

7. PALYNOLOGY OF PALEOGENE CLAY FROM DSDP SITE 368, CAPE VERDE RISE

Elena D. Zaklinskaja, Geological Institute of the USSR Academy of Sciences, Moscow

The section at Site 368 (Cape Verde Rise) has Upper Cretaceous (Turonian?) black clay and nanno ooze and marl separated from lower Miocene marl by a thick sequence (about 640 m) of green, gray-green, and red clay and silty clay that are extremely poor in organic remains. Upper Cretaceous agglutinated foraminifers (Krasheninnikov and Pflaumann, this volume) were recognized in the lower part of this sequence. Some interbeds in the clay (Samples 27, CC through 30, CC) are characterized by radiolarians (Johnson, this volume) and nannoplankton (Cepek, this volume) of early Eocene age.

Sixteen samples were examined with the aim of obtaining supplementary palynological data and establishing the Cretaceous-Paleogene boundary. Pollen of land plants and a diverse complex of micro-phytoplanktonic cells were found only in Sample 41-4, 11-13 cm. The palynological complex consists of the flora of angiosperm plants (Plates 1, 2, 3). Gymnosperms are usually absent but a few rare pollen grains (*Ephedripites* and *Cycadaceae*?) were found. The pollen includes mainly the families Santalaceae, Lecydiaceae, Sapindaceae, Rubiaceae, Sonneratiaceae, Euphorbiaceae, Pandanaceae, Moraceae, Thimelaeaceae, Bombacaceae, Combretaceae, Apocinaceae, Nymphaeaceae, Palmaceae, Papaveraceae, Myrtaceae, Juglandaceae (*Engelhardtia*), and Betulaceae (*Alnipollenites*). The greatest diversity occurs in the Neogene and Holocene flora and these represent a flora from tropical and subtropical latitudes. The established palynocomplex characterizes a flora of the forest type and plant coenoses associated with coasts which had humid microclimates that promoted the growth of brushwoods of the mangrove type (pollen *Rhizophoraceae*, *Sonneratiaceae*, *Avicenia*, *Nipa*). The predominance of angiosperms in the assemblage indicates that the shore line was not more than several hundred kilometers from the site of deposition. Numerous marine palynological studies of coastal regions and open seas show that with distance from shore, the relative content of angiosperm pollen decreases relative to pollen from gymnosperms. This is particularly true of pollen grains of gymnosperms which are carried by the wind.

The flora found in sediments from Site 368 differs from the Late Cretaceous and early Paleogene floras of the tropical zone discussed in the literature. These assemblages are also different from the floras of Late

Cretaceous to early Paleogene age from the Euramerian ("Norma"), Beringian ("Aquila") and Central Atlantic (*Proxaperites-Proteaceae*) which have been discussed by Vakhrameev et al. (1970) and Muller (1970). The main part of the taxa (*Psilotricolpites operculatus* V.d. Hammen, *Euphorbia* cf. *hypericifolia*, *Retitricolporites chubutensis*, some species of the *Phyllanthus* Zone and family *Sonneratiaceae* and *Florchuetzia bombacacites* is assigned an age younger than the early Paleogene (Danian-Paleocene). The palynocomplex can be correlated to palynozones B-D suggested by Van der Hammen and Wijmstra (1964) for the late Paleocene to Eocene of British Guiana and palynozones *Retibrevitricolporites triangulatus* and *Psilotricolporites operculatus-Reticolpites gainensis* established by Hermeraad et al. (1968) for the late Paleocene and Eocene of the tropics, particularly for the regions of the Caribbean and western margins of Africa. However, the palynocomplex also contains components from the *Florschuetzia levipoli* Zone whose age in the Kalimantan region is middle Eocene.

It is evident that the exact age of the flora cannot be determined by studying only one sample. Nevertheless, the Paleogene (likely Eocene) age of the palynocomplex is beyond doubt. The same conclusion is likely to follow from an analysis of phytomicroplankton, the complex of which contains species of *Microhistridium*, *Systematophora*, *Hystrichosphaera*, among many others. They are known from late Paleocene and Eocene sediments from the equatorial and sub-equatorial zones.

A systematic study of the whole section will enable a series of correlative pollen taxa to be established and their changes in the chronological succession to be followed.

REFERENCES

- Hermeraad, J., Hopping, G., and Muller, J., 1968. Palynology of tertiary sediments from tropical areas: *Rev. Palaeobot. Palynol.*, v. 6, p. 189-348.
- Muller, J., 1970. Palynological evidence on early differentiation of angiosperms: *Biol. Rev.*, v. 45, p. 417-450.
- Vakhrameev, V., Dobruskina, I., Zaklinskaja, E., and Meyen, S., 1970. Paleozoic, and mesozoic floras of Eurasia and phytogeography of this time: *Tr. Geol. Inst. Acad. Sci. USSR*, v. 208, p. 102-331.
- Van der Hammen, Th. and Wijmstra, T., 1964. A palynological study on the Tertiary and Upper Cretaceous of British Guiana: *Leidse Geol. Neded.*, D 30, p. 183-241.

PLATE 1

- Figures 1-5, 8 Sonneratiaceae
 1, 2. *Sonneratia* sp.? cf. *S. alba* Backer
 3, 4, 5. ? *S.* cf. *griffitii* Kurz.
- Figures 6, 7 *Sonneratia* cf. *alba* Backer
- Figure 9 *Ulmoideipites* sp.
- Figure 10 *Foveotricolporites corynoides* Wijmstra
- Figure 11 *Liliacidites crassibaculatus* Archangl.
- Figures 12-14 Moraceae
 12. *Morus* sp.
 13, 14. gen. et sp. indet.
- Figure 15 *Bombax* sp.
- Figure 16 Gramineae (gen. et sp. indet.)
- Figure 17 Euphorbiaceae (cf. *Blumeodendron* sp.)

PLATE 2

- Figures 1-4 Rhizophoraceae (*Rhizophora* sp.)
- Figures 5-7 Euphorbiaceae (*Euphorbia* sp.)
- Figures 8-15 Euphorbiaceae
 8, 9. *Psilatricolporites colpiconstriatus* Hoecken-Klink.
 10-12. *Phyllanthus* sp.
 13. *Alhornea* sp.
 14, 15. *Psilatricolporites operculatus* Van der Hammen.
- Figure 16 Combretaceae (*Psilatricolporites minutus* Van der Hammen)
- Figure 17 Rubiaceae (*Coffea* sp.)
- Figures 18, 19 Sapindaceae (cf. *Lepisanthes*)
- Figure 20 *Tricolpitempollenites baculiferus* R. Pot.
- Figure 21 *Retistephanocolpites regularis* Hoecken Klink.

(see page 936)

PLATE 1

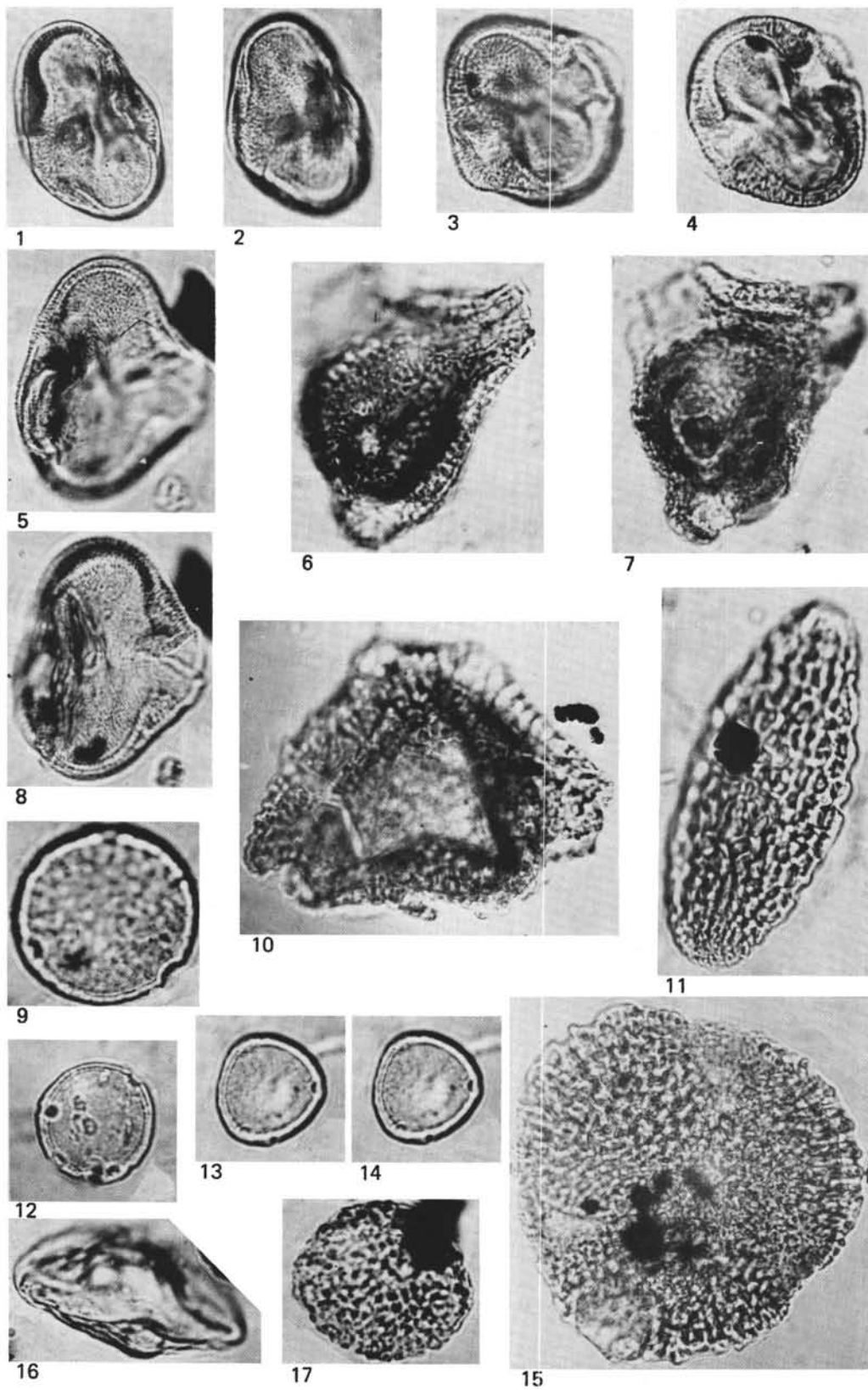


PLATE 2

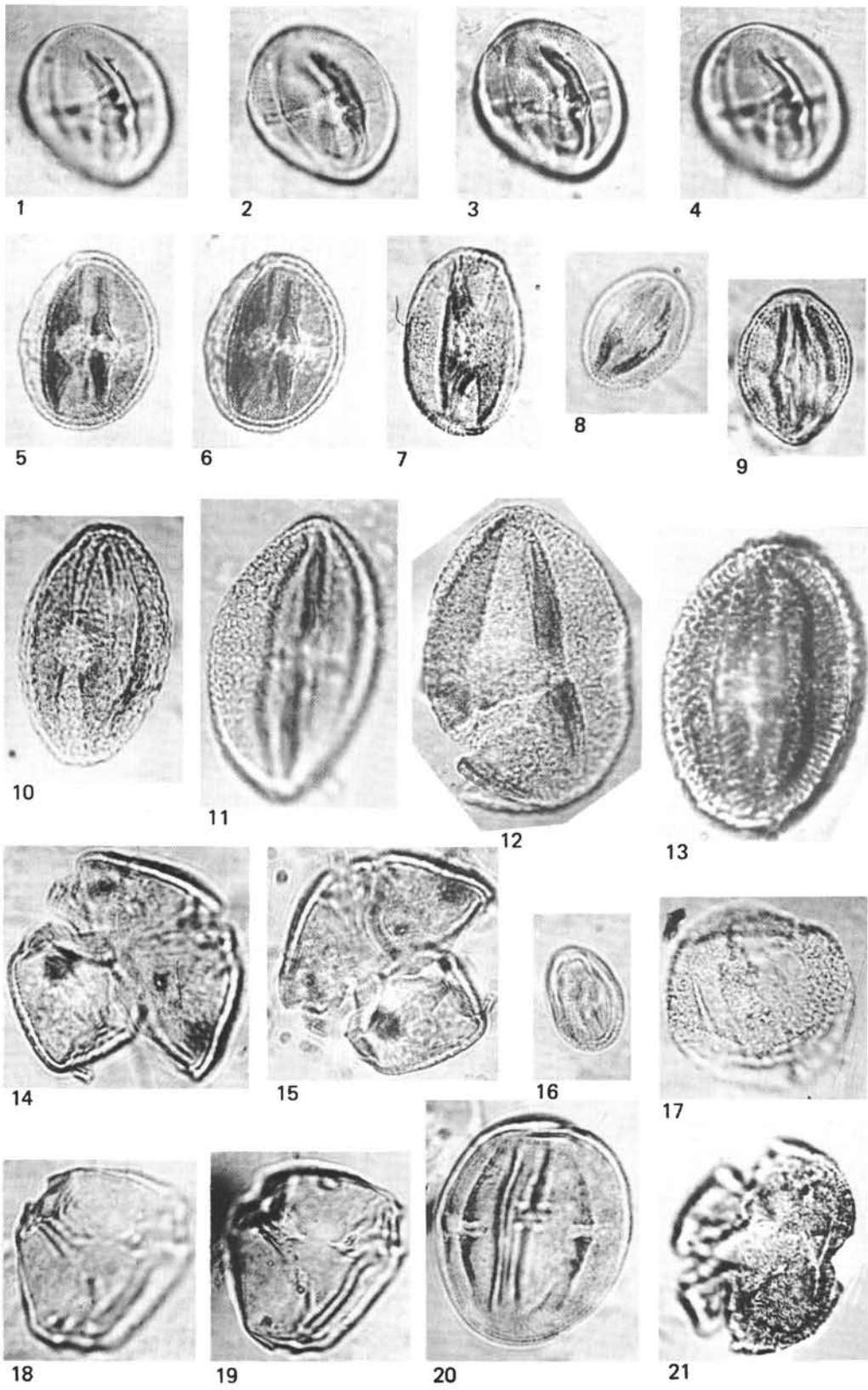
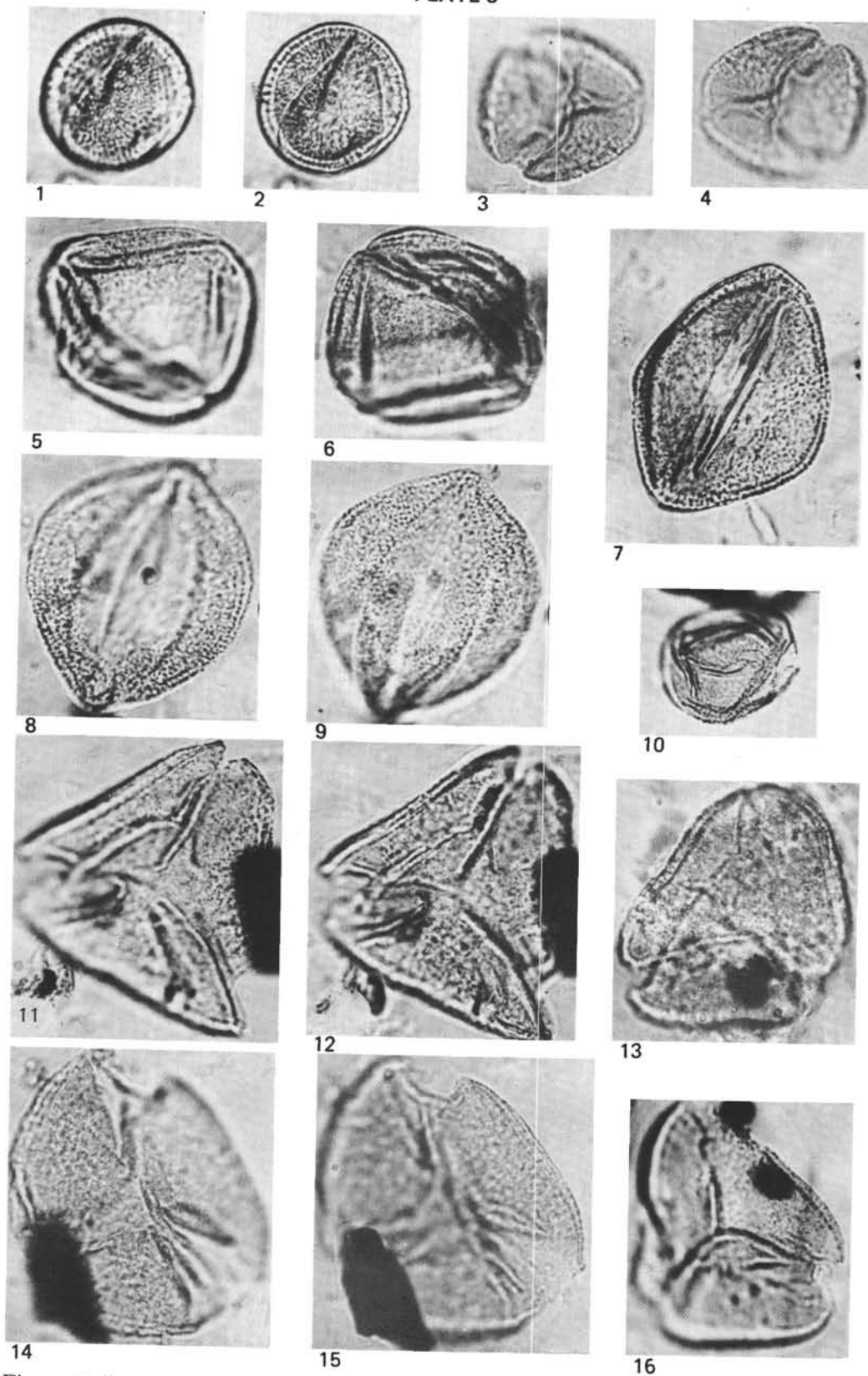


PLATE 3



Figures 1, 2

Figures 3, 4, 11-16

Figures 5, 6

Figures 7-9

Figure 10

Retitricolpites sp.

Sapindaceae (gen. et sp. indet.)

Lecydiaceae (*Psilatricolpites lecythioides* Archangl.)

Retitricolpites nitidus Wijnstra

Angiospermae indet.