and the Aldebaran Sandstone and between the upper Colinlea Sandstone and the Catherine Sandstone. In Warrong No.1, Evans & Hodgson (1965) noted a sandstone of ?P3a age unconformably overlying the ?Lower Carboniferous and which could be in a stratigraphically comparable position to the lower Colinlea Sandstone. It is therefore quite possible that the lower part of the Colinlea Sandstone is pre-P3b in age.

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* The system of coding palynomorph species now employed in the BMR necessitates rejection of previously used numerical codes. Baltisphaeridium sp. 360 = Micrhystridium sp. 3 of earlier reports.

Lower - Upper Permian (Cont'd)

Units P3a - P4 & P3-4

The Ingelara Formation and Catherina Sandstone of P3b age are not recognizable as separate units in the western Springsure area, but the succeeding Peawaddy Formation has been mapped from the Denison Trough, across the Springsure area, into the Tambo area (Exon & Kirkegaard, 1965). Neither the one sample from BMR 33 (Tambo), nor the core sample from BMR 32 (Tambo) (Table 1) from the Peawaddy Formation yielded microplankton. Cuttings at 140-50 feet in BMR 32 yielded acritarchs, but these include contaminants from P3c or above. However, cuttings between 1650 and 1710 feet in Jericho No.1, from an interval which Benedek (1965) regarded as the Peawaddy Formation yielded rare acritarhs (Micrhystridium and Veryhachium). The brackish or marine character of the Peawaddy Formation thus seems to be lessening westwards, but more control points are needed before a positive assessment of this facet can be made.

Unit P3c is the most widespread acritarch horizon in the sequence. Firmly identified at the base of the Bandanna Formation (base of the Black Alley Shale) in outcrop, it has been found in BMR 5 (Springsure) at the same stratigraphic position, immediately above the Mantuan Downs Productus horizon on the Springsure Shelf, but within the Peawaddy Formation in the Tambo area in BMR 32 (Tambo), cuttings 130-40 feet, and in SPL No.1 (Birkhead), cuttings 3250 feet.

Lithological similarity between the Bandanna Formation of SPL No.1 (Birkhead), the section 3785 to 4009 feet in Boree No.1 and 1300 to 1588 feet in Jericho No.1 led to an examination of cuttings from the base of the latter sections (see Plate 4) for Baltisphaeridium sp. 360: none was found. The sandstone between 3250 and 3400 feet in the Birkhead well of presumed P3b age also seems to have no counterpart in Boree No.1, and it appears that P3b and P3c sediments could be overlapped in a southwesterly direction across the Galilee Basin.

Sediments immediately succeeding P3c in BMR 5 (Springsure), SPL No.1 (Birkhead) and of presumably comparable stratigraphic position in Boree No.1 lacked microplankton, and, in contrast to P3c, unit P3d is not recognizable as a distinct unit outside Denison Trough. The marine environment appears to have regressed eastwards in the Upper Permian P3d times.

Units P3a – P4 & P3–4 (Cont'd)

In the late Permian sediments to the south and north of Birkhead, where microplankton are absent, and usage of the term P3–4 becomes necessary, the sections are generally more sandy and coaly. Division of the well sections at least into Colinlea, Peawaddy and Bandanna becomes impossible and the question remains whether the sandstone – coal sections of P3–4 of these regions represent all or part of these three formations. If, as surmised, overlap within P3c–d times takes place southwards, similar overlap with facies changes may occur in a northerly direction, and most of P3–4 in the Jericho, Longreach and Galilee areas correlates with P4 and some of P3d of the Denison Trough.

Lower Triassic

The Lower Triassic of the Bowen Geosyncline is divisible into four units Tr1a, Tr 1b, Tr2a and Tr2b (Evans, 1965). The lowest of these, Tr1a has not yet been recognized outside the Denison Trough. The succeeding unit Tr1b is widespread across at least the southern half of the geosyncline. It is represented in the Galilee Basin by only one sample, Maranda No.1, core 6, 2073 feet, where "*Trizonaesporites*" sp. 258, and fairly common Striatiti sp. 262 occur, apparently in the absence of *Densoisporites* (al. *Lundbladispora*) *playfordi* (Balme) (sp. 243). This core was cut about 220 feet above the base of the Rewan Formation. From thickness considerations, the unit may occur in the Galilee area (Plate 3), and perhaps in the Jericho area (Plate 4 and 5), although it is apparently missing from the Tambo and perhaps Springsure areas.

Units Tr2a–b

Unit Tr2a is the most widespread division of the Lower Triassic west of the Bowen Geosyncline. Recognized by its content of *Densoisporites palyfordi* (sp. 243) and an increased abundance of *Taeniaesporites* spp., it overlaps (= Lunatisporites) older divisions of the Lower Triassic in the Tambo area. In BMR 34 (Tambo) unit Tr2a rests directly on Permian sediments. The basal core of BMR 34 yielded a (?) *Quadrisporites horridus* (sp. 211) Hennelly and rare "*Triznoaesporites*" sp. 258 suggesting that basal Tr2a is represented there. Younger horizons in the zone have been sampled from higher in BMR 34, from Jericho No.1, the Namco and Test Bores in the Jericho area, and Maranda No.1 in the Longreach area. However, in association with older Lower Triassic units, Tr2a is cut out further south in the Tambo area. (Plate 4). Where evidence is available, Tr2a is succeeded by Tr3. Tr2b has not yet been recognized in the Galilee Basin, but this may be due

Units Tr2a-b

to collection failure. Whether or not the unconformity between unit Tr3 and pre-Triassic strata in the southern Tambo and Longreach areas represents a regional hiatus in the Galilee Basin, or merely an extension of the transgressive phase initiated in Tr2a times, cannot be ascertained. The Dunda Beds, which are interposed between Rewan Formation of Tr2a age and the Clematis Sandstone of Tr3 age in the northern portion of the Galilee Basin, are apparently not present in Maranda No.1 in the Longreach area, or east of the Birkhead structure (N. Exon pers. comm.). This formation is not merely a facies variant of the Rewan Formation, as their Tr3 age in BMR 36 (Tambo) indicates, and may comprise sediments deposited during a generally regressive phase between Tr2a and Tr3 times. Tr2b might be found within the base of the Dunda Beds.

The transgressive character of Tr2a is well illustrated by the abundant content (18% of a count of 300) of acritarchs <u>Veryhachium</u> cf. <u>V. reductum reductum</u> (sp. 270) de Jekhowsky and <u>Micrhystridum</u> sp. 273 in Jericho No.1, core 1, 1212 feet, probably indicative of brackish or marine conditions of sedimentation. Rare specimens of undifferentiated species of <u>Veryhachium</u> also occur in BMR 34 (Tambo), cuttings 70-80 feet. Spasmodic occurrences of relatively rare acritarchs are known from older Lower Triassic sections in the Bowen Geosyncline, but nothing as abundant as the Jericho collection of Lower Triassic acritarchs has previously been found in Australia in other than the Perth and Canning Basins. The abundant <u>Taeniaesporites</u> spp. and the presence of <u>Densoisporites playfordi</u> link Tr2a with the Lower Triassic (Otoceratan) Kockatea Shale <u>Taeniaesporites</u> assemblage of the Perth Basin (Balme, 1963), the macrofauna of which (Dickins & McTavish, 1963) is in turn comparable in certain aspects with that found in the Maryborough Basin (Denmead, 1964). The Lower Triassic of Tr2a age thus appears to have been a period of at least ephemeral marine transgression in both eastern and western Australia, and the acritarchs at Jericho are perhaps a reflection of this event. Other Tr2a acritarch and perhaps macrofossil occurrences in the eastern Australian Triassic basins, particularly the Bowen Geosyncline, may be expected. No microfaunas are associated with the Jericho

Units Tr2a-b (Cont'd)

acritarchs (Terpstra, pers. comm.), a situation which has been regarded by Taylor (1964) as an indication of non-marine conditions. However, microfaunas are also absent from the ammonoid bearing marine Kockatea Shale of Tr2a (Belford pers. comm.), and Taylor's argument is invalid in this context. The only microfaunas known from the region, possibly of Tr2a age, were recognized in Galilee No.1, core 7, 1776-81 feet (Pemberton, 1965, composite log), identified as conchostracans by P. J. Jones (pers. comm.) a form which generally flourishes in fresh water or brackish environments.

Middle - Upper Triassic

Units Tr3a - d

Unit Tr3, characterized by an abundance of Alisporites spp., has long been recognized as having extensive representation in the Bowen Geosyncline and it is the most extensive Triassic unit in the Galilee Basin, overlapping older sediments to rest on the Permian in the Tambo area (Plate 3). It has been identified in sections in all the Sheet areas discussed. Lists of the microfloras from these sections (Tables 2 - 4) and concurrent studies in the Bowen Geosyncline led to recognition of subdivisions of Tr3 (Evans, 1965), based on the distribution of species of Aratrisporites spp. and Duplexisporites gyratus Playford & Dettmann.

A succession of species of Aratrisporites begins to appear as early as unit Tr2a with A. coryliseminis (sp.249) Klaus, followed by A. sp. 252 (?=A. strigosus Playford) in Tr2b and, restricted to the unit, A. tenuispinosus (sp. 250) Playford and A. banksi (sp.248) Playford in Tr3b. Evans (1965) thought that Aratrisporites died out prior to the introduction of Duplexisporites gyratus, leaving a section termed Tr3c below the base of Tr3d, marked by the first appearance of D. gyratus. However, subsequently available information from the Leigh Creek area of South Australia (Playford & Dettmann, 1965) showed that A. coryliseminis, A. flexibilis P. & D. and A. paenulatus P. & D. occur in association with D. gyratus, and Evans' stratigraphic division Tr3c is not acceptable as defined. Consequent investigation led to the confirmatory discovery of A. cf. A. tenuispinosus with D. gyratus in SPL No.1 (Birkhead), cuttings 1700 feet. Unit Tr3c is consequently linked with Tr3d and the composite Tr3c-d defined as a

Middle - Upper Triassic

Units Tr3a - d (Cont'd)

sequence beyond the end of A. banksi (sp. 248), and including the first appearance of D. gyratus.

The Tr3 assemblages listed in Tables 2 - 4 do not include ones from SPL No.1 (Birkhead) as the table were compiled prior to recognition of the subdivisions of Tr3. As indicated above, however, samples from the Birkhead well were subsequently checked for species of Aratrisporites and the presence of Duplexisporites, the results of which are illustrated in Plate 4.

Unit Tr3a commences at least in the top of the Dunda Beds (BMR 36 (Tambo), and continues into the Clematis Sandstone and extends into the lower parts of the Moolayember Formation, while Tr3c-d includes the remainder of the Moolayember Formation.

No acritarchs have been discovered in Tr3 in the Galilee Basin, although they occur at several points in the Bowen Geosyncline.

Surat & Eromanga Basins

Jurassic

Unit J1

Unit J1, marked by the introduction of Classopollis, commences above the unconformity between the Moolayember Formation and Precipice Sandstone in the Surat Basin. It has been located in the Precipice Sandstone of Tooloombilla No.1 (Evans & Hodgson, 1965), and in the lower Evergreen Formation, below the Boxvale Member in BMR 46/54 (Taroom), immediately east of the Eddystone area (Plate 6). It was identified in Boree No.1, side wall core 3228 feet, in the west of the Tambo area and by lithological correlation, probably exists in the Westbourne No.1 section (Plate 4). It occurs in SPL No.1 (Birkhead), cuttings 1400 feet, below what is thought to be the Precipice Sandstone, an anomaly briefly mentioned by Evans (1964). A similar situation has possibly arisen in the Jericho area, where shot points A66 and A67, located on an undifferentiated sandstone (Vine et al., 1965), were sampled at depths at 153 feet and 200 feet respectively, probably from below the sandstone, and yielded J1 assemblages (Table 3). It may be that finer grained sediments below the main sandstone bench in the area are of Jurassic age. Exon (pers. comm.) has noted how the

Jurassic

Unit J1 (Cont'd)

Precipice Sandstone trends into a silty facies along the strike into the Tambo area, a feature perhaps related to the palynological observations. However, additional palynological and petrological tests of this problem are still required.

Existence of a considerable hiatus between Tr3c-d and J1 in the area is still postulated, as there is no evidence of the presence of correlates of the Ipswich Coal Measures and Bundamba Sandstone of the Ipswich - Clarence Basin.

Unit J2

The base of J2 is marked by the introduction of *Tsugaepollenites segmentatus* (Balme). It has long been known to be accompanied by a brief appearance of acritarchs in the Surat Basin (Evans, 1962, 1964). Tests of Arbroath No.1 (Evans in Mines Administration Pty., Ltd., 1963c) and Tooloombilla No.1 and Crystalbrook No.1 (Evans, & Hodgson, 1965) showed that the acritarch swarm occurred immediately above the Boxvale Sandstone Member of the Evergreen Formation with the "oolite horizon" (= Westgrove Ironstone Member). Close sampling of BMR 46/54 (Taroom), however, showed that two horizons of acritarch swarms exist, one above and one below the Boxvale Sandstone (Plate 6). The upper zone, as previously recognized, is associated with the Westgrove Ironstone Member, in that acritarchs appear immediately below and at the top of the member. It is characterized by *Micrhystridium* sp. 283 (= *Multiplicisphaeridium* sp., P1. I figs. 1, 2, 4 of Evans, 1962) and *Veryhachium* sp. 285 (=*Veryhachium* sp. A, P1. I, Figs. 3, 5, 6 *loc. cit.*). In no sample, however, was there an abundance comparable with the 13% count in Pickanjinnie No.2, swc 3582 feet, which included *Micrhystridium* sp. 283. The lower zone, immediately below the Boxvale Sandstone Member, has a greater abundance (up to 9%) of acritarchs and is marked by *Micrhystridium* sp. 280 and *Veryhachium* sp. 284, with no signs of *Micrhystridium* sp. 283. Recognition of these two horizons led to a check of previously examined acritarch localities at the base of J2, which resulted in discovery that both horizons exist across the Surat Basin, even when the Boxvale Sandstone Member is missing, such as in BMR 29 (Mundubbera) (Evans, 1964).

Jurassic

Unit J2 (Cont'd)

It must be noted that the intermediate bench of finer material in the Boxvale Sandstone Member, apparent in the field (Mollan et al., 1965) cannot be identified in BMR 46/54 (Taroom, and that there is some doubt whether the mudstones and very fine sandstone containing the lower acritarch zone in fact represents this intra-Boxvale interval. It must also be emphasized that acritarchs may occur within the sandy facies of the Boxvale Sandstone Member, but other than samples from 85 and 97 feet, no material from the member and suitable for processing was available. However, the existence of two, specifically distinguishable acritarch developments within the Evergreen Formation is useful in detecting the relative ages of sandstones within the formation, and will be discussed in detail elsewhere.

The westerly limit of the acritarch swarms in the Eddystone area lies between Crystalbrook No.1 (6.5% at 350-60 feet) and BMR 53 (Eddystone)(no acritarchs in several samples from the Westgrove Ironstone Member). No trace of the Evergreen acritarchs has yet been found in the Eromanga Basin.

Units J3 - 6

This portion of the stratigraphic column representing the remainder of the Jurassic, is best considered together with sections penetrated by the American Overseas Petroleum Ltd's., deep tests Strathmore No.1, Dulbydilla No.1, Donnybrook No.1, and Alba No.1 (Campbell, 1965), observations from which are presently being compiled. The following notes form an interim report on the results so far obtained.

Analysis of BMR 47 - 50 (Eddystone)has already shown that at least 150 form species may be recognized between the top of the Hutton Sandstone to about the top of the Westbourne Formation, many of limited stratigraphic distribution. Evans (1965) defined the base of unit J5 by the incoming of Contignisporites, Murospora florida (Balme) and Lycopodiumsporites circolumenus Cookson & Dettmann. This horizon occurs below the base of BMR 48, i.e. within the Injune Creek Beds of the Eddystone area, and between shot points A239 and A232, just below the base of the Adori Sandstone, near the Birkhead well in the Tambo area. A higher horizon, taken as the base of unit J6, and marked by the introduction of Dictyotosporites cf. D. speciosus, comes in

Units J3 - 6 (Cont'd)

towards the top of the Westbourne Formation in BMR 50 (Eddystone), between 210 and 240 feet, and below shot point A211 in the Tambo area. The name Westbourne Formation (Gerrard, 1964) is used to denote beds previously reconized by Mollan et al. (1965) as "Orallo Formation" in the western Eddystone area. It is now apparent from surface mapping and subsurface correlation that the Orallo Formation dies out and that the Blythesdale Formation and Gubberamunda Sandstone mergre or in part disappear to form one sandstone unit to the south of the Eddystone area (Exon, pers. comm.) so that the terminology used by Mollan et al. should be changed as follows for the western part of the Eddystone area.

Blythesdale Formation	-	Hooray Sandstone
Orallo Formation	-	Westbourne Formation
Gubberamunda Sandstone	-	Adori Sandstone

The Adori Sandstone dies out or becomes only a minor feature eastwards, within the Injune Creek Beds. In summary, formations in the Tambo and Roma area should be correlated as follows:-

Palynological Unit	Tambo Area	Roma Area
Kla ?J6	Hooray	Blythesdale Orallo Gubberamunda
J5	Westbourne	Injune Creek
J4	Adori	
J3		

Hutton

Jurassic - Cretaceous

The correct correlation between the Hooray Sandstone and Blythesdale Formation - Gubberamunda Sandstone remains to be determined. BMR 3 (Longreach), drilled very close to the Jericho/Longreach Sheet area boundary, was drilled into the top half of the Ronlo Beds. Three samples from this hole have been examined. Core at 146 feet contained an abundant assemblage, among which were:

Dingodinium cerviculum
Muderongia tetracantha

of the *D. cerviculum* Zone at the base of the Wilgunya Formation.

A core at 153 feet contained rare microplankton, Hystrichosphaeridium sp., ?Chlamydophorella nyei and ?D. cerviculum, with Dictyotosporites speciosus, Lycopodiumsporites circolumenus, Cicatricosisporites australiensis, Neoraistrickia truncata, no older than unit K1a. There was no sign of Murospora florida, and so it could be as young as unit K1b (Evans, 1965).

Core at 209 feet contained only spores, Applanopsis dampieri, Laricoidites reidi (common), Cyathidites australis rimalis, Cyathidites australis, Murospora florida, Styxisporites cf. S. majus, Contignisporites cooksonii, Ischyosporites scaberis. The presence of M. florida and C. cooksonii shows that it is no older than J5. The negative evidence of the absence of Dictyotosporites and other spores characteristic of J6 and K1a suggests that this horizon may be as old as J5. The Ronlo Beds could therefore contain sediments correlating with both the Adori and uppermost Hooray Sandstones, but further tests on the Hooray Sandstone are required to correctly interpret the relationship of these formations.

APPENDIX I

BLACKALL - MITCHELL SEISMIC SURVEY

A request was received on 22nd April 1963 from American Overseas Petroleum Ltd., for palynological information from seismic shot point samples from Traverse A on A.T.P. 80P, in the vicinity of S.P.L. No.1 (Birkhead) well. The company was interested particularly in Line "A", SP 220-234 and Line "E" SP1-38. The results of this examination were reported to the company on 12 June 1963 in a minute from which the following notes have been extracted. Fossil names have been brought up to date.

Observations

Line "A" SP111-234 and Line "E" SP1-38 form a section trending east-north-eastwards across the strike from approximately the base of the Cretaceous Tambo Formation onto the "Triassic" Bundamba Group as represented on the G.S.Q., map of Queensland. While it is not to be expected that the formation boundaries on the map are accurately surveyed in this region, the map was used as the basis by which a suitable westerly limit to the sampled section could be chosen within the marine Lower Cretaceous. SP 195 seemed to be the most suitable for this purpose.

LINE "A"

SP195, 100 feet. Lower Cretaceous, marine. Position within known subsurface sections not identifiable. The spore yield was neither large nor diverse. However, it included:

Cicatricosisporites australiensis
Contignisporites cooksonii
Chlamydophorella nyei

C. australiensis and the microplankton C. nyei are sufficient to indicate a marine Cretaceous age. Several reworked Triassic and Permian (e.g. Dulhuntyispora parvithola) spores were identifiable.

SP211, 100 feet. Probably Upper Jurassic.
Spore yield moderate, including:-

Ischyosporites scaberis
Dictyotosporites speciosus
Murospora florida
Staplinisporites caminus

No microplankton could be found.

I. scaberis and D. speciosus occur mainly in basal Lower Cretaceous sediments in eastern Australia. However, the apparent absence of the marker species C. australiensis and the presence of M. florida indicate this sample belongs to a restricted horizon at the top of the Upper Jurassic. S. caminus has not been found in definite Cretaceous sediments. A correlate of this horizon is known shortly below the marine Cretaceous beds of U.K.A. Cabawin No. 1 in what could be referred to the top of the Blythesdale Group (higher than as identified by Union Oil in the well completion report).

SP220* Buff sand. A most unlikely source of spores and not processed.

SP223 White-buff sand. As for SP220.

SP225 White-buff sand. Although not a likely spore-bearing sample, extraction from this sample was attempted. The clay fraction was floated away from the sand in an attempt to concentrate any spores with the clay. However, no spores could be detected.

Amoseas Time Cross-Section Line "A", Part 5, SP2000-249 (September 1962) indicates that SP220-225 penetrated well below the weathered zone. It is therefore reasonable to assume that the sandy beds represented by these shot points are probably barren of spores.

SP229, 140 feet. Greenish-grey, medium grained sandstone. Probably Middle Jurassic. Older than the Blythesdale Group of the Surat Basin (Cabawin No. 1, A.A.O. 1 (Roma)). Represents brackish, if not marine facies. Fossils include:-

Cyathidites australis
Baculatisporites comaumensis
Classopollis classoides
Applanopsis dampieri
aff. Murospora florida
Cingulatisporites saevus
Annulispora folliculosa
Rugulatisporites ramosus

(Microplankton)

Micrhystridium spp.

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* Samples between SP220 and SP 246 are listed if available in the B.M.R. weather processed or not.

The specimen with affinities with M. florida unfortunately cannot be positively assigned to that species, a form which ranges through the Blythesdale Group of Cabawin No.1. The combination of C. saevus and A. folliculosa implies a possible correlation with the upper Walloon Coal Measures of the Surat Basin. The remarkable feature of this sample is the presence of several specimens of hystrichospheres. It recalls similar occurrences, although possibly somewhat older, in Corfield No.1 (Evans, 1962c) and Brookwood No.1 (Evans, in Pemberton, 1963). For the present, they are taken as indicators of brackish, if not marine conditions of deposition. No dinoflagellates could be found that might prove a definite marine environment.

SP232. Similar lithology to SP229. Spore yield not high, but e.g. Lycopodiumsporites rosewoodensis de Jersey, Annulispora folliculosa de Jersey were present and a Middle Jurassic age is implied. No hystrichospheres could be discovered.

SP235. As for SP 232.

LINE "E"

Several samples from Line "E" between SP1 and SP38 were available. However, only SP 25 and SP 31 were suitable for examination: the remainder were of ochreous sand. Even these points consisted mainly of course sands with shale fragments. The few spores obtained from them probably came from the shale component and might be reworked.

The best yield came from:-

SP31 that contained:

Ishyosporites punctatus
Applanopsis dampieri
Staplinisporites caminus

SP25 also contained Staplinisporites caminus.

In consequence both samples are probably Upper Jurassic in age. Both samples contained a large proportion of both Permian and Triassic "reworked" spores.

Samples from Line "A" SP235-249 have also been examined to connect with S.P.L. No.1 (Birkhead) from which palynological data has previously been obtained (Evans, 1962b).

LINE "A"

SP235. Lithology and spore yield as for SP232 (see above). Middle Jurassic.

SP238. As for SP232, although grain size is somewhat finer.

SP241. Lithology as at SP238. Middle Jurassic, somewhat older than predecessors. An abundant spore yield that included:

Cyathidites australis
Baculatisporites comaumensis
Leptolepidites verrucatus
aff. Lycopodiumsporites rosewoodensis
Lysopodiumsporites spp.
Cingulatisporites granulatus
Perotriliti sp.
Applanopsis dampieri
Tsugaepollenites segmentatus
Cycadopites cf. C. nitidus
Muroranti sp.
Classopollis sp.
Lariooidites reidi

The presence of Murornati sp., Perotriliti sp. with the rest of the assemblage suggests that a correlate of the base of the Walloon Coal Measures or the top of the Hutton Sandstone is represented.

SP243, 140 feet. Hard, carbonaceous siltstone. Lower Cretaceous, marine. Abundant fossils, including:-

Rouseisporites reticulatus
Coptospora paradoxa
Balmeisporites cf. holodictyus
Trilobotriletes trioreticulatus
Crybelosporites striatus
Dictyotosporites speciosus
Cicatricosisporites australiensis
Dinoflagellate gen. indet.
aff. Ceratocystidiopsis ludbrooki

This assemblage would seem to fit best above the Dingodinium cerviculum zone of the base of the marine Cretaceous Lower Wilgunya Formation and possibly below the Toolebuc horizon, although it could be somewhat younger than that marker. Conorada Ooroonoo No.1, core 9, 1882 feet would fit reasonably closely to this level.

SP244. ??Glauconitic sandstone.

SP246. Carbonaceous shale.

SP249. Carbonaceous shale. Lower Cretaceous, marine. Microfissils abundant, including:

Cicatricosisporites australiensis
Pilosisporites notensis
Gleicheniidites circinidites (fairly common)
"Polypodiaoeaeidites" sp.
Odontochitina operculata
Cymatiosphaera sp.

As with SP243, this sample is younger than the basal marine Lower Cretaceous zone of the Great Artesian Basin. Whether it is older or younger than the Toolebuc horizon is not determined.

Comments

Line "A" SP195 to SP235 give the impression of progressively older horizons in an easterly direction as might be expected from the regional viewpoint. However, the change in rock type between SP225 to SP229 may have some bearing on the pre-Blythesdale hiatus detected at Corfield and Brookwood where it would seem that some of the Blythesdale and possibly some of the Walloon are missing.

The appearance of acritachs at SP229 may be related to corresponding occurrences at Corfield and Brookwood, although these points may not be exactly the same age.

The regional trend of older section to the east is apparently reversed at least towards the eastern end of Line "E" where Upper Jurassic horizons are again present.

The most remarkable feature however, is displayed by Line "A" SP 241 to SP 243 in which a sudden change occurs from a Middle Jurassic correlate of the basal Walloon Coal Measures or top of the Hutton Sandstone of the Surat Sub-basin to a marine Lower Cretaceous correlate of the upper part of the Lower Wilgunya Formation or younger within half a mile. This could be explained by faulting, but the evidence from S.P.L. No.1 (Birkhead) makes this doubtful.

The sample from SP249, located at the site of the Birkhead well, came from no deeper than 120 feet below surface. (The base of the weathered zone was penetrated 110 feet). However, the Birkhead well at 197 feet was of early Middle Jurassic age, comparable with that of SP241. An important hiatus therefore occurs between 120 and 197 feet. Presumably this hiatus comes to the surface between SP241 and 243.

This feature can only be interpreted as the result of strong overlap occurring in Lower Cretaceous times.

REFERENCES

BALME, B.E., 1963 - Plant microfossils from the Lower Triassic of Western Australia. Palaeonotology, 6 (1), 12-40.

BENEDEK, S., 1965 - Alliance Jericho No.1 Well completion report. Authority to Prospect 81P Queensland. Alliance Oil Development Australia N.L. (unpubl.).

CAMPBELL, I.R., 1965 - Final geological report of the Mitchell - Morven test-drilling project A to P 101P, Queensland (unpubl.).

COOKSON, ISABEL C. & EISENACK, A., 1960 - Microplankton from Australian Cretaceous sediments. Micropaleontology, 6(1), 1-18.

DE JERSEY, N.J., 1962 - Palynology of a sample of core 5, South Pacific Ltd., Birkhead No.1 Well. Rep. to Chief Govt. Geologist, Geol. Surv. Qld., 17th August 1962 (unpubl.).

DE JERSEY, N.J., HAMILTON, M., & PATEN, R.J., 1963 - The palynology of samples from Oil Development N.L. Maranda No.1 Well. Geol. Surv. Qld. Rec., 1963/2 (unpubl.)

DENMEAD, A.K., 1964 - Note on marine macrofossils with Triassic affinities from the Maryborough Basin, Queensland. Aust. Journ. Sci., 27 (4), 117.

DICKINS J.M., & MACTAVISH, R.A., 1963 - Lower Triassic marine fossils from the Beagle Ridge (BMR 10) Bore, Perth Basin, Western Australia. Journ. Geol. Soc. Aust., 10 (1), 123 - 140.

EISENACK, A., & COOKSON, ISABEL C., 1960 - Microplankton from Australian Lower Cretaceous sediments. Proc. Roy. Soc. Vic., 72 (1), 1-10.

EVANS, P.R., 1961 - Palynological report on South Pacific Pty., Ltd., (Birkhead) Well. Bur. Min. Resour. Aust. Rec., 1961/102 (unpubl.)

EVANS, P.R., 1962a - Microfossils associated with the "Bundamba Group" of the Surat Basin, Queensland. Ibid., 1962/115 (unpubl.).

EVANS, P.R., 1962b - A revised report on S.P.L. No.1 (Birkhead) Well, Great Artesian Basin, Queensland. Ibid., 1962/139 (unpubl.).

EVANS, P.R., 1962c - The stratigraphy of Magellan Corfield No.1 Bore, Great Artesian Basin, Queensland. Ibid. 1962/174 (unpubl.).

EVANS, P.R., 1964 - Some observations on the Mesozoic of the Baralaba. Monto, Taroom & Mundabbera 1:250,000 Sheet area, Bowen-Surat Basin, Queensland. Ibid., 1964/91 (unpubl.).

EVANS, P.R., 1964b - A correlation of some deep wells in the north-eastern Eromanga Basin, central Queensland. Ibid., 1964/197 (unpubl.).

EVANS, P.R., 1965 - Recent advances in Mesozoic stratigraphic palynology in Australia. Ibid., 1965/192 (unpubl.).

EVANS, P.R. & HODGSON, E.A., 1965 - Palynological correlation of Planet Tooloombilla No.1, Crystallbrook No.1 and Warrong No.1, Eddystone 1:250,000 Sheet area, Surat Basin, Queensland. Bur. Min. Resour. Aust. Rec., 1965/88 (unpubl.).

EVANS, P.R. & WHITE, MARY E., 1966 - A Carboniferous flora from the Joe Joe Formation of Queensland. Bur. Min. Resour. Aust. Rec., (in prep.).

EXON, N.F. & KIRKEGAARD, A.G., 1965 - Notes on the stratigraphy of the north-east part of Tambo 1:250,000 Sheet area. Bur. Min. Resour. Aust. Rec., 1965/90 (unpubl.).

GEOLOGICAL SURVEY OF QUEENSLAND, 1960 - Occurrence of petroleum and natural gas in Queensland. Geol. Surv. Qld., Publ., 299.

GERRARD, M.J., 1964a - American Overseas Petroleum Limited Westbourne No. 1 Well completion report (unpubl.).

GERRARD, M.J., 1964b - American Overseas Petroleum Limited Boree No.1 Well completion report (unpubl.).

GRISSETT, M., 1957 - South Pacific Pty., Ltd., Birkhead No.1 Bore, Tambo. Geol. Surv. Qld. Oil Co., Rep., 66 (unpunl.).

HARE, R. & ASSOCIATES, 1963a - Well completion report Oil Development N.L. Maranda No.1 Well (unpubl.).

HARE, R. & ASSOCIATES, 1963b - Well completion report Farmout Drillers N.L. Alice River No.1 (unpubl.).

HEIKKILA, H.H., 1965 - Palaeozoic of the Adavale Basin, Queensland. VIIIth Comm. Min. & Met. Congr. Aust. & N.Z., 155, 15-18. (preprint).

HILL, DOROTHY, 1951 - Geology. Handbook of Queensland. Aust. Ass. adv. Sci., Brisbane, 13-24.

HILL, DOROTHY, 1957 - Springsure - 4 miles geological series (G/55-3) Explanatory notes. Bur. Min. Resour. Aust. Note Ser., 5.

HILL, DOROTHY & DENMEAD A.K. (ed.), 1960 - The geology of Queensland. Geol. Soc. Aust. Journ., 7.

LEWIS, J.H. & KYRANIS, N., 1962 - Phillips's-Sunray Etonvale No.1 Well completion report (unpubl.).

MINES ADMINISTRATION PTY. LTD., 1962a - Associated Australian Oilfields N.L. Glentulloch No.1 Well completion report Q/55-56P/104 (unpubl.).

MINES ADMINISTRATION PTY. LTD., 1962b - Associated Australian Oilfields N.L. Killoran No.1 Well completion report. Q/55-56P/108 (unpubl.).

MINES ADMINISTRATION PTY. LTD., 1962c - Associated Australian Oilfields N.L. Westgrove No.1 Well completion report. Q/55-56P/109 (unpubl.).

MINES ADMINISTRATION PTY. LTD., 1962d - Associated Australian Oilfields N.L., Westgrove No.2 Well completion report. Q/55-56P/110 (unpubl.).

MINES ADMINISTRATION PTY. LTD., 1963a - Associated Australian Oilfields N.L. Kildare No.1 Well completion report. Q/55-56P/117 (unpubl.).

MINES ADMINISTRATION PTY. LTD., 1963b - Associated Australian Oilfields N.L. Westgrove No.3 Well completion report. Q/55-56P/119 (unpubl.).

MINES ADMINISTRATION PTY. LTD., 1963c - Associated Australian Oilfields N.L. Arbroath No.1 Well completion report. Q/55-56P/131 (unpubl.).

MINES ADMINISTRATION PTY. LTD., 1963d - Associated Australian Oilfields N.L. Purbrook No.1 Well completion report. Q/55-56P/135 (unpubl.).

MOLLAN, R.G., EXON, N.F., & KIRKEGAARD, A.G., 1964 - The geology of the Springsure 1:250,000 Sheet area, Queensland <u>Bur. Min. Resour. Aust. Rec.</u>, 1964/27 (unpubl.).

MOLLAN, R.G., EXON, N.F., & FORBES, V.R., 1965 - Notes on the geology of the Eddystone 1:250,000 Sheet area. <u>Bur. Min. Resour. Aust. Rec.</u> 1965/98 (unpubl.)

MOTT, W.D. & ASSOCIATES, 1964a - Well completion report Longreach Oil Limited Hulton No.1 Well. (unpubl.).

MOTT, W.D. & ASSOCIATES, 1964b - Well completion report Longreach Oil Limited Saltern Creek No.1 Well (unpubl.).

MOTT, W.D. & ASSOCIATES, 1964c - Well completion report Longreach Oil Limited Marchmont No.1 Well (unpubl.).

NAMCO INTERNATIONAL INCORPORATED, 1964 - Seismic survey report, Jericho area, Authority to Prospect 81P, Queensland for Alliance Oil Development Australia No Liability (unpubl.).

PEMBERTON, R.L., 1965 - Well completion report Lake Galilee No.1. Exoil No Liability (unpubl.).

PLAYFORD, G. & DETTMANN, MARY E., 1965 - Rhaeto-Liassic plant microfossils from the Leigh Creek Coal Measures, South Australia. <u>Senck. Leth.</u>, 46(2-3), 127-181.

REYNOLDS, M.A., 1965 - The sedimentary basins of Australia and the stratigraphic occurrence of hydrocarbons. <u>Bur. Min. Resour. Aust. Rec.</u>, 1965/196 (unpubl.).

TAYLOR, D.J., 1964 - The depositional environment of the marine Cretaceous sediments of the Otway Basin. Aust. Petrol. Expl. Ass. Journ. (for 1964), 140-144.

VINE, R.R., JAUNCEY, W., CASEY, D.J., & GALLOWAY, M.C., 1965 - Geology of the Longreach - Jericho - Lake Buchanan area, Queensland. Bur. Min. Resour. Aust. Rec., 1965/245 (unpubl.).

WHITEHOUSE, F.W., 1955 - The geology of the Queensland portion of the Great Artesian Basin. Appendix G in Artesian Water Supplies in Queensland. Dep. Co-ord. Gen. Publ. Works Qld.

TABLE 1: MICROFOSSIL DISTRIBUTION CHART - GAB1745A, SPL 1(BIRKHEAD), BMR32 & 33(TAMBO)

MICROFOSSIL	No.	MFP 3571 Cutt.130-40'	MFP 3572 Cutt.140-50'	MFP 3570 C. 1 186'	MFP 3573 C. 1 84½'	MFP 1116 Cutt.2900'	MFP 1975 Cutt.3050'	MFP 1976 Cutt.3150'	MFP 1977 Cutt.3250'	MFP 1112 C. 4 3600'	MFP 3352 GAB 1745A
SAMPLE (well)		BMR32	BMR32	BMR32	BMR33	SPL 1(BIRKHEAD)	SPL 1(BIRKHEAD)	SPL 1(BIRKHEAD)	SPL 1(BIRKHEAD)	SPL 1(BIRKHEAD)	
AGE		P3c	P3b	P3b	P3b	P3-4	P3-4	P3-4	P3c	C1	C1-2
Leiotriletes sp.	1									+	
Punctatisporites sp.	3									+	
Calamospora sp.	4									+	
Punctatisporites sp.	7									+	
Granulatisporites sp.	8									+	
Perinotriliti sp.	10									+	
aff. Retusotriletes sp.	12									+	
Rugulatisporites sp.	22									+	+
Kraeuselisporites sp.	35									+	
Vallatisporites sp.	37									+	+
aff. Dictyotriletes sp.	43									+	
Monosacciti sp.	44									+	+
Monosacciti sp.	45										?
Parasaccites sp.	50									+	
Parasaccites sp.	51									+	+
Calamospora sp.	58									+	
Cingulati sp.	69									+	
Cyclogranisporites sp.	100									+	
Granulatisporites sp.	161										?
Monocolpates sp.	164										+
aff. Cristatisporites sp.	174									+	
Potonieisporites neglectus	192										+
Punctatisporites gretensis	5							+		+	
Retusotriletes diversiformis	6	+					+	+	+	+	
Dulhuntyispora dulhuntyi	122			+					+		
Vitreisporites sp.	135		+						+		
Striatoabietites sp.	149								+		
Striatopodocarpites sp.	210	+	+						+		
Baltisphaeridium sp.	360	C	+						C		
Micrhystridium spp. undiff.		+	+						+		
Veryhachium sp.	361	+							+		
Microfoveolatispora trisina	372		+					+	+		
Dulhuntyispora parvithola	123	+	+				+		+		
Vesicaspora sp.	137	+	+				+	+	+		
Protohaploxypinus amplus	147	+		+	+		+	+	+		
Protohaploxypinus sp.	148	+		+	+		+	+	+		
"Marsupipollenites" sinuosus	151						+	+	+		
Marsupipollenites triradiatus	152	+	+	+	+		+	+	+		
Leiotriletes directus	207	+			+		+	+	+		
Anapiculatisporites ericianus	115	+	+	+		+		+	+		
Kraeuselisporites apiculatus	127		+	+		+	+	+	+		
Vesicaspora ovata	138	+	+	+	+	+	+	+	+		
Parasaccites sp.	190					+			+		
aff. Gnetaceaepollenites sp.	208	+				+	+		+		
Granulatisporites sp.	110							+			
Striatoabietites sp.	209		+					?			
Baculatisporites sp.	109	+			+	+		+			
Lophotriletes tereteangulatus	113	+					+				
Limitisporites sp.	142	+	+				+				
Protohaploxypinus cf. P. limpidus	146	+		?	+		+				
Ginkgocycadophytus vetus	154						+				
Striatoabietites cf. S. multistriatus	150	+		+	+	+	+				
Monosaccites sp.	157	+	+		+	+					
Granulatisporites micronodosus	111				+						
Conbaculatisporites sp.	112				+						
Protohaploxypinus sp.	144				+						
Acanthotriletes uncinatus	114	+		?							
Striatopodocarpites cancellatus	143	+	+	+							
Bascanisporites undosus	139			+							
Alisporites sp.	140			?							
Platysaccus sp.	141			+							
aff. Ovalipollis sp.	136		+	+							
Perinotriliti sp.	156		+	+							

GAB = Field Locality
MFP = Sample Registration Number

TABLE 2: MICROFOSSIL DISTRIBUTION CHART - JERICHO BORES, MARANDA, ALICE RIVER, BMR34, 35 & 36(TAMBO).

No.	MICROFOSSIL	Tr3b BMR35 MFP 3574 C. 1 217½'	Tr3a BMR36 MFP 3575 Cutt.70-80'	Tr3b ALICE RIVER MFP 2422 C. 4 1780'	Tr3a ALICE RIVER MFP 2423 C. 5 2300'	Tr3b MARANDA MFP 2232 C. 3 1266'	Tr3b MARANDA MFP 2268 C. 4 1443'	Tr2a MARANDA MFP 2233 C. 5 1962	Tr1b MARANDA MFP 2274 C. 6 2073'	Tr2a MFP 3355 [illegible]est Bore	Tr2a MFP 3356 Namco Bore	Tr2a BMR34 MFP 3588 Cutt.70-80'	Tr2a BMR34 MFP 3589 C. 1 149'
84	Striatiti sp.												?
211	Quadrisporites horridus												?
218	Cyathidites sp.	+	+	+	+			+					+
224	Cyclogranisporites sp.												+
237	Concavisporites sp.								+				+
245	Cingutriletes sp.												+
258	"Trizonaesporites" sp.								+				+
352	Verrucosisporites sp.							+					+
6	Retusotriletes diversiformis								?	?		?	?
219	Todisporites sp.			+			+					+	+
239	Zebrasporites sp.					+			+			+	+
243	Lundbladispora playfordi							+		+	?	+	+
246	Kraeuselisporites sp.				?			+		+	+	+	+
253	Punctatosporites sp.								+			+	+
255	Polypodiisporites ipsvichiensis					+			+			+	+
261	Striatites sp.											?	+
262	Striatiti sp.							?	+	+	+	+	+
263	Taeniaesporites cf. T. obex				?			+	+	+		+	+
277	Alisporites sp.	c	c	c	c	c	c	+		+	+	+	+
353	Lundbladispora brevicula							+	+	+	+	+	+
222	Cyclogranisporites sp.		+	+		+		+	+	+	+	+	
240	Distalanulisporites sp.								+			+	
278	Platysaccus queenslandi					+	+					+	
344	Vitreisporites pallidus											+	
	Veryhachium sp. undiff.											+	
234	Verrucosisporites sp.										+		
355	Apiculati sp.												
359	Kraeuselsiporites sp.										?		
371	Rugulatisporites sp.									+			
274	Hilate sp.								+				
288	Alisporites sp.								+				
290	Anapiculatisporites sp.								+				
304	Verrucosisporites sp.								+				
347	Granulatisporites sp.								+				
348	Granulatisporites sp.								+				
351	Apiculati sp.								+				
257	Nuskoisporites radiatus							+	+				
241	Discisporites sp.						?	+	+				
220	Concavisporites sp.							+					
309	Perinomonoliti sp.	+	+					+					
346	Laevigati sp.							+					
349	Apiculati sp.							+					
354	Cingulati sp.							+					
249	Aratrisporites sp.	+					+	+					
250	Aratrisporites sp.						+						
266	Ginkgocycadophytus sp.			+			+						
293	Cyclogranisporites sp.						+						
363	Hilates sp.						?						
294	Conbaculatisporites sp.	+	+			+	+						
256	Thymospora sp.					+							
267	Ginkgocycadophytus sp.					+							
276	Alisporites sp.		+	+	+	+							
264	Striatoabietites sp.					+							
221	Calamospora sp.		+	+	+	+							
356	Laevigati sp.				+								
357	Perinotriliti sp.				+								
232	Verrucosisporites sp.			+									
231	Apiculati sp.		?										
252	Aratrisporites sp.		+										
300	Alisporites sp.		+										

TABLE 3: MICROFOSSIL DISTRIBUTION CHART - ALLIANCE JERICHO SEISMIC SURVEY.

MICROFOSSIL		Tr2a MFP 3385 B/192	Tr3c-d MFP 3396 B/51	Tr3b MFP 3464 C/55	Tr3b MFP 3465 C/59	Tr3b MFP 3466 C/61	Tr3b MFP 3467 C/65	J1 MFP 3394 A/66	J1 MFP 3395 A/67
Punctatisporites gretensis	5	?							
Striatiti sp.	84	?							
Cyclogranisporites sp.	224	+							
Concavisporites sp.	237	+							
Lundbladispora playfordi	243	+							
Cingutriletes sp.	245	?							
Kraeuselisporites sp.	246	+							
Striatiti sp.	262	+							
Taeniaesporites cf. T. obex	263	+							
Granulatisporites sp.	348	+							
Lundbladispora brevicula	353	+							
Cingulati sp.	354	+							
Foveosporites sp.	364	?							
aff. Lycopodiumsporites sp.		+							
Todisporites sp.	219	+	+	+					
Cyclogranisporites sp.	222	+		+	+	+	+		
Verrucosisporites sp.	232		+	+					
Calamospora sp.	221		+	+	+	+			
Ginkgocycadophytus sp.	266		+	+	+	+			
Alisporites sp.	277		c	c	c	c			
Aratrisporites sp.	252			+					
Alisporites sp.	288			+					
Cyclogranisporites sp.	293			+					
Hilates sp.	363			+					
Concavisporites sp.	220			+	+	+			
Striatoabietites sp.	264			+		+			
Aratrisporites sp.	249			+	+	+	+		
Aratrisporites sp.	250			+			+		
Conbaculatisporites sp.	294				+	+			
Cyathidites cf. C. minor	313							+	
Baculatisporites comaumensis	315							+	
"Pityosporites" grandis	330							+	
Lycopodiumsporites sp.	322							+	+
Perinopollenites elatoides	329							+	+
Classopollis spp.	336							c	c
Lycopodiumsporites sp.	321								+
Laricoidites sp.	331								+
Lycopodiumsporites sp.	339								+
Vitreisporites pallidus	344								+

TABLE 4: MICROFOSSIL DISTRIBUTION CHART - GALILEE NO.1.

SAMPLE	MICROFOSSIL	MFP3281 C. 2 605 ft	MFP3282 C. 5 1156 ft	MFP3288 C.12 3162 ft	MFP3290 C.13 3464 ft	MFP3345 C.14 3486 ft	MFP3292 C.15 3829 ft	MFP3309 C.23 6167 ft	MFP3311 C.25 6817 ft	MFP3312 C.26 7060 ft	MFP3313 C.27 7359 ft	MFP3606 C.29 7973 ft
AGE		Tr3	Tr3	P3-4	P3-4	Plb	Plb	Cl-2	Cl	Cl	Cl	Cl
44	Monosaccites sp.							+			+	+
7	Punctatisporites sp.						+	+	c	fc		+
190	Parasaccites sp.					c	c	fc			+	+
6	Retusotriletes diversiformis				+		+	+	+			+
1	Leiotriletes sp.									+		
14	Cyclogranisporites sp.									+		
30	Verrucosisporites sp.									cf		
10	Perinotriliti sp.							+		+		
22	Rugulatisporites sp.								+			
35	Kraeuselisporites sp.							+	+			
192	Potonieisporites neglectus						+	cf	?			
28	Verrucosisporites sp.							+				
37	Vallatisporites sp.							+				
43	aff. Dictyotriletes sp.							+				
191	Parasaccites sp.						+	+				
59	cf. Granulatisporites sp.						+					
61	Apiculatisporis sp.						+					
91	Monocolpates sp.						cf					
193	Vestigisporites sp.						+					
186	Monocolpates sp.					+						
187	aff. Protohaploxypinus goraiensis					+						
109	Baculatisporites sp.				+							
122	Dulhuntyispora dulhuntyi				+							
372	Microfoveolatispora trisina				+							
	Striatiti (total)			c	c							
110	Granulatisporites sp.			+	+							
137	Vericaspora sp.			+	+							
138	Vesicaspora ovata			+	+							
143	Striatopodocarpites cancellatus			+	+							
148	Protohaploxypinus sp.			+	+							
112	Conbaculatisporites sp.			+								
147	Protohaploxypinus amplus			+								
151	"Marsupipollenites" sinuosus			+								
218	Cyathidites sp.		+									
222	Cyclogranisporites sp.		+									
253	Punctatosporites sp.		+									
293	Cyclogranisporites sp.		+									
354	Cingulati sp.		+									
277	Alisporites sp.	c	+									
221	Calamospora sp.	+										
276	Alisporites sp.	+										

BARREN SAMPLES

MFP3280 C. 1, 290 ft
MFP3283 C. 7, 1776 ft
MFP3284 C. 8, 2105 ft
MFP3285 C. 9, 2407 ft
MFP3286 C.10, 2707 ft
MFP3287 C.11, 2846 ft
MFP3289 C.12, 3164 ft
MFP3291 C.14, 3480 ft
MFP3308 C.20, 5281 ft
MFP3310 C.24, 6515 ft
MFP3607 C.31, 8558 ft

PROCESSED: DISCUSSED BY G.PLAYFORD

MFP3608 C.36, 9325 ft
MFP3609 C.37, 9642 ft
MFP3610 C.38, 993[illegible] ft
MFP3611 C.39,10284 ft

TABLE 5: MICROFOSSIL DISTRIBUTION CHART - JERICHO NO.1

No.	MICROFOSSILS	Tr2a: MFP3582 C. 1 1212'	P3-4: MFP3583 C. 2 1714'	Plb: MFP3838 Cutt.1970-80' MFP3839 Cutt.1980-90'	Cl/Pla: MFP3584 C. 6 3583'	Cl: MFP3585 C. 7 4000'	Cl: MFP3586 C. 9 4582'	Cl: MFP3587 C.10 5080'
	Leiozonotriletes naumovae							+
192	Potonieisporites neglectus							?
43	aff. Dictyotriletes sp.					+	+	+
35	Kraeuselisporites sp.				+	+	+	+
7	Punctatisporites sp.			+	+	+	+	+
10	Perinotriliti sp.						+	
193	Vestigisporites sp.						+	
5	Punctatisporites gretensis				+	+	+	
22	Verrucosisporites sp.				+	+	+	
37	Vallatisporites sp.				+		+	
44	Monosaccites sp.				+	+	+	
50	Parasaccites sp.				+	+	+	
71	Verrucosisporites sp.				+	+	+	
190	Parasaccites sp.			+	?		+	
12	aff. Retusotriletes sp.					+		
97	Apiculatisporis sp.					+		
157	Monosaccites sp.					+		
8	Granulatisporites sp.				+	+		
14	Cyclogranisporites sp.				+	+		
19	Acanthotriletes sp.				+	+		
52	Parasaccites sp.				+	+		
191	Parasaccites sp.				+	+		
6	Retusotriletes diversiformis	?		+	+	+		
91	Monocolpates sp.			+		?		
2	Leiotriletes sp.				+			
17	Anapiculatisporites sp.				+			
38	Kraeuselisporites sp.				+			
106	Monocolpates sp.				+			
4	Calamospora sp.			+	+			
82	Klausipollenites sp.			+	+			
48	aff. Striatopodocarpites sp.			+				
101	Apiculati sp.			+				
163	Striatoabietites sp.			+				
183	Lophotriletes sp.			+				
186	Monocolpates sp.			+				
198	Protohaploxypinus sp.			+				
107	Apiculatisporis sp.		+					
110	G ranulatisporites sp.		+					
113	Lophotriletes tereteangulatus		+					
117	Anapiculatisporites sp.		+					
135	Vitreisporites sp.		+					
143	Striatopodocarpites cancellatus		+					
147	Protohaploxypinus amplus		+					
148	Protohaploxypinus sp.		+					
152	Marsupipollenites triradiatus		+					
209	Striatoabietites sp.		+					
	Abietosacciti spp. undiff.		+					
218	Cyathidites sp.	+						
222	Cyclogranisporites sp.	+						
223	Cohbaculatisporites sp.	+						
239	Zebrasporites sp.	+						
243	Lundbladispora playfordi	+						
245	Cingutriletes sp.	+						
246	Kraeuselisporites sp.	+						
253	Punctatosporites sp.	+						
254	Thymospora sp.	+						
260	Striatiti sp.	+						
262	Striatiti sp.	+						
263	Taeniaesporites cf. T. obex	+						
270	Veryhachium cf. V. reductum	C						
273	Micrhystridium sp.	+						
344	Vitreisporites pallidus	+						
353	Lundbladispora brevicula	+						
355	Apiculati sp.	+						
357	Perinotriliti sp.	+						
358	Megaspore	+						

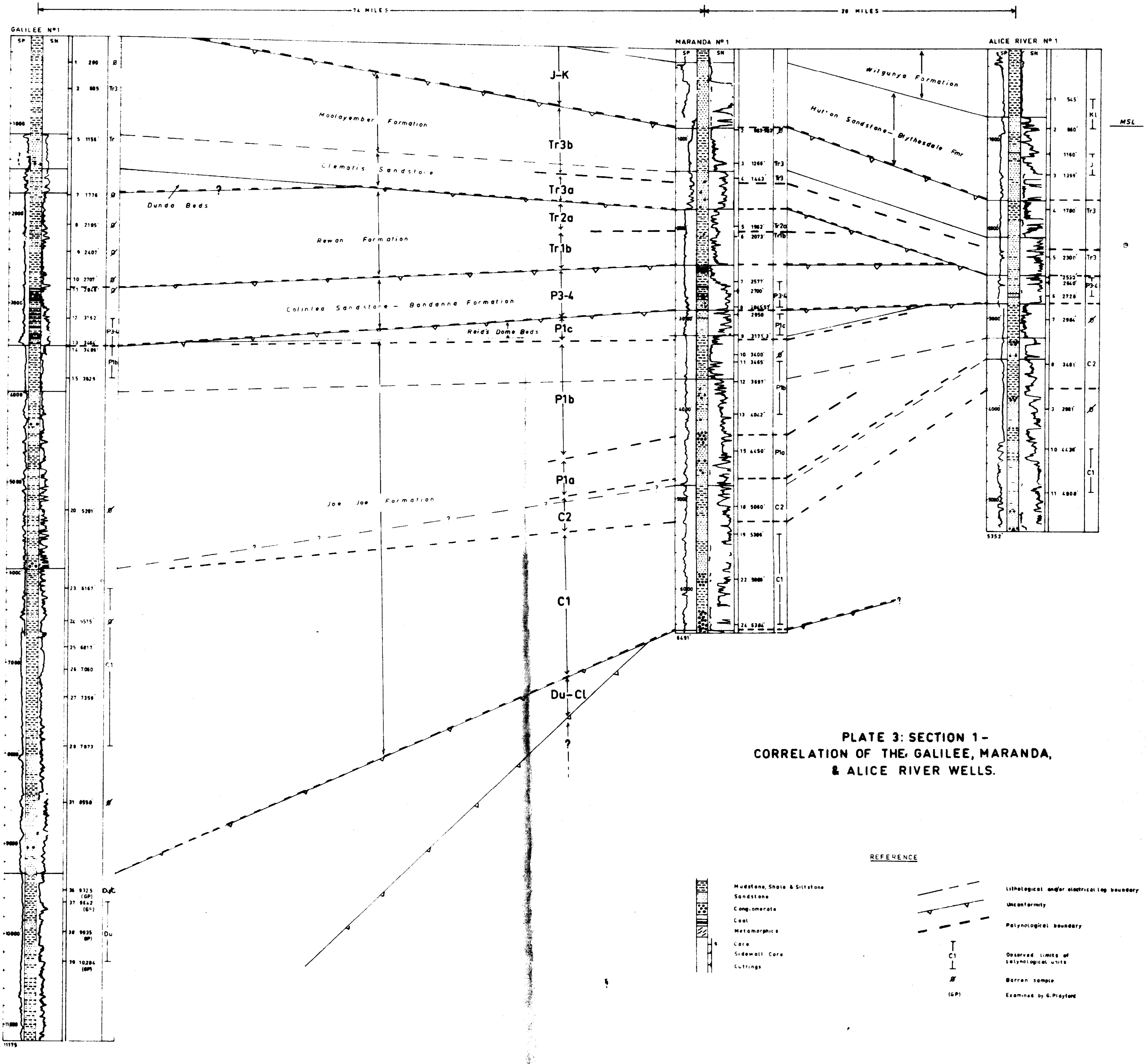


PLATE 3: SECTION 1 - CORRELATION OF THE GALILEE, MARANDA, & ALICE RIVER WELLS.

F55/A/50

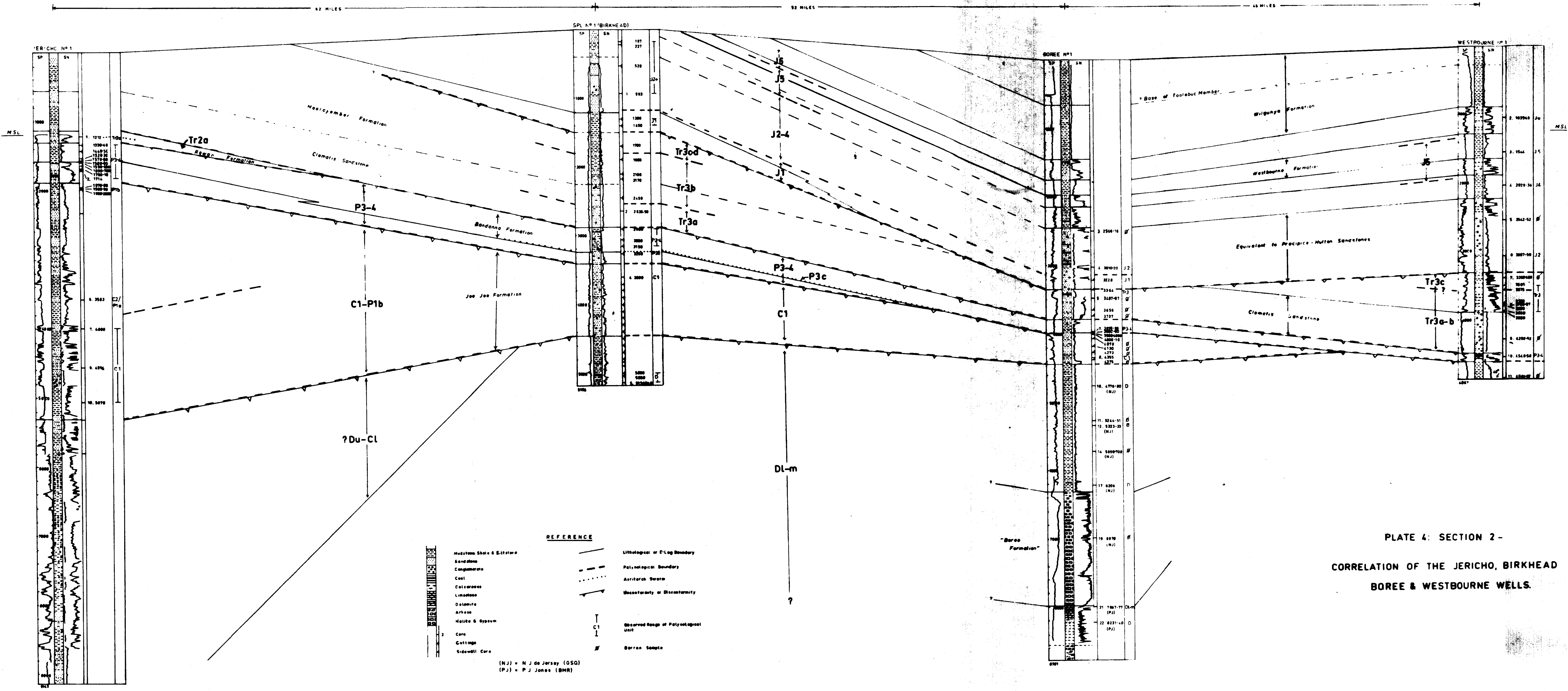
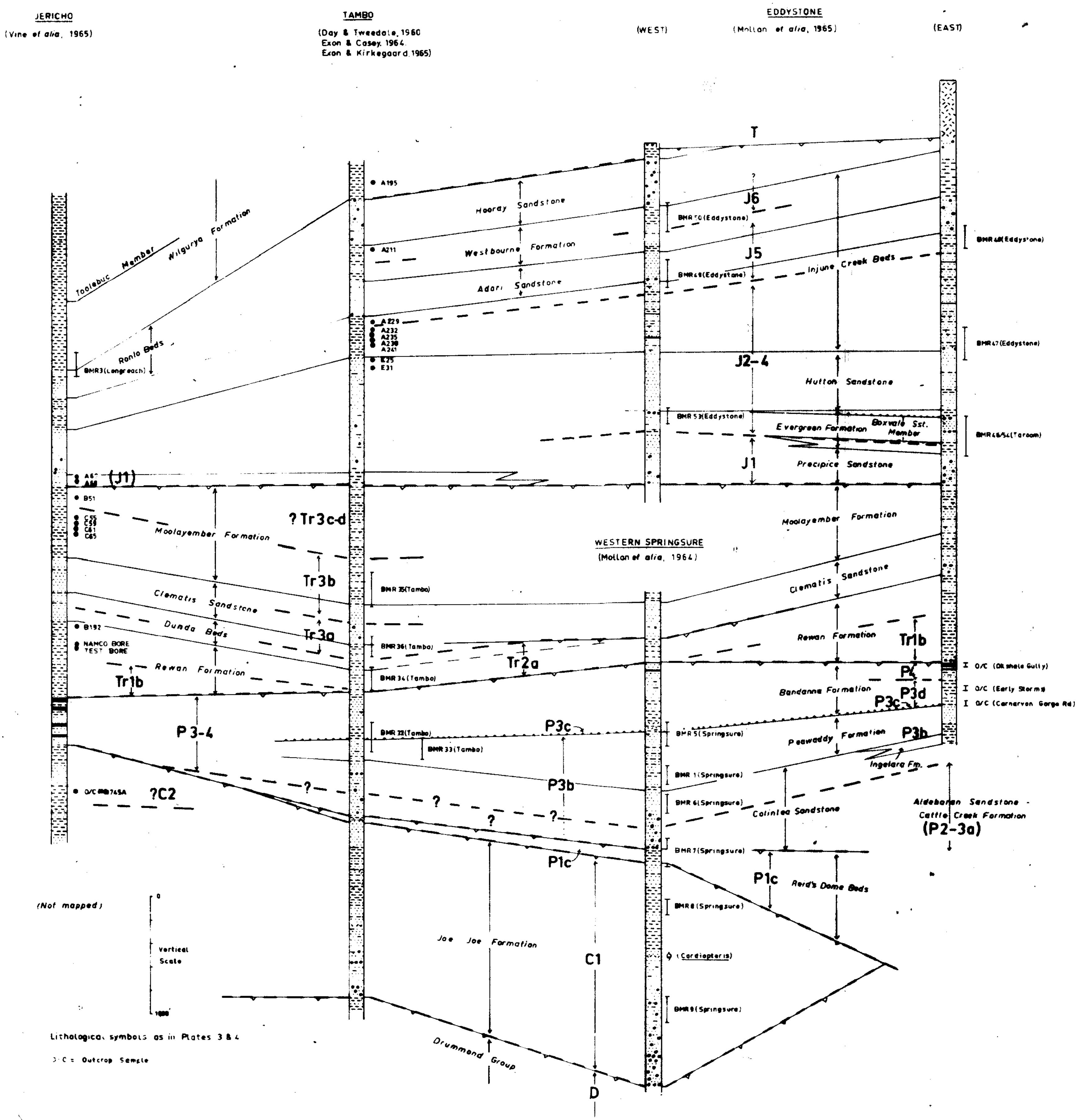


PLATE 4: SECTION 2 -

CORRELATION OF THE JERICHO, BIRKHEAD BOREE & WESTBOURNE WELLS.

PLATE 5.

CORRELATIONS BETWEEN COMPOSITE SECTIONS THROUGH, & RELATIVE STRATIGRAPHIC POSITIONS OF NEAR-SURFACE SAMPLES FROM THE JERICHO, TAMBO, EDDYSTONE & WESTERN SPRINGSURE 1:250,000 SHEET AREAS

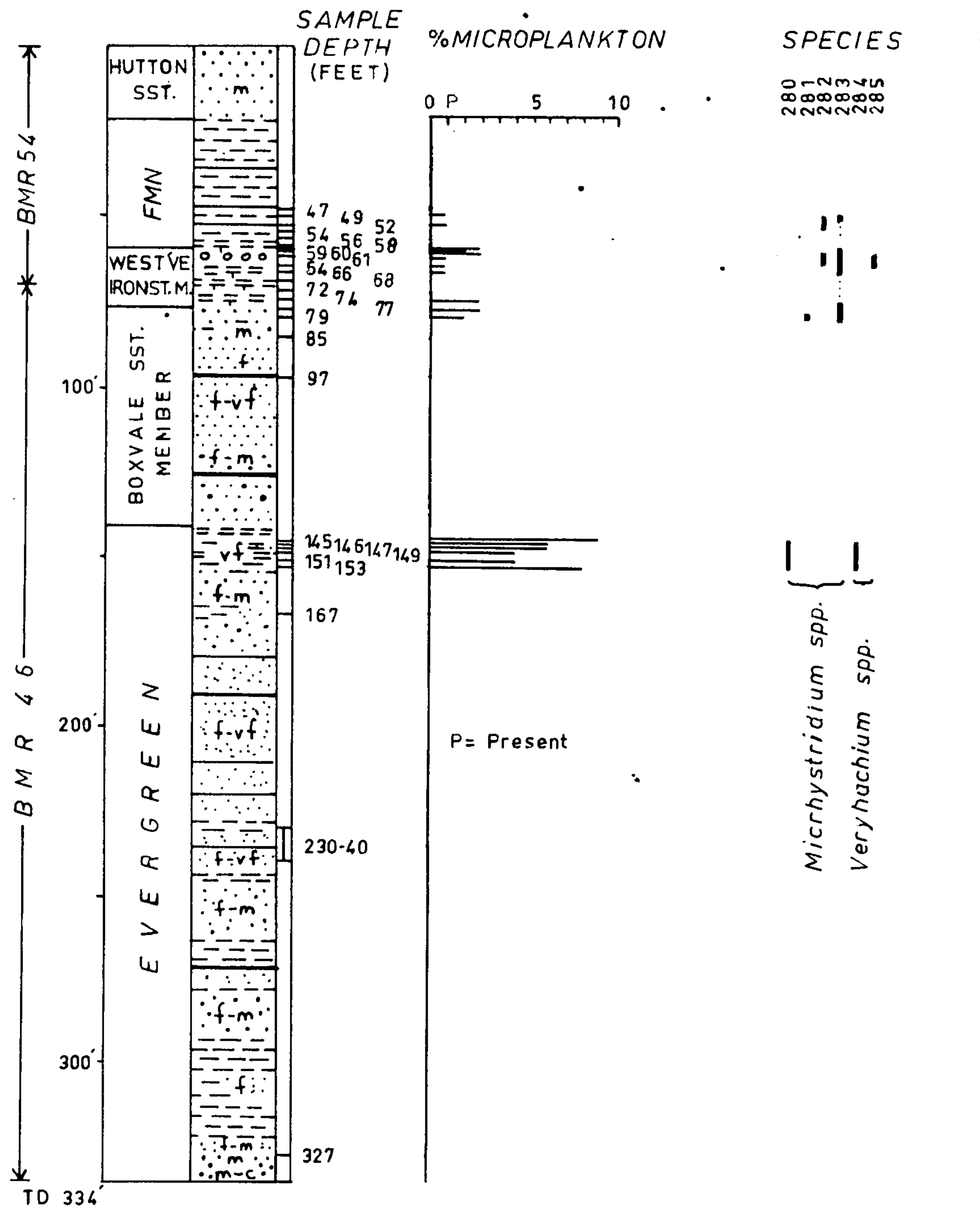


Bureau of Mineral Resources Geology & Geophysics August 1965. To accompany Record 1966/6

Q/A96

PLATE 6.

MICROPLANKTON DISTRIBUTION IN THE EVERGREEN FM: BMR46/54(TAROOM)



See Moffan, Exon & Forbes (1965) for lithological descriptions & key to symbols.