

Avec les compliments de l'un
des auteurs
M. Vanguetstaine

Devonian (Emsian-Famennian) Palynomorphs

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EMSIAN

Miospore assemblages which can be positively assigned to the Early Devonian have, to date, only been recorded from core material from Well A1-33. Assemblages of Emsian age were recorded from the interval 8079 to 8091 ft. whilst assemblages from 8055 to 8076 ft. contain some taxa which are common in the Emsian elsewhere but are not diagnostic. Assemblages recovered from sediments in the interval 9700 to 9709 ft. in Well A1-33 were dominated by leiospheres together with smaller numbers of acanthomorph acritarchs. The age of this interval is unknown but it could be as old as Ordovician.

The Emsian assemblages recovered from the interval between 8079 to 8091 ft. contain a wide variety of azonate miospores together with species possessing an equatorial crassitude, specimens with zonate extensions are rare. Miospores with sculptural or structural modifications around their equators are relatively common i.e. *?Procoronaspora* sp., *Diatomozonotriletes* sp. A. and *Craspedispora craspeda*. The presence in these assemblages of *Emphanisporites annulatus*, *E. erraticus*, *E. rotatus*, *E. cf. decoratus*, *E. obscurus*, *Dibolisporites eifeliensis*, *D. cf. gibberosus*, *D. echinaceus*, *Apiculiretusispora brandtii* together with small tripapillate miospores suggest an Early or Middle Emsian age to be probable. The assemblages are closely comparable with Emsian microfloras recorded in the Polignac Basin of Algeria (Jardiné & Yapaudjian, 1968) and the Rhadames Basin of Western Libya (Massa & Moreau-Benoit, 1976).

EIFELIAN

Miospore assemblages of probable Eifelian age have been recovered from Well A1-37 from cored material at 10674 ft. The miospore populations which are extremely well preserved contain representatives of the following taxa: *Anapiculatisporites* sp., *Dibolisporites cf. bullatus*, *Hystricosporites* spp., *Emphanisporites spinaeformis*, *Diatomozonotriletes* sp., *Calyptosporites cf. velatus*, *C. cf. spinosus*, *Grandispora cf. libyensis*, *Samarisporites* sp. A., *S. cf. megaformis*, *? Spinozonotriletes cf. naumovii*, "*Hymenozonotriletes*" *discors* and *Ancyrospora nettersheimensis*. This assemblage is closely comparable with other previously reported Eifelian

population from Algeria (Jardiné & Yapaudjian, 1968), Saudi Arabia (Hemer & Nygreen, 1966) and Western Libya (Massa & Moreau-Benoit, 1976). Despite close similarity at generic level between the composition of the northeast Libyan assemblages with those from the Rhenish Middle Devonian of the Eifel region of Germany, comparison at specific level is almost impossible. The presence in the Libyan material of *Ancyrospora nettersheimensis* is however of interest since this species was found to be confined to the Late Emsian and Early Eifelian in the Eifel region (Riegel, 1974).

GIVETIAN

Givetian miospore assemblages have been encountered in several wells including A1-37, B1-31, E1-82 and G1-82. Diagnostic components in these assemblages include *Acinosporites acanthomammillatus*, *A. macrospinosus*, *Dibolisporites echinaceus*, *Geminispora tuberculata*, *Grandispora inculca*, *G. libyensis*, *Rhabdosporites langii*, *Verrucosisporites premnus* and *V. scurrus*, and suggest an early Givetian age.

Chitinozoan populations have been recovered from the same horizons as the above miospore assemblages in Well A1-37 in the interval between 9251 to 9840 ft. The assemblage recovered from the sample at 9840 ft. is the most diversified in composition with representatives of *Eisenackitina castor* (*sensu* J. A. Legault, 1973) being the dominant component. Amongst the other species present are forms sometimes erroneously attributed to *Angochitina devonica* but here referred to as *Gotlandochitina* sp. B. In addition there are isolated individuals identified as *Gotlandochitina milanensis*, *Ancyrochitina ?aequoris* and *Hoegisphaera glabra* which were recorded as common components of the lower part of the Aouinet-Ouenine II Formation in the Rhadames Basin of western Libya by Massa & Moreau-Benoit (1976) which is also considered to be of Early Givetian age. Chitinozoan assemblages recovered from younger sediments at 9251 and 9290 ft. in Well A1-37 are dominated by *Fungochitina pilosa*, a species which has previously been recorded from both Givetian and Frasnian sediments in the Rhadames Basin of western Libya, northern France and the U.S.A. (Taugourdeau, Ph. 1965; Collinson, C. & Scott, A. J., 1958 and Urban, J. B. and Newport, R. L., 1973).

FRASNIAN

Assemblages of Frasnian palynomorphs which have been recorded in Well C1-125 in the interval 10300 to 11000ft. and in Well A1-115 between 8762 to 8784 ft. are characterised by the occurrence of the following miospore taxa:— *Verrucosisporites bullatus*, *Samarisporites triangulatus*, *Ancyrospora langi* and *A. multifurcata*. The presence in these assemblages of the acritarchs *Horologinella quadrispina*, *H. horologia*, *Unellium winslowae* and *Villosacapsula globosa* suggests by comparison with their previously known distribution in the Algerian Sahara (Jardiné *et al.*, 1974) a Late Frasnian age. *Villosacapsula globosa* has previously been found in Belgium to be restricted to a narrow zone transitional to the Frasnian – Famennian boundary.

FAMENNIAN

Earliest Famennian palynomorphs have been recorded in Well A1-NC-92 in the interval 13400 to 13500ft., where the diagnostic miospore *Cyrtospora cristifer* occurs in association with the distinctive Frasnian-Famennian boundary association of acritarchs including *Crassiangulina tessellata*, *Umbellasphaeridium deflandrei*, *Unellium winslowae*, *Veryhachium pannuceum* and *Villosacapsula globosa*.

Late Famennian miospore populations are characterised by the presence of *Leiotriletes libyensis*, *Rugospora flexuosa* and abundant representatives of *Spelaeotriletes* cf. *crustatus*. Distinctive assemblages of latest Famennian (Strunian) age with the characteristic miospore *Retispora lepidophyta* accompanied by *Knoxisporites literatus* and *Vallatisporites pusillites* were

recorded in Well C1-125 in the interval 9300 to 9700ft. and in Well A1-37 between 8418 and 8421ft. These miospore populations are accompanied by acritarchs of the sphaeromorph and acanthomorph type in which the genera *Gorgonisphaeridium* and *Lophosphaeridium* predominate.

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Explanation of Plate 17

Figs. 1–8 are $\times 500$; figs. 9–12 are $\times 1000$

- Fig. 1. *Dibolisporites* sp. A. A1-33, 8064-8067ft., Slide 711A, Q32, AGC 181.
- Fig. 2. *Retusotriletes* sp. A. A1-33, 8088-8091 ft., Slide 717A, M37/2 – M38/1, AGC 182.
- Fig. 3. *Apiculiretusispora* cf. *brandtii* Streele, 1964. A1-33, 8088-8091 ft., Slide 718A, J33, AGC 183.
- Fig. 4. ?*Granulatisporites* sp. A (?contaminant). A1-33, 8064-8067ft., Slide 711A, H33/3, AGC 184.
- Fig. 5. *Procoronaspora* sp. A1-33, 8079-8082 ft., Slide 715B, 041/3, AGC 185.
- Fig. 6. *Diatomozonotriletes* sp. A. A1-33, 8079-8082 ft., Slide 715B, F44/2, AGC 186.
- Fig. 7. *Emphanisporites* cf. *obscurus* McGregor, 1961. A1-33, 8082-8085ft., Slide 716A, R30/4, AGC 187.
- Fig. 8. *Emphanisporites erraticus* (Eisenack, 1944). A1-33, 8088-8091 ft., Slide 718A, 040/4 – 041/3, AGC 188.
- Fig. 9. ?*Camarozonotriletes* sp. A1-33, 8085-8088 ft., Slide 717A, 041/4, AGC 189.
- Fig. 10. *Aneurospora* sp. A1-33, 8061-8064 ft., Slide 710A, K47/2, AGC 190.
- Fig. 11. *Emphanisporites* cf. *decoratus* Allen, 1965. A1-33, 8085-8088 ft., Slide 717A, G34, AGC 191.
- Fig. 12. *Camarozonotriletes* sp. A A1-33, 8079-8082 ft., Slide 715B, U37/4, AGC 192.



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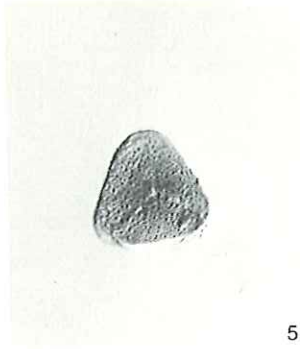
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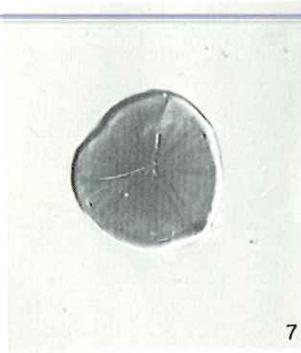
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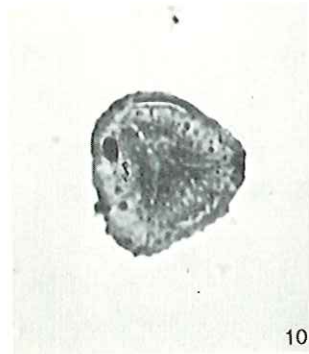
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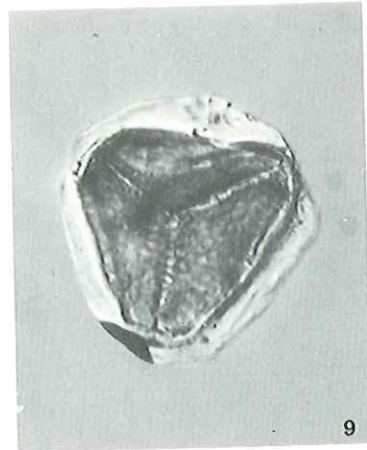
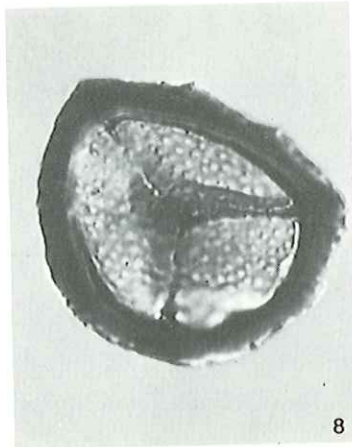
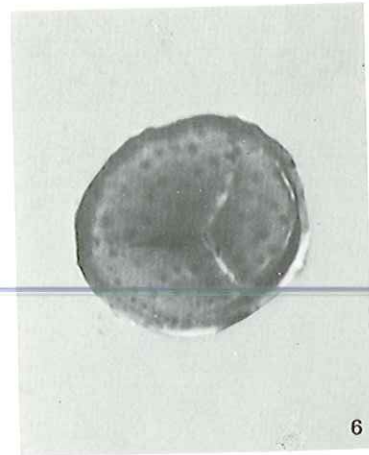
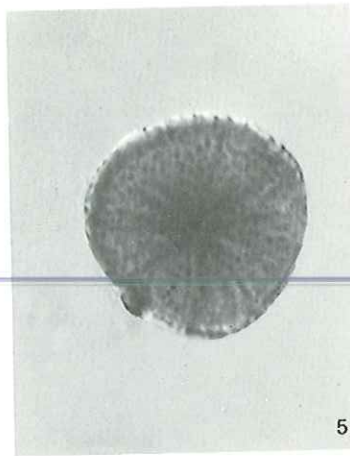
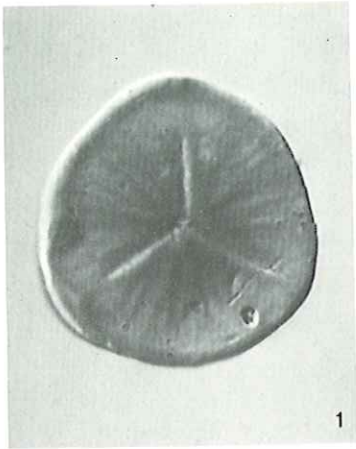
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Explanation of Plate 18

All figures are × 1000

- Fig. 1. *Emphanisporites obscurus* McGregor, 1961. A1-33, 8082-8085 ft., Slide 716A, P28, AGC 193.
- Fig. 2. *Emphanisporites* cf. *obscurus* McGregor, 1961. A1-33, 8082-8085 ft., Slide 716A, K42/4 – L43/1, AGC 194.
- Fig. 3. *Emphanisporites erraticus* (Eisenack) McGregor, 1961. A1-33, 8082-8085 ft., Slide 716A, F43/1, AGC 195.
- Fig. 4. *Emphanisporites ?annulatus* McGregor, 1961. A1-33, 8088-8091 ft., Slide 718A, M35/1, AGC 196.
- Fig. 5. *Emphanisporites* cf. *decoratus* Allen, 1965. A1-33, 8082-8085 ft., Slide 716A, M33/1, AGC 197.
- Fig. 6. *Aneurospora* sp. A. A1-33, 8082-8085 ft., Slide 716A, K33, AGC 198.
- Fig. 7. *Aneurospora* sp. B. A1-33, 8082-8085 ft., Slide 716A, F32/2, AGC 199.
- Fig. 8. *Cymbosporites* sp. A1-33, 8082-8085 ft., Slide 716A, S41/2, AGC 200.
- Fig. 9. *Craspedispora* sp. A1-33, 8079-8082 ft., Slide 715A, T36/4, AGC 201.



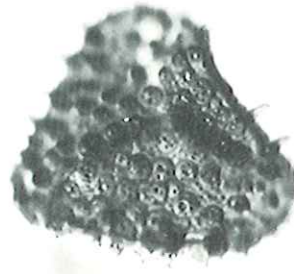
Explanation of Plate 19

All figures are $\times 1000$

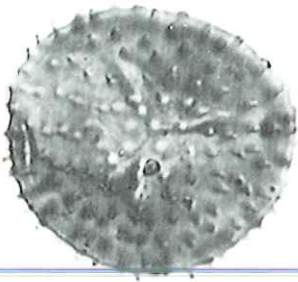
- Fig. 1. ?*Dibolisporites* sp. B. A1-33, 8064-8067ft., Slide 711A, Q30/4, AGC 202.
- Fig. 2. *Diatomozonotriletes* sp. A. (contaminant), A1-33, 8088-8091 ft., Slide 718B, K40/3, AGC 203.
- Fig. 3. *Dibolisporites eifeliensis* (Lanninger) McGregor, 1973. A1-33, 8082-8085 ft., Slide 716A, J43, AGC 204.
- Fig. 4. *Procoronaspora* sp. A1-33, 8082-8085 ft., Slide 716A, N32, AGC 205.
- Fig. 5. *Dibolisporites* sp. C. A1-33, 8079-8082 ft., Slide 715A, Q40, AGC 206.
- Fig. 6. *Dibolisporites* sp. cf. *gibberosus* (Naumova) Richardson, 1965. A1-33, 8079-8082ft., Slide 715A, L43, AGC 207.



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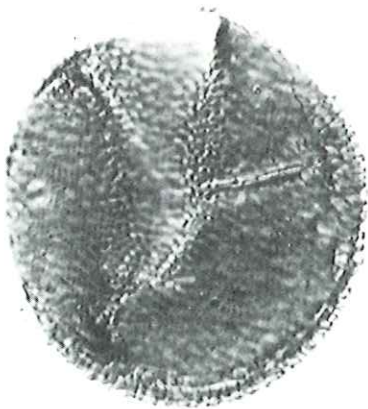
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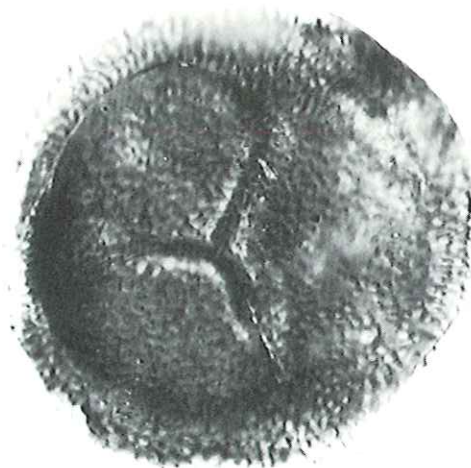
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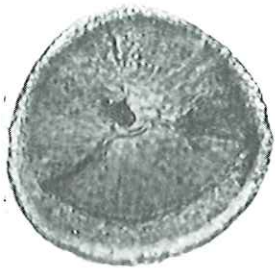


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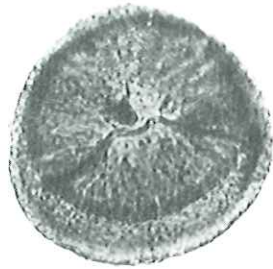
Explanation of Plate 20

All figures are $\times 500$

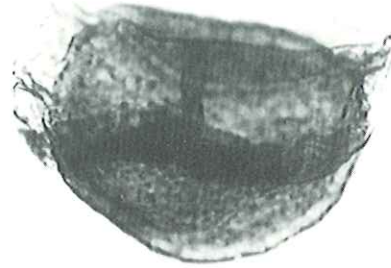
- Fig. 1-2. cf. "*Hymenozonotriletes*" *biformis* Archangelskaya, 1963. A1-37, 10674 ft., S.G. 10674/14, AGC 208.
- Fig. 3. *Zonate* sp. A. A1-37, 10674 ft., Slide 3, AGC 269.
- Fig. 4. "*Hymenozonotriletes*" *discors* (Chibrickova) A1-37, 10674 ft., S.G. 10674/5, AGC 209.
- Fig. 5. *Craspedispora* sp. A1-37, 10674 ft., S.G. 10674/20, AGC 210.
- Fig. 6. *Samarisporites* sp. B. A1-37, 10674 ft., S.G. 10674/16, AGC 211.
- Fig. 7. ?*Spinozonotriletes* cf. *naumovii* (Kedo) Richardson, 1965. A1-37, 10674 ft., S.G. 10674/1, AGC 212.
- Fig. 8. ?*Calyptosporites* sp. A. A1-37, 10674 ft., S.G. 10674/8, AGC 213.



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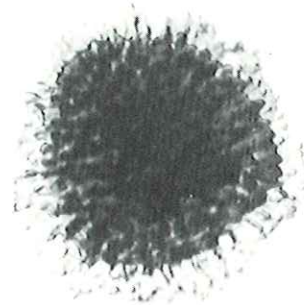
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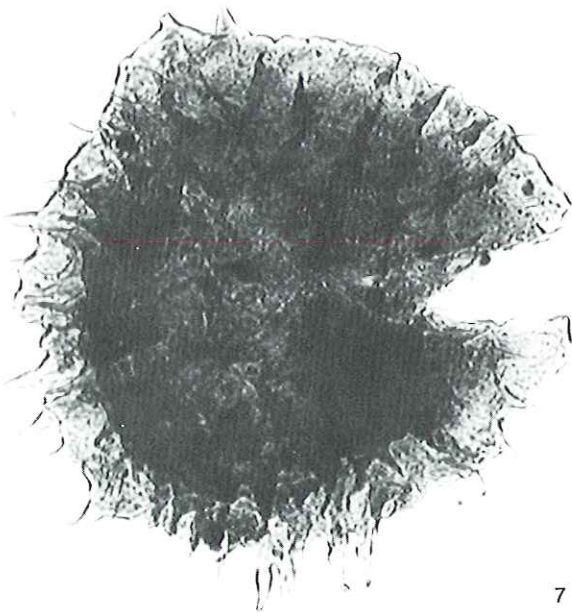
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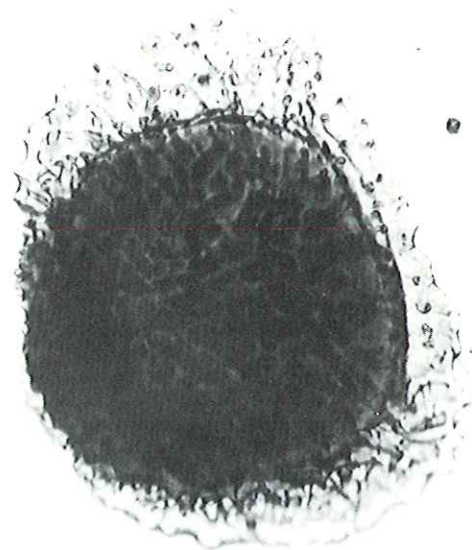
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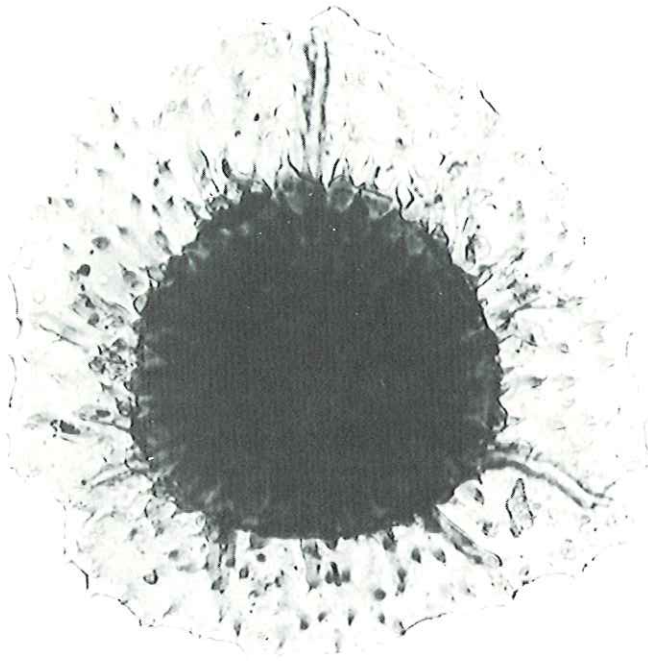


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Explanation of Plate 21

All figures are $\times 500$

- Fig. 1. ?*Calyptosporites* sp. A. A1-37, 10674ft., S.G. 10674/15, AGC 214.
Fig. 2-3. *Samarisporites* sp. A. A1-37, 10674ft., S.G. 10674/23, AGC 215.
Fig. 4. cf. "*Hymenozonotriletes*" *discors* Chibrickova, 1959. A1-37, 10674ft., S.G. 10674/21, AGC 216.
Fig. 5. ?*Contagisporites* sp. A1-37, 10674ft., S.G. 10674/10, AGC 217.
Fig. 6. *Calyptosporites* sp. B. A1-37, 10674ft., S.G. 10674/2, AGC 218.
Fig. 7. *Calyptosporites* cf. *velatus* (Eisenack) Richardson, 1962. A1-37, 10674ft., S.G. 10674/6, AGC 219.



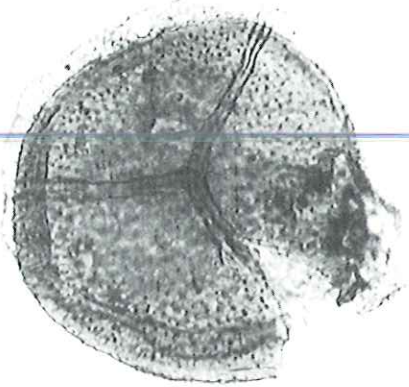
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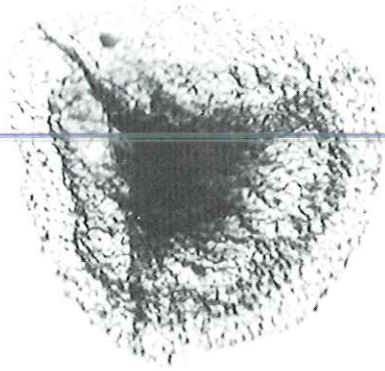
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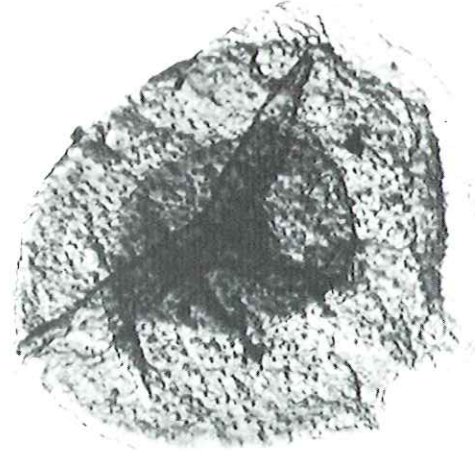
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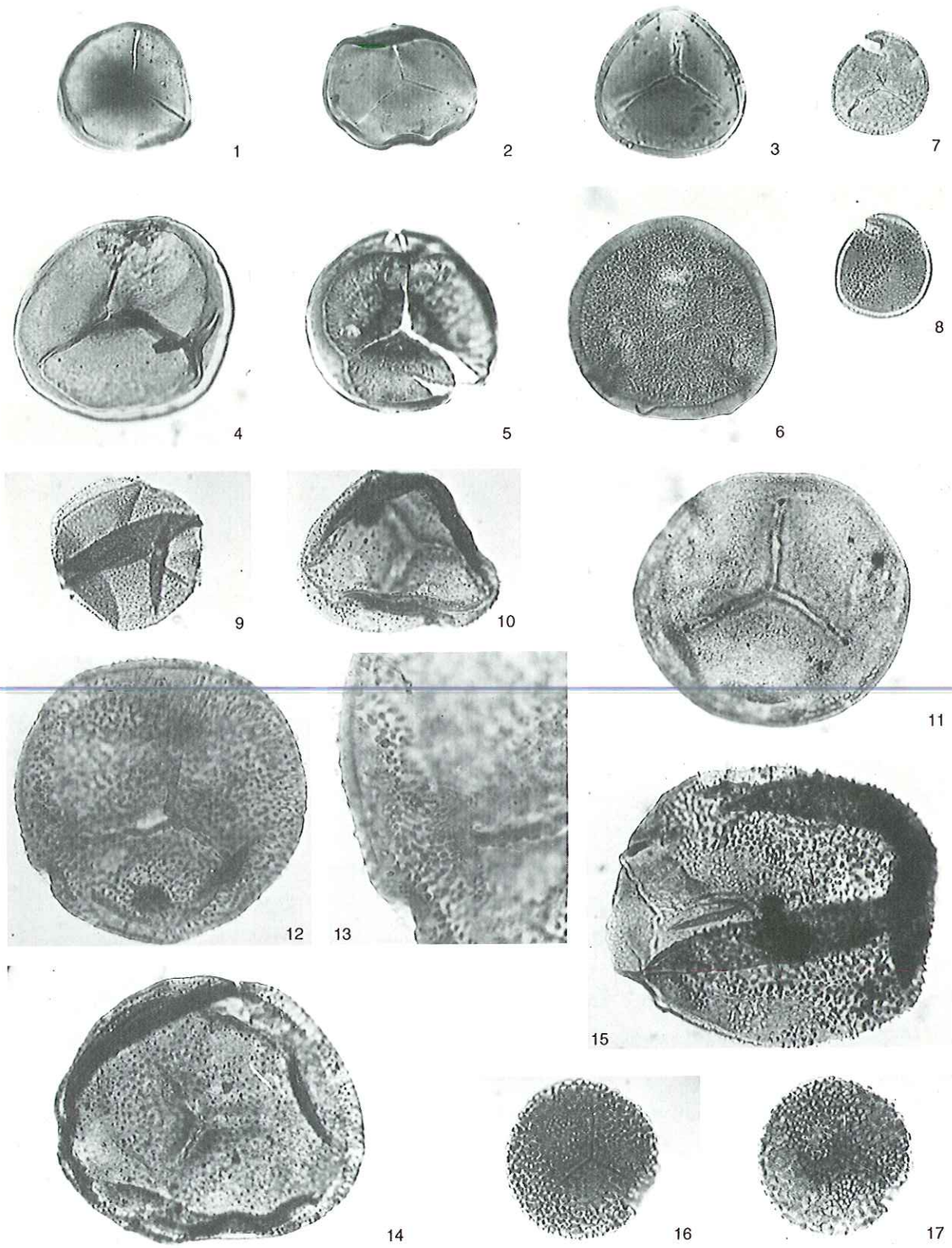


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Explanation of Plate 22

All figures are $\times 500$ unless otherwise indicated

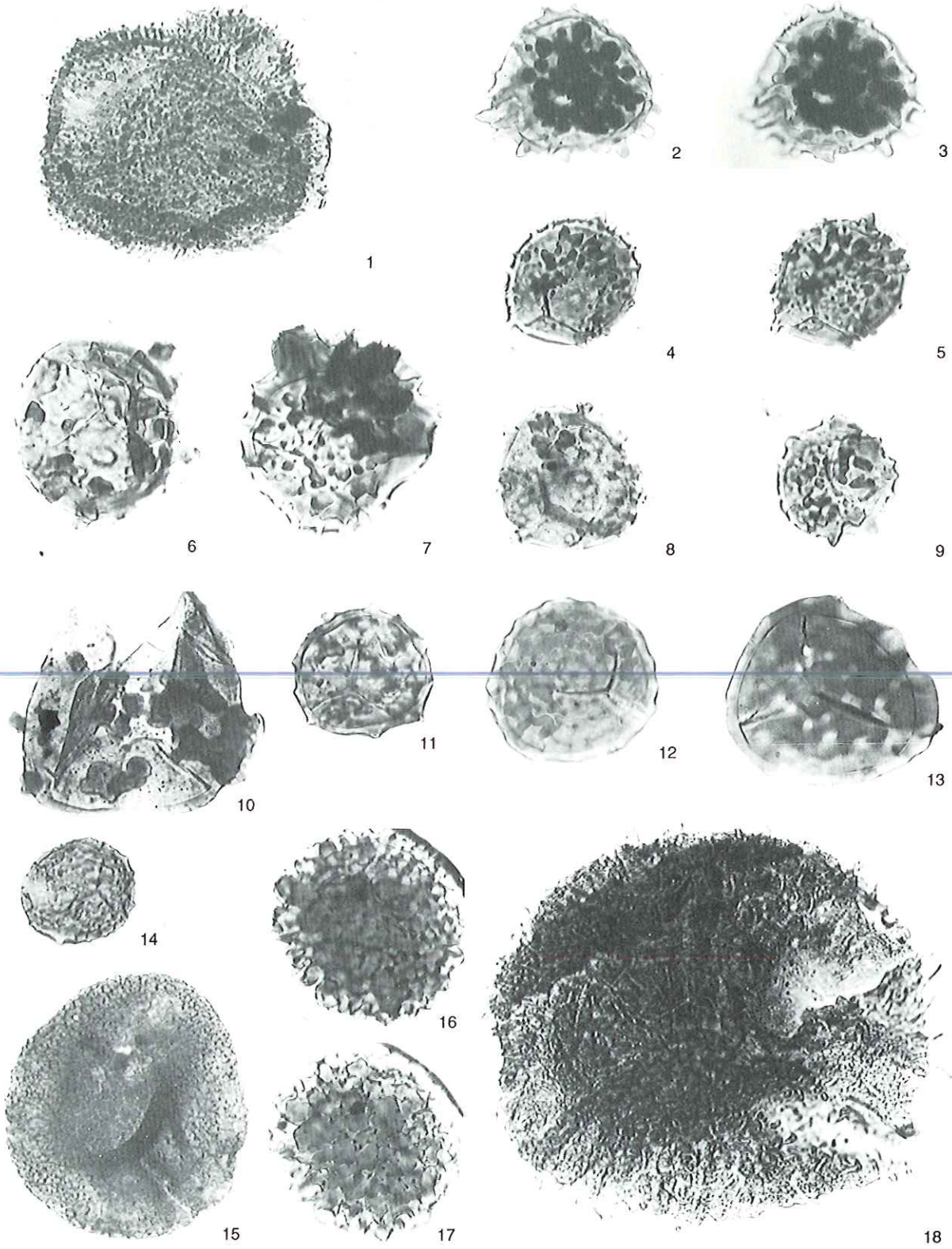
- Fig. 1. *Retusotriletes actinomorphus* Chibrikova, 1962. E1-82, Core 7, 1319m., S.G. 1319/36, AGC 220.
- Fig. 2. *Retusotriletes triangulatus* (Strel), Strel 1967. E1-82, Core 7, 1319m., S.G. 1319/19, AGC 221.
- Fig. 3. *Retusotriletes* sp. E1-82, Core 7, 1319m., S.G. 1319/56, AGC 222.
- Fig. 4. *Retusotriletes rotundus* (Strel) Strel, 1967. J1-81A, 15685ft., AGC 223.
- Fig. 5. *Retusotriletes rugulatus* Riegel, 1973. J1-81A, 15685ft., AGC 224.
- Fig. 6. *Punctatisporites* sp. E1-82, Core 7, 1319m., S.G. 1319/44, AGC 226.
- Figs. 7, 8. *Cyclogranisporites* sp. E1-82, Core 7, 1319m., S.G. 1319/15, AGC 225.
- Fig. 9. *Apiculiretusispora plicata* (Allen) Strel, 1967. E1-82, Core 7, 1319m., S.G. 1319/9, AGC 227.
- Fig. 10. *Apiculiretusispora* cf. *brandtii* (Strel). E1-82, Core 7, 1319m., S.G. 1319/1, AGC 228.
- Fig. 11. *Apiculiretusispora arenorugosa* McGregor, 1973. J1-81A, 15685ft., AGC 229.
- Figs. 12, 13. *Apiculiretusispora brandtii* Strel, 1964. E1-82, Core 7, 1319m., S.G. 1319/20, (Fig. 13, Detail of specimen in Fig. 12, $1000\times$), AGC 230.
- Fig. 14. *Apiculiretusispora* cf. *brandtii* Strel, 1964. E1-82, Core 7, 1319m., S.G. 1319/68, AGC 231. Specimen with widely detached outer layer.
- Fig. 15. *Dibolisporites* cf. *gibberosus* (Naumova) var. *major* (Kedo) Richardson, 1965. J1-81A, 15685ft., AGC 232.
- Fig. 16-17. *Verrucosisporites* sp. E1-82, Core 7, 1319m., S.G. 1319/2, AGC 233.



Explanation of Plate 23

All figures are $\times 500$

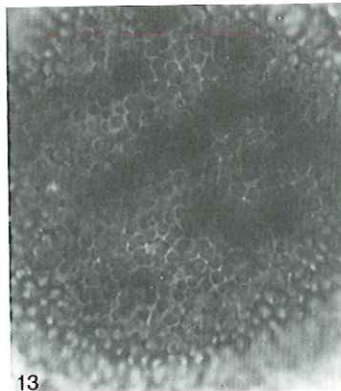
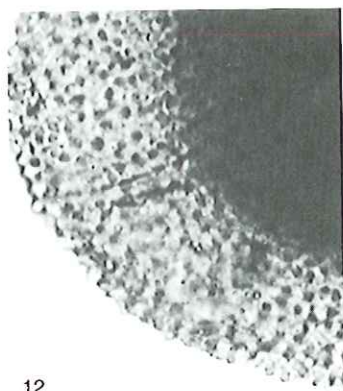
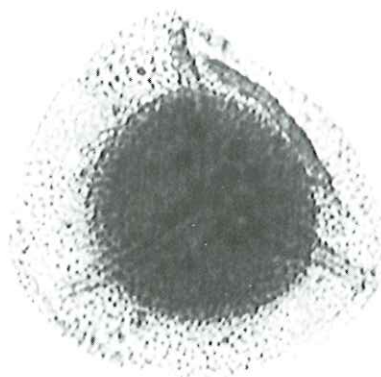
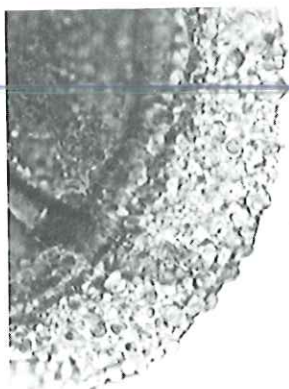
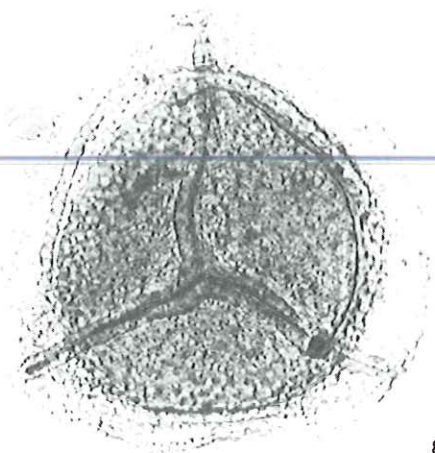
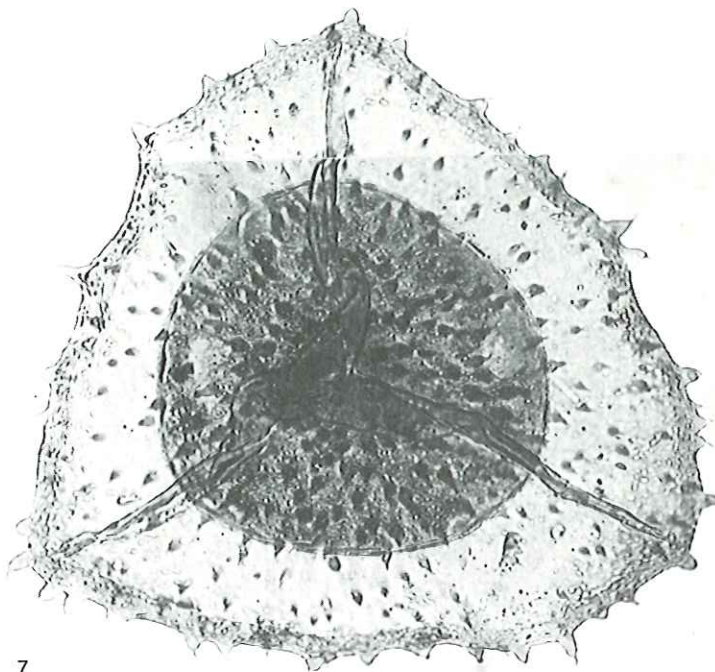
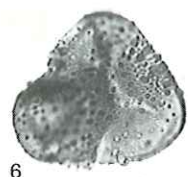
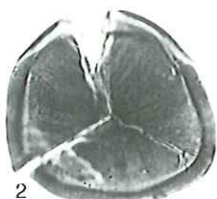
- Fig. 1. *Dibolisporites echinaceus* (Eisenack) Richardson, 1965. E1-82, Core 7, 1319m., S.G. 1319/7, AGC 234.
- Figs. 2, 3. *Raistrickia aratra* Allen, 1965. E1-82, Core 7, 1319m., S.G. 1319/26, AGC 235.
- Figs. 4, 5. *Verrucosisporites scurrus* (Naumova) McGregor & Camfield, 1982. J1-81A, 15685ft., AGC 236.
- Fig. 6. *Raistrickia* cf. *aratra* Allen, 1965. J1-81A, 15685ft., AGC 237.
- Fig. 7. *Verrucosisporites* cf. *premnus* Richardson, 1965. J1-81A, 15685ft., AGC 238.
- Fig. 8. *Lophozonotriletes* sp. E1-82, Core 7, 1319m., S.G. 1319/62, AGC 239.
- Fig. 9. *Verrucosisporites scurrus* (Naumova) McGregor & Camfield, 1982. E1-82, Core 7, 1319m., S.G. 1319/80, AGC 240.
- Fig. 10. *Lophotriletes* sp. E1-82, Core 7, 1319m., S.G. 1319/58, AGC 241.
- Fig. 11. *Dictyotriletes* sp. E1-82, Core 7, 1319m., S.G. 1319/4, AGC 242.
- Fig. 12. *Convolutispora* sp. E1-82, Core 7, 1319m., S.G. 1319/27, AGC 243.
- Fig. 13. *Brochotriletes* sp. E1-82, Core 7, 1319m., S.G. 1319/8, AGC 244.
- Fig. 14. *Dictyotriletes* sp. E1-82, Core 7, 1319m., S.G. 1319/79, AGC 245.
- Fig. 15. *Acinosporites* cf. *apiculatus* (Streel) Streel, 1964. E1-82, Core 7, 1319m., S.G. 1319/32, AGC 246.
- Figs. 16, 17. *Acinosporites* sp. E1-82, Core 7, 1319m., S.G. 1319/53, AGC 848.
- Fig. 18. *Acinosporites acanthomammillatus* Richardson, 1965. E1-82, Core 7, 1319m., S.G. 1319/57, AGC 247.



Explanation of Plate 24

All figures are $\times 500$ unless otherwise indicated

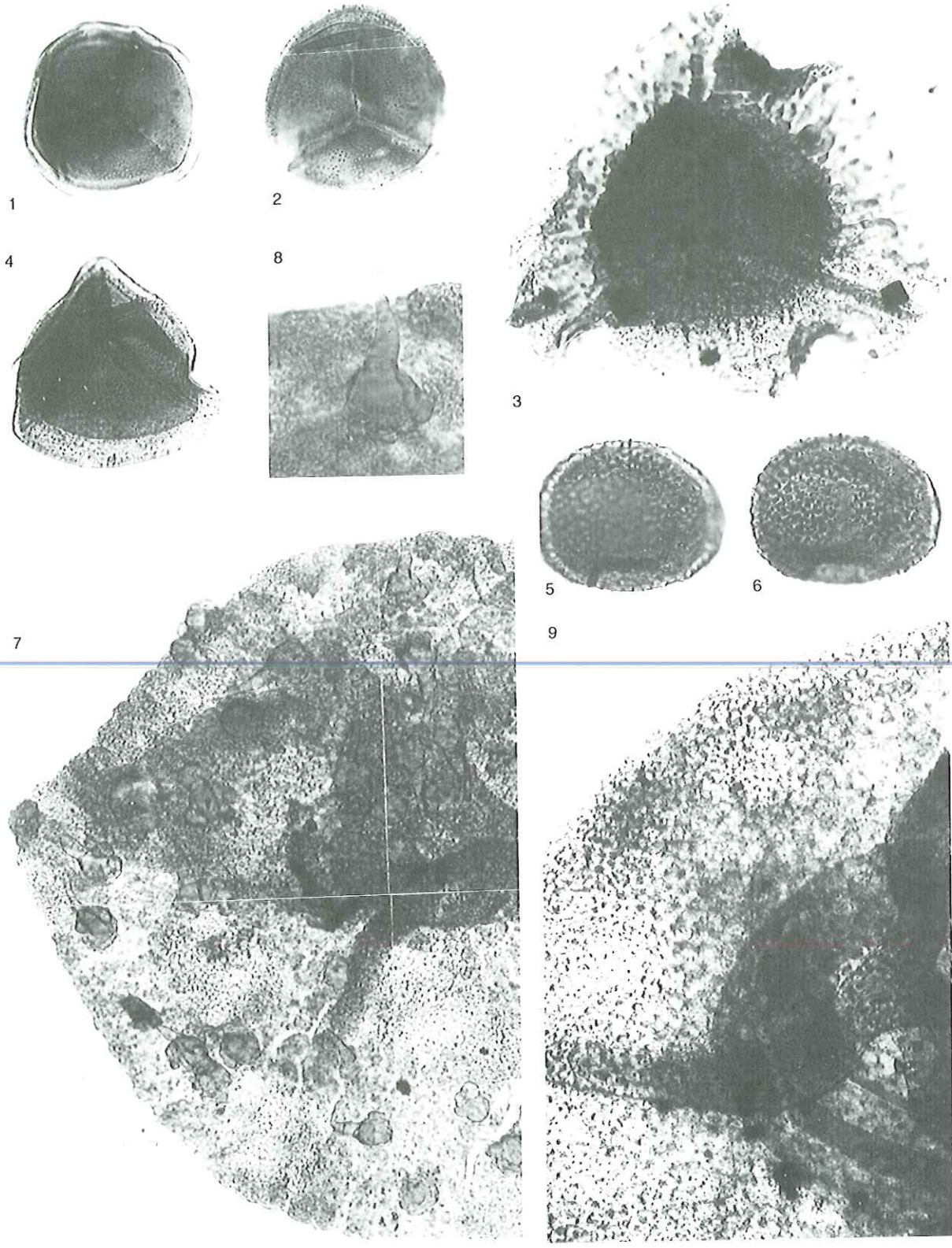
- Figs. 1, 2. *Emphanisporites spinaeformis* Schultz, 1968. E1-82, Core 7, 1319m., S.G. 1319/10, AGC 248.
- Fig. 3. *Emphanisporites* sp. with faint proximal radial ribs and narrow thin zona. E1-82, Core 7, 1319m., S.G. 1319/30, AGC 249.
- Fig. 4. *Anapiculatisporites* sp. E1-82, Core 7, 1319m., S.G. 1319/14, AGC 250.
- Figs. 5, 6. *Diatomozonotriletes* sp. E1-82, Core 7, 1319m., S.G. 1319/16, AGX 251.
- Fig. 7. *Grandispora libyensis* Moreau-Benoit, 1980. E1-82, Core 7, 1319m., S.G. 1319/44, AGC 252.
- Figs. 8, 9. *Grandispora* sp. A. E1-82, Core 7, 1319m., S.G. 1319/12, AGC 253. (Fig. 9: Detail of specimen in fig. 8). Compare with Daemon *et al.* 1967, pl. 3, fig. 35, 36 and Bär & Riegel 1974, pl. 1, fig. 13).
- Fig. 10. *Grandispora* sp. B. E1-82, Core 7, 1319m., S.G. 1319/25, AGC 254. Finely sculptured form with cingulate central body.
- Figs. 11, 12, 13. *Grandispora* sp. C. E1-82, Core 7, 1319m., S.G. 1319/18, AGC 255. (Fig. 12, 13: Details of specimen in fig. 11, $1000\times$).



Explanation of Plate 25

All figures are $\times 500$ unless otherwise indicated

- Fig. 1. *Geminospora* sp. E1-82, Core 7, 1319m., S.G. 1319/76, AGC 256.
- Fig. 2. *Geminospora tuberculata* (Kedo) Allen, 1965. E1-82, Core 7, 1319m., S.G. 1319/28, AGC 257.
- Fig. 3. *Calyptosporites proteus* (Naumova) Allen, 1965. J1-81A, 15685ft., AGC 258.
- Fig. 4. *Rhabdosporites* sp. E1-82, Core 7, 1319m., S.G. 1319/64, AGC 259.
- Figs. 5, 6. "Monolete" verrucate spore. E1-82. Core 7, 1319m., S.G. 1319/2, AGC 260.
- Figs. 7, 8. *Hystricosporites* sp. megaspore. E1-82. Core 7, 1319m., S.G. 1319/11, AGC 261. (Fig. 8: Detail of specimen in Fig. 7, $1000\times$).
- Fig. 9. *Biharisporites* sp. E1-82. Core 7, 1319m., S.G. 1319/40, AGC 262.



Explanation of Plate 26

All figures are $\times 500$

Fig. 1. *Tasmanites* sp. I1C-81, SWC 5806, AGC 263.

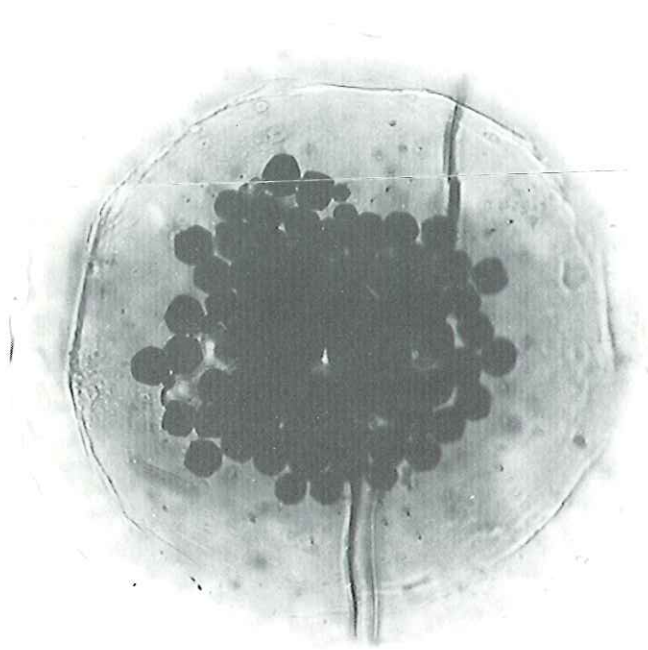
Fig. 2. *Leiosphaeridia* sp. I1C-81, SWC 5806, AGC 264.

Fig. 3. *Gorgonisphaeridium* sp. I1C-81, SWC 5806, AGC 265.

Fig. 4. *Polyedryxium pharaonis* Deunff, 1961. J1-81A, 15685ft., AGC 266.

Figs. 5, 6. *Polyedryxium fragosulum* Playford, 1977. I1C-81, SWC 5806, AGC 267. (phase contrast).

Fig. 7. *Incertae sedis*. E1-82, Core 7, 1319m., S.G. 1319/40, AGC 268. Bipolar body with 4 resp. 6 hollow "bifurcate" appendages at poles (see Doubinger 1966).



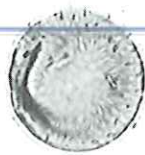
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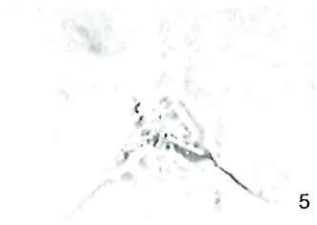
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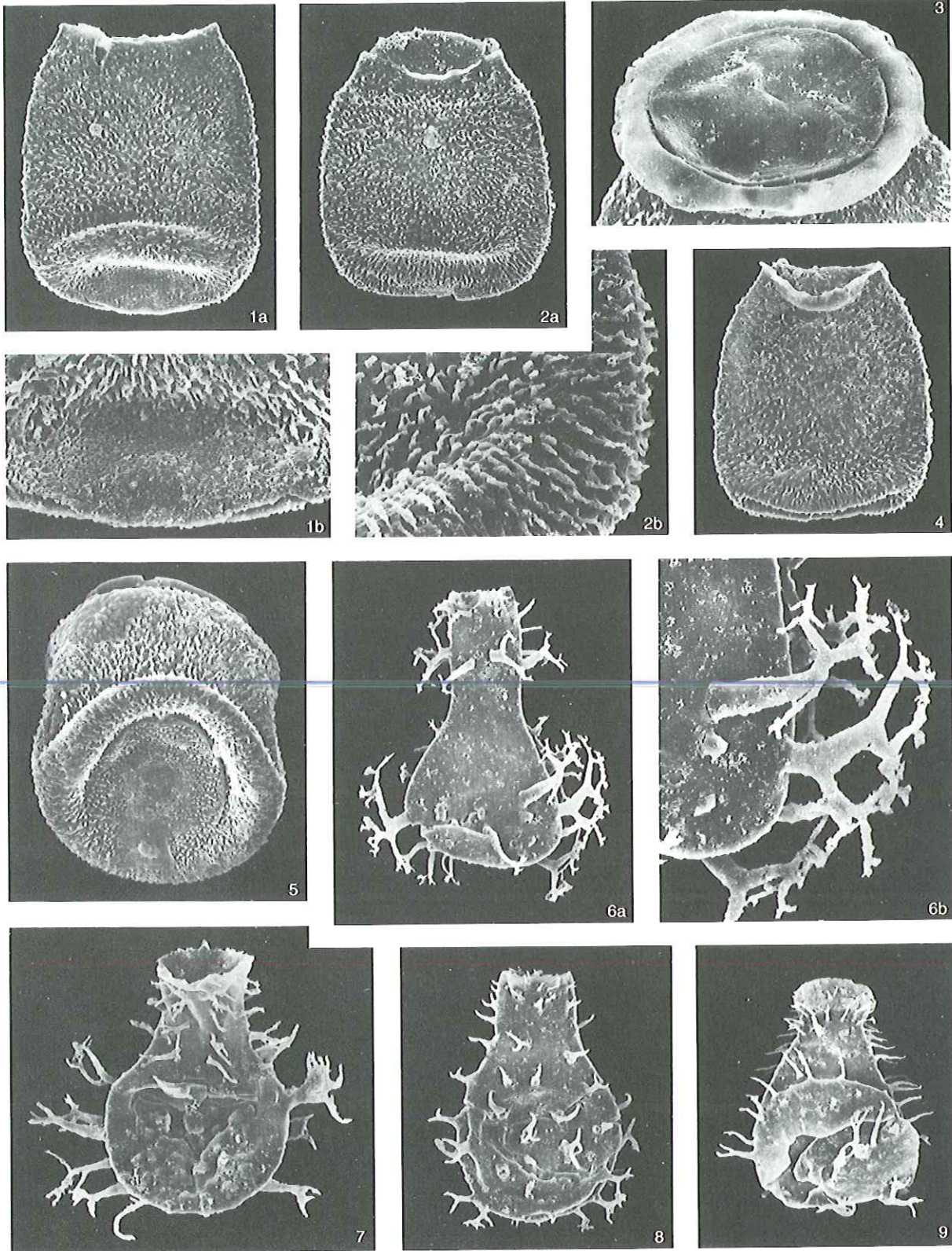
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6

Explantion of Plate 27

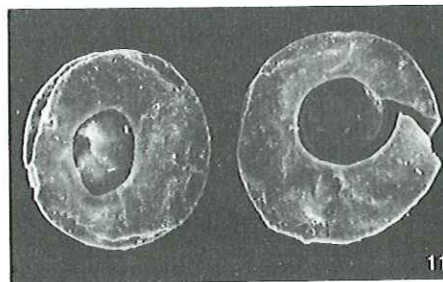
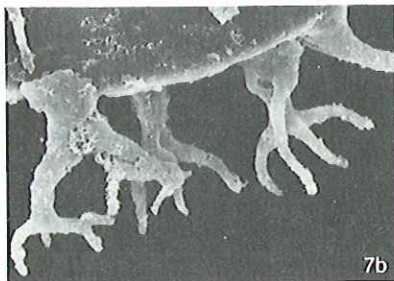
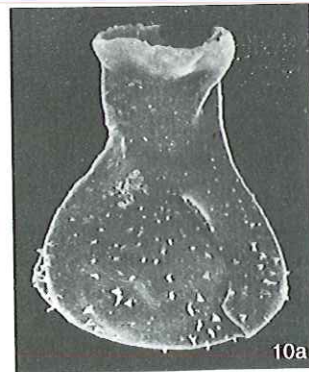
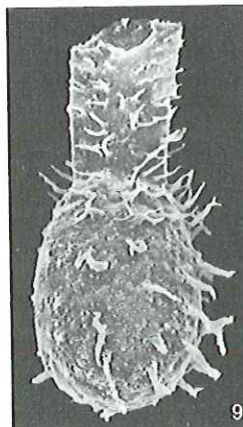
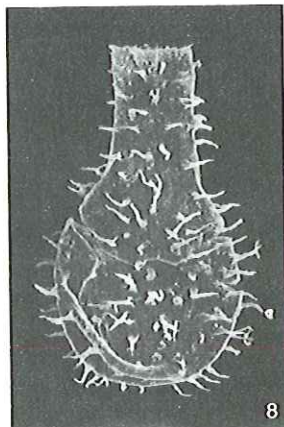
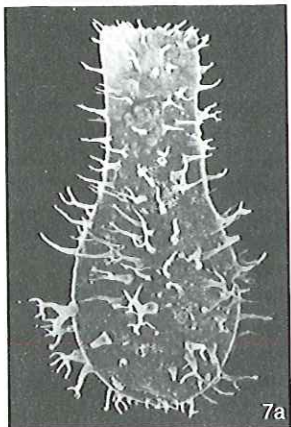
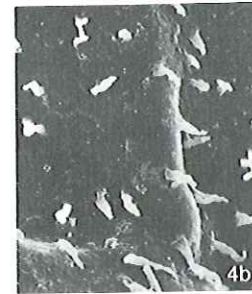
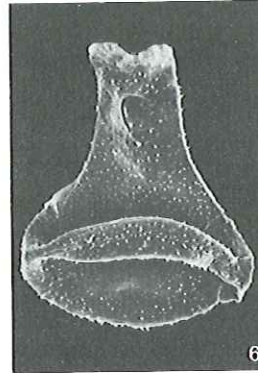
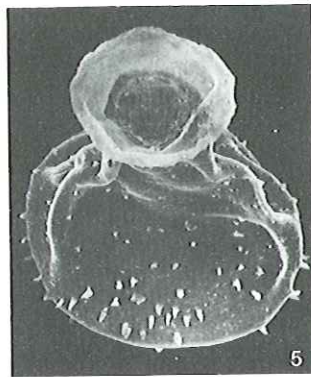
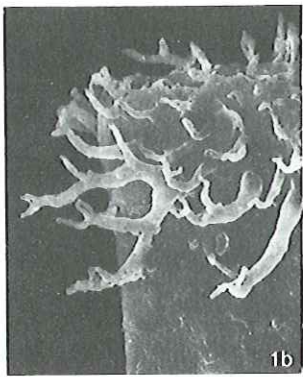
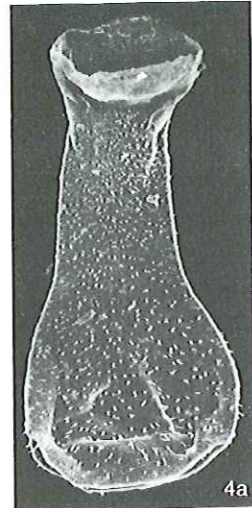
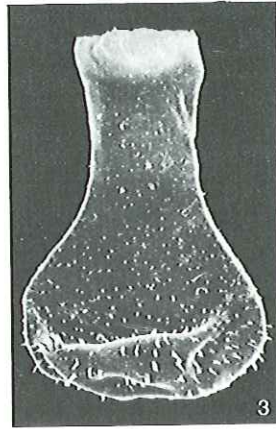
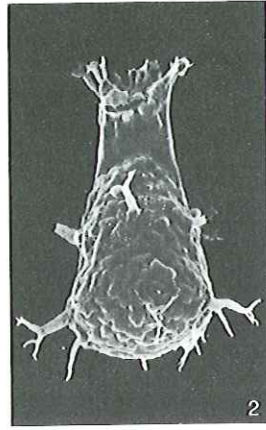
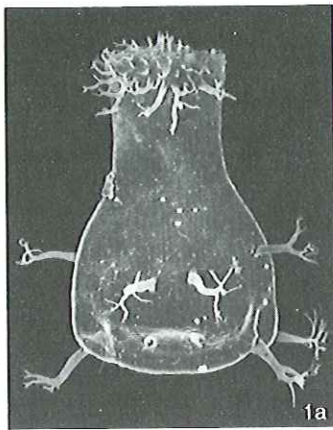
- Fig. 1 a, b. *Eisenackitina castor* Jansonius, 1964. sensu Legault, 1973. A1-37, 9840ft., Slide 13, N35/2, 1a: $\times 300$; 1b: $\times 750$, AGC 270. (The spinous forms are restricted to the Givetian while *E. castor* s.s. occurs in Late Eifelian).
- Fig. 2a, b. *Eisenackitina castor* Jansonius, 1964. sensu Legault, 1973. A1-37, 9840ft., Slide 13, Q35/1, 2a: $\times 300$; 2b: $\times 1250$, AGC 271. (Givetian).
- Fig. 3. Oral pole (collarette and operculum) of *Eisenackitina castor* Jansonius, 1964, sensu Legault, 1973. A1-37, 9840ft., Slide 13, 038/2, $\times 750$, AGC 272.
- Fig. 4. *Eisenackitina castor* Jansonius, 1964, sensu Legault, 1973. A1-37, 9840ft., Slide 13, Q37/4, $\times 300$, AGC 273. (Givetian).
- Fig. 5. *Eisenackitina castor* Jansonius, 1964, sensu Legault, 1973. A1-37, 9840ft., Slide 13, M34/4, $\times 400$, AGC 274. (Givetian).
- Fig. 6a, b. *Gotlandochitina?* sp. A. A1-37, 9840ft., Slide 13, N38, 6a: $\times 300$; 6b: $\times 750$, AGC 275.
- Fig. 7. *Gotlandochitina* sp. A1-37, 9840ft., Slide 13, P36/4, $\times 400$, AGC 276.
- Fig. 8. *Gotlandochitina milanensis* (Collinson & Scott, 1958). A1-37, 9840ft., Slide 13, P38/4, $\times 300$, AGC 277. (Givetian).
- Fig. 9. *Ancyrochitina ?aequoris* Urban & Kline, 1970. A1-37, 9840ft., Slide 13, 037/3, $\times 300$, AGC 278. (Givetian).



Explanation of Plate 28

- Fig. 1a, b. *Alpenachitina eisenacki* Dunn & Miller, 1964. Contaminated cuttings from J1-81A, 12800-12850ft., (Ashgill), Slide 2, N38/3, 1a: $\times 300$; 1b: $\times 1000$, AGC 279. (Eifelian-Givetian).
- Fig. 2. *Alpenachitina eisenacki* Dunn & Miller, 1964. Contaminated cuttings from J1-81A, 12950-13000ft., (Ashgill), Slide 1, M39/4, $\times 300$, AGC 280. (Eifelian-Givetian).
- Fig. 3. *Fungochitina pilosa* (Collinson & Scott, 1958). A1-37, 9251 ft., Slide 15, 039, $\times 300$, AGC 281. (Eifelian-Frasnian).
- Fig. 4a, b. *Fungochitina pilosa* (Collinson & Scott, 1958). A1-37, 9251 ft., Slide 15, 038, 4a: $\times 250$; 4b: $\times 1250$, AGC 282. (Eifelian-Frasnian).
- Fig. 5. *Fungochitina pilosa* (Collinson & Scott, 1958). A1-37, 9251 ft., Slide 15, R43/1, $\times 400$, AGC 283. (Eifelian-Frasnian).
- Fig. 6. *Fungochitina pilosa* (Collinson & Scott, 1958). A1-37, 9290ft., Slide 14, L43, $\times 300$, AGC 284. (Eifelian-Frasnian).
- Fig. 7a-b. *Gotlandochitina* sp. B. (= *Angochitina devonica* Eisenack, 1955, sensu Urban, 1972). A1-37, 9840ft., Slide 13, Q35, 7a: $\times 250$; 7b: $\times 1000$, AGC 285. (*A. devonica* s.l. is reported from the Pragian up to the Frasnian).
- Fig. 8. *Gotlandochitina* sp. B. (= *Angochitina devonica* Eisenack, 1955, sensu Urban, 1972). A1-37, 9840ft., Slide 13, Q35/1, $\times 250$, AGC 286. (*A. devonica* s.l. is reported from the Pragian up to the Frasnian).
- Fig. 9. *Gotlandochitina* sp. B. (= *Angochitina devonica* Eisenack, 1955, sensu Urban, 1972). A1-37, 9840ft., Slide 13, P34, $\times 300$, AGC 287. (*A. devonica* s.l. is reported from the Pragian up to the Frasnian).
- Fig. 10a, b. *Fungochitina pilosa* (Collinson & Scott, 1958). A1-37, 9251 ft., Slide 15, Q37/2, 10a: $\times 300$; 10b: $\times 1250$, AGC 288. (Eifelian-Frasnian).
- Fig. 11 *Hoegisphaera glabra* Staplin, 1961. A1-37, 9840ft., Slide 13, Q34/1, $\times 300$, AGC 289. (Late Pragian-Early Frasnian; typical *H. glabra* are restricted to the Early Frasnian).

F. Paris
Givetian-Frasnian Chitinozoans



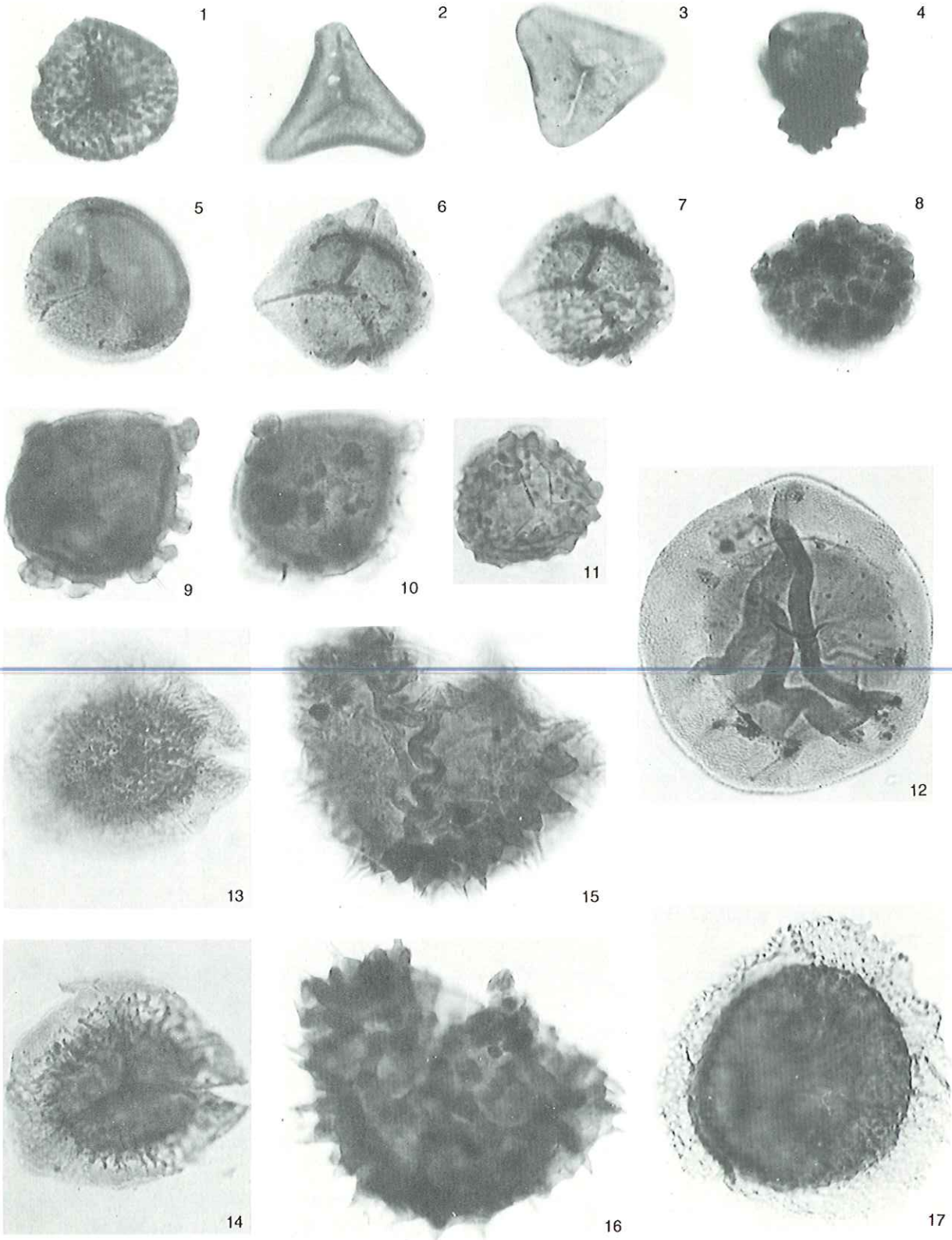
Explanation of Plate 29

All figures are $\times 500$

- Fig. 1. *Rugospora flexuosa* (Juskho) Streel in Becker *et al.*, 1974 A1-NC92, 13024 ft., Slide 1, R40, AGC 290 (Late Famennian).
-
- Figs. 2, 3. *Leiotriletes struniensis* Moreau-Benoit, 1979. 2. A1-NC92, 13024 ft., Slide 1, T41/1, AGC 291. 3. A1-NC92, 13024 ft., Slide 1, Q40/1, AGC 292. (Late Famennian).
- Fig. 4. *Cyrtospora cristifer* (Luber) Van der Zwan 1979. A1-NC92, 13400 ft., Slide 1, H39/4, AGC 293. (Famennian-Tournaisian).
- Fig. 5. *Geminospora lemurata* Balme, 1962. A1-115, 8784 ft., S.G. 8784/3, AGC 294. (Givetian-Famennian).
- Figs. 6, 7. *Samarisporites triangulatus* Allen, 1965. C1-125, 10700-10800 ft., Slide 1, 044, AGC 295. 6. proximal view, 7. distal view. (Givetian-Frasnian).
- Fig. 8. *Verrucosisporites bullatus* Taugourdeau-Lantz, 1967. C1-125, 10300-10400 ft., Slide 1, F35/2, AGC 296. (Frasnian).
- Figs. 9, 10. *Verrucosisporites premnus* Richardson, 1965. A1-37, 9638 ft., S.G. 9638/47, AGC 297. 9. proximal view, 10. distal view. (Eifelian-Frasnian).
- Fig. 11. *Verrucosisporites scurrus* McGregor & Camfield, 1982. A1-37, 9638 ft., S.G. 9638/20, AGC 298. (Eifelian-Frasnian).
- Fig. 12. *Rhabdosporites langi* (Eisenack) Richardson, 1960. A1-37, 9638 ft., S.G. 9638/44, AGC 299. (Eifelian-Givetian).
- Fig. 13, 14. *Samarisporites* sp. A1-115, 8784 ft., S.G. 8784/1, AGC 300. 13. distal view, 14. proximal view.
- Figs. 15, 16. *Acinosporites macrospinosus* Richardson, 1965. A1-37, 9825 ft., S.G. 9825/12, AGC 301. (Eifelian-Givetian).
- Fig. 17. *Grandispora inculta* Allen, 1965. A1-37, 9633 ft., S.G. 9633/17, AGC 302. (Givetian-Frasnian).

M. Streef
Givetian-Famennian Miospores

Plate 29

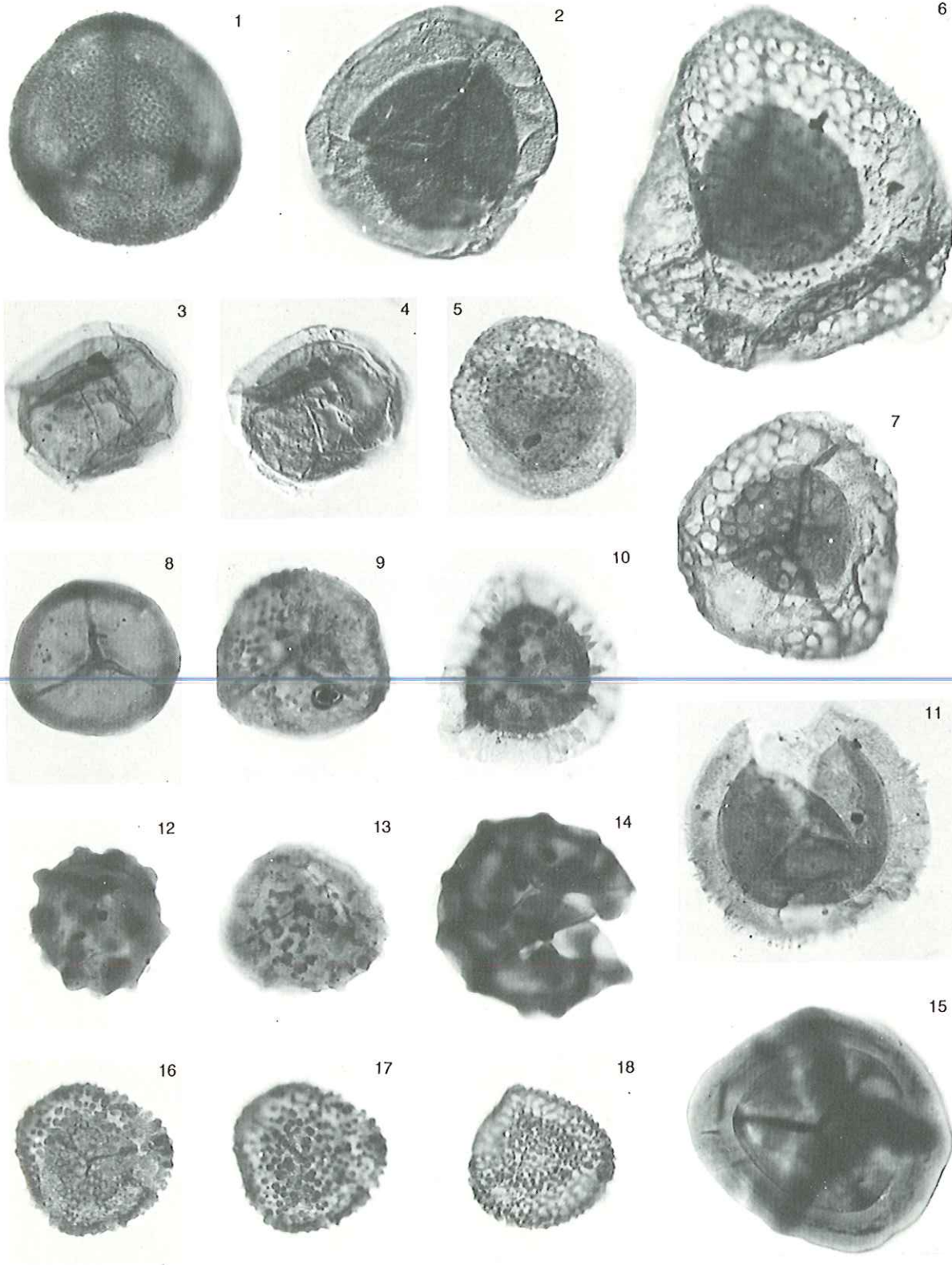


Explanation of Plate 30

All figures are $\times 500$

- Fig. 1. *Spelaeotriletes resolutus* Higgs, 1975. A1-37, 8418ft., S.G. 8418/41, AGC 303. (Famennian-Tournaisian).
- Fig. 2. *Spelaeotriletes granulatus* (Kedo) Moreau-Benoit, 1979. A1-37, 8421ft., S.G. 8421/9, AGC 304. Interference contrast view. (Famennian-Tournaisian).
-
- Figs. 3, 4. *Auroraspora asperella* (Kedo) Van der Zwan, 1979. A1-37, 8418ft., S.G. 8418/7, AGC 305. 4. Interference contrast view. (Famennian-Tournaisian).
- Figs. 5-7. *Retispora lepidophyta* (Kedo) Playford, 1976. 5. A1-37, 8421ft., S.G. 8421/23, AGC 306. 6. A1-37, 8421ft., S.G. 8421/22, AGC 307. 7. A1-37, 8421ft., S.G. 8421/18, AGC 308. (Late Famennian).
- Fig. 8. *Retusotriletes incohatus* Sullivan, 1964. A1-37, 8418ft., S.G. 8418/11, AGC 309. (Famennian-Tournaisian).
- Fig. 9. *Rugospora flexuosa* (Jushko) Streeel in Becker *et al.*, 1974. A1-37, 8418ft., S.G. 8418/14, AGC 310. (Late Famennian).
- Fig. 10. *Vallatisporites pusillites* (Kedo) Dolby & Neves, 1970. A1-37, 8418ft., S.G. 8418/6, AGC 311. (Late Famennian).
- Fig. 11. *Endoculeospora gradzinskii* Turnau, 1975. A1-37, 8421ft., S.G. 8421/26, AGC 312. (Famennian-Tournaisian).
- Fig. 12. *Lophozonotriletes bellus* Kedo, 1963. A1-37, 8418ft., S.G. 8418/65, AGC 313. (Famennian-Tournaisian).
- Fig. 13. *Pustulatisporites* sp. A1-37, 8418ft., S.G. 8418/38, AGC 314.
- Fig. 14. *Corbulispora* sp. A1-37, 8418ft., S.G. 8418/23, AGC 849.
- Fig. 15. *Knoxisporites literatus* (Waltz) Playford, 1963. A1-37, 8418ft., S.G. 8418/5, AGC 315. (Famennian-Tournaisian).
- Figs. 16-18. *Spelaeotriletes cf. crustatus* Higgs, 1975. 16, 17. A1-37, 8421ft., S.G. 8421/37, AGC 316. 16. proximal view. 17. distal view. 18. A1-37, 8421ft., S.G. 8421/21, AGC 317. (Famennian-Tournaisian).

M. StreeI
Late Famennian Miospores

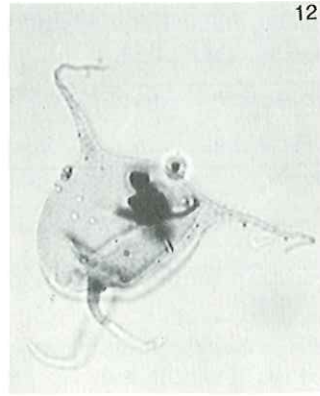
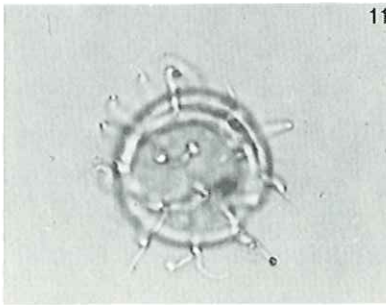
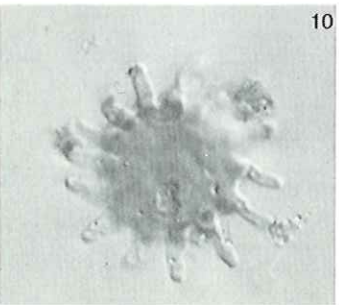
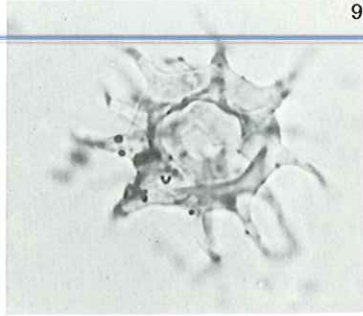
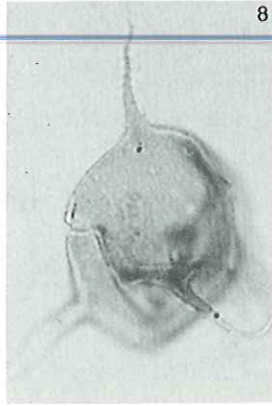
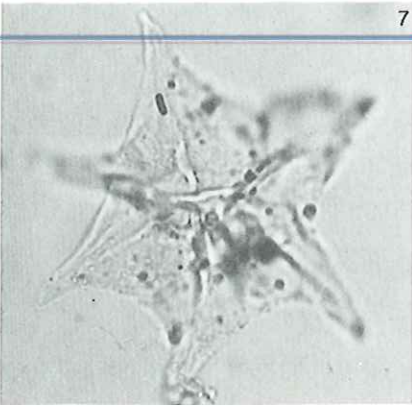
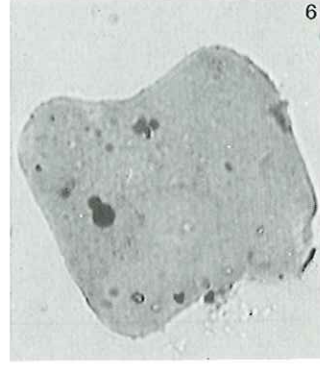
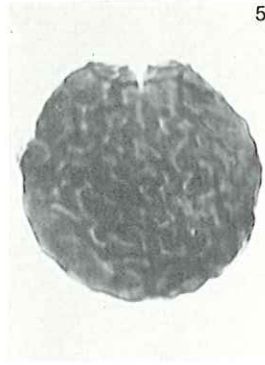
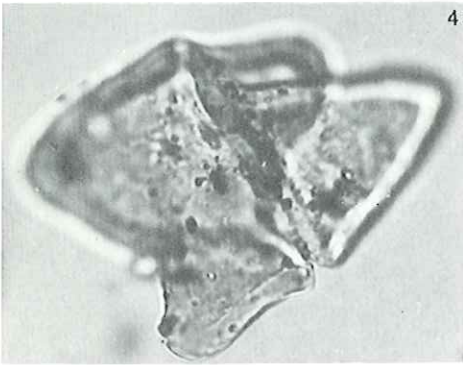
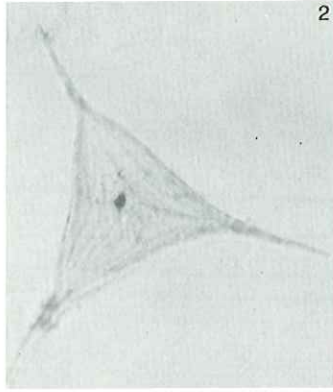
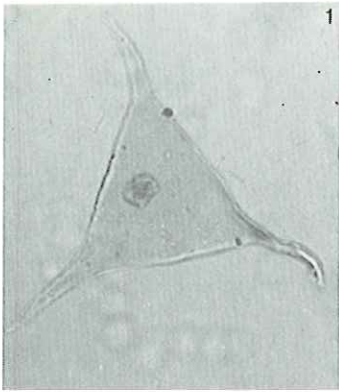


Explanation of Plate 31

All figures are $\times 1000$

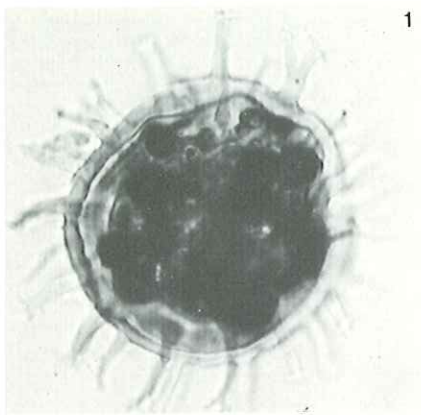
- Fig. 1. *Veryhachium downiei* Stockmans & Willière, 1962. C1-125, 1149, 9800-9900ft., Slide 19500, J43, AGC 318. (Ordovician-Tournaisian).
- Fig. 2. *Veryhachium pannuceum* Wicander & Loeblich, 1977. C1-125, 1155, 10400-10500ft., Slide 19.523, H33/4, AGC 319. (Frasnian-Famennian).
- Fig. 3. *Veryhachium* n. sp. A. A1-115, 8784ft., S.G. 8784/16A, AGC 320. (Famennian).
- Fig. 4. *Schizocystia* n. sp. A. A1-115, 8772ft., Slide 1, E25/4, AGC 321.
- Fig. 5. *Rugaletes* cf. *vietus* Playford & Dring, 1981. C1-125, 1152, 10100-10200ft., Slide 19520, J48, AGC 322. (Frasnian).
- Fig. 6. *Horologinella horologia* (Staplin) Jardiné *et al.*, 1972 C1-125, 1150, 9900-10000ft., Slide 19.500, S33/2, AGC 333. (Givetian-(Famennian)).
- Fig. 7. *Stellinium micropolygonale* (Stockmans & Willière) Playford, 1977. A1-115, 8784ft., Slide 1, H33/1, AGC 334. (Emsian-Famennian).
- Fig. 8. *Villosacapsula globosa* Vanguestaine *et al.*, 1983. C1-125, 1155, 10400-10500ft., Slide 19.523, T33/4, AGC 335. (Late Frasnian-Early Famennian).
- Fig. 9. *Micrhystridium stellatum* Deflandre, 1945. A1-115, 8784ft., Slide 1, S38/2, AGC 336. (Silurian-Early Mesozoic).
- Fig. 10. *Tornaciastela* Wicander, 1974. C1-125, 1153, 10200-10300ft., Slide 19.521, T44, AGC 337. (Famennian).
- Fig. 11. *Elektoriskos* cf. *deconinckii* (Stockmans & Willière, 1969) nov. comb. A1-115, 8784ft., Slide 1, J31/1, AGC 338. (Famennian).
- Fig. 12. *Villosacapsula globosa* Vanguestaine *et al.*, 1983. C1-125, 1156, 10500-10600ft., Slide 19.524, H39/4, AGC 339. (Late Frasnian-Early Famennian).

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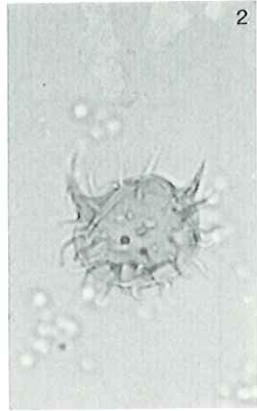


Explanation of Plate 32
All figures are $\times 1000$

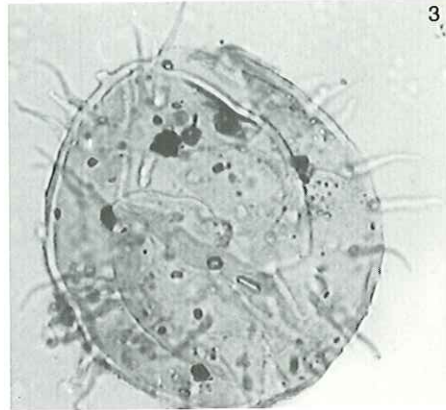
- Fig. 1. *Gorgonisphaeridium* n. sp. A. A1-115, 8784 ft., S.G. 8784/3A, AGC 340.
- Fig. 2. *Unellium winslowae* Rauscher, 1969. C1-125, 1150, 9900-10000 ft., Slide 19500, F39, AGC 341 (Frasnian-Famennian).
- Fig. 3. *Gorgonisphaeridium* cf. *ohioense* (Winslow) Wicander, 1974. C1-125, 1150, 9900-10000 ft., Slide 19500, P45/2, AGC 342. (Famennian).
- Fig. 4. *Helosphaeridium* n. sp. A. A1-115, 8774 ft., Slide 1, H30/4, AGC 343.
- Fig. 5. *Helosphaeridium* n. sp. A. A1-115, 8784 ft., Slide 1, S42/2-S43/1, AGC 344.
- Fig. 6. *Chomotriletes* aff. *vedugensis* Naumova, 1953 in Playford & Dring, 1981. C1-125, 1150, 9900-10000 ft., Slide 19500, J41, AGC 345.
- Fig. 7. *Gorgonisphaeridium* n. sp. B. A1-115, 8772, Slide 1, Y41, AGC 346.
- Fig. 8. *Gorgonisphaeridium* cf. *ohioense* (Winslow) Wicander, 1974. C1-125, 1150, 9900-10000 ft., Slide 19500, Z38/3, AGC 347. (Famennian).
- Fig. 9. *Pirea* sp. A. C1-125, 1150, 9900-10000 ft., Slide 19500, M41/4, AGC 348.
- Fig. 10. *Lophosphaeridium* cf. *impensum* Wicander & Loeblich, 1977. A1-115, 8774 ft., Slide 1, L46, AGC 349. (Famennian).
- Fig. 11. *Solisphaeridium apodasmion* (Wicander) Wicander & Loeblich, 1977. A1-115, 8784 ft., Slide 1, R33/3, AGC 350. (Famennian).
- Fig. 12. *Gorgonisphaeridium* sp. C. A1-115, 8772 ft., Slide 1, 037/4, AGC 351.



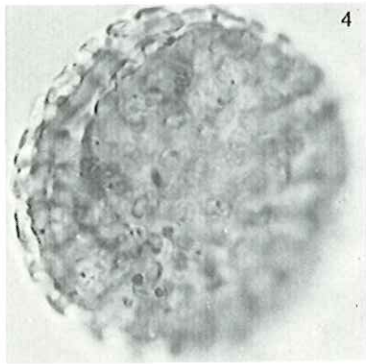
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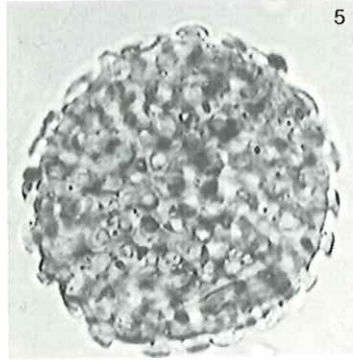
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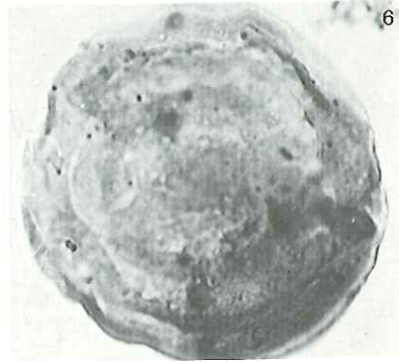
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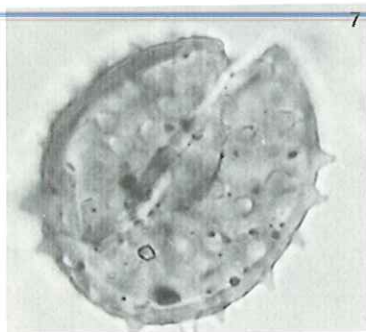
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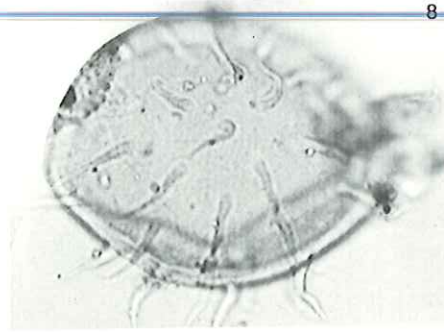
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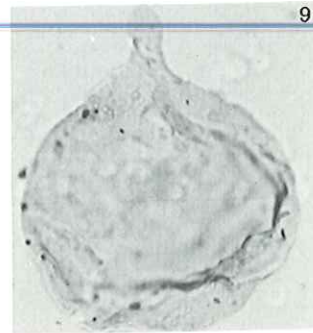
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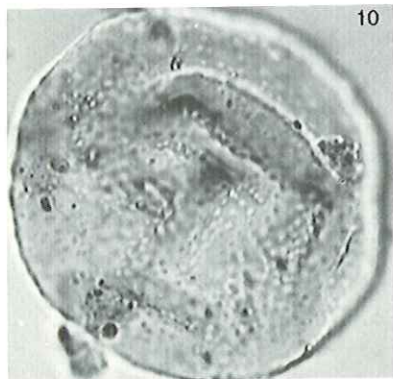
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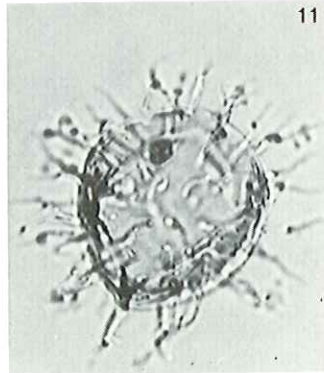
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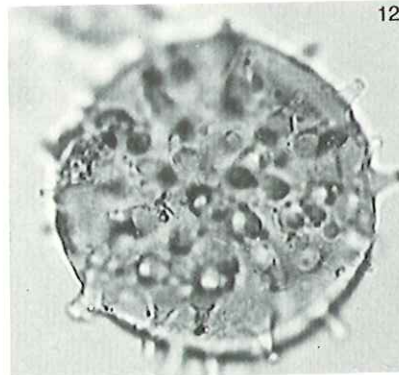
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10



11



12

