SPORE POLLEN DATA FROM THE LONDON CLAY

M. KEDVES

Botanical Institute of the Attila József University, Szeged

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Introduction

The London Clay is very important because of its rich macroflora remains. In contradistinction to the literary data concerning the macroflora, the spore pollen assemblage of these localities is treated of but by a relatively low number of works. MA KHIN SEIN (1961) published *Nothofagus* pollens and MACKO (1961, 1963) rendered account of the results of detailed examinations from the botanical point of view. From the paleobotanical point of view, the basic sporomorph types of the investigated strata can be considered known on the basis of MACKO's publication. From the stratigraphic point of view, however, the evaluation of the spore pollen assemblage has not taken place, as yet, as compared with the deposits of continental Europe, therefore it seemed to be desirable to examine the problem in this respect.

Prof. Dr. ST. MACKO, requested by me, has made available willingly his material for my examinations, I am deeply indebted to him for his generous help. The purpose of this paper is, therefore, first of all to evaluate some types that are important from the point of view of the geological ages.

Material and method

The examined material, as already mentioned, is the same as that examined by Prof. Dr. ST. MACKO thus we don't deal with it in details. In compliance with the purpose of this work, this paper publishes but the documentation of a few types.

Results

1. In the spore pollen assemblage, similarly to MACKO's results (1963), there occurred a great lot of *Hystrichosphaeridae* species, remains of *Foraminiferae* with chitin cover, and other plancton organisms.

2. In some samples the rebedded mesozoic forms, supposedly from the Jurassic ages, is highly considerable (E. g., *Classopollis* fsp., Pl. II, figs. 30–32, *Vitreisporites pallidus* (REISS. 1938) NILSSON 1958, Pl. II, figs. 33–35).

3. The „dubius" and „hiatus" forms of the *Taxodiaceae-Cupressaceae* pollens have occured generally in a great number, similarly, the quantity of the tricolporate pollens of „pusillus" and other similar types is comparatively large.

4. From stratigraphic and facies-ecologic point of view, the following spore pollens have been emphasized: (Until now, the reasons of selection have been afforded by known types applied from stratigraphic and facies-ecologic points of view; here, however, there are applied first of all KRUTZSCH's paper (1958) and other papers connected with it). *Leiotriletes adriennis* (R. POT. & GELL. 1933) W. KR. 1959 b fvar. *pseudotorus* W. KR. 1959 b (Pl. I, figs. 1–3); *Leiotriletes microadriennis* W. Kr. 1959 b fvar. *torus* KDS. 1961 a (Pl. I, figs. 4–6); *Cicatricosisporites* fsp. (Pl. I, figs. 7–9); *Schizaeoisporites* cf. *eocenicus* (SELLING 1944) R. POT. 1956 (Pl. I, figs. 10–12); *Concavisporites (Concavisporites* cf. *tectatus* W. KR. 1959 b (Pl. I, figs. 18–20); *Concavisporites (Obtusisporis)* fsp. (Pl. I, figs. 13–15); *Granulatisporites* fsp. (Pl. I, figs. 16, 17); *Plicapollis pseudoexcelsus* (W. KR. 1958) W. KR. 1961 d subfsp. *turgidus* PF. 1953 a (Pl. II, figs. 1, 2); *Plicapollis pseudoexcelsus* (W. KR. 1958) W. KR. 1961 d subfsp. *semiturgidus* PF. 1953 a (Pl. II, figs. 3–5); * *Platycaryapollis fsp.* (Pl. II, figs. 6–8); *Caryapollenites triangulus* (PF. 1953 a) W. KR. 1961 d (Pl. II, figs. 9–11); *Subtriporopollenites* cf. *anulatus* TH. & PF. 1953 subfsp. *anulatus* (Pl. *II, figs. 12–14); Intratriporopollenites microreticulatus* MAI 1961 (Pl. II, figs. 15–17); *Intratriporopollenites* cf. *minimus* MAI 1961 (Pl. II, figs. 18–20); *Interpollis* fsp. (Pl. II, figs. 21–23); *Anacolosidites efflatus* (R. POT. 1934 b) ERDTMAN 1954 (Pl. II, figs. 24–26); *Palmae* pollen of type „tranquillus" to be described taxonomically later (Pl. II, figs. 27–29).

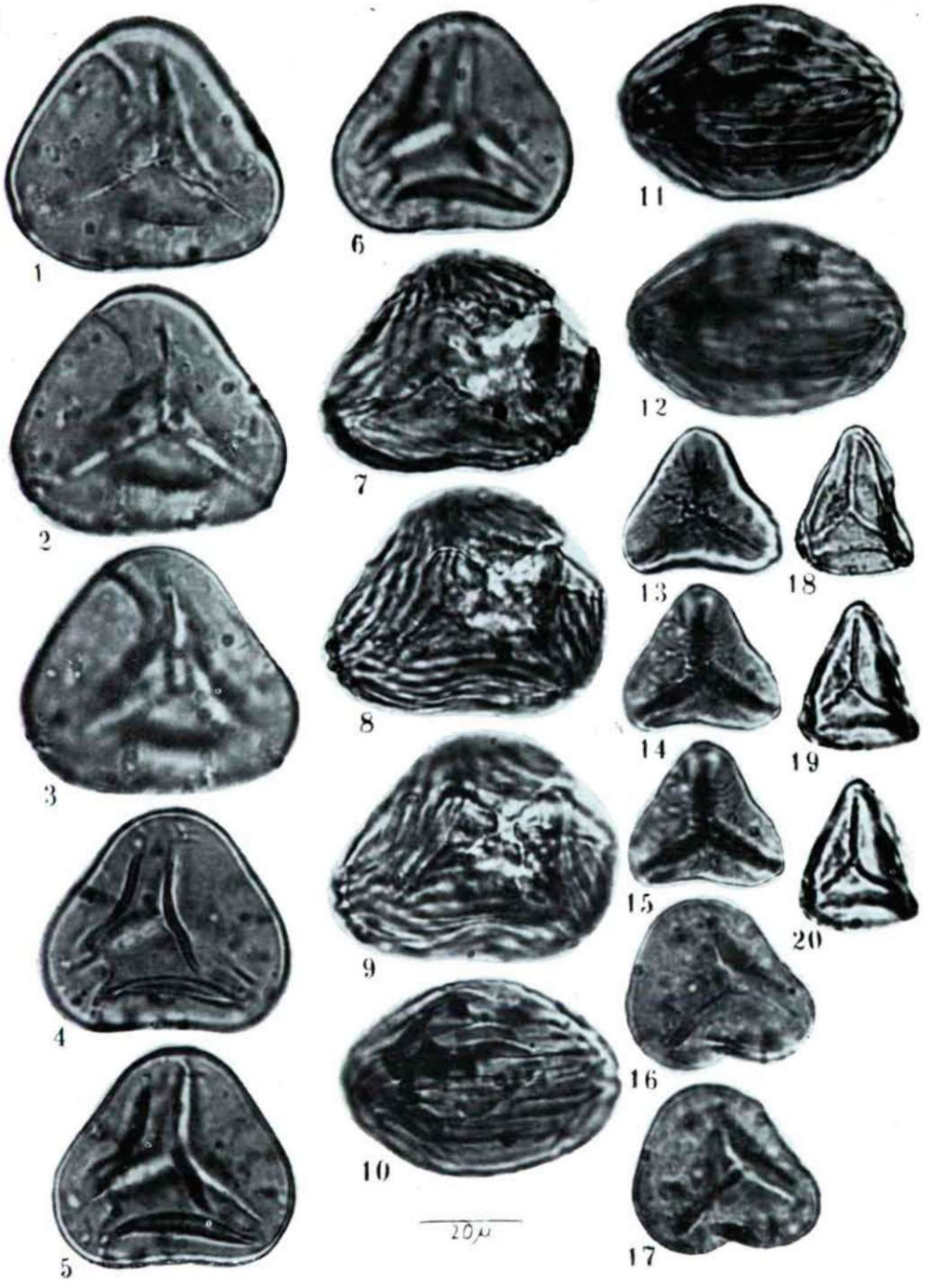
Discussion

In the spore pollen assemblage, the spores *Schizaeaceae* (cf. *Lygodium, Anemia, Schizaea)* and *Gleicheniaceae*, together with the pollens *Palmae* and *Olacaceae (Anacolosa)*, are reminding us of the spore pollen assemblage of tropical character that may occur, according to our recent results, beginning with the Sparnat in France (KEDVES 1967 a). From the strata rich in *Palmae* pollens and containing a lot of *Schizaeaceae* spores, the lowest coal strata of the Dorog basin may be mentioned as typical though recently that spore pollen assemblage is known in a lot of other localities, as well. The age of these

Plate I.

Figs. 1—3. — *Leiotriletes adriennis* (R. POT. & GELL. 1933) W. KR. 1959 b fvar. *pseudotorus* W. KR. 1959 b.
Figs. 4—6. — *Leiotriletes microadriennis* W. KR. 1959 b fvar. *torus* KDS. 1961 a.
Figs. 7—9. — *Cicatricosisporites* fsp.
Figs. 10—12. — *Schizaeoisporites* cf. *eocenicus* (SELLING 1944) R. POT. 1956.
Figs. 13—15. — *Concavisporites (Obtusisporis)* fsp.
Figs. 16, 17. — *Granulatisporites* fsp.
Figs. 18—20. — *Concavisporites (Concavisporites)* cf. *tectatus* W. KR. 1959 b.

Plate I.



strata is, as already mentioned in several places (e. g., KEDVES 1967 a), the middle Eocene, according to our present knowledge.

The occurrence of the genus *Plicapollis*, the *„Platycaryoid"*, *„Caryoid"* and *„Tilioid"* forms, MACKO's (1963) data *Interpollis velum* W. KR. 1961 d (Pl. XL, figs. 42—43), and the combined occurrence of the *Interpollis* fsp. observed by us in the London Clay refer to an age older than the middle Eocene. Compared with the summary table about the spore pollen assemblage of the Paris basin (prepared in February 1967, therefore not identical with that prepared in October 1966), it seems to be identical with the assemblage known from the clay facies in Flanders, its age is therefore the lower Eocene, nearer the Sparnat stage.

Evaluating the stratigraphic relation of the London Clay, we have to refer on a palynologic basis to the fact that, in respect of its age, it is not uniform, as D. E. RUSSEL was so good to draw my attention to it with his personnel communication. Its level, deeper than that examined by us, belongs to the Paleocene. Therefore, there are necessary further examinations for evaluating pollen-stratigraphically the London Clay like a considerable locality. According to our present knowledge, based on MACKO's documentation (1963), completed by this paper, we may speak about the spore pollen assemblage of the London Clay, as far known, in stratigraphic respect, like a type of the lower Eocene, suitable to be identified with the spore pollen assemblage of the Flanders Clay, examined in the localities Watten, resp. Templeuve-en-Pévéle. It is highly interesting that we succeeded, even in the mentioned localities, in observing several rebedded forms of the Jurassic ages, in the company of microfossils referring to a salt-water environment.

Summary

1. We have performed spore pollen examinations on samples of the London Clay elaborated paleobotanically in details by Prof. Dr. St. MACKO.

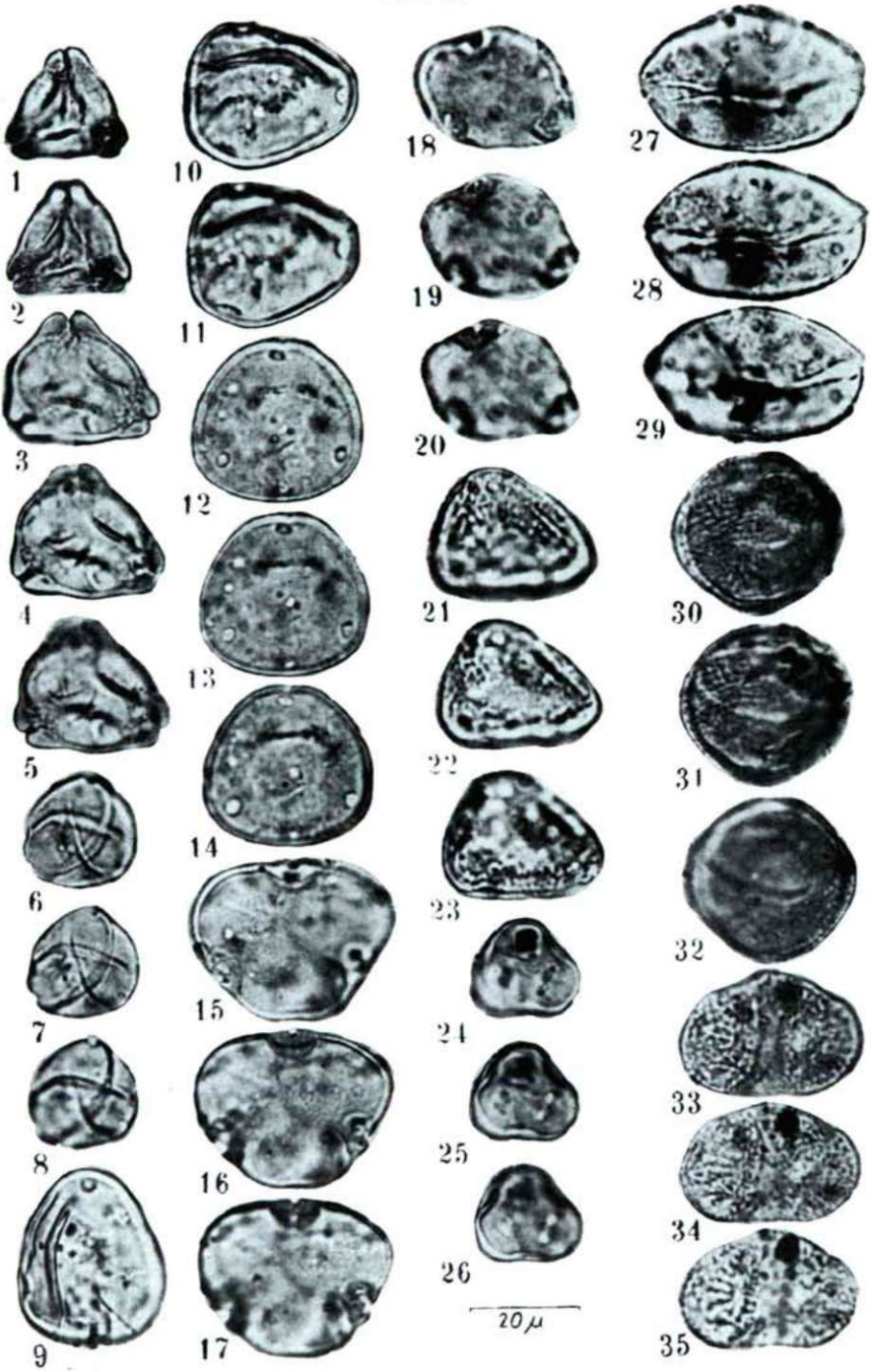
2. The observed forms refer, together with MACKO's publication (1963), to the lower Eocene age and seem to be identical with those observed in the Flanders Clay in the localities of Watten and Templeuve-en-Pévéle.

3. We want to indicate this spore pollen assemblage as the lower Eocene assemblage of the London Clay, remarking that the knowledge of the spore

Plate II.

Figs. 1, 2. — *Plicapollis pseudoexcelsus* (W. KR. 1958) W. KR. 1961 d subfsp. *turgidus* PF. 1953.
Figs. 3—5. — *Plicapollis pseudoexcelsus* (W. KR. 1958) W. KR. 1961 d subfsp. *semiturgidus* PF. 1953.
Figs. 6—8. — * *Platycaryapollis* fsp.
Figs. 9—11. — *Caryapollenites triangulus* (PF. 1953 a) W. KR. 1961 d.
Figs. 12—14. — *Subtriporopollenites* cf. *anulatus* Th. & PF. 1953 subfsp. *anulatus*.
Figs. 15—17. — *Intratriporopollenites microreticulatus* MAI 1961.
Figs. 18—20. — *Intratriporopollenites* cf. *minimus* MAI 1961.
Figs. 21—23. — *Interpollis* fsp.
Figs. 24—26. — *Anacolosidites efflatus* (R. POT. 1934 b) ERDTMAN 1954.
Figs. 27—29. — *Palmae* pollen, type „tranquillus".
Figs. 30—32. — *Classopollis* fsp.
Figs. 33—35. — *Vitreisporites pallidus* (REISS. 1938) NILSSON 1958.

Plate II.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pollen of that important locality is not final, as yet. A particularly important problem, to be examined, is that of the lower Paleocene level.

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