4. SPORES AND POLLEN FROM CRETACEOUS DEPOSITS OF THE EASTERN NORTH ATLANTIC OCEAN, DEEP SEA DRILLING PROJECT, LEG 41, SITES 367 AND 370

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SUMMARY

Four spore-pollen assemblages from Sites 367 and 370 are distinguished: Neocomian, Aptian(?) to lower Albian, upper Albian to lower Cenomanian, and Cenomanian. These are correlated to synchronous spore-pollen assemblages of West Africa, Eurasia, and North America.

INTRODUCTION

The samples in the study come from Site 370 (water depth 4216 m) drilled in the Morocco Basin and Site 367, 150 km west of (Guinea Bissau) Africa in the Cape Verde Basin (water depth 4748 m) (Figure 1). Six samples from Site 370 contained spores and pollen, but only two samples from Site 367 had spores and pollen. The remaining nine samples looked at proved either barren or contained only sporadic specimens of spores and pollen.

The samples were treated with hydrochloric acid, potassium, sodium hydroxide, and cadmium liquid. The specimens were prepared on glycerine jelly sealed with BF-2 glue or paraffin. All specimens are now stored at the Geological Institute of the USSR Academy of Sciences, No. 3949.

The results of the palynological analysis of the samples from both sites are summarized in Table 1 in percent content of spores and pollen. Table 2 is a range chart of some genera and species at Site 370.

The photomicrographs in Plates 1 thru 14 were done by means of microscope "Lumipan" with the microphotographic device MFN-12.

SITE 370: MOROCCO BASIN

Well-preserved spores and pollen were distinguished from six samples in the depth interval of 749 to 996 meters. Microplankton (dinoflagellates, acretarcheans) are very abundant and diverse. Four spore-spollen assemblages are distinguished within the above interval.

Assemblage I is represented by spores and pollen from the lowermost samples (41, CC, 996.0 m). The assemblage is characterized by abundant *Classopollis* (70)[1] and pollen *Dicheiropollis etruscus* (72), spores *Concavissimisporites variverrucatus* (5), *Concavissimisporites* sp. (6), *Tuberositriletes montuosus* (7), *Ceratosporites parvus* (9), *Cicatricosisporites brevilaesuratus* (16), *Cicatricosisporites* sp. sp. (18, 19), *Gleicheniidites senonicus* (26), *Coronatispora valdensis* (27), and *Patellasporites distaverrucosus* (30). Pollen

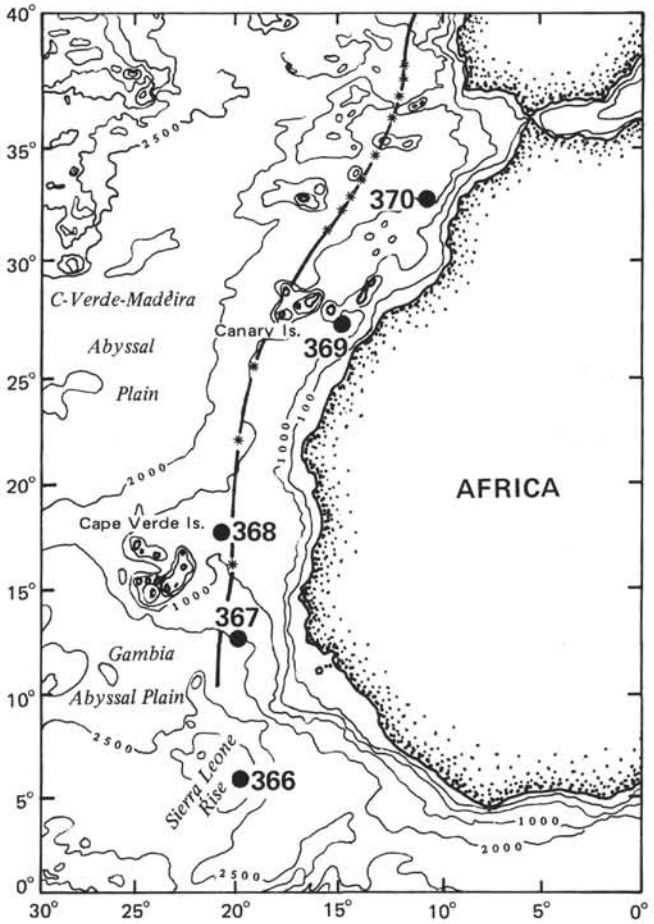

Figure 1. *Location of DSDP Sites 367 and 370.*

Ephedripites sp. sp. (45, 47, 48) and *Steevesipollenites* (56, 64) occur, but are not numerous. Pollen of the bisaccate conifers *Pinuspollenites* sp. (38), *Podocarpidites* sp (39), *Parvisaccites radiatus* (40), and *Vitreisporites pallidus* (41) occurs but the angiosperm pollen are absent.

Most of the above genera and species are known from Cretaceous deposits of many regions of the world, with a wide vertical distribution. *Tuberositriletes montuosus* was described from the Weldian of East Germany (Döring, 1964). *Cicatricosisporites brevilaesuratus* is representative of the Barremian and Aptian of England (Kemp, 1970), and in North America it is found in Albian sediments (Brenner, 1963). *Ceratosporites parvus* is found throughout the Barremian, Aptian, and Albian deposits of England (Kemp, 1970) and North America (Brenner, 1963). *Dicheiropollis etruscus* was first described from the

[1]The number in parentheses is the item number of a taxon in the "Systematics" section of this paper.

TABLE 1
Percentage Distribution Chart of Spores and Pollen in Cretaceous Sediments of Holes 370 and 367

		Hole 370						Hole 367	
		41, CC	32, CC	31, CC	30, CC	29, CC	27, CC	23, CC	21, CC
Depth (m)		996.0	844.0	834.5	815.5	796.5	758.5	787.0	701.5
Total of Grains		296	302	425	451	556	782	365	201
Spores		10.8	7.4	6.5	5.7	8.1	11.2	14.0	11.8
Gimnospermae		89.2	90.3	89.1	89.0	85.9	75.2	71.0	80.2
Angiospermae		–	2.3	4.4	5.3	6.0	13.6	15.0	8.0
1	*Cyathidites minor*	–	0.6	0.2	0.2	0.2	0.3	0.2	0.9
2	*C. australis*	0.7	0.3	0.2	–	0.7	0.1	0.8	–
3	*Stereisporites antiquasporites*	–	0.6	0.5	–	–	–	–	–
4	*Leptolepidites verrucatus*	–	0.6	–	–	–	0.1	–	–
5	*Concavissimisporites variverrucatus*	0.3	0.3	–	–	–	–	–	0.5
6	*Concavissimisporites* sp.	0.7	–	–	–	–	–	–	–
7	*Tuberositriletes montuosus*	0.7	–	–	–	–	–	–	–
8	*Verrucosisporites* sp.	0.7	–	0.2	0.2	–	–	0.5	–
9	*Ceratosporites parvus*	1.0	–	–	–	–	–	–	–
10	*Klukisporites* sp.	0.3	0.3	–	0.4	–	0.1	–	–
11	*Reticulatisporites* sp. 1	–	–	–	–	–	–	1.6	–
12	*Reticulatisporites* sp. 2	–	–	–	–	–	–	0.5	–
13	*Cicatricosisporites proxiradiatus*	–	0.6	0.7	0.2	0.5	0.2	–	–
14	*C. venustus*	–	0.3	0.2	–	–	–	–	–
15	*C. microstriatus*	0.3	–	–	–	–	–	–	–
16	*C. brevilaesuratus*	1.6	0.3	–	0.2	–	–	0.2	–
17	*C. potomacensis*	–	–	–	–	–	–	0.5	0.5
18	*Cicatricosisporites* sp. 1	0.7	–	–	–	–	–	–	–
19	*Cicatricosisporites* sp. 2	1.0	–	–	–	–	–	–	–
20	*Cicatricosisporites* sp. 3	–	–	0.5	–	–	–	–	–
21	*Cicatricosisporites* sp. 4	–	–	0.9	–	–	0.6	–	–
22	*Cicatricosisporites* sp. 5	–	1.0	–	–	–	–	–	–
23	*Appendicisporites* sp. 1	–	1.0	–	–	–	–	–	–
24	*Appendicisporites* sp. 2	–	0.3	–	0.2	–	–	–	–
25	*Appendicisporites* sp. 3	–	–	–	–	–	–	0.8	–
26	*Gleicheniidites senonicus*	0.7	0.6	1.6	1.7	6.0	0.8	–	–
27	*Coronatispora valdensis*	0.7	0.3	–	–	–	–	–	–
28	*Matonisporites* sp.	0.7	0.3	0.2	1.0	0.3	–	0.2	–
29	*Perotriletes pannuceus*	–	–	0.9	0.9	0.2	0.1	2.0	2.5
30	*Patellasporites distaverrucosus*	0.7	–	0.2	0.2	–	–	4.5	0.9
31	*Coptospora* sp.	–	–	–	–	–	0.2	0.2	0.5
32	*Reticulatasporites jardinus*	–	–	0.2	0.5	0.2	8.5	0.8	0.5
33	*Elaterosporites klaszi*	–	–	–	–	–	0.2	1.0	3.5
34	*Elaterocolpites* sp.	–	–	–	–	–	–	–	2.0
35	*Galeacornea causea*	–	–	–	–	–	–	0.2	–
36	*Cerebropollenites mesozoicus*	0.3	1.0	–	–	0.2	0.1	–	–
37	*Tsugaepollenites trilobatus*	1.3	0.3	–	–	0.2	–	–	–
38	*Pinuspollenites* sp.	4.0	0.6	0.2	–	0.2	0.3	–	0.5
39	*Podocarpidites* sp.	0.3	1.5	–	–	0.2	0.1	–	–
40	*Parvisaccites radiatus*	0.3	1.3	–	–	0.2	–	–	–
41	*Vitreisporites pallidus*	1.3	0.3	0.5	0.4	1.4	0.2	–	–
42	*Inaperturopollenites* sp.	–	–	–	0.2	5.3	–	–	–
43	*Araucariacites australis*	0.3	–	0.2	0.4	6.2	0.2	1.4	0.9
44	*Eucommiidites* sp.	0.7	0.3	0.2	0.4	–	0.7	–	–
45	*Ephedripites multicostatus*	0.7	2.0	0.4	0.6	0.5	3.3	4.8	–
46	*Ephedripites pentacostatus*	–	–	–	–	–	–	0.5	0.5
47	*Ephedripites* sp. 1	0.7	1.0	1.7	–	–	–	1.0	–
48	*Ephedripites* sp. 2	2.0	0.2	0.4	0.2	–	–	–	–
49	*Ephedripites* sp. 3	–	–	–	–	0.5	3.5	0.2	0.5
50	*Ephedripites jansonii*	–	–	–	–	0.5	0.6	1.0	0.5
51	*Ephedripites* sp. 4	–	–	–	–	–	0.7	–	–
52	*Ephedripites* sp. 5	–	0.6	1.7	0.4	0.3	0.3	–	0.5
53	*Ephedripites* sp. 6	–	–	–	–	–	0.1	–	–
54	*Ephedripites* sp. 7	–	–	–	–	–	–	0.2	0.5
55	*Steevesipillenites binodosus*	–	–	–	–	–	0.3	1.6	0.5
56	*Steevesipollenites* sp. 1	0.3	0.6	–	–	–	–	–	–
57	*Steevesipollenites dajani*	–	–	–	–	0.2	–	0.2	–
58	*Steevesipollenites* sp. 3	–	–	–	–	–	–	0.5	–
59	*Steevesipollenites* sp. 4	–	–	–	–	–	–	0.2	–
60	*Steevesipollenites* sp. 5	–	–	–	–	–	0.2	–	–

TABLE 1 – *Continued*

	Hole 370						Hole 367	
	41, CC	32, CC	31, CC	30, CC	29, CC	27, CC	23, CC	21, CC
Depth (m)	996.0	844.0	834.5	815.5	796.5	758.5	787.0	701.5
Total of Grains	296	302	425	451	556	782	365	201
Spores	10.8	7.4	6.5	5.7	8.1	11.2	14.0	11.8
Gimnospermae	89.2	90.3	89.1	89.0	85.9	75.2	71.0	80.2
Angiospermae	–	2.3	4.4	5.3	6.0	13.6	15.0	8.0
61 *Steevesipollenites* sp. 6	–	–	–	–	–	–	1.0	–
62 *Steevesipollenites* sp. 7	–	0.6	–	0.2	–	0.7	–	–
63 *Steevesipollenites* sp. 8	–	–	–	0.9	–	0.7	–	1.3
64 *Steevesipollenites* sp. 8a	1.0	–	–	–	1.4	–	–	–
65 *Steevesipollenites* sp. 9	–	–	1.7	1.1	–	0.8	1.0	–
66 *Steevesipollenites* sp. 10	–	–	–	0.2	–	0.3	0.2	–
67 *Monosulcites chaloneri*	–	–	–	0.2	1.7	0.1	7.0	0.5
68 *Monosulcites* sp.	2.3	0.3	1.4	1.1	1.2	0.2	0.2	–
69 *Monocolpopollenites* sp.	–	–	–	–	–	–	1.0	–
70 *Classopollis* sp. sp.	70.4	79.4	80.2	82.3	65.7	61.3	49.0	74.0
71 *Exesipollenites tumulosus*	–	0.3	0.5	0.4	–	0.5	–	–
72 *Dicheiropollis etruscus*	3.5	–	–	–	–	–	–	–
73 *Clavatipollenites* sp.	–	1.0	–	–	1.5	0.5	–	–
74 *Asteropollis asteroides*	–	–	0.7	0.4	0.7	0.3	–	–
75 *Liliacidites peroreticulatus*	–	1.3	0.2	0.2	0.2	0.5	–	–
76 *Liliacidites* sp.	–	–	–	–	0.2	0.1	0.8	–
77 *Psilatricolpites* sp.	–	–	0.7	0.2	0.2	–	0.5	1.0
78 *Retitricolpites* cf. *operculatus*	–	–	–	–	0.2	0.1	–	–
79 *Retitricolpites* sp. 1	–	–	–	–	–	–	0.8	0.5
80 *Retitricolpites* sp. 2	–	–	0.4	1.4	0.7	0.9	0.4	1.0
81 *Retitricolpites* sp. 3	–	–	–	–	–	0.2	–	–
82 *Retitricolpites* sp. 4	–	–	–	–	–	–	0.2	–
83 *Retitricolpites* sp. 5	–	–	–	–	–	0.2	1.7	–
84 *Retitricolpites* sp. 6	–	–	0.4	0.5	0.2	–	0.2	1.0
85 *Tricolpites* cf. *giganteus*	–	–	–	–	–	–	0.5	–
86 *Tricolpites microstriatus*	–	–	–	0.4	–	0.2	0.2	–
87 *Tricolpites* sp. 1	–	–	–	–	–	–	0.2	0.5
88 *Tricolpites* sp. 2	–	–	–	–	–	–	0.8	–
89 *Bacutricolpites* sp. 1	–	–	–	–	–	0.2	–	–
90 *Bacutricolpites* sp. 2	–	–	–	–	0.7	–	–	0.5
91 *Striatopollis sarstedtensis*	–	–	0.2	0.2	–	1.5	0.2	1.0
92 *Striopollenites dubius*	–	–	–	–	0.5	6.2	2.0	–
93 *Tetracolpites* sp.	–	–	–	–	–	0.7	0.2	–
94 *Tricolporopollenites triangulus*	–	–	–	–	–	–	0.5	1.0
95 *Tricolporopollenites* sp.	–	–	1.4	1.6	0.7	0.2	1.7	0.5
96 *Hexaporotricolpites lamellaferus*	–	–	–	–	–	0.5	–	–
97 *Tetradopollenites* sp.	–	–	–	–	0.2	–	0.2	–
98 *Triorites* sp.	–	–	–	–	–	0.3	–	–
99 *Triporopollenites* sp.	–	–	–	–	–	–	0.2	–
100 *Cretacaeiporites polygonalis*	–	–	–	–	–	0.2	0.5	–
101 *Cretacaeiporites mulleri*	–	–	0.2	0.2	–	0.2	0.5	0.5
102 *Cretacaeiporites scabratus*	–	–	0.2	0.2	–	0.2	0.8	0.5
103 *Proxapertites* sp.	–	–	–	–	–	0.2	–	–
104 *Auriculiidites reticulatus*	–	–	–	–	–	–	0.2	–
105 Forma sp. 1	–	–	–	–	–	–	0.2	–
106 Forma sp. 2	–	–	–	–	–	–	0.2	–
107 Forma sp. 3	–	–	–	–	–	–	0.5	–
108 Forma sp. 4	–	–	–	–	–	–	0.2	–
109 Forma sp. 6	–	–	–	–	–	0.2	–	–
110 Forma sp. 6	–	–	–	–	–	–	0.2	–
111 Forma sp. 7	–	–	–	–	–	–	0.2	–
112 Forma sp. 8	–	–	–	–	–	–	0.2	–

marine Neocomian in Italy (Trevisan, 1971). Later it was recognized in Neocomian deposits of Africa and the Atlantic coast of South America, but it was not found beyond the Neocomian (Jardiné et al., 1973). Thus, the age of Assemblage I is Neocomian.

Assemblage II is found in Core 32 (844.0 m). *Dicheiropollis etruscus*, restricted to the Neocomian, disappears and some new genera and species appear: *Cicatricosisporites proxiradiatus* (13), *Cicatricosisporites venustus* (14), *Cicatricosisporites* sp. 5 (22) *Appendicisporites* sp. 1 (23) and *Appendicisporites* sp. 2 (24). Just as in the previous assemblage, there are many *Classopollis* sp. (68), as well as the pollen of bisaccate conifers and pollen *Ephedripites* sp. sp. (45, 47, 48, 52)

TABLE 2
Pollen Diagram of Species in Cretaceous Sediments of Hole 370

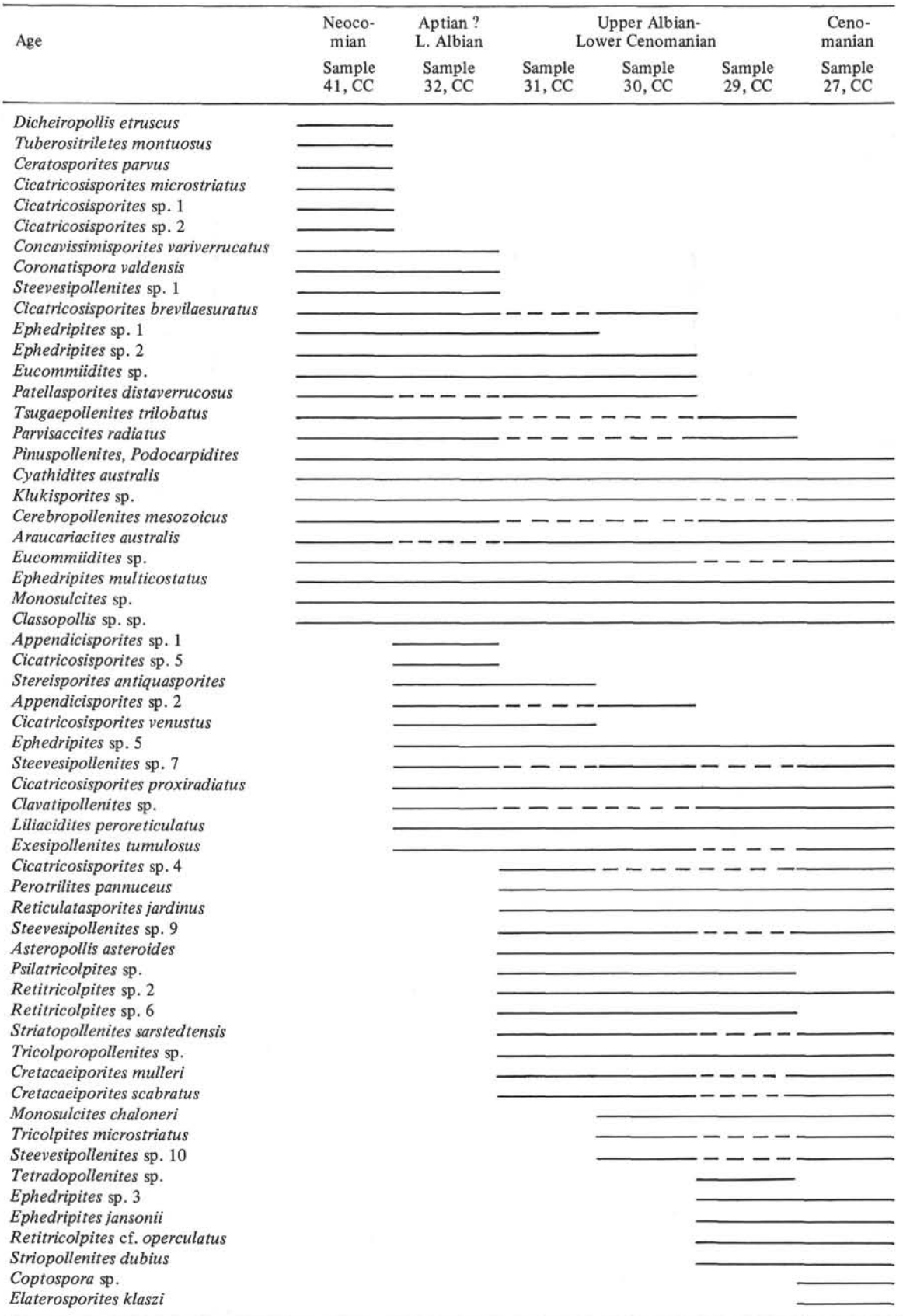

TABLE 2 *(Continued)*

Age	Neocomian	Aptian ? L. Albian	Upper Albian-Lower Cenomanian			Cenomanian
	Sample 41, CC	Sample 32, CC	Sample 31, CC	Sample 30, CC	Sample 29, CC	Sample 27, CC
Ephedripites sp. 4						———
Ephedripites sp. 6						———
Steevesipollenites binodosus						———
Retitricolpites sp. 5						———
Tetracolpites sp.						———
Hexaporotricolpites lamellaferus						———
Triorites sp.						———
Cretacaeiporites polygonalis						———
Proxapertites sp.						———

and *Steevesipollenites* sp. 1 (56). This assemblage is characterized by the appearance of a monocolpate pollen of angiosperms *Clavatipollenites* (73) and *Liliacidites peroreticulatus* (75) and no angiosperm pollen of the tricolpate type.

Most of these spores have a wide vertical distribution. Spores *Appendicisporites* sp. 1 and *Cicatricosisporites* sp. 5 were only observed in Assemblage II. Jardiné and Magloire (1965) point out the presence of similar spores of the genus *Appendicisporites* in the Aptian to lower Albian of Senegal, and Boltenhagen (1965) describes *Appendicisporites* for the Aptian of Gabon and Congo. The appearance of pollen *Clavatipollenites* and *Liliacidites peroreticulatus* is assigned to the Barremian to Aptian (Kemp, 1970); Doyle, 1969). The disappearance of the *Dicheiropollis etruscus* pollen argues against a Barremian age of this assemblage. The absence of the angiosperm pollen of the tricolpate type does not allow a middle Albian age. Thus, the age of the assemblage is given as Aptian to early Albian. This assemblage is similar to Assemblage XI of the Aptian to early Albian distinguished from lower Cretaceous deposits of Senegal (Jardiné and Magloire, 1965).

Assemblage III was singled out from Samples 31, CC, 30, CC, and 29, CC (interval 796.0 to 834.5 m). This assemblage has spores *Perotrilites pannuceus* (29), *Reticulatasporites jardinus* (32), *Cicatricosisporites* sp. 4 (21), and a greater abundance of *Gleicheniidites senonicus* spores (26) than occurs in the lower assemblages. The pollen *Classopollis* (70) is abundant as before, *Ephedripites* sp. sp. (45, 47, 48, 52), and *Steevesipollenites* sp. 9 (65) are not common and grains of bisaccate conifers are rare. The assemblage is characterized by the presence of the angiosperm pollen of the tricolpate, tricolporate and periporate types. This pollen is represented by *Asteropollis asteroides* (74),*Psilatricolpites* sp. (77), *Retitricolpites* sp. sp. (80, 84), *Tricolporopollenites* sp. (91), *Cretacaeiporites mulleri* (101), and *Cretacaeiporites scabratus* (102). The pollen *Striatopollis sarstedtensis* (91) and *Tricolpites microstriatus* (86) occur in Sample 30, CC, and *Striopollenites dubius* (92) and *Retitricolpites* cf. *operculatus* (78) occur in Sample 29, CC. *Perotrilites pannuceus* is known from Albian to Cenomanian deposits of Peru (Brenner, 1963), the Albian to Cenomanian of the Senegal and Ivory Coast (Jardiné and Magloire, 1965), and Albian and Albian to Cenomanian deposits of Brazil (Herngreen, 1973). *Reticulatasporites jardinus* was recognized in the Aptian to Cenomanian of the Senegal, Albian to Cenomanian of Nigeria, Aptian, Albian and Cenomanian of Gabon and Congo (Jardiné et al., 1974b); in the Albian and Albian to Cenomanian of Brazil (Herngreen, 1973) and Peru (Brenner, 1963). *Asteropollis asteroides* was defined from the middle Albian of Oklahoma, USA (Hedlung and Norris, 1968). This species was found in upper Albian and Cenomanian of England (Laing, 1975), in the Cenomanian of France (Azema et al., 1972), and in Cenomanian and Turonian in Australia (Dettmann, 1973). Pollen of the genus *Retitricolpites* appears almost simultaneously throughout the world from the lower middle Albian, and its abundance and diversity increase in the upper Albian and Cenomanian. In West Africa and South America, the first grains of the tricolpate type also first appear at this level (Jardiné and Magloire, 1965; Muller, 1966; Herngreen, 1973). The first tricolporate (*Tricolporopollenites*) grains of angiosperms are observed not earlier than the late Albian, and sometimes only from the Cenomanian (Doyle, 1969; Muller, 1970; Dettmann, 1973). The tricolporate grains first appear in West Africa and Brazil in the Albian to Cenomanian (Jardiné and Magloire, 1965; Herngreen, 1973). The periporate pollen of the genus *Cretacaeiporites* is known from Albian deposits of West Africa, Peru, and Brazil. *Cretacaeiporites scabratus* was defined as *Multiporopollenites* sp. from the Turonian to lower Cenomanian of Ivory Coast (Jardiné and Magloire, 1965). Boltenhagen (1965) singled out a similar species from the Albian to Cenomanian of Gabon and in Brazil this species was restricted to Albian to Cenomanian deposits (Herngreen, 1973). *Cretacaeiporites mulleri* was described from the upper Albian to Cenomanian of Brazil, from the Turonian of Peru (Brenner, 1968), and Turonian to lower Cenomanian of Senegal and Ivory Coast (Jardiné and Magloire, 1965). *Striatopollis sarstedtensis* was defined from the lower Paleogene of East Germany (Krutzsch, 1959). However, this species was also found in the upper Albian to lower Cenomanian of England (Laing, 1975) and in the Cenomanian of Portugal (Groot and Groot, 1962). *Striopollenites dubius* is representative of the Albian and Cenomanian of Senegal and Ivory Coast (Jardiné

and Magloire, 1965). *Tricolpites microstriatus* was described from the Turonian of Senegal and Ivory Coast.

Thus, most of the forms mentioned above have a range within the upper Albian to lower Cenomanian. Comparison with assemblages from the near-shore basins of West Africa (Jardiné and Magloire, 1965) and South America (Herngreen, 1973) confirms the upper Albian to lower Cenomanian correlation.

Assemblage IV is found in Sample 27, CC (758.5 m). The composition of spores does not vary significantly, but the percent of *Reticulatasporites jardinus* increases up to 8.5%, and one grain of *Elaterosporites klaszi* (33) and one grain of *E. verrucatus* were found. The abundances of *Ephedripites* and *Steevesipollenites* pollen increase up to 15%. *Steevesipollenites binodosus* (55), *Ephedripites* sp. 4 (51), and *Ephedripites* sp. 6 (53), which were not found in the underlying samples, appear in this assemblage. The *Classopollis* pollen content decreases somewhat. Sporadic specimens of the bisaccate coniferous pollen are present. The pollen of angiosperms is represented by *Retitricolpites* sp. sp. (80, 81, 83), *Bacutricolpites* sp. (89), *Striopollenites dubius* (92), *Tricolpites microstriatus* (86), *Striatopollis sarstedtensis* (91), *Cretacaeiporites mulleri* (101), and *C. scabratus* (102). A number of new species and genera appears, such as *Proxapertites* sp. (103), *Cretacaeiporites polygonalis* (100), *Hexaporotricolpites lamellaferus* (96), *Tetracolpites* sp. (93), and *Triorites* sp. (98).

The genera unique to this assemblage are *Tetracolpites* sp., *Hexaporotricolpites lamellaferus*, and *Triorites* sp. *Tetracolpites* sp. was defined by Jardiné and Magloire (1965) in the upper Albian to lower Cenomanian deposits of the Senegal and Ivory Coast. A similar form was found in the Albian to Cenomanian of Portugal (Groot and Groot, 1962). *Hexaporotricolpites* appears in the upper Albian to lower Cenomanian in Brazil (Herngreen, 1973). This pollen has a range from the upper Albian to Cenomanian in West Africa (Jardiné et al., 1972). The pollen *Triorites* sp. (98) has not been found in other localities in Africa or South America. The upper Cenomanian of West Africa is characterized by a triporate form, *Triorites africanicus*, described by Jardiné from the upper Cenomanian of Senegal. This same species is also found in the upper Cenomanian of Brazil. However, this species was not observed in these DSDP samples. Nevertheless, the presence of the triporate pollen (*Triorites* sp.) allows the assignment of a late Cretaceous age to this assemblage and perhaps it can be refined to the lower to middle Cenomanian.

SITE 367: CAPE VERDE BASIN

Seven samples of black shales were analyzed from the interval of 625.0 to 844.0 meters. Only two contain pollen and spores; sample 23, CC (787.0 m) and Samples 21, CC (701.5 m).

Sample 23, CC contains a great number of well-preserved spores and pollen, and a small amount of microplankton. The spore assemblage is mostly *Patellasporites distaverrucosus* (30), *Reticulatisporites* sp. (11, 12), *Verrucosisporites* sp. (8), *Reticulatasporites jardinus* (32), *Perotrilites pannuceus* (29), *Coptospora* sp. (31), *Elaterosporites klaszi* (33), *Galeacornea causea* (35), *Cicatricosisporites* sp. sp. (17, 16), and *Appendicisporites* sp. 3 (25). Pollen of *Ephedripites* and *Steevesipollenites* is rather abundant with *S. binodosus* (55) and large forms of *Steevesipollenites* sp. 3 (58). The *Classopollis* pollen make up 49% of the assemblage. Pollen of angiosperm plants are very diverse and are represented by tricolpate, tricolporate and periporate forms. One triporate grain was found (*Triporopollenites* sp. [99]) as was some questionable forms belonging, perhaps, to angiosperm plants (105, 106, 107, 108, 110, 111, 112). Sample 21, CC has a high abundance of the *Classopollis* pollen and elatere-bearing forms (*Elaterosporites klaszi*, and *Elaterocolpites* sp.). One grain of *Pinuspollenites* sp. was found. Angiosperm pollen from Sample 21, CC are not common and are less diverse than in Sample 23, CC.

The assemblages from the two samples are similar to the Cenomanian Assemblage IV from Site 370, although minor differences appear. No pollen of angiosperm — *Trorites* sp. (94) and *Hexaporotricolpites lamellaferus* — were found in Hole 367 and spores of *Gleicheniidites senonicus*, pollen of bisaccate conifers *Vitreisporites pallidus*, *Podocarpidites* sp., and only one grain of *Pinuspollenites* sp. were found. On the other hand, there are species at Site 367 samples that were not observed in Hole 370: *Steevesipollenites* sp. 3 (58), *Auriculiidites reticulatus* (104), *Tricolpites* cf. *giganteus* (85), and *Triporopollenites* sp. (99) known from younger deposits of Africa (Turonian to Cenomanian). However, the presence of *Perotrilites pannuceus*, *Reticulatasporites jardinus*, *Patellasporites distaverrucosus*, and *Striopollenites dubius* allows an age assignment of not younger than Cenomanian for this assemblage.

COMPARISON WITH WEST AFRICA AND SOUTH AMERICA

The assemblages from Sites 370 and 367 are quite similar to assemblages from the near-shore basins of West Africa and South America. Many genera and species unique to the assemblages of West Africa and South America are found in the DSDP samples. For example, the *Classopollis* pollen is a predominant element common to Cretaceous deposits of Brazil and Africa. The pollen of the genera *Ephedripites* and *Steevesipollenites* occurs in the above deposits in lesser amounts than occurs in Brazil, Senegal, and Ivory Coast. The spore of *Perotrilites pannuceus* and *Reticulatasporites jardinus* are widespread in Albian and Albian to Cenomanian deposits of Brazil, Senegal, and Ivory Coast. They are also common in Albian to lower Cenomanian sediments from Site 370, but their abundance does not exceed 1% of the assemblage, with the exception of the Cenomanian where *R. jardinus* increases up to 8.5%.

Elatere-bearing forms are presented in the Albian to Cenomanian of Brazil, Senegal, Ivory Coast, Nigeria, Gabon, and Algeria by a great genetic diversity (*Elaterosporites*, *Elaterocolpites*, *Elateroplicites*, *Senegalosporites*, and *Sofrepites*). Only rare specimens of the *Elaterosporites* and *Elaterocolpites* were recognized in the DSDP samples.

The angiosperm pollen in the spore-pollen assemblages from Sites 370 and 367 is represented by many species common to the assemblages from West

Africa and Brazil. *Striopollenites dubius* is representative of the Albian to Cenomanian of Senegal and Ivory Coast, but it was not recorded in Brazil. *Hexaporotricolpites lamellaferus* was found in the upper Albian of Gabon, Congo, Angola, and in the upper Albian to lower Cenomanian of Brazil, but it was not found in the Albian to Cenomanian of Senegal and Ivory Coast. *Cretacaeiporites polygonalis* occurs in Senegal in the upper Albian to lower Cenomanian; in Brazil it appears from the lower Albian, and in high abundance in the Albian to Cenomanian. Rare specimens of this species were recognized in Cenomanian assemblages from Sites 370 and 367. Single specimens *Cretacaeiporites mulleri* and *C. scabratus* were observed in upper Albian to Cenomanian assemblages from Sites 370 and 367, but these species are common in upper Albian to lower Cenomanian sediments of Brazil. These species were recognized in Senegal only in the upper Cenomanian and Turonian.

The assemblages from Site 370 are characterized by the presence of pollen of bisaccate conifers represented by *Pinuspollenites* sp., *Podocarpidites* sp., *Parvisaccites radiatus*, *Vitreisporites pallidus*, none of which are recorded in Cretaceous assemblages of Brazil, Peru, Senegal, Gabon, Congo, and Kameron (Herngreen, 1973; Brenner, 1968; Boltenhagen, 1965; Jardiné and Magloire, 1965). In addition, assemblages from Site 370 contained *Gleicheniidites senonicus*, *Stereisporites antiquasporites*, *Tuberositriletes montuosus*, *Corontispora valdensis* and pollen of angiosperm *Asteropollis asteroides*, none of which are known from Cretaceous spore-pollen assemblages of Brazil and West Africa, but are found in Cretaceous spore-pollen assemblages from Eurasia, North America, and Australia.

COMPARISON WITH OTHER REGIONS

Comparison of the assemblages from the lower and middle Cretaceous sediments of Sites 370 and 367 with those from near-shore basins of West Africa and South America and assemblages from other areas of the world strongly support the existence of a special African-South American province, a suggestion first made by Herngreen (1974).

The lower to middle Cretaceous assemblages of the African-South American province are characterized by the following:

1) Presence of the following genera and species peculiar to this province: *Dicheiropollis etruscus*,[2] *Reticulatasporites jardinus*, *Elaterosporites*, *Elaterocolpites*, *Galeacornea*, *Senegalosporites*, *Elateroplicites*, *Sofrepites*, *Elateropollenites*, *Striopollenites dubius*, *Hexaporotricolpites lamellaferus*, *H. emelianovi* and *Cretacaeiporites*.

2) Absence of the following genera widespread in lower and middle Cretaceous deposits of Eurasia, North America, Australia: *Pilosisporites*, *Trilobosporites*, *Stereisporites*, *Foraminisporis*, *Kuylisporites*, *Aequitriradites*, *Cooksonites*, *Couperisporites*, *Taurocusporites*, *Densoisporites*, and *Rouseisporites*.

3) The pollen *Ephedripites* and *Steevesipollenites* has a greater diversity of species in the African-South American province than in Eurasia, North America, and Australia.

The common stages of development of flora in the African-South American province do not differ from other regions. The tricolpate pollen of angiosperms always appears in the middle or at the end of the lower Albian and is represented mostly by reticulate forms. The tricolporate pollen of angiosperm appears from the upper Albian to lower Cenomanian and the triporate forms occurs from the Cenomanian, and at the same levels as occur in Eurasia, North America, and Australia. This must have been a time when the vegetation of this province was unique and the genera and species were restricted to the province only.

CONCLUSIONS

The data suggest that the supply of spores and pollen feeds the area of Site 370 from the shores of West Africa, Eurasia, and, very likely, North America. This assumption is based on the presence of typical African genera and species, as well as pollen of bisaccate conifers and some spores (*Gleicheniidites senonicus*, *Stereisporites antiquasporites*, *Tuberositriletes montuosus*, *Coronatispora valdensis*), pollen *Asteropollis asteroides* which is not known from Cretaceous sediments of Africa, but is found in Eurasia and North America.

The assemblage studies are well correlated to synchronous ones of West Africa and Brazil. However, a much lesser content of most genera and species, as compared to the assemblages from the near-shore basins of West Africa and Brazil is worth noting. They include spore *Perotrilites pannuceus*, *Reticulatasporites jardinus*, pollen of gymnosperms *Ephedripites* and *Steevesipollenites*, as well as the pollen of angiosperm plants. The sediments penetrated at Site 367 originated relatively close to the shore line of West Africa, as evidenced by the presence of large forms of angiosperms that could hardly be transfered over larger distances.

The climate that prevailed during accumulation of Cretaceous sediments from Sites 370 and 367 must have been warm and dry, as evidenced by abundant pollen *Classopollis* and the diversity of pollen *Ephedripites* and *Steevesipollenites*.

SYSTEMATICS

Below is the list of taxa found. Geological and Geographical distribution of the previously defined species is given. The distribution of taxa in the sections studied is presented in Table 1.

Anteturma Sporites H. Potonie, 1893

Infraturma Laevigati Bennie and Kidston emend. R. Potonie, 1956

Genus CYATHIDITES Couper, 1953

1. Cyathidites minor Couper, 1953
(Plate 1, Figure 1)

Worldwide distribution in Mesozoic sediments.

[2] *Decheiropolis etruscus* was first defined from the Neocomian of Italy, but since then, it has only been found in Africa and South America.

2. Cyathidites australis Couper, 1953
(Plate 1, Figures 2, 3)

Worldwide distribution in Mesozoic sediments.

Genus STEREISPORITES Pflug, 1953

3. Stereisporites antiquasporites (Wilson and Webster) Dettmann, 1963.
(Plate 1, Figure 5)

Worldwide distribution in Mesozoic sediments.

Infraturma Apiculati Bennie and Kidston emend. Potonie, 1956

Genus LEPTOLEPIDITES Couper, 1953

4. Leptolepidites verrucatus Couper, 1953
(Plate 1, Figures 6-8)

Worldwide distribution in Mesozoic sediments.

Genus CONCAVISSIMISPORITES Delcourt and Sprumont emend. Delcourt, Dettmann, Hughes, 1963

5. Concavissimisporites variverrucatus (Couper) Brenner, 1963
(Plate 1, Figure 9)

Lower Cretaceous of USA (Brenner, 1963) and England (Couper, 1958; Kemp, 1970).

6. Concavissimisporites sp.
(Plate 1, Figures 10, 11)

Genus TUBEROSITRILETES Döring, 1964

7. Tuberositriletes montuosus Döring, 1964
(Plate 1, Figure 12)

Wealden of GDR.

Genus VERRUCOSISPORITES (Ibr.) Smith and Mitarbeiter, 1964

8. Verrucosisporites sp.
(Plate 1, Figures, 13, 14)

Genus CERATOSPORITES Cookson and Dettmann, 1958

9. Ceratosporites parvus Brenner, 1963
(Plate 1, Figures 15)

Barremian-Aptian and Albian of England (Kemp, 1970) and Albian of the USA (Brenner, 1963).

Infraturma Murornati R. Potonie and Kremp, 1954

Genus KLUKISPORITES Couper, 1958

10. Klukisporites sp.
(Plate 4, Figures 2, 3)

Genus RETICULATISPORITES (Ibr.) Neves, 1964

11. Reticulatisporites sp. 1.
(Plate 4, Figure 12)

12. Reticulatisporites sp. 2
(Plate 4, Figures 13-15)

Genus CICATRICOSISPORITES Pontonie and Gelletich, 1933

13. Cicatricosisporites proxiradiatus Kemp, 1970
(Plate 1, Figure 16)

Aptian and Albian of England (Kempt, 1970).

14. Cicatricosisporites venustus Deak, 1963
(Plate 1, Figure 17)

Upper Aptian of Hungary, Lower Cretaceous of England (Kemp, 1970) and Upper Cretaceous of Spain (Van Ameron, 1965).

15. Cicatricosisporites microstriatus Jardiné and Magloire, 1965
(Plate 1, Figure 18)

Aptian-Albian of Ivory Coast (Jardiné and Magloire, 1965).

16. Cicatricosisporites brevilaesuratus Couper, 1958 emend. Kemp, 1970
(Plate 2, Figure 1-3)

Barremian and Aptian of England (Couper, 1958; Kemp, 1970) and in Potomac Group of USA (Brenner, 1963).

17. Cicatricosisporites potomacensis Brenner, 1963
(Plate 2, Figure 7)

Barremian-Aptian of Potomac Group of the USA (Brenner, 1963) and Barremian of England (Kemp, 1970).

18. Cicatricosisporites sp. 1
(Plate 2, Figures 4, 5)

19. Cicatricosisporites sp. 2
(Plate 2, Figure 6)

20. Cicatricosisporites sp. 3
(Plate 2, Figure 8)

21. Cicatricosisporites sp. 4
(Plate 3, Figures 1, 2)

22. Cicatricosisporites sp. 5
(Plate 3, Figures 3, 4)

Genus APPENDICISPORITES Weyland et Krieger, 1953

23. Appendicisporites sp. 1
(Plate 3, Figures 5, 6)

24. Appendicisporites sp. 2
(Plate 3, Figure 7)

25. Appendicisporites sp. 3
(Plate 3, Figure 8)

Infraturma Tricrassati Dettmann, 1963

Genus GLEICHENIIDITES (Ross ex Delcourt and Sprumont) Dettmann, 1963

26. Gleicheniidites senonicus Ross, 1949
(Plate 3, Figures 9-13)

Worldwide distribution in upper Mesozoic sediments.

Genus CORONATISPORA Dettmann, 1963

27. Coronatispora valdensis (Couper) Dettmann, 1963
(Plate 4, Figure 1)

Wealden-Albian of England (Kemp, 1970) and Albian of Canada (Playford, 1971).

Infraturma Auriculati Schopf emend. Dettmann, 1963

Genus MATONISPORITES Couper, 1958

28. Matonisporites sp.
(Plate 1, Figure 4)

Suprasubturma Perinotrilites Erdtman, 1947

Genus PEROTRILITES (Erdman) ex Couper, 1953

29. Perotrilites pannuceus Brenner, 1963
(Plate 4, Figure 5, 6)

Albian of Maryland, USA (Brenner, 1963), Albian-Cenomanian of Pêru (Brenner, 1968); Albian-Cenomanian of Senegal and Ivory Coast basin (Jardiné et Magloire, 1965); Albian-Cenomanian of Brazil (Herngreen, 1973).

Infraturma Patinati Butterworth and Williams, 1958

Genus PATELLASPORITES Groot and Groot emend. Kemp, 1970.
(Plate 4, Figures 8-11)

Neocomian-Upper Aptian of England (Kemp, 1970) and Potomac Group, USA (Brenner, 1963).

Turma Hilates Dettmann, 1963

Genus COPTOSPORA Dettmann, 1963

31. Coptospora sp.
(Plate 4, Figure 7)

Incertae sedis

Genus RETICULATASPORITES Leschik, 1955

32. Reticulatasporites jardinus Brenner, 1968
(Plate 3, Figures 15, 16)

Aptian-Cenomanian of Senegal, Ivory Coast, Nigeria, Cameroun, Gabon, Congo (Jardiné et al., 1974b), Albian-Cenomanian of Peru (Brenner, 1968).

Infraturma Appendiciferi ?

Genus ELATEROSPORITES Jardiné, 1967

33. Elaterosporites klaszi (Jardiné and Magloire) Jardiné, 1967
(Plate 5, Figure 1-5)

Upper Albian-Lower Cenomanian of Peru (Brenner, 1968).

Genus ELATEROCOLPITES Jardiné et Magloire emend. Jardiné 1967

34. Elaterocolpites sp.
(Plate 5, Figures 8, 9)

Genus GALEACORNEA Stover, 1963

35. Galeacornea cf. causea Stover, 1963
(Plate 5, Figure 6)

U. Albian to L. Cenomanian of Senegal and Gabon (Jardiné, 1967; Stover, 1963).

Anteturma Pollenites Potonie, 1931

Infraturma Saccizonati Bhardwaj, 1957

Genus CEREBROPOLLENITES (Couper) Nilsson, 1958

36. Cerebropollenites mesozoicus (Couper) Nilsson, 1958
(Plate 10, Figures 19, 20)

Worldwide distribution in Upper Mesozoic sediments.

Genus TSUGAEPOLLENITES Potonie et Venitz emend. Potonié, 1958

37. Tsugaepollenites trilobatus (Balme) Dettmann, 1963
(Plate 10, Figure 16, 17)

Worldwide distribution in upper Mesozoic sediments.

Subturma DISACCITES Cookson, 1947

Genus PINUSPOLLENITES Raatz, 1937

38. Pinuspollenites sp.
(Plate 10, Figure 6, 15)

Genus PODOCARPIDITES Cookson ex Couper, 1953

39. Podocarpidites sp.
(Plate 10, Figure 7-11)

Genus PARVISACCITES Couper, 1958

40. Parvisaccites radiatus Couper, 1958
(Plate 10, Figures 12-14)

Worldwide distribution in lower Cretaceous sediments.

Genus VITREISPORITES LESCHIK, 1955

41. Vitreisporites pallidus (Reissinger) Nilsson, 1958
(Plate 9, Figures 27, 28)
Worldwide distribution in Mesozoic sediments.

Subturma Azonaletes Luber emend. Potonié and Kremp, 1954

Genus INAPERTUROPOLLENITES (ex Thoms. et Pfl. 1955) emend. R. Potonié, 1966

42. Inaperturopollenites sp.
(Plate 9, Figure 2)

Genus ARAUCARIACITES Cookson ex Couper, 1953

43. Araucariacites australis Cookson, 1947
(Plate 9, Figure 3)
Worldwide distribution in Mesozoic and Tertiary sediments.

Subturma Praecolpates Potonie and Kremp, 1954

Genus EUCOMMIIDITES Erdtman emend. Couper, 1958

44. Eucommiidites sp.
(Plate 9, Figures 23-26)

Subturma Polyplicates Erdtman, 1952

Genus EPHEDRIPITES Bolchovitina, 1953

45. Ephedripites multicostatus Brenner, 1963
(Plate 6, Figure 1-5)
Albian of USA (Hedlund and Norris, 1968; Brenner, 1963).

46. Ephedripites pentacostatus Brenner, 1968
(Plate 7, Figure 8, 9)
Albian-Cenomanian of Peru (Brenner, 1968), Albian of Ivory Coast (Jardiné and Magloire, 1965).

47. Ephedripites sp. I
(Plate 6, Figures 8-14)

48. Ephedripites sp. 2
(Plate 6, Figures 15-18)

49. Ephedripites sp. 3
(Plate 6, Figures 19-26)

50. Ephedripites jansonii (Pocock) Muller, 1968.
(Plate 7, Figures 1-5)

51. Ephedripites sp. 4
(Plate 7, Figures 6, 7)

52. Ephedripites sp. 5
(Plate 7, Figures 6, 7)

53. Ephedripites sp. 6
(Plate 9, Figure 1)

54. Ephedripites sp. 7
(Plate 7, Figure 22)

Genus STEEVESIPOLLENITES Stover, 1964

55. Steevesipollenites binodosus Stover, 1964
(Plate 7, Figure 10-14)
Albian-Turonian of Senegal (Stover, 1964), upper Albian-lower Cenomanian of Brazil (Herngreen, 1973).

56. Steevesipollenites sp. I
(Plate 7, Figure 15-17)

57. Steevesipollenites dajani Brenner, 1968
(Plate 7, Figure 18)
Albian-Cenomanian of Peru (Brenner, 1968).

58. Steevesipollenites sp. 3
(Plate 7, Figure 19)

59. Steevesipollenites sp. 4
(Plate 7, Figure 20)

60. Steevesipollenites sp. 5
(Plate 7, Figure 21)

61. Steevesipollenites sp. 6
(Plate 8, Figures 1-4)

62. Steevesipollenites sp. 7
(Plate 8, Figures 5, 6)

63. Steevesipollenites sp. 8
(Plate 8, Figure 7-9)

64. Steevesipollenites sp. 8a
(Plate 8, Figures 10-12)

65. Steevesipollenites sp. 9
(Plate 8, Figures 13, 14)

66. Steevesipollenites sp. 10
(Plate 8, Figures 15-18)

Subturma Monocolpates Iversen et Troels-Smith, 1950

Genus MONOSULCITES Cookson ex Couper, 1958

67. Monosulcites chaloneri Brenner, 1963
(Plate 9, Figures 15, 16)

Albian of the USA (Brenner, 1963; Hedlund and Norris, 1968); Aptian-Albian of England (Kemp, 1970).

68. Monosulcites sp.
(Plate 9, Figures 17-22)

Genus MONOCOLPOPOLLENITES Thomson and Pflug, 1953

69. Monocolpopollenites sp.
(Plate 9, Figures 29, 30)

Subturma Monoporines Naumova, 1939

Genus CLASSOPOLLIS Pflug emend. Couper, 1958

70. Classopollis sp. sp.
(Plate 9, Figures 4-14)

Genus EXESIPOLLENITES Balme, 1957

71. Exesipollenites tumulosus Balme, 1957
(Plate 10, Figure 18)

Worldwide distribution in upper Mesozoic sediments.

Genus DICHEIROPOLLIS Trevisan, 1971

72. Dicheiropollis etruscus Trevisan, 1971
(Plate 10, Figures 1-5)

Neocomian of Italy (Trevisan, 1971), Neocomian of Angola, Congo, Gabon, and Brazil (Jardiné et al., 1974a)

Angiospermous pollen grains

Genus CLAVATIPOLLENITES Couper, 1958

73. Clavatipollenites sp.
(Plate 11, Figures 1, 2)

Genus ASTEROPOLLIS Hedlund and Norris, 1968

74. Asteropollis asteroides Hedlund et Norris, 1968
(Plate 11, Figures 2, 3)

Middle Albian of USA (Hedlund and Norris, 1968); upper Albian-middle Cenomanian of England (Laing, 1975); Cenomanian-Turonian of Eastern Australia (Dettmann, 1973).

Genus LILIACIDITES Couper, 1953

75. Liliacidites peroreticulatus (Brenner) Singh, 1971
(Plate 11, Figures 5-8)

Upper Albian-middle Cenomanian of England (Laing, 1975); upper Barremian-Albian Maryland, USA (Brenner, 1963); upper Albian-Cenomanian of Alberta, Canada (Norris, 1967); Albian of Peru (Brenner, 1968); middle Cenomanian of France (Azema et al., 1972); middle Albian of Oklahoma, USA (Hedlund and Norris, 1968).

76. Liliacidites sp.
(Plate 11, Figures 9, 10)

Genus PSILATRICOLPITES van der Hammen ex van der Hammen and Wymstra, 1964

77. Psilatricolpites sp. (Plate 11, Figure 20)

Genus RETITRICOLPITES van der Hammen ex van der Hammen and Wymstra, 1964

78. Retitricolpites cf. operculatus Herngreen, 1973
(Plate 12, Figure 8)

Upper Albian-Cenomanian of Brazil (Herngreen, 1973).

79. Retitricolpites sp. 1
(Plate 11, Figure 14)

80. Retitricolpites sp. 2
(Plate 11, Figures 15-17)

81. Retitricolpites sp. 3
(Plate 11, Figure 18)

82. Retitricolpites sp. 4
(Plate 13, Figure 1)

83. Retitricolpites sp. 5
(Plate 13, Figures 2, 3)

84. Retitricolpites sp. 6
(Plate 11, Figure 19)

Genus TRICOLPITES Cookson ex Couper, 1953

85. Tricolpites cf. giganteus Jardiné and Magloire, 1965
(Plate 13, Figures 20, 21)

Turonian-Senonian of Senegal and Ivory Coast (Jardiné and Magloire, 1965).

86. Tricolpites microstriatus Jardiné and Magloire, 1965
(Plate 12, Figures 14-17)

The species was described from the Turonian of Senegal and Ivory Coast.

87. Tricolpites sp. 1
(Plate 11, Figures 11-13)

88. Tricolpites sp. 2
(Plate 13, Figures 4, 5)

Genus BACUTRICOLPITES (van der Hammen) Pierce 1961

89. Bacutricolpites sp. 1
(Plate 12, Figures 1-3)

90. Bacutricolpites sp. 2
(Plate 12, Figure 4)

Genus STRIATOPOLLIS Krutzsch, 1959

91. Striatopollis sarstedtensis Krutzsch, 1959
(Plate 12, Figures 18, 19)

Paleocene of DGR (Krutzsch, 1959); upper Albian-lower Cenomanian of Portugal and the upper Albian-lower Cenomanian of England (Laing, 1975).

Genus STRIOPOLLENITES Rouse, 1962

92. Striopollenites dubius Jardiné and Magloire, 1965
(Plate 12, Figures 12, 13)

Upper Albian-lower Cenomanian of Senegal and Ivory Coast (Jardiné and Magloire, 1965).

Genus TETRACOLPITES Vemal, 1952

93. Tetracolpites sp.
(Plate 13, Figures 6-8)

Genus TRICOLPOROPOLLENITES Pflug et Tomson, 1958

94. Tricolporopollenites triangulus Groot et al., 1961
(Plate 11, Figures 23, 24)

Cenomanian of USA (Groot et al., 1961).

95. Tricolporopollenites sp.
(Plate 11, Figures 25-31)

Genus HEXAPOROTRICOLPITES Boltenhagen, 1967

96. Hexaporotricolpites lamellaferus Jardiné et al., 1972
(Plate 12, Figures 9-11)

Upper Albian of Gabon, Congo and Angola (Jardine et al., 1972), upper Albian-lower Cenomanian of Brazil (Herngreen, 1973).

Genus TETRADOPOLLENITES Sittler, 1954

97. Tetradopollenites sp.
(Plate 11, Figures 21, 22)

Genus TRIORITES Cookson ex Couper, 1953 emend. Potonie, 1960

98. Triorites sp.
(Plate 13, Figures 15-18)

Genus TRIPOROPOLLENITES Pflug and Tomson, 1953

99. Triporopollenites sp.
(Plate 12, Figure 20)

Genus CRETACAEIPORITES Herngreen, 1973

100. Cretaceous polygonalis (Jardiné and Magloire) Herngreen, 1973

(Plate 13, Figures 9, 10)

Upper Albian-lower Cenomanian of Senegal, Aptian-upper Cenomanian of Ivory Coast (Jardiné and Magloire, 1965); Albian of Peru (Brenner, 1968); lower middle Albian-lower Cenomanian of Brazil (Herngreen, 1973).

101. Cretacaeiporites mulleri Herngreen, 1973
(Plate 13, Figures 11, 12)

Upper Albian-lower Cenomanian of Brazil (Herngreen, 1973); Turonian-lower Cenomanian of Senegal and Ivory Coast (Jardiné and Magloire, 1965).

102. Cretacaeiporites scabratus Herngreen, 1973
(Plate 13, Figures 13, 14)

Upper Albian-lower Cenomanian of Brazil (Herngreen, 1973); Turonian-lower Senonian of Senegal and Ivory Coast (Jardiné and Magloire, 1965); Albian-Cenomanian of Gabon (Boltenhagen, 1965).

Genus PROXAPERTITES van der Hammen, 1956

103. Proxapertites sp.
(Plate 12, Figures 5, 6)

Genus AURICULIIDITES Elsik, 1965

104. Auriculiidites reticulatus Elsik, 1965
(Plate 13, Figure 19)

Campanian of Peru (Elsik, 1965); Turonian of Peru (Brenner, 1968); lower Maestrichtian of Senegal (Jardiné and Magloire, 1965).

Incertae sedis

105. Forma sp. 1
(Plate 14, Figure 1)

106. Forma sp. 2
(Plate 14, Figure 2)

107. Forma sp. 3
(Plate 14, Figures 3, 4)

108. Forma sp. 4
(Plate 14, Figure 5)

109. Forma sp. 5
(Plate 14, Figure 6)

110. Forma sp. 6
(Plate 14, Figure 7)

111. Forma sp. 7
(Plate 14, Figure 8)

112. Forma sp. 8
(Plate 14, Figure 9)

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PLATE 1

Magnification ×600

Figure 1 — *Cyathidites minor* Couper, 1953.
Morocco Basin, 370-41, CC.
Cenomanian.

Figure 2 — *Cyathidites australis* Couper, 1953.
Morocco Basin, 370-41, CC,
Neocomian.

Figure 3 — *Cyathidites australis.*
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figure 4 — *Matonisporites* sp.
Morocco Basin, 370-32, CC,
Aptian-?lower Albian.

Figure 5 — *Stereisporites antiquasporites* (Wilson and Webster) Dettmann, 1963.
Morocco Basin, 370-32, CC,
Aptian-?lower Albian.

Figure 6 — *Leptolepidites verrucatus* Couper, 1953.
Morocco Basin, 370-27, CC,
Cenomanian.

Figures 7, 8 — *Leptolepidites verrucatus.*
Morocco Basin, 370-32, CC,
Aptian-?lower Albian.

Figure 9 — *Concavissimisporites veriverrucatus* (Couper) Brenner, 1963.
Morocco Basin, 370-41, CC,
Neocomian.

Figures 10, 11 — *Concavissimisporites* sp.
Morocco Basin, 370-41, CC,
Neocomian.

Figure 12 — *Tuberositriletes montuosus* Doring, 1964.
Morocco Basin, 370-41, CC,
Neocomian.

Figure 13 — *Verrucosisporites* sp.
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figure 14 — *Verrucosisporites* sp.
Morocco Basin, 370-30, CC,
upper Albian-lower Cenomanian.

Figure 15 — *Ceratosporites parvus* Brenner, 1963.
Morocco Basin, 370-41, CC,
Neocomian.

Figure 16 — *Cicatricosisporites proxiradiatus* Kemp, 1970.
Morocco Basin, 370-27, CC,
Cenomanian.

Figure 17 — *Cicatricosisporites venustus* Deak, 1963.
Morocco Basin, 370-32, CC,
Aptian-?lower Albian.

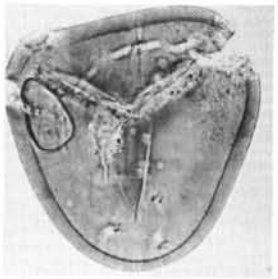
Figure 18 — *Cicatricosisporites microstriatus* Jardiné and Magloire, 1965.
Morocco Basin, 370-41, CC,
Neocomian.

PLATE 1


1


2


3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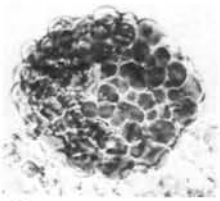
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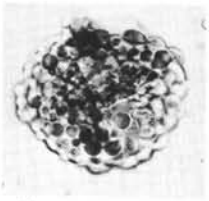
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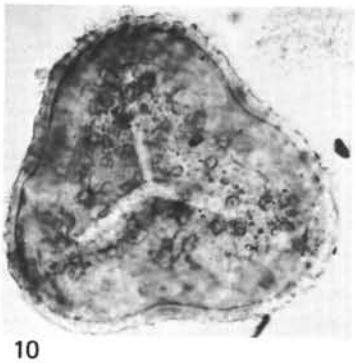
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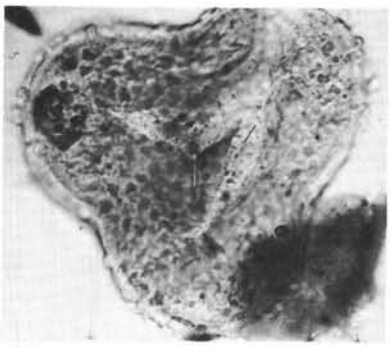
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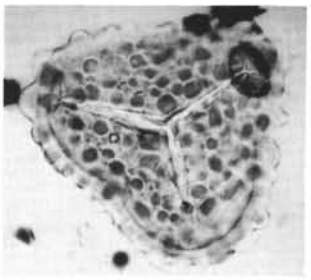
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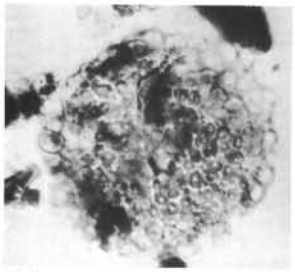
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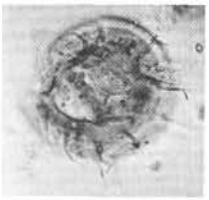

15a


15b


16a


16b


17


18

PLATE 2

Magnification ×600

Figures 1-3 — *Cicatricosisporites brevilaesuratus* Couper, 1958.
Morocco Basin, 370-41, CC,
Neocomian.

Figures 4, 5 — *Cicatricosisporites* sp. 1.
Morocco Basin, 370-41, CC,
Neocomian.

Figure 6 — *Cicatricosisporites* sp. 2.
Morocco Basin, 370-41, CC,
Neocomian.

Figure 7 — *Cicatricosisporites potomacensis* Brenner, 1963.
Cape Verde Basin, 367-21, CC,
Cenomanian.

Figure 8 — *Cicatricosisporites* sp. 3.
Morocco Basin, 370-31, CC,
upper Albian-lower Cenomanian.

PLATE 2

1a

1b

2a

2b

4a

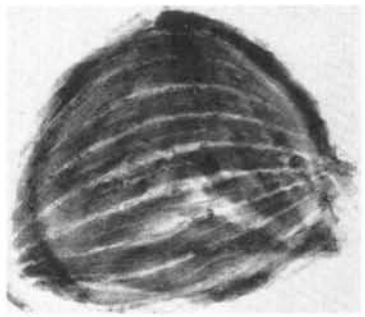
4b

6

7a

7b

3a



3b

5a

5b

8

PLATE 3

Magnification ×600

Figures 1, 2 — *Cicatricosisporites* sp. 4.
Morocco Basin, 370-27, CC,
Cenomanian.

Figures 3, 4 — *Cicatricosisporites* sp. 5.
Morocco Basin, 370-32, CC,
Aptian-?lower Albian.

Figures 5, 6 — *Appendicisporites* sp. 1.
Morocco Basin, 370-32, CC.
Aptian-?lower Albian.

Figure 7 — *Appendicisporites* sp. 2.
Morocco Basin, 370-32, CC,
Aptian-?lower Albian.

Figure 8 — *Appendicisporites* sp. 3.
Cape Verde Basin, 367-23, CC,
Cenomanian.

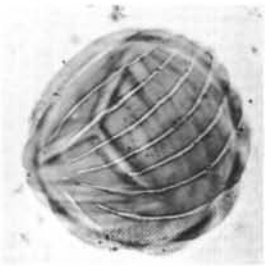
Figures 9, 10 — *Gleicheniidites senonicus* Ross, 1949.
Morocco Basin, 370-41, CC,
Neocomian.

Figure 11 — *Gleicheniidites senonicus.*
Morocco Basin, 370-27, CC,
Cenomanian.

Figures 12, 13 — *Gleicheniidites senonicus.*
Morocco Basin, 370-32, CC,
Aptian-lower Albian.

Figures 14, 15 — *Reticulatasporites jardinus* Brenner, 1968.
Morocco Basin, 370-27, CC,
Cenomanian.

PLATE 3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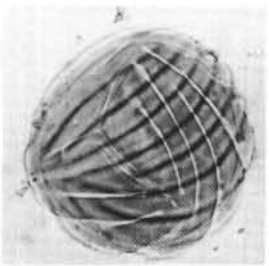
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2a


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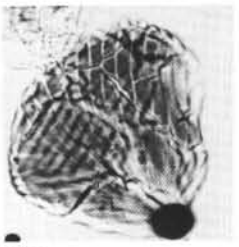
3a


3b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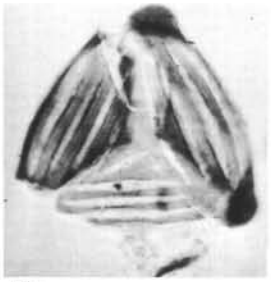
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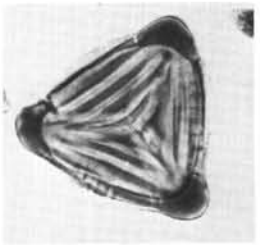
5b


6a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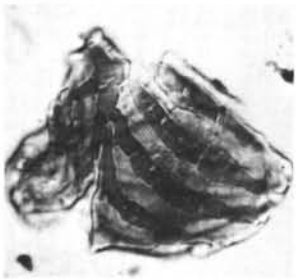
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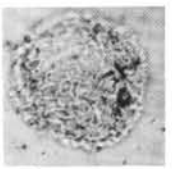
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PLATE 4

Magnification ×600

Figure 1 — *Coronatispora valdensis* (Couper) Dettmann, 1963.
Morocco Basin, 370-32, CC,
Aptian-?lower Albian.

Figure 2 — *Klukisporites* sp.
Morocco Basin, 370-41, CC,
Neocomian.

Figure 3 — *Klukisporites* sp.
Morocco Basin, 370-32, CC,
Aptian-?lower Albian.

Figure 4 — *Corrugatisporites ivoirensis* Jardiné and Magloire, 1965.
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figures 5, 6 — *Perotrilites pannuceus* Brenner, 1963.
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figure 7 — *Coptospora* sp.
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figures 8-10 — *Patellasporites distaverrucosus* (Brenner) Kemp, 1970.
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figure 11 — *Patellasporites distaverrucosus.*
Morocco Basin, 370-41, CC,
Neocomian.

Figure 12 — *Reticulatisporites* sp. 1.
Cape Verde Basin, 367-23, CC,
Cenomanian.

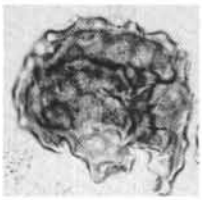
Figures 13-15 — *Reticulatisporites* sp. 2.
Cape Verde Basin, 367-23, CC,
Cenomanian.

PLATE 4


1a


1b


2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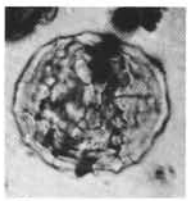
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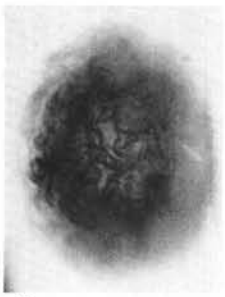
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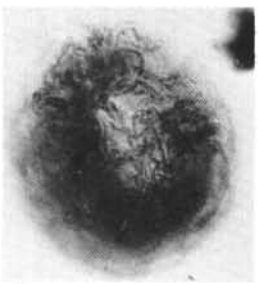
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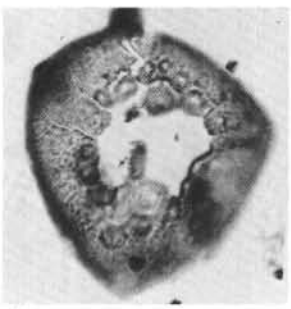
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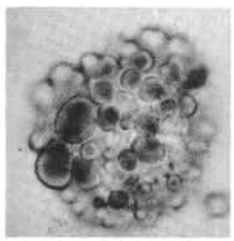
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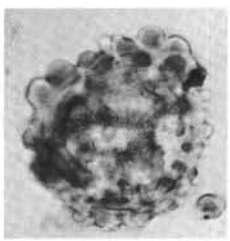
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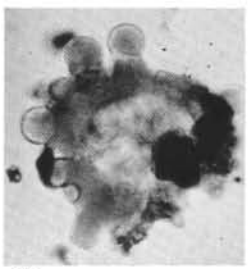
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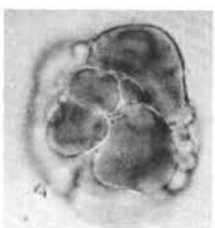
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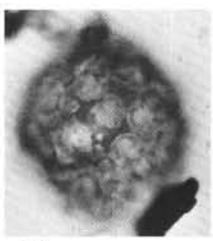
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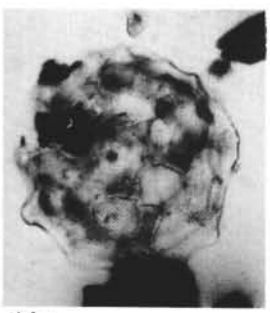
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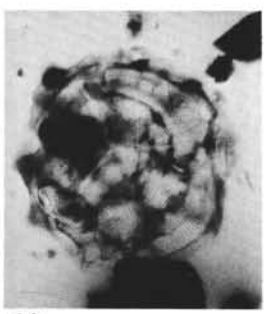
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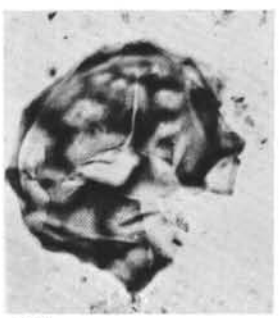
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PLATE 5

Magnification ×600

Figures 1-3 — *Elaterosporites klaszi* . (Jardiné and Magloire) Jardiné, 1967.
Cape Verde Basin, 367-21, CC,
Cenomanian.

Figures 4, 5 — *Elaterosporites klaszi.*
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figure 6 — *Galeacornea* cf. *causea* Stover, 1963.
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figure 7 — *Elaterosporites* sp.
Cape Verde Basin, 367-23, CC,
Cenomanian

Figures 8, 9 — *Elaterocolpites* sp.
Cape Verde Basin, 367-21, CC,
Cenomanian.

Figures 10-12 — ?*Galeacornea* sp.
Cape Verde Basin, 367-21, CC,
Cenomanian.

Figure 13 — ?*Galeacornea* sp.
Morocco Basin, 370-29, CC,
upper Albian-lower Cenomanian.

PLATE 5


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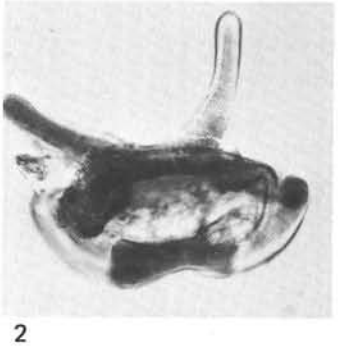
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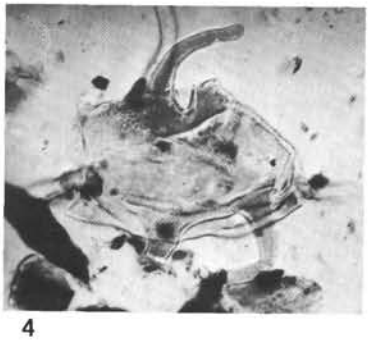
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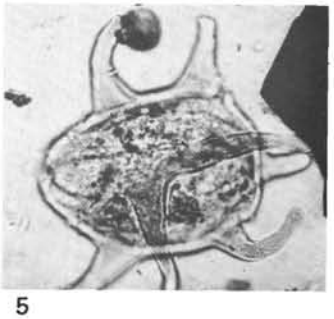
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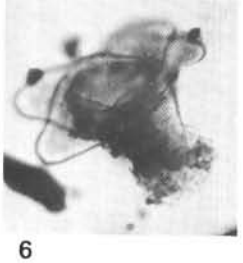
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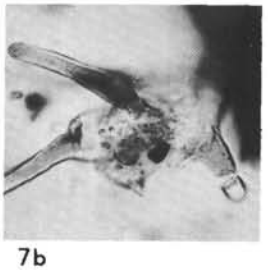
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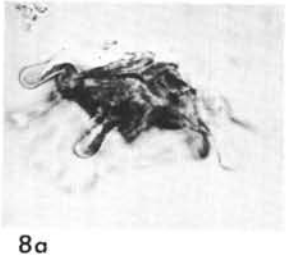
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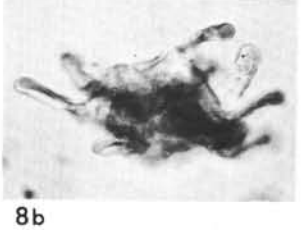
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PLATE 6

Magnification ×600

Figures 1, 2 — *Ephedripites multicostatus* Brenner, 1963.
Morocco Basin, 370-41, CC,
Neocomian.

Figures 3-5 — *Ephedripites multicostatus.*
Morocco Basin, 370-32, CC,
Aptian-?lower Albian.

Figures 6, 7 — *Ephedripites* sp. 5.
Morocco Basin, 370-27, CC,
Cenomanian.

Figures 8-12 — *Ephedripites* sp. 1.
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figures 13, 14 — *Ephedripites* sp. 1.
Morocco Basin, 370-41, CC,
Neocomian.

Figures 15-18 — *Ephedripites* sp. 2.
Morocco Basin, 370-41, CC,
Neocomian.

Figures 19-26 — *Ephedripites* sp. 3.
Morocco Basin, 370-27, CC,
Cenomanian.

PLATE 6


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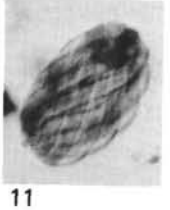
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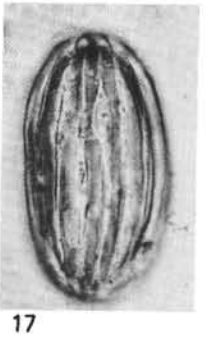
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21b


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25a


25b

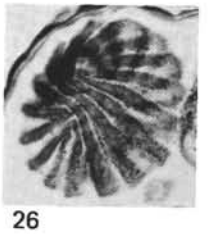
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PLATE 7

Magnification ×600

Figures 1-5 *Ephedripites jansonii* (Pocock) Muller, 1968.
Morocco Basin, 370-27, CC,
Cenomanian.

Figures 6, 7 *Ephedripites* sp. 4.
Morocco Basin, 370-27, CC,
Cenomanian.

Figures 8, 9 *Ephedripites pentacostatus* Brenner, 1968.
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figures 10-12 *Steevesipollenites binodosus* Stover, 1964.
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figures 13, 14 *Steevesipollenites binodosus.*
Morocco Basin, 370-27, CC,
Cenomanian.

Figure 15 *Steevesipollenites* sp. 1.
Morocco Basin, 370-41, CC,
Neocomian.

Figures 16, 17 *Steevesipollenites* sp. 1.
Morocco Basin, 370-32, CC,
Aptian-?lower Albian.

Figure 18 *Steevesipollenites dajani* Brenner, 1968.
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figure 19 *Steevesipollenites* sp. 3.
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figure 20 *Steevesipollenites* sp. 4.
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figure 21 *Steevesipollenites* sp. 5.
Morocco Basin, 370-27, CC,
Cenomanian.

Figure 22 *Ephedripites* sp. 7.
Cape Verde Basin, 367-23, CC,
Cenomanian.

PLATE 7


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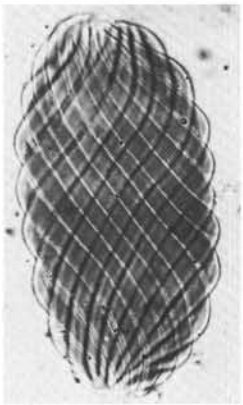
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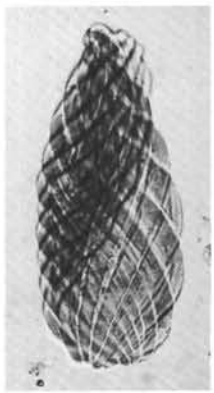
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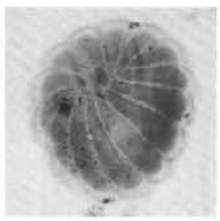
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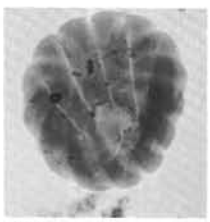
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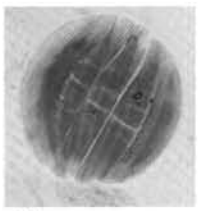
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PLATE 8

Magnification ×600

Figures 1-4 *Steevesipollenites* sp. 6.
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figures 5, 6 *Steevesipollenites* sp. 7.
Morocco Basin, 370-27, CC,
Cenomanian.

Figures 7-9 *Steevesipollenites* sp. 8.
Morocco Basin, 370-27, CC,
Cenomanian.

Figures 10-12 *Steevesipollenites* sp. 8a.
Morocco Basin, 370-41, CC,
Neocomian.

Figures 13-14 *Steevesipollenites* sp. 9.
Morocco Basin, 370-27, CC,
Cenomanian.

Figures 15-16 *Steevesipollenites* sp. 10.
Cape Berde Basin, 367-23, CC,
Cenomanian.

Figures 17, 18 *Steevesipollenites* sp. 10.
Morocco Basin, 370-27, CC,
Cenomanian.

PLATE 8


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PLATE 9

Magnification ×600, Figures 13, 14, ×1000

Figure 1 — *Ephedripites* sp. 6.
Morocco Basin, 370-27, CC,
Cenomanian.

Figure 2 — *Inaperturopollenites* sp.
Morocco Basin, 370-27, CC,
Cenomanian.

Figure 3 — *Araucariacites australis* Cookson, 197.
Morocco Basin, 370-41, CC,
Neocomian.

Figures 4-7, 13, 14 — *Classopollis* sp.
Morocco Basin, 370-41, CC,
Neocomian.

Figures 8, 9 — *Classopollis* sp.
Morocco Basin, 370-32, CC,
Aptian-?lower Albian.

Figures 10-12 — *Classopollis* sp.
Morocco Basin, 370-27, CC,
Cenomanian.

Figures 15, 16 — *Monosulcites chaloneri* Brenner, 1963.
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figures 17-19 — *Monosulcites* sp.
Morocco Basin, 370-41, CC,
Neocomian.

Figure 20 — *Monosulcites* sp.
Morocco Basin, 370-27, CC,
Cenomanian.

Figures 21, 22 — *Monosulcites* sp.
Cape Verde Basin, 367-23, CC.
Cenomanian.

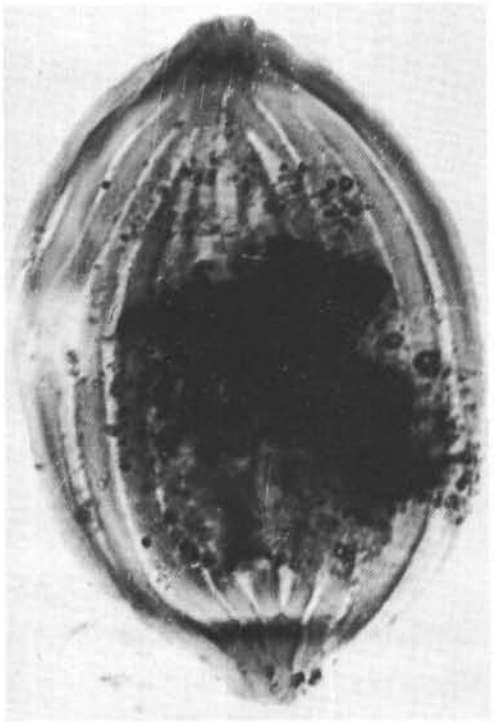
Figure 23 — *Eucommiidites* sp.
Morocco Basin, 370-27, CC,
Cenomanian.

Figures 24-26 — *Eucommiidites* sp.
Morocco Basin, 370-41, CC,
Neocomian.

Figures 27, 28 — *Vitreisporites pallidus* (Reissinger) Nilsson, 1958.
Morocco Basin, 370-41, CC,
Neocomian.

Figures 29, 30 — *Monocolpopollenites* sp.
Cape Verde Basin, 367-23, CC,
Cenomanian.

PLATE 9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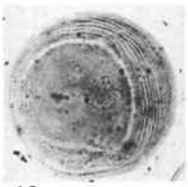
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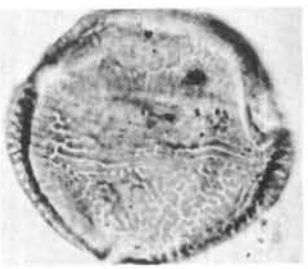
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15a


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16a


16b


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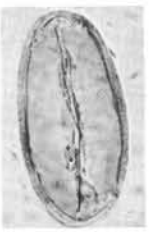
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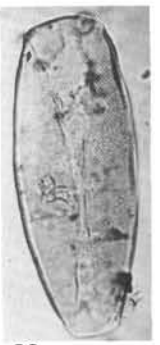
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PLATE 10

Magnification ×600

Figures 1-5 *Dicheiropollis etruscus* Trevisan, 1971.
Morocco Basin, 370-41, CC,
Neocomian.

Figure 6 *Pinuspollenites* sp.
Morocco Basin, 370-41, CC,
Neocomian.

Figures 7, 8, 11 *Podocarpidites* sp.
Morocco Basin, 370-41, CC,
Neocomian.

Figure 9 *Podocarpidites* sp.
Morocco Basin, 370-27, CC,
Cenomanian.

Figure 10 *Podocarpidites* sp.
Morocco Basin, 370-32, CC,
Aptian-?lower Albian.

Figures 12, 14 *Parvisaccites radiatus* Couper, 1958.
Morocco Basin, 370-32, CC,
Aptian-lower Albian.

Figure 13 *Parvisaccites radiatus.*
Morocco Basin, 370-41, CC,
Neocomian.

Figure 15 *Pinuspollenites* sp
Morocco Basin, 370-41, CC,
Neocomian.

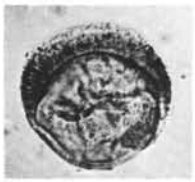
Figures 16, 17 *Tsugaepollenites trilobatus* (Balme) Dettmann, 1963.
Morocco Basin, 370-41, CC,
Neocomian.

Figure 18 *Exesipollenites tumulus* Balme, 1957.
Morocco Basin, 370-41, CC,
Cenomanian.

Figure 19 *Cerebropollenites mesozoicus* (Couper) Nilsson, 1958.
Morocco Basin, 370-41, CC,
Neocomian.

Figure 20 *Cerebropollenites mesozoicus.*
Morocco Basin, 370-32, CC,
Aptian-?lower Albian

PLATE 10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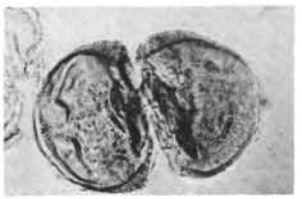
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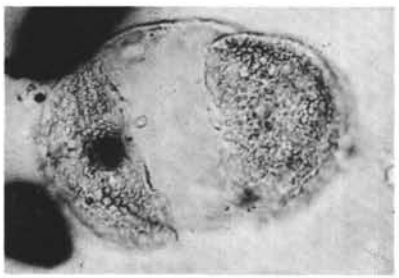
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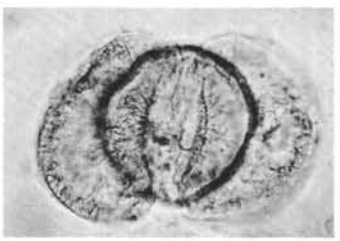
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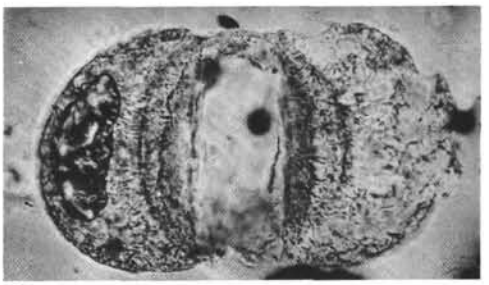
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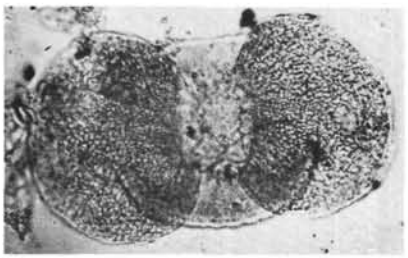
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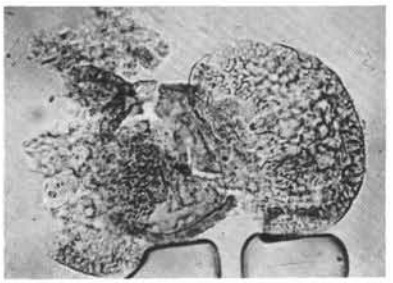
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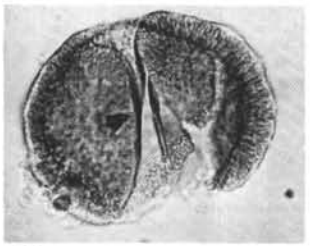
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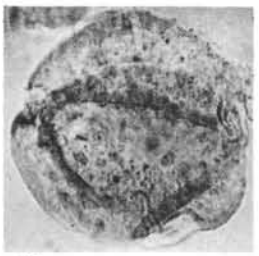
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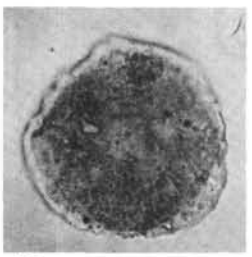
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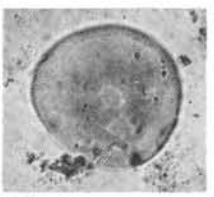
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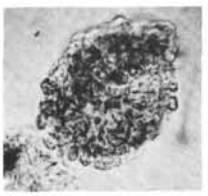
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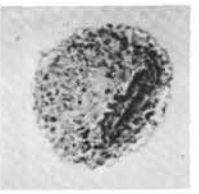
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PLATE 11

Magnification ×1000

Figure 1 — *Clavatipollenites hughesi* Couper, 1958.
Morocco Basin, 370-32, CC,
Aptian-?lower Albian.

Figure 2 — *Clavatipollenites rotundus* Kemp, 1968.
Morocco Basin, 370-27, CC,
Cenomanian.

Figures 3, 4 — *Asteropollis asteroides* Hedlund and Norris, 1968.
Morocco Basin, 370-27, CC,
Cenomanian.

Figures 5-7 — *Liliacidites peroreticulatus* (Brenner) Laing, 1975.
Morocco Basin, 370-32, CC,
Aptian-?lower Albian.

Figure 8 — *Liliacidites peroreticulatus.*
Morocco Basin, 370-27, CC,
Cenomanian.

Figures 9, 10 — *Liliacidites* sp.
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figures 11-13 — *Tricolpites* sp. 1.
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figure 14 — *Retitricolpites* sp. 1.
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figures 15-17 — *Retitricolpites* sp. 2.
Morocco Basin, 370-27, CC,
Cenomanian.

Figure 18 — *Retitricolpites* sp. 3.
Morocco Basin, 370-27, CC,
Cenomanian.

Figure 19 — *Retitricolpites* sp. 6.
Cape Verde Basin, 367-21, CC,
Cenomanian.

Figure 20 — *Psilatricolpites* sp.
Morocco Basin, 370-27, CC,
Cenomanian.

Figure 21 — *Tetradopollenites* sp.
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figure 22 — *Tetradopollenites* sp.
Morocco Basin, 370-27, CC,
Cenomanian.

Figures 23, 24 — *Tricolporopollenites triangulus* Groot, Penny and Groot, 1961.
Cape Verde Basin, 367-23, CC,
Cenomanian.

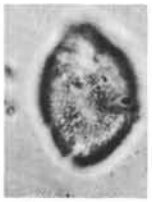
Figures 25, 28, 29 — *Tricolporopollenites* sp.
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figures 26, 27, 32 — *Tricolporopollenites* sp.
Morocco Basin, 370-29, CC,
lower Albian-lower Cenomanian.

Figures 30, 31 — *Tricolporopollenites* sp.
Morocco Basin, 370-27, CC,
Cenomanian.

PLATE 11


1a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2b


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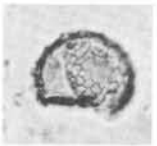
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7b


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11a


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12a


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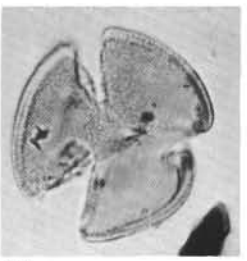
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16a


16b


17a


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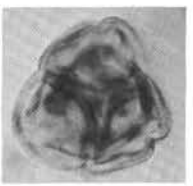

21


18a


18b


19


20


22a

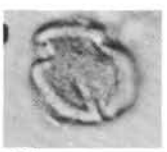

22b


23


24


25a


25b


26a


26b


27a


27b


28

29

30

31

32a

32b

PLATE 12

Magnification ×1000

Figures 1-3 — *Bacutricolpites* sp. 1.
Morocco Basin, 370-27, CC,
Cenomanian.

Figure 4 — *Bacutricolpites* sp. 2.
Morocco Basin, 370-29, CC,
upper Albian-lower Cenomanian.

Figures 5, 6 — *Proxapertites* sp.
Morocco Basin, 370-29, CC,
upper Albian-lower Cenomanian.

Figure 7 — ?*Tetracolpites* sp.
Morocco Basin, 370-29, CC,
upper Albian-lower Cenomanian.

Figure 8 — *Retitricolpites* cf. *operculatus* Herngreen, 1973.
Morocco Basin, 370-27, CC,
Cenomanian.

Figures 9-11 — *Hexaporotricolpites lamellaferus* Jardiné, Doerenkamp and Legoux, 1972.
Morocco Basin, 370-27, CC,
Cenomanian.

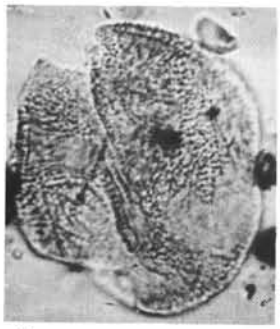
Figures 12, 13 — *Striopollenites dubius* Jardiné and Magloire, 1965.
Morocco Basin, 370-27, CC,
Cenomanian.

Figures 14-17 — *Tricolpites microstriatus* Jardiné and Magloire, 1965.
Morocco Basin, 370-27, CC,
Cenomanian.

Figures 18, 19 — *Striatopollis sarstedtensis* Krutzsch, 1959.
Morocco Basin, 370-27, CC,
Cenomanian.

Figure 20 — *Triporopollenites* sp.
Cape Verde Basin, 367-23, CC,
Cenomanian.

PLATE 12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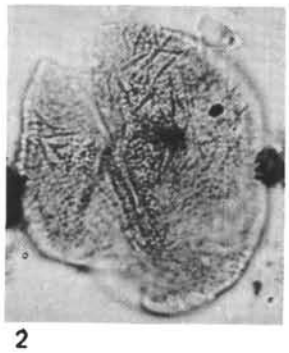
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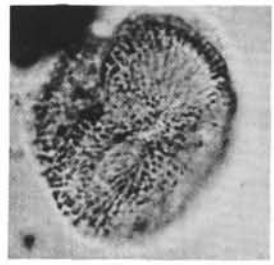
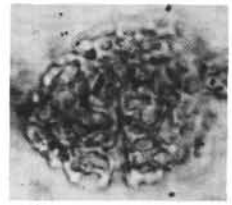
3


4


5


6


7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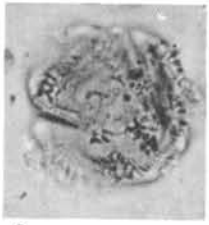
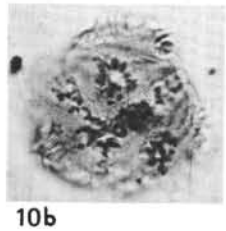
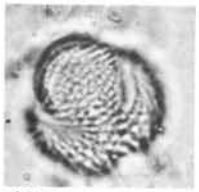

9


10a

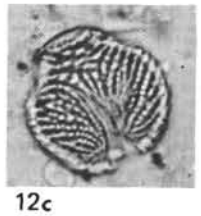

10b


11a


11b

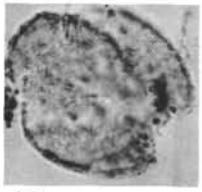

12a


12b


12c


13a


13b


14

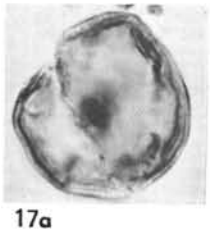

15a


15b


16


18a


18b


17a


17b


17c


19a


19b


20

PLATE 13

Magnification ×1000

Figure 1 — *Retitricolpites* sp. 4.
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figure 2 — *Retitricolpites* sp. 5.
Morocco Basin, 370-27, CC,
Cenomanian.

Figure 3 — *Retitricolpites* sp. 5.
Cape Verde Basin 367-23, CC,
Cenomanian.

Figures 4, 5 — *Tricolpites* sp. 2.
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figure 6 — *Tetracolpites* sp.
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figures 7, 8 — *Tetracolpites* sp.
Morocco Basin, 370-23, CC,
Cenomanian.

Figures 9, 10 — *Cretacaeiporites polygonalis* (Jardiné and Magloire) Herngreen, 1973.
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figures 11, 12 — *Cretacaeiporites mulleri* Herngreen, 1973.
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figures 13, 14 — *Cretacaeiporites scabratus* Herngreen, 1973.
Morocco Basin, 370-27, CC,
Cenomanian.

Figures 15-18 — *Triorites* sp.
Morocco Basin, 370-27, CC,
Cenomanian.

Figure 19 — *Auriculiidites reticulatus* Elsik, 1965.
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figures 20, 21 — *Tricolpites* cf. *giganteus* Jardiné and Magloire, 1965.
Cape Verde Basin, 367-23, CC,
Cenomanian.

PLATE 13


1a


1b


2a


2b


3a


3b


4


6

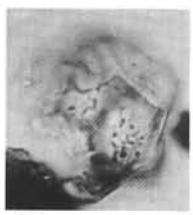

7a


7b


8


5


9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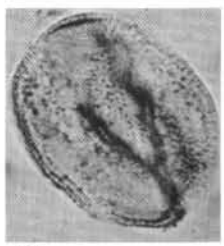
11


12

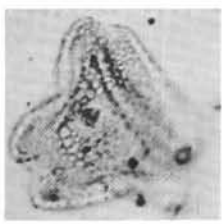

13

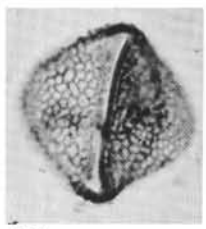

14


15a

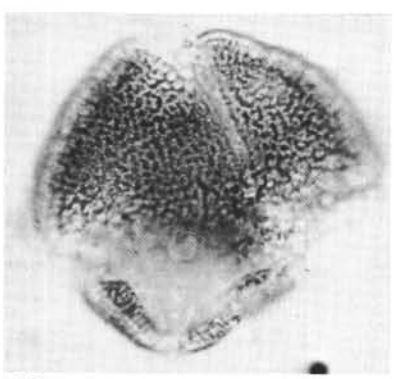

15b


16


17


18


19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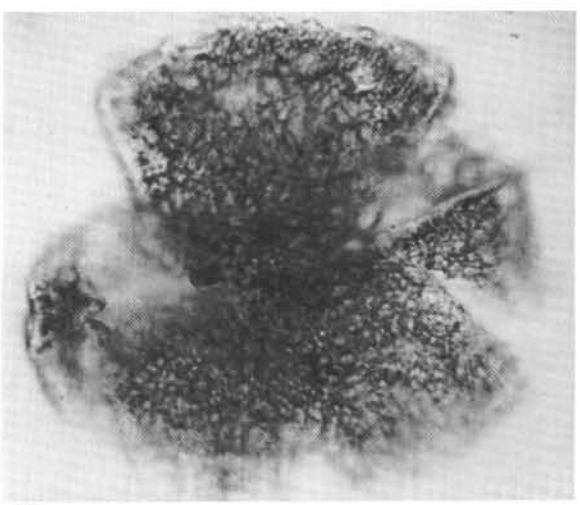

21

PLATE 14

Magnification ×1000

Figure 1 — Forma sp. 1.
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figure 2 — Forma sp. 3.
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figures 3, 4 — Forma sp. 3.
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figure 5 — Forma sp. 4.
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figure 6 — Forma sp. 5.
Morocco Basin, 370-27, CC,
Cenomanian.

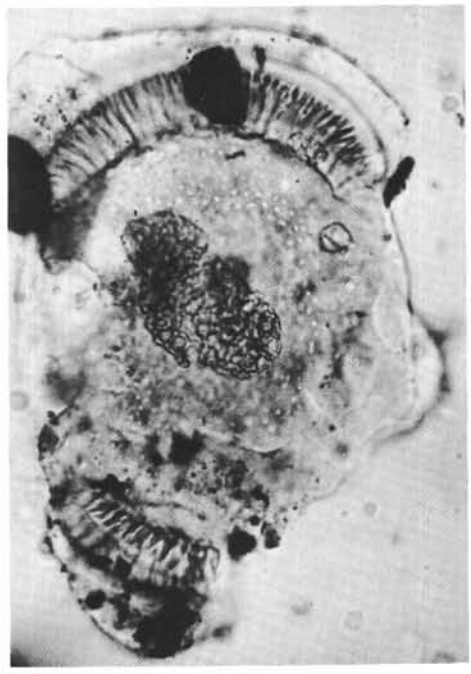
Figure 7 — Forma sp. 6.
Cape Verde Basin, 367-23, CC,
Cenomanian.

Figure 8 — Forma sp. 7.
Cape Verde Basin, 367-23, CC,
Cenomanian.

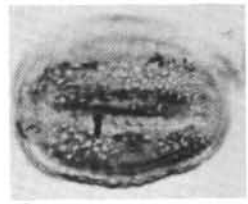
Figure 9 — Forma sp. 8.
Cape Verde Basin, 367-23, CC,
Cenomanian.

PLATE 14

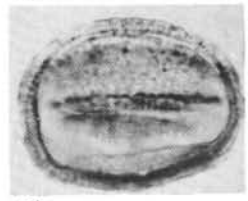
1a



1b



2a



2b

3

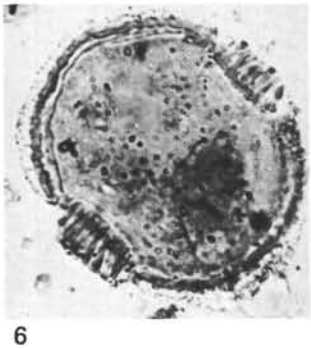
5a

5b

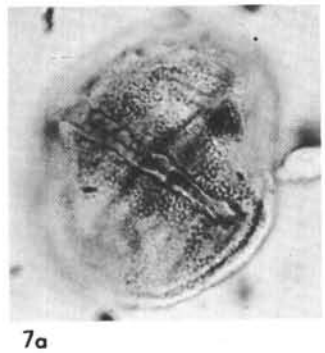
5c

4a

4b



6

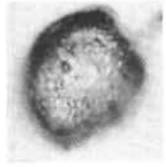


7a

7b

8a

8b



8c

9