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THE ASSEMBLAGE OF AUTOCHTONOUS COAL PLANT-REMAINS FROM THE MIOCENE NEAR HRÁDEK NAD NISOU (ZITTAU BASIN, NORTH BOHEMIA)

The second contribution to the knowledge of palaeocarpological taphocenoses from open pit Kristina is presented. The clayish and coal-related sediments of the Upper brown coal seam complex and its overlier produce a peculiar assemblage of the small-sized plant fossils, which can be considered for an expression of the autochtonous plant-association. However it is poor generically (18 genera), though rich in specimens. The herbal aquatic and swamp plants (emersed, float leaf and submerged communities) as well as woody coal plants (shrubs and trees) present. The absolute necessity of the separated describing of the taphoecenoses from every types of litofacies generally is discussed shortly and pointed out. The requirement of a detailed determination of the litofacies at the same time in the modern palaeobotanical paper is supported by examples from the new literature. 4 species are described newly: *Myrica hudibra, Mneme donata, Proserpinaca ervinii* and *Potamogeton nochtensis.*

A SHORT REVIEW OF THE PALAEOCARPOLOGICAL TAPHOCENOSE FROM THE COALY AND CLAYISH LITHOFACIES; WHY SUCH A CLOSE ATTENTION TO THE LITHOFACIES?

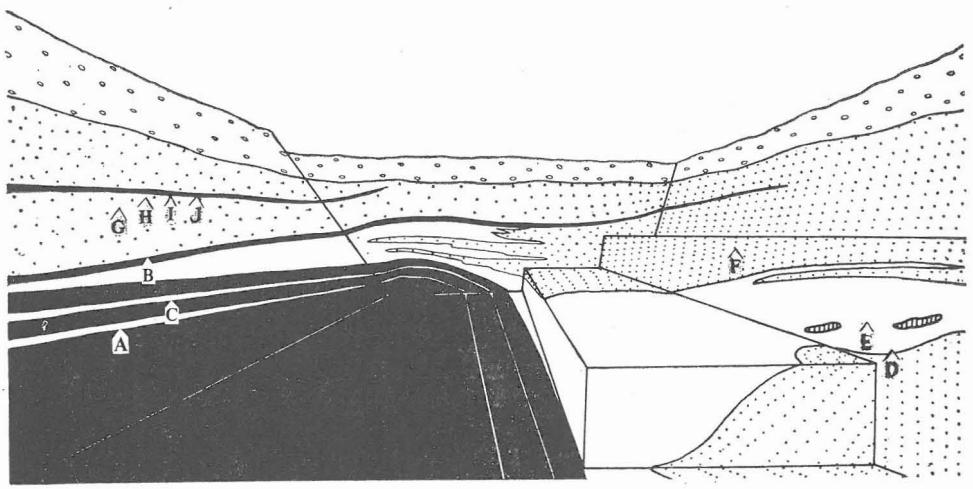
Present paper is a continuation of the first report on the Miocene carpological taphocenose from the open coal pit Kristina, Hrádek nad Nisou (HOLÝ 1977). On the contradistinction to that first one this paper deals with the new species from the palaeocarpological taphocenoses (so-called "palaeoassociations") from the lithofacies closely connected with the brown-coal-accumulation. The problems concerning of the general and local stratigraphy are summarized in the paper cited above and in detail by VÁCL — ČADEK (1962) especially.

As the lithofacies related to the accumulation of the xylitic brown coal seam we can consider the plastic clay (with carbonaceous pigment),

carbonaceous clay (event. with a minor, omissible psammitic admixture) and so-called "Blätterkohle". As follows from the list of fossils below, the palaeocarpological plant-assemblage differs extremly from the formerly described taphocenose from overlying sands (HOLÝ 1977). The producers of the majority of fossils mentioned here we consider for the coal plants.

List of fossils from the horizonts given in tab. 1 as:	A	B	C	H	I	J
Taxodiaceae: Glyptostrobus europaeus (BGT.) UNG.	A	B			I	J
Sequoia couttsiae HEER		B			I	
Conif. inc. sedis: Cupressospermum saxonicum MAI		B			I	J
Magnoliaceae: Magnolia burseracea (MENZEL) MAI				H	I	
Myricaceae: Myrica hudibra sp. nov.					I	J
Moraceae: Ficus potentilloides MAI		B				
Hypericaceae: Hypericum septestum NIKITIN					I	
Symplocaceae: Symplocos cf. salzhausensis (LUDWIG) KIRCHH.					I	
Lythraceae: Microdiptera parva CHANDLER		B				
Mneme donata sp. nov.		B	C		I	
Haloragaceae: Proserpinaca ervinii sp. nov.					I	
Vitaceae: Tetrastigma chandleri KIRCHH.					I	
Nyssaceae: Nyssa ornithobroma UNGER					I	
Cornaceae: Swida gorbunovii (DOROFEEV) NEGRU			C			
Cyperaceae: Dulichium marginatum (C. et E. M. REID) DOROFEEV					I	
Araceae: Epipremnum(?) ornatum REID — CHANDLER		B				
Arecaceae: Calamus daemonorhops (UNG.) CHANDLER		B				
Potamogetonaceae: Potamogeton heinkei MAI					I	J
Potamogeton nochtensis MAI sp. nov. (hoc loco)					I	J

Schema of the geological situation of the brown coal pit Kristina near Hrádek nad Nisou, a view of the nothern wall, perspective projection



We have what to do with a relatively poor assemblage consisting of herbal aquatic and marsh plants and brown coal producing trees and shrubs. The ecological and climatological analysis of the assemblages from open pit Kristina will be discussed in another paper together with a comparizon with related palaeobotanical taphocenoses from another localities. On this place let it be only explained why the author decided to divide the whole flora from Kristina into two formally separated papers: the author only used the opportunity to accentate excessively the necessity of the most strictly separated investigation and analytical as well as synthetical treatment with assemblages of palaeobotanical relics from every individual litological facies, though it would be represented by no matter how thin lens of distinct sediment.

A lot of indistinctness and confusions can be a consequence of inaccurate fixing of the palaeobotanical assemblages into a detailed lithological column, geological section on the locality. The sins against this seeming pedantry can be illustrated even in the instances from quite modern and highly standardby papers. Let us examplify the case of *Mastixiaceae*-assemblages from the Upper Lusatia (MAI 1964, pp. 56, 67, 84, 92—93, 99): though MAI brings as detailed systematical descriptions, as lithological columns (with several assemblages), after all we have only to suppose we have what to do with no single taphocenose designatable as "*Mastixiaceae-flora*"; both in systematical descriptions (with exceptions) and in lists of fossils (ibidem pp. 132—142) all assemblages of plant fossils are mixed together.

CZECZOTT (1970) has yielded the next example: as it is evident from the geological section (CZECZOTT 1970, fig. 1) of the open pit Turów,

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Explanations of the table 1

Black = xylitic coal seam, seamlet; white = clay; vertical hatching = clay-ironstone concretion; dotted = coarse-grained sand, pea-gravel with thin layers and lenses, schliers of sandy clay; minute ellipses = Quaternary gravel.
Capital letters show a position of investigated samples in section:

A = brownish plastic *clay*: upper intercalation in the main xylitic complex (about 5 m under the overlying of xylitic seam)
B = dark-brown carbonaceous *clay* and "*Blätterkohle*" from the uppermost part of the 1st xylitic seamlet splitting out of the main xylitic seam
C = finely sandy cocoa-brown *clay* with a rich carbonaceous pigment (under the uppermost part of the main xylitic seam)
D = base of light-gray *sandy clays* with clay-inronstone concreations (above the main xylitic seam)
E = light-gray *sandy clay* (rich in cuticles, with large clay-ironstone concretions) in the underlier of sands with *Eomastixia*
F = 1—2 cm thick schliers, thin lenses or thin bands of *sandy clays* with rich xylitic and carbonaceous entities, *Eomastixia, Mastixia* etc. embeded in coarse-grained sand and pea-gravel
G = light-gray coarse-grained sand with *clayish schliers* with *Fagus, Ocotea, Pterocarya, Tectocarya*; situated about 1 m under the uppermost xylitic seamlet
H = cocoa-brown *sandy clay* directly underlying the uppermost xylitic seamlet
I = dark-brown carbonaceous *clay* from the base of the uppermost xylitic seamlet
J = „*Blätterkohle*" (mostly consisted of *Glyptostrobus* branches) from the base of the uppermost xylitic seamlet

as well as from CZECZOTT's mentions — the large locality coal quarry Turów is to be analysed step by step, layer after layer — the single litofacial units: but in the same paper the assemblage (or assemblages?) is treated like (*Mastixiaceae*) "Tertiary flora of Turów" in the consideration of stratigraphical correlation.

For a good example let us pick out the description of taphocenoses from Oberpfalz (JUNG — KNOBLOCH — KVAČEK 1971): though from the sandy sediments of the mentioned region there are well known very rich *Mastixiaceae — Lauraceae* — assemblages the authors correctly separated autochtonous "floral-associations" from the clayish beds intercalating the coal-seams anyhow (ibidem, p. 238).

Trying to compare the cited autochtonous assemblage with those described from North Bohemian brown coal basin (BŮŽEK — HOLÝ 1964) we cannot ascertain any more serious differences! However, till this time we have not discovered any typical allochtonous palaeocarpological assemblages in that region as well as this flora calls for a new more detailed specific elaboration. From this point of view any kind of the palaeofloristical correlation of that palaeocarpological assemblage is to be premature or "half-cooked" (MAI 1967, p. 69 etc.).

Having this opportunity the author calls the attention to the Fasterholt flora from Denmark (FRIES 1975): the unusually rich and well preserved palaeocarpological assemblage originates from the fine-grained and extraordinarilly assorted sand immediately contacted with brown coal seam. This assemblage consist of a very impoverished *Mastixiaceae*-flora with exceptionally high percentage of autochtonous floristic palaeoassociation (about 45 % of aquatic and marsh herbal plants and woody coal plants!). Regarding this fact the authoress have made the growth form — analsis (ibidem, pp. 183—184, fig. 2) unwarrantedly, for that she have not used any similar palaeocarpological assemblage originating from the comparable lithofacies. In this way the assemblage from Fasterholt is to be regarded as a extraordinary transitional facies, based probably geomorphologically and ecologically.

SYSTEMATIC DESCRIPTIONS OF THE NEW SPECIES

Myricaceae

Myrica L. **1753**

Myrica hudibra sp. nov.

(Pl. 1, f. 1—16)

Diagnosis: Endocarps roundish broadly ovate in outline, somewhat oblique, 2.3—3.4 mm long, 1.8—2.8 mm broad; rounded in lower half, more straight-sided in superior part; apex rounded to slightly pointed; locule rather flat, ovate in outline; anterior and posterior endocarp-walls to ×2 thicker than on the lateral suttures; frequently twinned according to the level oblique to the plane of dehiscence. Exocarp thin, leathery.

Holotypus: Nr. G-4350, deposited in the palaeobotanical collection of the Palaeontological Department, National Museum Prague, Nat. Hist. Mus., pl. 1, f. 1.

Locus typicus et stratum typicum: brown coal pit Kristina near Hrádek nad Nisou, Zittau basin. Layers I, J from the overlier of the Upper brown coal seam complex. Ottnangian.

Material: About 65 carbonaceous endocarps.

Description: *Endocarps* rounded ovate to broadly ovate in outline, 2.3—(2.8)—3.4 mm long an d 1.8—(2.3)—2.8 mm broad;ratio of length. breadth (see below "L:B ratio") 1.7—(1.22)—1.28. Lower half rounded to suddenly narrowed in outline; the superior half sides converging more straightly though they are convex. Apex mostly more or less rounded, narrowed, rarely somewhat pointed (a trace after a style-base). Endocarp just primarilly asymerical: the asymetry emphasized by fosilization so the endocarps are secondarily compressed perhaps in the direction of the plane of dehiscence or somewhat oblique to it; the asymetry sometimes gives the endocarp a lop-sided arrangment.

Suttures thinnest on the sides (about 0.3 mm), the anterior and posterior endocarp-walls are to ×2 thicker. Locule ovate in outline, flat and shallow. Suttures usually followed by a thin rib-shaped thickening on the outer surface, especially at the upper half. The surface smooth.

Exocarp very thin, leathery, smooth, rarely preserved. Fruits very frequently twinning at the plane oblique to the plane of dehiscence. Twinning fruits always developed unequally.

Affinities: Very similar forms usually are put down into the range of *Myrica boveyana* CHANDLER (Stampian to Ottnangian?); but our new species differs in its much smaller size, in thinner walls and in its quite smooth surface; also the front-wall-thickening, the shallow locule and the slight asymetry of the whole fruit of *Myrica hudibra* sp. nov. are the diacritical characteristics. *Myrica hudibra* sp. nov. is closer related to *Myrica minima* NEGRU (NEGRU 1972, pp. 84—85, Moldavia, U.S.S.R.), but the new species differs from the second one in somewhat larger size, in asymmetry, generally more ovate outline and in thicker walls of the endocarp. *Myrica ucrainica* DOROFEEV et NEGRU (DOROFEEV — NEGRU 1970, Ukraine, U.S.S.R.) is very similare especially: but its endocarps are a little more thickset, rather rounded in the outline, with heart-shaped to broadly ovate locule and with about ×2 wider suttures; also it is symmetric, not oblique. Other well-known species show another characteristics: different shape, essentialy larger size ore verrucate epicarp.

Living counterparts: Fruits of the modern *Myrica javanica* BLUME yield similar characteristics: moderate flattening, nearly smooth outer surface, thin meridional keel, but larger size (4—5 mm length) and cordate outline. Endocarps of *Myrica rubra* have obliquely blunted base, but they are much longer (4—5 mm) and irregularly ornamented on the outer surface. The Asiatic species appear to be more relate than the North American, mostly verrucate fruits.

Lythraceae

Mneme EYDE **1972**

Mneme donata sp. nov.

(Pl. 1, f. 17-22, pl. 2, f. 1—9, textfig. 1)

1964 *Microdiptera parva* non auct. CHANDLER; MAI 1964, pp. 112—113, pl. 15, f. 36.

1964 *Diclidocarya menzelii* non auct. E. M. REID; HOLÝ 1964, p. 219.

Diagnosis: Seeds of elongate and inverted—trapeziform outline (sometimes oblong to angular-obovate), 1.0—1.6 mm long and 0.8—1.1 mm broad; L:B ratio 1.1—1.5; lateral sides straight to slightly convex; germinal operculum elongate-oval to rounded-oblong in outline.

Holotypus: Nr. G-4351, deposited in the palaeobotanical collection of the Palaeontological Department, National Museum Prague, Nat. Hist. Mus., pl. 1, f. 17,18.

Locus typicus et stratum typicum: brown coal pit Kristina near Hráedk nad Nisou, Zittau basin. Layer B, C, I from the uppermost part of the Upper brown coal seam complex and its overlier. Ottnangian.

Material: About 75 carbonaceous seeds.

Description: Seeds straight in axis, 1.0—1.5 mm long, 0.8—1.1 mm broad, L:B ratio usually 1.1—1.5. Elongate and inverted-trapeziform in outline, sometimes angular - obovate, rounded - oblong, extraordinarily narrow — obovate to almost elliptic in outline; lateral sides straight to

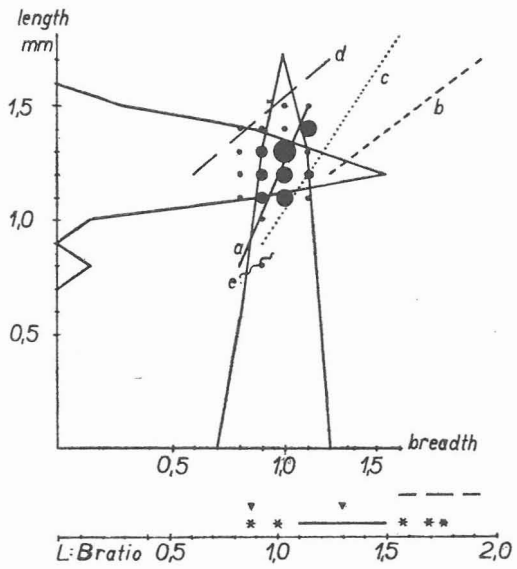


Fig. 1: Mneme sp. div.

The range of the seed-size: Mneme donata sp. nov. (simple line — a), Mneme sibirica (shortly dashed line — b), Mneme (?) tavdensis (dotted line — c), Mneme uralensis (long--dashed line — d), Mneme minor (wavy line — e).

Two curves to show the abundance of individually measured length and breadth of Mneme donata sp. nov.

Black rings specify the number of cases of individual sizes of Mneme donata sp. nov. (1, 2, 3—5, more than 5 cases — according to the diameter of the rings).

Beneath: the extent of L:B ratio of Mneme donata sp. nov. (simple line, sporadic = asteriscs), Mneme sibirca (black triangles), Mneme uralensis (long-dashed line).

slightly convex, apex as well as the base rounded; seed-body 0.3—0.5 mm broad, slightly overtoping above, with two thick (not winged!) ledges. It is longitudinally finely striate, plane to slightly concave, only extraordinarily somewhat convex on the ventral side: with two longitudinal lateral furrows on its margin occasionally. The dorsal side is convex, with elongate — oval to rounded — oblong germinal operculum; 8 longitudinal rows of equiaxially arranged polygonal cells running over the operculum.

A f f i n i t i e s : There are two closely relate species: the first one, *Mneme uralensis* (DOROFEEV) EYDE (DOROFEEV 1970, p. 60) is somewhat larger but longer and slender especially (L:B ratio 1,55—1,92), of pronouncedly trapeziform outline, sometimes with slightly concave lateral sides, oval germinal operculum with numerous rows composed of polygonal cells. The second, *Mneme tavdensis* (DOROFEEV) comb. n. (DOROFEEV 1968, pp. 117—118) is to be similar, but broader, provided with remarkable but thick and narrow wings, with a shorter germinal operculum and with a narrowing rounded base. *Mneme minor* (CHANDLER) EYDE (CHANDLER 1960, pp. 232—233) is considerably smaller and oval to rounded — triangular in its outline. Seeds od *Mneme sibirca* (NIKITIN) EYDE (NIKITIN 1965, p. 81) are broader and somewhat larger, rounded to trapeziform in outline, usually slightly bent in its axis, tending to be undulated on the margin. *Mneme menzelii* (E. M. REID) EYDE (E. M. REID 1927, p. 3) is much larger and more or less oval in outline.

The specimens from Hartau (MAI 1964, pp. 112—113, pl. 15, f. 36) are specificaly identical, they agree in their all characteristics to this new species.

To distinguish genera *Microdiptera* and *Mneme* (i.e. *Diclidocarya*) — it made difficulties even to the authoress of the genus *Microdiptera* (see CHANDLER 1957, pl. 15, f. 135 and f. 146!). But the absence of perfect wings (which are so characteristical for *Microdiptera*) is undoubted: in coal pit Kristina there was found a fragment of fruit belonging to the new species; all the seeds in fruit-fragment are closely crowded together and no traces after wings were ascertained on them.

R e m a r k s : Representatives of the extinct genus *Mneme* EYDE had to be produced by aquatic or marsh plants. Though they appear from time to time in Lower Tertiary floras (e. g. CHANDLER, cited above), the new species (and probably the whole genus) is to be considered for an highly characteristic Euro-Siberian floral element. The close relationship of the new species with the Siberian species is astonishing; but this fact must not be only the single relevant in judging of the climatic-necessaries of described plant community.

We have no living counterpart for any comparison. It is possible only to state, that the family absent in circumpolar cool zone recently, it is poorly represented in the temperate zone and towards the aequator the number of species increases (KOEHNE 1898, p. 5). Plants frequently living in marshy or aquatic communities, often with special accomodations of the seeds for water-disseminating.

Haloragaceae

Proserpinaca L. **1753**

Proserpinaca ervinii sp. nov.

(Pl. 2, f. 10—18, textfig. 2, 3)

1964 *Proserpinaca reticulata* non auct. C. et E. M. REID; HOLÝ 1964, p. 219

Diagnosis: Fruits trilocular, barrel-shaped in outline, 1.5—2.0 mm long, 1.2—1.8 mm broad, the broadest in the middle; with a constriction under the apical collar; base rounded, quickly narroved into the shortest stalklet; dorsal and median veins striking, the network of secondary veinlets not too conspicuous. Locules bag-shaped, inflate.

Holotypus: Nr. G-4266 deposited in the palaeobotanical collection of the Palaeontological Department, National Museum Prague, Nat. Hist. Mus., pl. 2 f. 10.

Locus typicus et stratum typicum: brown coal pit Kristina near Hrádek nad Nisou, Zittau basin. Layer I from the overlier of the Upper brown coal seam complex. Ottnangian.

Material: 15 specimens of carbonaceous seeds.

Description: Trilocular fruit, 1.5—(1.8)—2.0 mm long, 1.2—(1.4)—1.8 mm broad, barrel-shaped in outline; the broadest in the half of the length or somewhat lower. Fruit-body markedly delimited by the constriction from the apical collar. Base rounded, quickly narrowed into a broad, very short and pointed stalklet 0.1—0.25 mm long. Transverse section shows rounded-lobate triangular outline; locules bag-shaped and inflate.

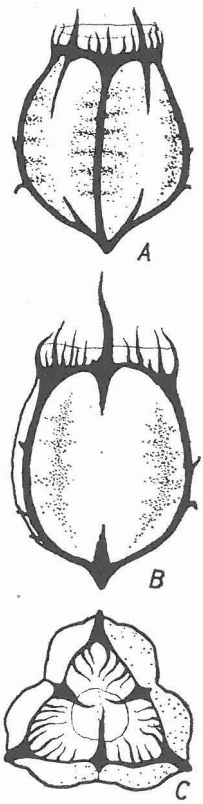


Fig. 2: Proserpinaca ervinii sp. nov.

A, B — schematic view of both lateral faces showing the course of veins and the general shape of fruits. C — schematic apical view. × 17 enlarged.

Prominent dorsal veins (strong, a little waved) running down the edges of the locules: each of them branching on the endocarp-surface into 3 to 5 irregular transverse and not too much conspicuous zigzag anastomoses. Longitudinal middle perianth veins are placed on the bottom of a shallow (nearly flat) furrows between the locules: closely above the fruit base (in 1/4 to 1/3 of the length) they submerge under the perianth surface and near-by under the apical collar they appear once more on the surface. The middle ribs (i.e. perianth veins) ending on the apex similar to a triangular tip or like to 1 mm long bristlet; immediately under the border of the apical collar arch-like branches of the neighbour dorsal veins join the median one: dorsal veins have branched into two arched limbs below the apical collar, upwards branching off three to four very short pricklets or bristlets.

One or two very fine teeth („spines") solitary sitting on the lower part of the dorsal veins, projecting laterally. Apical collar of triangular outer and rounded inner outline in the view on ground plan. L:B ratio 1.15—1.35.

Affinities: The new species shows a close relation to the Neogene species *Proserpinaca reticulata* C. et E. M. REID from Krościńko n. D. (SZAFER 1947, pl. 119, pl. 10, figs. 17—24) in its L:B ratio especially. But *Proserpinaca ervinii* sp. nov. is distinctly smaller, the surface of its locules is smoother, differs also in its barrel-shaped and above constricted outline (not narrowed apically). *Proserpinaca pterocarpa* DOROFEEV (DOROFEEV 1963, p. 234) is only a little larger and its L:B ratio is cognate too: but it differs in its highly trapeziform outline; the broadest it is in lower part, its base is either shortly pointed or to emarginate. The locules-surface displays well developed distinct and nodular veiny reticulum; the other setuliform or capillary veins branching off radially out around the whole length of the dorsal veins; mostly tetralocular. Unfortunetely, in both cases we are lacking in detailed descriptions of the veins-reticulum, probably of the very constant outer characteristic on the fruit: other features are too dependent on the conditions and the state of preservation.

There are also another fruits deserving of the comparison: fruits from Lagernij Sad, U.S.S.R. (NIKITIN 1965, p. 83, pl. 14, figs. 7—10) denominated as *Proserpinaca reticulata* C. et E. M. REID *var. acuminata* NIKITIN, however, are very narrow and relatively much slender: their other parameters remind of the range of our new species.

Living counterparts: *Proserpinaca palustris* L. and *Proserpinaca intermedia* MACK have fruits 2—5 mm long, actuely angled, sharply angled to winged (in their cross-section outline), with concave sides. *Proserpinaca pectinata* LAM. has fruits 2.5—4 mm long, irregularly ridged, obtusely angled (cross-section outline), with nearly flat sides (CLEASON — CRONQUIST 1963, p. 498). *Proserpinaca* is an amphibious or marsh herb living in the North and Central America, from Guatemala to Canada.

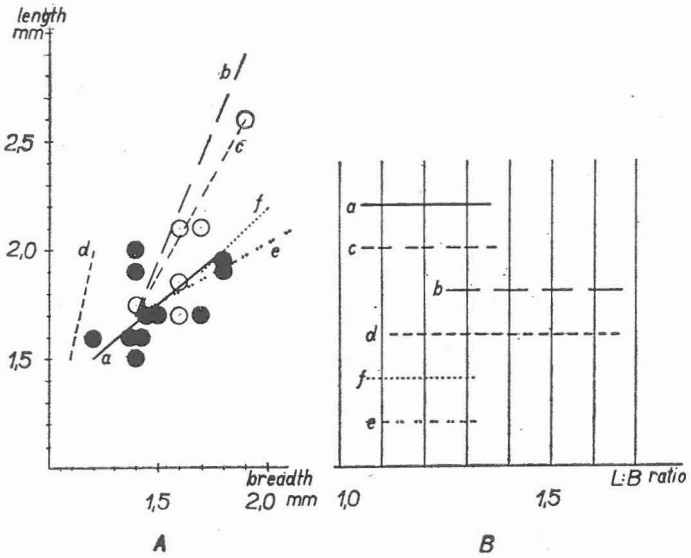


Fig. 3: Proserpinaca sp. div.

A — the range of the fruit-size: Proserpinaca ervinii sp. nov. (simple line — a), Proserpinaca reticulata (Kroscieńko long-dashed line — b), Reid's type-specimens — double-dashed line — c), Proserpinaca reticulata var. acuminata (shortly-dashed line — d), Proserpinaca pterocarpa (Siberian localities — double-dotted line — e, Mamontova gora — dotted line — f).

Black dings specify the individual sizes of the specimens of new species. White rings: the same characteristic of type specimens of Proserpinaca reticulata.

B — the extent of L : B ratio of individual species of Proserpinaca sp. div. The explanations like in A.

Potamogetonaceae

Potamogeton L. **1753**

Potamogeton nochtensis MAI sp. nov. (hoc loco)

(Pl. 3, f. 1—10)

Diagnosis: Endocarps oval in lateral outline, 1.0—2.1 mm long and 1.05—1.4 mm broad; base rounded, apex suddenly narrowed axially into the strong base of style; lateral faces nearly flat, only slightly biconvex; ventral margin rounded, the dorstal one convex; a little central depression without a perforation; outer surface smooth.

Holotypus: Nr. G-4295, deposited in the palaeobotanical collection of the Palaeontological Department, National Museum Prague, Nat. Hist. Mus., pl. 3, f. 3.

Locus typicus et stratum typicum: brown coal pit Kristina near Hrádek nad Nisou, Zittau basin. Layers I, J from the overlier of the Upper brown coal seam complex. Ottnangian.

Material: Fruits, about 100 carbonaceous specimens.

Description: Fruits mostly oval in outline, nearly flattened, only very slightly biconvex, 1.0—(1.5)—2.1 mm long and 1.5—(1.2)—1.4 mm broad. Base rounded, apex quickly narrowed into the strong base of a style axially; lateral faces nearly flat, only slightly convex towards their centres; with a rounded, little and shallow central depression without any perfect perforation; ventral outline rounded and entire, slightly emarginate on the hilum-region; dorsal outline convex, with a smooth germinal valve reaching the base of the style, without a keel. The style — rest about 0.1—0.35 mm long. L:B ratio 1.0—(1.3)—1.8.

Affinities and living counterparts: Living relatives are to be found in the group of *Potamogeton polygonifolius* POUR. Closely related species from the Siberian Miocene, *Potamogeton minimus* DOROFEV (1963, p. 103—104) differs in its a little smaller dimensions, distinctly keeled germinal valve, conspicuously longer and more or less cylindrical to conical style-base, completely perforated central condyle and somewhat thicksetter general shape (outline). *Potamogeton heinkei* MAI, well known from the Lusatian Miocene (and as well as present in the same lithofacies in coal pit Kristina) is extraordinarily similar and differs mainly in absence of any rest of the style.

REFERENCES

BŮŽEK, Č., HOLÝ, F. (1964): Small-sized plant remains from the coal formation of the Chomutov—Most—Teplice basin. Sbor. geol. Věd, Ř. P. **4**, 105—138. Praha.

BŮŽEK, Č., HOLÝ, F., KVAČEK, Z. (1966): Zpráva o paleobotanickém výzkumu terciéru hrádecké části žitavské pánve. Zpr. geol. Výzk. Ústř. Úst. geol. 1964, 256—257. Praha.

CHANDLER, M. E. J. (1957): The Oligocene flora of the Bovey Tracey Lake basin, Devonshire. Bull. Brit. Mus., natur. Hist., Ser. Geol. **3**, 3, 71—123. London.

CHANDLER, M. E. J. (1960): Plant remains of the Hengistbury and Barton Beds. Bull. Brit. Mus., natur. Hist., Ser. Geol. **4**, 6, 191—238. London.

CZECZOTT, H. (1970): O wieku trzeciorzędowej flory Turowa k. Bogatyni Górne Lużyce. Kwartalnik Geologiczny, **14**, 4, 778—801. Warszawa.

DOROFEEV, P. I. (1963): Tretičnije flory Zapadnoj Sibiri. Izd. Akad. Nauk SSSR. Moskva—Leningrad.

DOROFEEV, P. I. (1968): Ob oligocenovoj flore Zauralja. Paleont. Žurn., 1968, 2, 111—119. Moskva.

DOROFEEV, P. I. (1970): Tretičnije flory Zauralja. Izd. Nauka, AN SSSR, Bot. Inst. Komarova. Leningrad.

DOROFEEV, P. I., NEGRU, A. G. (1972): O plodach Myrica L. iz miocenovych otloženij Ukrajiny i Moldavii. Ukr. bot. Žurn., **27**, 4. Kijev.

EYDE, R. H. (1972): Note on geologic histories of flowering plants. Brittonia, **24**, 1, 111—116. U.S.A.

FRIIS, E. M. (1975): Climatic implications of microcarpological analysis of the Miocene Fasterholt flora, Denmark. Bull. geol. Soc. Denmark, **24**, 179—191. Copenhagen.

GLEASON, H. A., CRONQUIST, A. (1963): Manual of Vascular Plants of Northeastern Unites States and Adjacent Canada. D. v. Nostrand Comp., Inc. Princeton, New Jersey, U.S.A.

HOLÝ, F. (1964): Zpráva o paleontologických výzkumech terciérních a kvartérních usazenin žitavské pánve (lom Kristina). Zpr. geol. Výzk. Ústř. Úst. geol. 1963, 218—220. Praha.

HOLÝ, F. (1977): On some new species from the Mastixiaceae-flora taphocenose from the Miocene near Hrádek nad Nisou (Zittau basin, North Bohemia). — Acta Musei Nationalis Pragae, XXXI B (1975), 3 - 5, Praha.

JUNG, W., KNOBLOCH, E., KVAČEK, Z. (1971): Makrofloristische Untersuchungen im Braunkohlentertiär der Oberpfalz. Mitt. Bayer Staatssamml. Paläont. hist. Geol., **11**, 223—249. München.

KOEHNE, E. (1893): Lythraceae. In: Engler A. — Prantl K.: Die Natürliche Pflanzenfamilien etc. **3**, 7, 1—16. Leipzig.

MAI, D. H. (1964): Die Mastixioideen-Floren im Tertiär der Oberlausitz. Paläont. Abh. (Geol. Gessel. DDR), Abt. B, **2**, 1, 1—192. Berlin.

MAI, D. H. (1967): Die Florenzonen, der Florenwechsel und die Vorstellung über den Klimaablauf im Jungentertiär der Deutschen Demokratischen Republik. Abh. ZGI, **10**, 55—81. Berlin.

NEGRU, A. G. (1972): Ranněsarmatskaja flora severovostoka Moldavii. AN Mold. SSR. Kišiněv.

NIKITIN, P. A. (1965): Akvitanskaja semennaja flora Lagernovo Sada. Tomsk.

REID, E. M. (1927): A new species of Diclidocorya E. M. REID from the Senftenberg brown-coal. Journ. Bot., **65**, 1—4. London.

SZAFER, W. (1946—7): The Pliocene Flora of Kroscienko in Polonia. Rozpr. Wydz. mat.-przyr. PAU, B, **72**, 2, 163—375. Kraków.

VÁCL, J., ČADEK, J. (1962): Geologická stavba hrádecké části Žitavské pánve. Sbor. Ústř. Úst. geol., odd. geol., **27**, 331—383. Praha.

FRANTIŠEK HOLÝ

SOUBOR ZBYTKŮ AUTOCHTONNÍCH UHLOTVORNÝCH ROSTLIN Z MIOCÉNU U HRÁDKU NAD NISOU (ŽITAVSKÁ PÁNEV, SEVERNÍ ČECHY)

V nejsvrchnějších polohách svrchního slojového pásma a jeho sedimentárním nadloží v povrchovém dole Kristina (Hrádek nad Nisou, Žitavská pánev) byly paleokarpologicky zkoumány vzorky hornin geneticky blízkých uhlotvorné sedimentaci: plastické jíly s uhelným pigmentem, uhelnaté jíly s případnou podřadnou psammitickou příměsí a tzv. „Blatterkohle" — lupkové uhlí s hojnou jílovitou příměsí, s velmi hojnými listy a větvičkami, jež jsou příčinou jemně vrstevnaté textury sedimentu. Jednotlivé zkoumané polohy A, B, C, H, I, J jsou schematicky znázorněny na tab. 1 v textu, včetně upřesněného litologického popisu. Uvedené polohy se v profilu střídají s psammitickými až psefitickými polohami, jejichž paleokarpologický obsah byl podrobně popsán v předcházejícím příspěvku Holý 1977). Na rozdíl od zcela allochtonní tafocenózy (obsahující hojné klimaticky velmi náročné dřeviny), jež byla do pánve naplavována z poměrně vzdáleného okolí, zřejmě vertikálně exponovaného, popsané seskupení semen a plodů je výrazem autochtonní, ba i uhlotvorné vegetace. Běžně se vyskytují zástupci rodů *Glyptostrobus, Cupressospermum, Mneme,* dále též *Sequoia, Magnolia, Myrica, Potamogeton,* ojediněle *Ficus, Hypericum, Symplocos, Microdiptera, Proserpinaca, Tetrastigma, Nyssa, Swida, Dulichium, Epipremnum*(?), *Calamus.* Jde tedy o pozůstatky vodních a bažinných bylin a dále keřů a stromů, jež se přímo podílely na tvorbě uhlí. V této tafocenóze zdaleka nejsou tak výrazně zastoupeny velmi teplomilné, subtropické, ponejvíce indomalajské prvky, jako je tomu v případě paleokarpologického obsahu hrubozrnných písků: zato se zde výrazněji prosazují prvky mesotermní, dále rody s větší klimatickou valencí a dokonce okruhy druhů eurosibiřského rázu. Klimatický a ekologický rozbor tafocenóz z lomu Kristina bude uveřejněn souhrnně na jiném místě spolu s porovnáním s jinými lokalitami.

Striktní formální oddělení obou tafocenóz (allochtonní a téměř autochtonní) autor provedl právě proto, aby poukázal na to, jak pochybné je směšování souborů rostlinných zbytků z rozličných jednotlivých litofaciálních typů do „květeny lokality", ale také na to, jak krajně nepravděpodobné a umělé je hledání příčin ve změně a kolísání klimatu v krátkých a litologicky pestrých vertikálních profilech. „Ochuzení" květeny jde ruku v ruce se stupněm autochtonity hnědouhelných tafocenóz. Autor požaduje, aby spolu s kvalitativním srovnáním třetihorních souborů paleobotanických zbytků byly nutně uváděny i jejich litofacie. Pro takto formulované požadavky paleobotanického výzkumu přináší jako ukázky způsoby zpracování některých paleobotanických lokalit v moderní literatuře. Jako nové jsou v práci popsány čtyři druhy: *Myrica hudibra* sp. nov., *Mneme donata* sp. nov., *Proserpinaca ervinii* sp. nov. a *Potamogeton nochtensis* MAI sp. nov. (hoc loco).

EXPLANATIONS OF PLATES

PLATE 1

Myrica hudibra sp. nov.: figs. 1—16

Endocarps distinctly asymetrical (1, 4, 5, 6, 9, 10), secondarily oblique compressed (4, 13, 14, 16), with a thin rib-shaped thickening on the suture (3, 4, 5, 9, 10), with a trace after style-base (2, 10, 11); unequally developped twinning fruits (11, 12, 14, 15) and the cross-section of it (14).Holotype fig. 1, Nr. G-4350. ×10.

Mneme donata sp. nov.: figs. 17—22

Seeds with a typical rounded-oblong to inverted-trapeziform outline: dorsal side (17, 19, 20, 21), ventral side (18, 22), slightly overtoping seed-body (17, 18, 19, 21, 22). Holotype figs. 17, 18, Nr. G-4351.
1=G-4350, 2=G-4352, 3=G-4353, 4=G-4354, 5=G-4355, 6=G-4356, 7=G-4357, 8=G-4358, 9=G-4359, 10=G-4360, 11=G-4361, 12=G-4362, 13=G-4363, 14=G-4364, 15=G-4365, 16=G-4366, 17, 18=G-4351, 19=G-4367, 20=G-4368, 21=G-4369. ×25.

PLATE 2

Mneme donata sp. nov.: figs. 1—9

Seeds in dorsal view (1, 3, 5, 7, 9), ventral view (2, 4, 6, 8), with detached germinal valve (5). ×25.

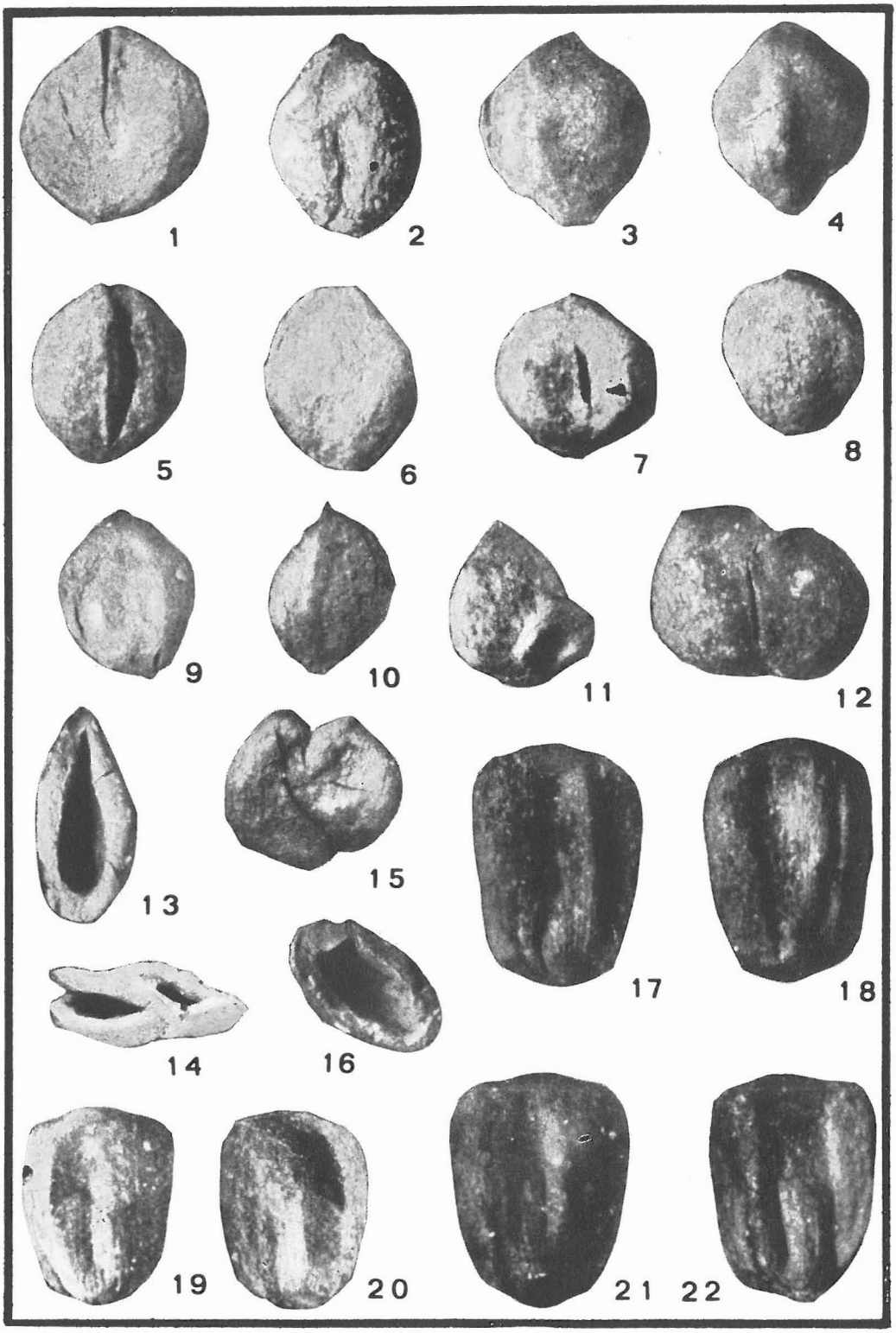
Proserpinaca ervinii sp. nov.: figs. 10—18

Trilocular fruits, rather compressed, barel-shaped in outline; well developed apical collar, pointed stalklet (10, 11, 12, 13, 15, 16, 17); oblique-compressed fruit (14) with apical foramen; prominent dorsal veins (10, 13, 14, 16), bases of bristles (12, 15, 18). Holotype fig. 10, G-4266.
1=G-4370, 2=G-4371, 3=G-4372, 4=G-4373, 5, 6=G-4374, 7=G-4375, 8=G-4376, 9=G-4377, 10=G-4266, 11=G-4269, 12=G-4263, 13=G-4267, 14=G-3066, 15=G-4263, 16, 17=G-4265, 18=G-4264. ×20.

PLATE 3

Potamogeton nochtensis MAI sp. nov. hoc loco: figs. 1—10

Fruits with a style base in lateral view (1—10), dorsal view (12, 14), ventral view (11, 13); basiventral hilum-pit (11), not keeled germinal valve (12, 14). Holotype fig. 3, G-4295.
1=G-4293, 2=G-4291, 3=G-4295, 4=G-4389, 5=G-4290, 6=G-4294, 7=G-4296, 8=G-4294, 9=G-4292, 10=G-4297, 11, 12=G-4298, 13, 14=G-4299. ×25.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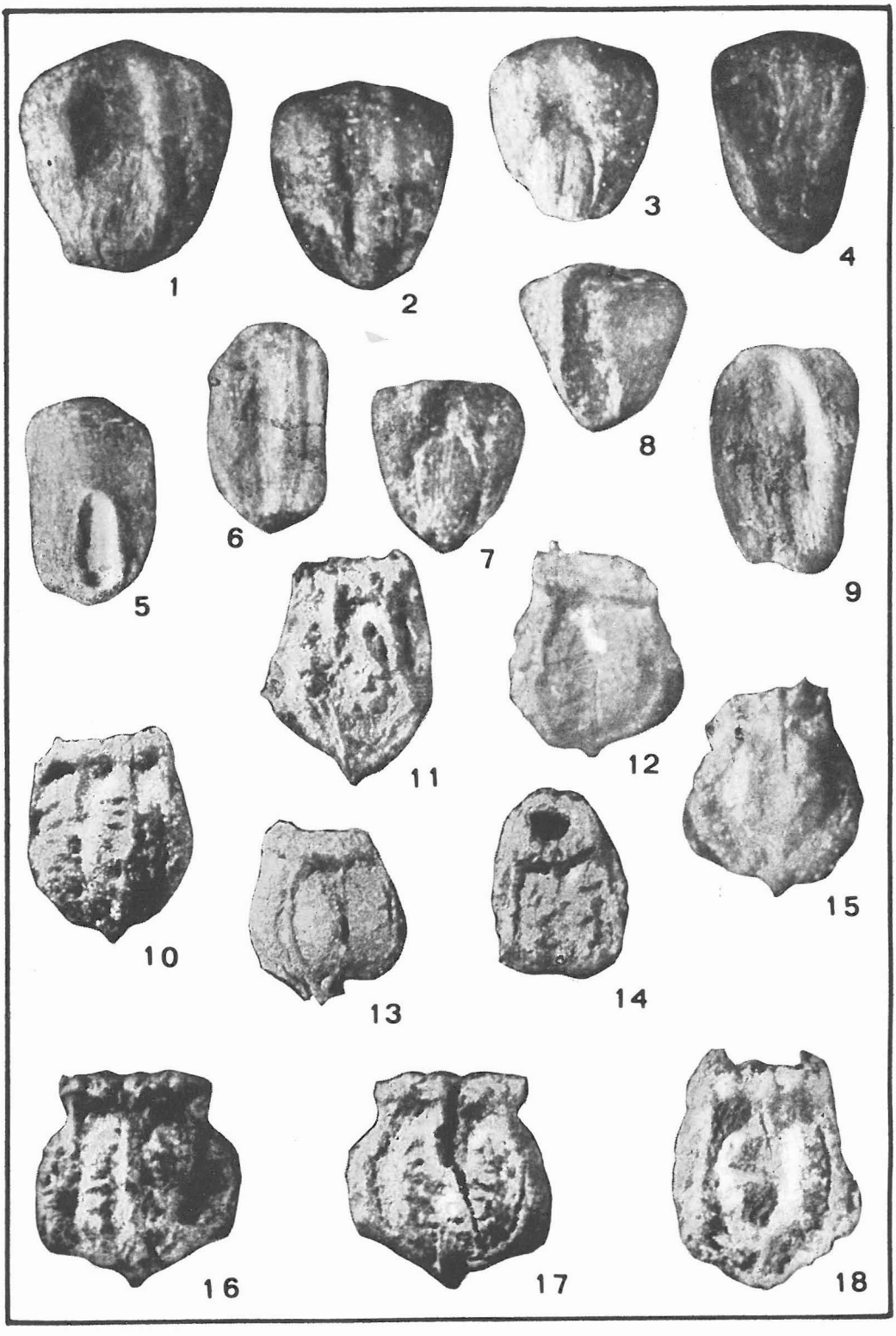
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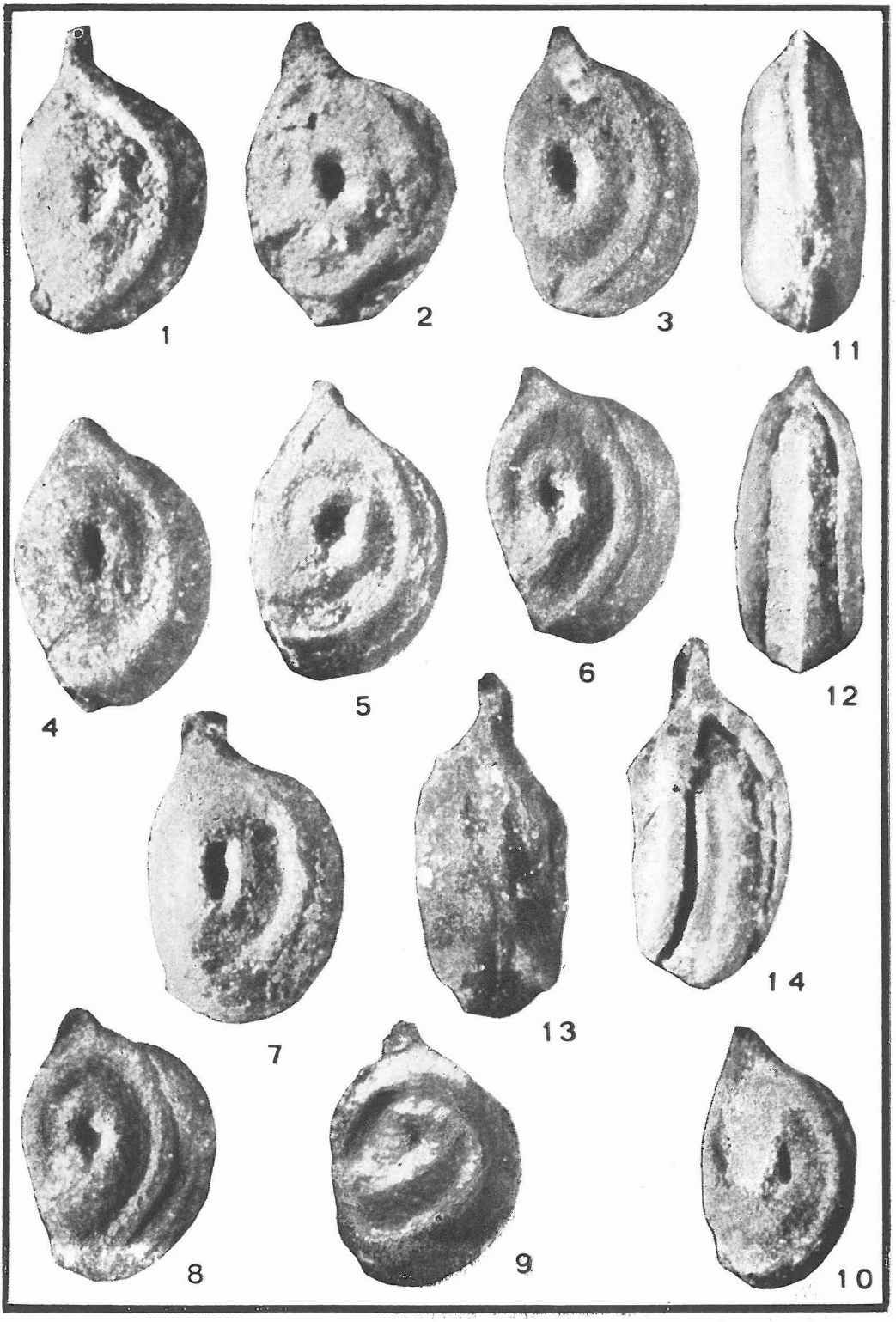
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