

PALYNOLOGICAL REPORT ON INTERSTATE/SHELL GARVOC NO.1 WELL

3076 FEET - 4964 FEET



Eighteen sidewall cores taken from between 3076 feet and 4964 feet and a chip of core 1 at 4352½ feet in Interstate/Shell Garvoc No.1 well were submitted by Shell Development (Australia) Pty. Ltd. for palynological analyses. The samples studied include shales, siltstones, and sandstones and provide a representative coverage of all but the upper horizons of the Mesozoic sequence penetrated by the well.

Before palynological processing, the sidewall cores were cleaned as thoroughly as possible, and it was noted that some of the porous sandstone samples were impregnated with drilling mud. The samples were processed by a technique outlined by Dettmann (1968), and the resultant residues mounted in glycerine jelly on glass microscope slides. All but two of the samples yielded plant material in concentrations ranging from sparse to abundant (see Table 1). The quality of preservation of the plant material was determined and is documented in Table 1. From this table it is evident that the plant material from all samples is generally fairly to poorly preserved, although some of the siltstones provided perceptibly better preserved plant material than that extracted from the sandstones.

The plant material identified includes spores, pollen grains, and wood and cuticular fragments; occasional specimens that may be of aquatic (chlorophycean) origin were also observed but microplankton or other marine or brackish water indicators were not encountered.

Analyses of the individual spore-pollen assemblages indicates that the section examined is of Lower Cretaceous age and includes a Middle-Upper Albian sequence overlying (? disconformably) strata of Neocomian and Aptian age. These age determinations are based upon the presence of the Middle-Upper Albian Coptospora paradoxa Zone at 3334 feet (and ? 3076 - 3262 feet) and the older (Neocomian - Aptian), Cyclosporites hughesi, subzone of the Dictyotosporites speciosus Zone between 3549 feet and 4964 feet. The younger (Lower Albian), Crybelosporites striatus, subzone of the latter zone was not recognized in the sediments studied; if present it would be expected to occur somewhere in the interval 3334 - 3549 feet.

The microfloral assemblages recovered from the sediments are documented below with reference to their qualitative and quantitative content; the quantitative estimates are expressed in the following terms:- Ab (abundant) - numerical representation of a particular species totals at least 5% of total microflora, C (common) - numerical representation of a species forms 1-5% of total microflora, and R (rare) - numerical representation of a species is less than 1% of total microflora.

MICROFLORAL ASSEMBLAGES AND AGE DETERMINATIONS

A. 3076 feet - 3334 feet

3076 feet

A small residue composed almost entirely of wood fragments was extracted from the sample. Several spore specimens were observed and are referable to the following species :

Spores: Baculatisporites comaumensis (Cookson)
Cyathidites australis Couper
Stereisporites antiquasporites (Wilson & Webster)

3262 feet

The palynological residue is chiefly composed of wood fragments with infrequent cuticle and rare spores and pollen grains. The following types were identified :

Spores: Baculatisporites comaumensis (Cookson)
Cyathidites australis Couper
Lycopodiumsporites austroclavatidites (Cookson)
Neoraistrickia truncata (Cookson)
Stereisporites antiquasporites (Wilson & Webster)

Pollen: Araucariacites australis Cookson
Microcachryidites antarcticus Cookson
Podocarpidites cf. ellipticus Cookson

3334 feet

An abundant and diverse assemblage of spores and pollen grains was obtained from the sample. Species identified include :

Spores:	<u>Aequitriradites spinulosus</u> (Cookson & Dettmann)	R
	<u>A. verrucosus</u> (Cookson & Dettmann)	R
	<u>Baculatisporites comaumensis</u> (Cookson)	C
	<u>Biretisporites</u> cf. <u>potoniaei</u> Delcourt & Sprumont	R
	<u>Cicatricosisporites australiensis</u> (Cookson)	R
	<u>Cingutritetes clavus</u> (Balme)	R
	<u>Coptospora paradoxa</u> (Cookson & Dettmann)	R
	<u>Crybelosporites striatus</u> (Cookson & Dettmann)	R
	<u>Cyathidites australis</u> Couper	Ab
	<u>C. Minor</u> Couper	Ab
	<u>C. punctatus</u> (Delcourt & Sprumont)	R
	<u>Dictyotosporites speciosus</u> Cookson & Dettmann	R
	<u>Foraminisporis asymmetricus</u> (Cookson & Dettmann)	R
	<u>F. dailyi</u> (Cookson & Dettmann)	R
	<u>Laevigatosporites ovatus</u> Wilson & Webster	R
	<u>Leptolepidites major</u> Couper	R
	<u>L. verrucatus</u> Couper	R
	<u>Lycopodiumsporites austroclavatidites</u> (Cookson)	C
	<u>L. nodosus</u> Dettmann	R
	<u>Neoraistrickia truncata</u> (Cookson)	R
	<u>Pilosporites notensis</u> Cookson & Dettmann	R
	<u>Rouseisporites reticulatus</u> Pocock	R
	<u>R. simplex</u> (Cookson & Dettmann)	R
	<u>Stereisporites antiquasporites</u> (Wilson & Webster)	Ab
	<u>Trilites</u> cf. <u>tuberculiformis</u> Cookson	R
	<u>Velosporites triquetrus</u> (Lantz)	R
Pollen:	<u>Alisporites grandis</u> (Cookson)	R
	<u>A. similis</u> (Balme)	R
	<u>Araucariacites australis</u> Cookson	C
	<u>Classopollis</u> cf. <u>classoides</u> Pflug	R
	<u>Microcachryidites antarcticus</u> Cookson	Ab
	<u>Podocarpidites</u> cf. <u>ellipticus</u> Cookson	C
Incertae		
Sedis:	<u>Schizosporis spriggi</u> Cookson & Dettmann	R
Remanie:	<u>Aratrisporites</u> sp. - Triassic	
	<u>Nuskosporites</u> sp. - Permian	

Samples at 3076 feet and 3262 feet contain insufficient representation of stratigraphically significant species for precise age determination or zonal assignment. The horizon at 3334 feet, however, yielded an abundant microflora in which Coptospora paradoxa, Dictyotosporites speciosus, and Crybelosporites striatus are components. This association establishes the presence of the Middle-Upper Albian Coptospora paradoxa Zone (of Dettman and Playford 1968). Moreover, the concurrence of C. paradoxa and D. speciosus indicates that the horizon is near the base of the zone and is referable to Evans's (1966) Unit K2a.

B. 3549 feet - 4964 feet

3549 feet

The sample yielded abundant spores and pollen grains and infrequent wood and cuticular tissue. The diverse spore-pollen assemblage identified includes the following species:

Spores:	<u>Aequitriradites verrucosus</u> (Cookson & Dettmann)	R
	<u>Baculatisporites comaumensis</u> (Cookson)	C
	<u>Geratosporites equalis</u> Cookson & Dettmann	R
	<u>Cicatricosporites australiensis</u> (Cookson)	C
	<u>C. ludbrooki</u> Dettmann	R
	<u>Couperisporites tabulatus</u> Dettmann	R
	<u>Cyclosporites hughesi</u> (Cookson & Dettmann)	C
	<u>Cyathidites australis</u> Couper	Ab
	<u>C. minor</u> Couper	Ab
	<u>C. punctatus</u> (Delcourt & Sprumont)	R
	<u>Dictyotophyllidites crenatus</u> Dettmann	C
	<u>Distyotosporites complex</u> Cookson & Dettmann	R
	<u>D. speciosus</u> Cookson & Dettmann	C
	<u>D. filorus</u> Dettmann	R
	<u>Foraminisporis asymmetricus</u> (Cookson & Dettmann)	R
	<u>F. dailyi</u> (Cookson & Dettmann)	R
	<u>F. wonthaggiensis</u> (Cookson & Dettmann)	R
	<u>Klukisporites scaberis</u> (Cookson & Dettmann)	R
	<u>Lycopodiacidites asperatus</u> Dettmann	R
	<u>Lycopodiumsporites austroclavatidites</u> (Cookson)	C
	<u>L. circolumenus</u> Cookson & Dettmann	R
	<u>L. eminulus</u> Dettmann	R
	<u>L. facetus</u> Dettmann	R
	<u>L. nodosus</u> Dettmann	R
	<u>Leptolepidites major</u> Couper	R
	<u>L. verrucatus</u> Couper	C
	<u>Neoraistrickia truncata</u> (Cookson)	C
	<u>Pilosporites notensis</u> Cookson & Dettmann	R
	<u>Rouseisporites reticulatus</u> Pocock	R
Pollen:	<u>Alisporites grandis</u> (Cookson)	C
	<u>A. similis</u> (Balme)	R
	<u>Araucariacites australis</u> Cookson	C
	<u>Classopollis</u> cf. <u>classoides</u> Pflug	C
	<u>Microcachryidites antarcticus</u> Cookson	Ab
	<u>Podocarpidites</u> cf. <u>ellipticus</u> Cookson	C
	<u>P.</u> cf. <u>multesimus</u> (Bolkhovitina)	R
Incertae		
Sedis:	<u>Schizosporis reticulatus</u> Cookson & Dettmann	R

3642 feet

Spores and pollen grains occur commonly in the residue which also contains abundant fragments of wood and cuticle. The following species were identified:

Spores:	<u>Baculatisporites comaumensis</u> (Cookson)	C
	<u>Cicatricosisporites australiensis</u> (Cookson)	R
	<u>Ceratosporites equalis</u> Cookson & Dettmann	R
	<u>Cooksonites variabilis</u> Pocock	R
	<u>Cyclosporites hughesi</u> (Cookson & Dettmann)	R
	<u>Cyathidites australis</u> Couper	Ab
	<u>C. minor</u> Couper	Ab
	<u>C. punctatus</u> (Delcourt & Sprumont)	R
	<u>Dictyophyllidites crenatus</u> Dettmann	C
	<u>Dictyotosporites speciosus</u> Cookson & Dettmann	R
	<u>Foraminisporis dailyi</u> (Cookson & Dettmann)	R
	<u>F. wonthaggiensis</u> (Cookson & Dettmann)	C
	<u>Klukisporites scaberis</u> (Cookson & Dettmann)	R
	<u>Kuylisporites lunaris</u> Cookson & Dettmann	R
	<u>Leptolepidites major</u> Couper	R
	<u>L. verrucatus</u> Couper	R
	<u>Lycopodiumsporites austroclavatidites</u> (Cookson)	C
	<u>L. circolumenus</u> (Cookson & Dettmann)	R
	<u>L. eminulus</u> Dettmann	R
	<u>L. nodosus</u> Dettmann	R
	<u>Pilosisorites notensis</u> Cookson & Dettmann	R
	<u>Stereisorites antiquasporites</u> (Wilson & Webster)	C
Pollen:	<u>Classopollis</u> cf. <u>classoides</u> Pflug	C
	<u>Microcachryidites antarcticus</u> Cookson	Ab
	<u>Podocarpidites</u> cf. <u>ellipticus</u> Cookson	Ab
	<u>Tsugaepollenites dampieri</u> (Balme)	R

3763 feet

The following diverse assemblage of spores and pollen grains was obtained from the sample. Other plant material identified includes fragments of wood and cuticle and rare examples of forms with possible chlorophycean affinities.

Spores:	<u>Aequitriradites spinulosus</u> (Cookson & Dettmann)	R
	<u>Baculatisporites comaumensis</u> (Cookson)	C
	<u>Ceratosporites equalis</u> Cookson & Dettmann	R
	<u>Cicatricosisporites australiensis</u> (Cookson)	R
	<u>C. ludbrookii</u> Dettmann	R
	<u>Cooksonites variabilis</u> Pocock	R
	<u>Cyclosporites hughesi</u> (Cookson & Dettmann)	C
	<u>Cyathidites australis</u> Couper	C
	<u>C. minor</u> Couper	Ab
	<u>Dictyotophyllidites crenatus</u> Dettmann	C
	<u>Dictyotosporites complex</u> Cookson & Dettmann	R
	<u>D. speciosus</u> Cookson & Dettmann	C
	<u>Foraminisporis dailyi</u> (Cookson & Dettmann)	R
	<u>F. wonthaggiensis</u> (Cookson & Dettmann)	R
	<u>Klukisporites scaberis</u> (Cookson & Dettmann)	R
	<u>Leptolepidites major</u> Couper	R
	<u>L. verrucatus</u> Couper	C
	<u>Lycopodiumsporites austroclavatidites</u> (Cookson)	C
	<u>L. eminulus</u> Dettmann	C
	<u>L. facetus</u> Dettmann	R
	<u>L. nodosus</u> Dettmann	R
	<u>L. reticulumsporites</u> (Rouse)	R
	<u>Neoraistrickia truncata</u> (Cookson)	R
	<u>Osmundacidites wellmanii</u> Couper	R
	<u>Pilosisorites notensis</u> Cookson & Dettmann	R
	<u>P. parvispinosus</u> Dettmann	R
	<u>Rouseisorites reticulatus</u> Pocock	R

	<u>Stereisporites antiquasporites</u> (Wilson & Webster)	C
Pollen:	<u>Alisporites grandis</u> (Cookson)	C
	<u>A. similis</u> (Balme)	R
	<u>Araucariacites australis</u> Cookson	C
	<u>Cycadopites nitidus</u> (Balme)	R
	<u>Classopollis</u> cf. <u>classoides</u> Pflug	C
	<u>Microcachryditites antarcticus</u> Cookson	Ab
	<u>Podocarpidites</u> cf. <u>ellipticus</u> Cookson	C
Incertae		
Sedis:	<u>Schizosporis reticulatus</u> Cookson & Dettmann	R

3940 feet

The small residue obtained from the sample contains rare spores and pollen grains. The following species are each represented by only one to several specimens:

Spores:	<u>Baculatisporites comaumensis</u> (Cookson)
	<u>Cicatricosporites australiensis</u> (Cookson)
	<u>Cooksonites variabilis</u> Pocock
	<u>Cyathidites australis</u> Couper
	<u>Dictyotophyllidites crenatus</u> Dettmann
	<u>Klukisporites scaberis</u> (Cookson & Dettmann)
	<u>Leptolepidites major</u> Couper
	<u>L. verrucatus</u> Couper
	<u>Lycopodiumsporites austroclavatidites</u> (Cookson)
	<u>L. eminulus</u> Dettmann
	<u>Neoraistrickia truncata</u> (Cookson)
	<u>Rouseisporites reticulatus</u> Pocock
	<u>Stereisporites antiquasporites</u> (Wilson & Webster)
Pollen:	<u>Classopollis</u> cf. <u>classoides</u> Pflug
	<u>Microcachryditites antarcticus</u> Cookson
	<u>Podocarpidites</u> cf. <u>ellipticus</u> Cookson
	<u>Tsugaepollenites dampieri</u> (Balme)
Remanie:	<u>Striatites</u> sp. - Permian

4078 feet

A small residue containing poorly preserved specimens of the following spore-pollen species was extracted from the sample:

Spores:	<u>Aequitriradites verrucosus</u> (Cookson & Dettmann)
	<u>Cicatricosporites australiensis</u> (Cookson)
	<u>Ceratospores equalis</u> Cookson & Dettmann
	<u>Cyathidites australis</u> Couper
	<u>C. minor</u> Couper
	<u>Dictyotospores speciosus</u> Cookson & Dettmann
	<u>Klukisporites scaberis</u> (Cookson & Dettmann)
	<u>Lycopodiumsporites austroclavatidites</u> (Cookson)
	<u>L. eminulus</u> Dettmann
	<u>Neoraistrickia truncata</u> (Cookson)
	<u>Pilosporites notensis</u> Cookson & Dettmann
	<u>Rouseisporites reticulatus</u> Pocock
	<u>Stereisporites antiquasporites</u> (Wilson & Webster)
Pollen:	<u>Alisporites similis</u> (Balme)
	<u>Araucariacites australis</u> Cookson
	<u>Microcachryditites antarcticus</u> Cookson
	<u>Podocarpidites</u> cf. <u>ellipticus</u> Cookson

In addition the following species are represented by one or two well preserved specimens which are considered to be contaminants from higher horizons. The sample (a quartzitic sandstone) was impregnated with drilling mud which could not be removed.

Balmeisporites holodictyus Cookson & Dettmann (fragments only)
Crybelosporites striatus (Cookson & Dettmann)
Tricolpites sp.
Triorites harrisii Couper

4184 feet

An assemblage composed of abundant spores and pollen grains and rare chlorophycean derivatives was extracted from the sample. The following species were identified:

Spores:	<u>Aequitriradites spinulosus</u> (Cookson & Dettmann)	R
	<u>A. verrucosus</u> (Cookson & Dettmann)	R
	<u>Baculatisporites comaumensis</u> (Cookson)	R
	<u>Cicatricosisporites australiensis</u> (Cookson)	C
	<u>C. ludbrooki</u> Dettmann	C
	<u>Ceratosporites equalis</u> Cookson & Dettmann	R
	<u>Cooksonites variabilis</u> Pocock	C
	<u>Couperisporites tabulatus</u> Dettmann	C
	<u>Cyclosporites hughesi</u> (Cookson & Dettmann)	R
	<u>Cyathidites australis</u> Couper	Ab
	<u>C. minor</u> Couper	Ab
	<u>Dictyotophyllidites crenatus</u> Dettmann	C
	<u>Dictyotosporites speciosus</u> Cookson & Dettmann	R
	<u>Foraminisporis dailyi</u> (Cookson & Dettmann)	R
	<u>F. wonthaggiensis</u> (Cookson & Dettmann)	C
	<u>Klukisporites scaberis</u> (Cookson & Dettmann)	R
	<u>Kraeuselisporites linearis</u> (Cookson & Dettmann)	R
	<u>Kuylisporites lunaris</u> Cookson & Dettmann)	R
	<u>Laevigatosporites</u> sp.	C
	<u>Leptolepidites major</u> Couper	R
	<u>L. verrucatus</u> Couper	R
	<u>Lycopodiumsporites austroclavatidites</u> (Cookson)	R
	<u>L. eminulus</u> Dettmann	R
	<u>Pilososporites notensis</u> Cookson & Dettmann	C
	<u>P. parvispinosus</u> Dettmann	R
	<u>Rouseisporites reticulatus</u> Pocock	R
Pollen:	<u>Alisporites grandis</u> (Cookson)	R
	<u>Classopollis</u> cf. <u>classoides</u> Pflug	C
	<u>Microcachryidites antarcticus</u> Cookson	Ab
	<u>Podocarpidites</u> cf. <u>ellipticus</u> Cookson	C
	<u>P.</u> cf. <u>multesimus</u> (Bolkhovitina)	R
	<u>Podosporites microsaccatus</u> (Couper)	R
Incertae		
Sedis:	<u>Schizosporis reticulatus</u> Cookson & Dettmann	R

4272 feet

The residue extracted from the sample is chiefly composed of wood and cuticular material. In addition spores and pollen grains referable to the following species were observed:

Spores:	<u>Baculatisporites comaumensis</u> (Cookson)	C
	<u>Ceratosporites equalis</u> Cookson & Dettmann	R
	<u>Cicatricosisporites australiensis</u> (Cookson)	C
	<u>C. ludbrooki</u> Dettmann	R
	<u>Cooksonites variabilis</u> Pocock	R
	<u>Cyathidites australis</u> Couper	Ab
	<u>C. minor</u> Couper	C

	<u>Foraminisporis dailyi</u> (Cookson & Dettmann)	R
	<u>F. wonthaggiensis</u> (Cookson & Dettmann)	R
	<u>Klukisporites scaberis</u> (Cookson & Dettmann)	R
	<u>Lycopodiumsporites austroclavatidites</u> (Cookson)	R
	<u>Pilosisorites notensis</u> Cookson & Dettmann)	R
	<u>Reticulatisporites pudens</u> Balme	R
	<u>Stereisorites antiquasporites</u> (Wilson & Webster)	C
Pollen:	<u>Alisporites grandis</u> (Cookson)	Ab
	<u>A. similis</u> (Balme)	R
	<u>Araucariacites australis</u> Cookson	R
	<u>Microcachryidites antarcticus</u> Cookson	Ab
	<u>Podocarpidites cf. ellipticus</u> Cookson	C

4394 feet

Rarely occurring spores and pollen grains and abundant wood fragments were observed in the small residue extracted from the sample. The following species were identified :

Spores:	<u>Aequitriradites</u> sp.	
	<u>Cicatricosisporites australiensis</u> (Cookson)	
	<u>Cyathidites australis</u> Couper	
	<u>Laevigatosporites</u> sp.	
	<u>Lycopodiumsporites austroclavatidites</u> (Cookson)	
	<u>Stereisorites antiquasporites</u> (Wilson & Webster)	
Pollen:	<u>Alisporites grandis</u> (Cookson)	
	<u>Cycadopites</u> sp.	
	<u>Podocarpidites cf. ellipticus</u> Cookson	

4489 feet

Abundant spores and pollen grains and minor quantities of wood and cuticle were extracted from the sample. The following species were observed :

Spores:	<u>Aequitriradites spinulosus</u> (Cookson & Dettmann)	R
	<u>Baculatisporites comaumensis</u> (Cookson)	R
	<u>Ceratosporites equalis</u> Cookson & Dettmann	R
	<u>Cicatricosisporites australiensis</u> (Cookson)	C
	<u>Cooksonites variabilis</u> Pocock	R
	<u>Cyclosporites hughesi</u> (Cookson & Dettmann)	R
	<u>Cyathidites australis</u> Couper	Ab
	<u>C. minor</u> Couper	Ab
	<u>C. asper</u> (Bolkhovitina)	C
	<u>Contignisporites cooksonii</u> (Balme)	R
	<u>Dictyotophyllidites crenatus</u> Dettmann	C
	<u>Dictyotosporites speciosus</u> Cookson & Dettmann	R
	<u>Foraminisporis dailyi</u> (Cookson & Dettmann)	R
	<u>F. wonthaggiensis</u> (Cookson & Dettmann)	R
	<u>Ischyosporites punctatus</u> Cookson & Dettmann	R
	<u>Kuylisporites lunaris</u> Cookson & Dettmann	R
	<u>Klukisporites scaberis</u> (Cookson & Dettmann)	C
	<u>Leptolepidites major</u> Couper	R
	<u>L. verrucatus</u> Couper	R
	<u>Lycopodiacidites asperatus</u> Dettmann	R
	<u>Lycopodiumsporites austroclavatidites</u> (Cookson)	C
	<u>L. eminulus</u> Dettmann	R
	<u>Pilosisorites notensis</u> Cookson & Dettmann	C

	<u>P. parvispinosus</u> Dettmann	R
	<u>Reticulatisporites pudens</u> Balme	R
	<u>Rouseisporites reticulatus</u> Pocock	R
	<u>Stereisporites antiquasporites</u> (Wilson & Webster)	C
Pollen:	<u>Alisporites grandis</u> (Cookson)	C
	<u>Araucariacites australis</u> Cookson	C
	<u>Classopollis</u> cf. <u>classoides</u> Pflug	C
	<u>Microcachryidites antarcticus</u> Cookson	Ab
	<u>Podocarpidites</u> cf. <u>ellipticus</u> Cookson	Ab

4532 $\frac{1}{2}$ feet (core 1)

The sample failed to yield plant material of any description.

4637 feet

No spores or pollen grains were extracted from the sample which yielded rare fragments of woody tissue.

4705 feet

Plant material extracted from the sample includes rare spores and a small amount of woody tissue. Spore types observed include :

Baculatisporites comaumensis (Cookson)
Ceratosporites equalis Cookson & Dettmann
Cicatricosisporites australiensis (Cookson)
Cyathidites australis Couper
C. minor Couper

4798 feet

The small residue obtained from the sample includes rare spores and pollen grains and infrequent woody tissue. The following types were identified:

Spores: Baculatisporites comaumensis (Cookson)
Cyathidites australis Couper
Pollen: Araucariacites australis Cookson
Cycadopites nitidus (Balme)
Microcachryidites antarcticus Cookson
Podocarpidites cf. ellipticus Cookson

4878 feet

Spores and pollen grains are of common occurrence in the residue which also contains abundant wood and cuticular material. Spore-pollen species identified include:

Spores: Baculatisporites comaumensis (Cookson) C
Ceratosporites equalis Cookson & Dettmann R
Cicatricosisporites australiensis (Cookson) R
Cyathidites australis Couper Ab
C. minor Couper Ab
Foraminisporis dailyi (Cookson & Dettmann) R

	<u>Klukisporites scaberis</u> (Cookson & Dettmann)	R
	<u>Leptolepidites major</u> Couper	R
	<u>L. verrucatus</u> Couper	C
	<u>Lycopodiacidites asperatus</u> Dettmann	R
	<u>Lycopodiumsporites austroclavatidites</u> (Cookson)	C
	<u>L. circolumenus</u> Cookson & Dettmann	R
	<u>L. eminulus</u> Dettmann	C
	<u>L. facetus</u> Dettmann	R
	<u>L. nodosus</u> Dettmann	R
	<u>Matonisporites cooksoni</u> Dettmann	R
	<u>Murospora florida</u> (Balme)	R
	<u>Neoraistrickia truncata</u> (Cookson)	R
	<u>Sestrosporites pseudoalveolatus</u> (Couper)	R
Pollen:	<u>Velosporites triquetrus</u> (Lantz)	R
	<u>Alisporites grandis</u> (Cookson)	C
	<u>A. similis</u> (Balme)	C
	<u>Araucariacites australis</u> Cookson	C
	<u>Classopollis</u> cf. <u>classoides</u> Pflug	C
	<u>Microcachryidites antarcticus</u> Cookson	Ab
	<u>Podocarpidites</u> cf. <u>ellipticus</u> Cookson	C
	<u>Tsugaepollenites dampieri</u> (Balme)	R

4940 feet

Plant material extracted from the sample consists chiefly of wood fragments. Spores and pollen grains are of rare occurrence and are referable to the following species:

Spores:	<u>Baculatisporites comaumensis</u> (Cookson)	
	<u>Cyathidites australis</u> Couper	
	<u>C. minor</u> Couper	
	<u>Foraminisporis dailyi</u> (Cookson & Dettmann)	
	<u>Lycopodiumsporites austroclavatidites</u> (Cookson)	
	<u>Neoraistrickia truncata</u> (Cookson)	
Pollen:	<u>Araucariacites australis</u> Cookson	
	<u>Classopollis</u> cf. <u>classoides</u> Pflug	
	<u>Cycadopites nitidus</u> (Balme)	
	<u>Microcachryidites antarcticus</u> Cookson	
	<u>Podocarpidites</u> cf. <u>ellipticus</u> Cookson	
	<u>Tsugaepollenites dampieri</u> (Balme)	

4964 feet

An abundant and diverse assemblage of spores and pollen grains was obtained from the sample. Species identified include :

Spores:	<u>Baculatisporites comaumensis</u> (Cookson)	Ab
	<u>Contignisporites cooksonii</u> (Balme)	R
	<u>Cicatricosisporites australiensis</u> (Cookson)	C
	<u>Cooksonites variabilis</u> Pocock	R
	<u>Couperisporites</u> sp.	R
	<u>Cyclosporites hughesi</u> (Cookson & Dettmann)	R
	<u>Cyathidites australis</u> Couper	C
	<u>C. minor</u> Couper	Ab
	<u>Dictyophyllidites crenatus</u> Dettmann	R
	<u>Dictyotosporites speciosus</u> Cookson & Dettmann	R
	<u>Foraminisporis dailyi</u> (Cookson & Dettmann)	R

	<u>Ischyosporites punctatus</u> Cookson & Dettmann	R
	<u>Januasporites spinulosus</u> Dettmann	R
	<u>Klukisporites scaberis</u> (Cookson & Dettmann)	R
	<u>Leptolepidites verrucatus</u> Couper	C
	<u>L. major</u> Couper	R
	<u>Lycopodiacidites asperatus</u> Dettmann	R
	<u>Lycopodiumsporites austroclavatidites</u> (Cookson)	C
	<u>L. circolumenus</u> Cookson & Dettmann	C
	<u>L. eminulus</u> Dettmann	R
	<u>Murospora florida</u> (Balme)	R
	<u>Neoraistrickia truncata</u> (Cookson)	C
	<u>Osmundacidites mollis</u> (Cookson & Dettmann)	R
	<u>Pilosporites notensis</u> Cookson & Dettmann	R
	<u>Stereisporites antiquasporites</u> (Wilson & Webster)	C
Pollen:	<u>Araucariacites australis</u> Cookson	C
	<u>Cycadopites nitidus</u> (Balme)	C
	<u>Classopollis cf. classoides</u> Pflug	R
	<u>Microcachryidites antarcticus</u> Cookson	Ab
	<u>Podocarpidites cf. ellipticus</u> Cookson	Ab
	<u>Podosporites microsaccatus</u> (Couper)	C
	<u>Tsugaepollenites dampieri</u> (Balme)	R
	<u>T. trilobatus</u> (Balme)	R

Samples between 3549 feet and 4964 feet yielded spore-pollen assemblages in which Dictyotosporites speciosus and Cyclosporites hughesi are components. This association indicates that the section belongs to the Neocomian-Aptian Cyclosporites hughesi Subzone of the Dictyotosporites speciosus Zone. The younger subzone of this zone, the Crybelosporites striatus Subzone (Lower Albian), was not recognized. Specimens of Crybelosporites striatus were recorded from the sample at 4078 feet, but these are almost certainly contaminants from higher in the well. As noted previously, the sample from which C. striatus was obtained, was impregnated with drilling mud. Furthermore, C. striatus and other probable contaminants (Balmeisporites holodictyus, Tricolpites sp. and Triorites harrisii) are distinctly better preserved and less compressed than all other spore-pollen types observed in the residue from the sample at 4078 feet.

The lower horizons of the Cyclosporites hughesi Subzone in the Garvoc well (between 4878 feet and 4964 feet) yielded Murospora florida. These horizons may thus be equated to Evans's (1966) Unit Kla, the upper part of which corresponds to the lower horizons of the C. hughesi Subzone (see Dettmann and Playford 1968). Criteria upon which the C. hughesi Subzone may be further subdivided are currently being investigated.

Microfloras obtained from the C. hughesi Subzone in the Garvoc No.1 well are composed almost entirely of spores and pollen grains. Occasional specimens of possible chlorophycean types (Schizosporis reticulatus) were observed at 3549 feet, 3763 feet, and 4184 feet.

CONCLUSIONS

Microfloras obtained from Garvoc No.1 well indicate that basal horizons of the Middle-Upper Albian Coptospora paradoxa Zone were encountered

at 3334 feet. The underlying section between 3549 feet and 4964 feet is entirely within the Neocomian-Aptian Cyclosporites hughesi Subzone of the Dictyotosporites speciosus Zone. Sediments referable to the Lower Albian Crybelosporites striatus Subzone (of the D. speciosus Zone) were not detected in the well.

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EXPLANATION OF TABLE 1

Preservation and zonal attribution of plant microfossil assemblages in Interstate/Shell Garvoc No.1 well, 3076 feet - 4964 feet.

Abbreviations:

Yield expresses frequency of spores and pollen in the palynological residues as follows:-

- Ab = abundant
- C = common
- Sp = sparse
- B = barren

Colour and preservation. Spores, pollen, wood, and cuticle present in the residues are denoted by their colour (col.) and quality of preservation (pres.) thus:-

- Y = yellow
- Br = brown
- Bl = black
- good = well preserved
- fair = fairly preserved
- poor = poorly preserved

Spore-pollen zones are those defined by Dettmann and Playford (1968).

TABLE 1

Depth (feet)	Yield	Spore-Pollen		Wood		Cuticle		Spore-Pollen Zone	
		Col.	Pres.	Col.	Pres.	Col.	Pres.		
3076	Sp	Br	fair-poor	Br-Bl	Fair-poor	Br	Fair-poor	?	
3262	"	"	"	"	"	"	"		
3334	Ab	Y-Br	good-fair	"	fair	Y-Br	fair	Coptospora paradoxa Zone	
3549	"	"	fair	"	fair-poor	"	fair-poor	Dictyotosporites speciosus Zone Cyclosporites hughesi Subzone	
3642	C	"	fair-poor	"	"	"	"		
3763	Ab	"	"	"	"	"	"		
3940	Sp	Br	"	"	"	"	"		
4078	"	"	poor	"	"	DY-Br	poor		
4184	Ab	DY-Br	fair-poor	"	"	"	fair-poor		
4272	Sp	Br	"	"	"	"	"		
4394	"	"	"	"	"	"	"		
4489	Ab	"	"	"	"	"	"		
4532 ¹ / ₂	B	-	-	-	-	-	-		
4637	"	-	-	Br	poor	-	-		
4705	Sp	Br	fair-poor	Br-Bl	fair-poor	-	-		
4798	"	"	"	"	"	-	-		
4878	C	"	"	"	"	DY-Br	fair-poor		
4940	Sp	"	"	"	"	"	"		
4964	Ab	"	"	"	"	"	"		