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Lepidodendraceae středočeských uhelných pánví
(Předběžná studie).

The Lepidodendraceae of the coaldistricts of Central Bohemia
(A preliminary study).

(Předloženo 27. II. 1947.)

V následujícím pojednání podávám výsledky svého studia o zástupcích rodů *Lepidodendron* STBG. a *Lepidophloios* STBG. sbíraných v nejrůznějších částech středočeských uhelných oblastí, jejichž podkladem jsou v prvé řadě sběry geologicko-paleontologického oddělení Národního musea v Praze a o nichž doufám, že se stanou v budoucnu jedním z mnoha vodítek při monografickém zpracování Lepidodendraceí našich uhelných pánví vůbec. Práce obírá se pouze tříděním sterilních větévek a kor, stadia fruktifikační hodlám probrati v jiné ze svých příštích prací.

Podrobným porovnáváním rozmanitě vzrostlých kor i olistěných mladších větévek vyplynuly leckteré změny v ohraničení a synonymice některých druhů, což podrobně diskutuji v anglickém textu. Za nejdůležitější z nich považuji objasnění Sternbergova pojmu *Lepidodendron dichotomum* a z toho vyplynuvší nový názor na systematickou příslušnost šištic zvaných *Sporangiostrobus,* čímž opravuji svá dřívější stanoviska k těmto oběma problémům, dále pak náležité objasnění pojmu *Lepidodendron lycopodioides* a jeho poměru ke Kidstonovu *L. simile* a Brongniartovu *L. ophiurus.* V neposlední řadě jest tu řešen též poměr mezi „druhy" *L. dissitum* CRÉP., *L. subdichotomum* STERZEL (t. j. *dichotomum* GEIN, non STBG.), *L. distans* O. FEISTM. a *L. rimosum* STBG. Pro nedostatek vhodného materiálu zdají se mi i nadále poněkud nejasnými Cordovo *L. fusiforme,* Sternbergovo *L. selaginoides* jakož i některé novější (asi 2 „druhy") nepříliš hojné nálezy.

Celkem se mi podařilo v našich vnitročeských uhelných pánvích rozlíšiti následujících 9 druhů Lepidodender a 3 druhy Lepidophloiosů:

Lepidodendron aculeatum STBG.

Lepidodendron obovatum STBG. (i. e. *dichotomum* STBG. ex parte, *Sternbergii* BGT., *brevifolium* ETT.),
Lepidodendron longifolium PRESL in STBG. (i. e. *dichotomum* STBG. ex parte),
Lepidodendron subdichotomum STERZEL (i. e. *dissitum* SAUVEUR et auct. ex parte, *loricatum* ARBER, *distans* O. FEISTM.),
Lepidodendron acutum PRESL in STBG. (i. e. *haidingeri* ETT.),
Lepidodendron simile KIDST (i. e. *lycopodioides* STBG. et div. auct. ex. parte, *elegans* div. auct. ex parte),
Lepidodendron ophiurus BGT. (i. e. *elegans* div. aut. ex parte, *lycopodioides* div. auct. ex parte, *rimosum* STBG.),
Lepidodendron sp. A. (— ? *Lepidodendron dichotomum* ZEILLER [non STBG.]),
Lepidodendron sp. B (— ? *Lepidodendron Jaraczewskii* ZEILLER, ? *L. fusiforme* CDA.),
„*Lepidodendron*" (= ? *Bothrodendron*) *selaginoides* STBG.,
Lepidophloios laricinus STBG.,
Lepidophloios acerosus L. et H. (i. e. *carinatus* WEISS ex parte),
Lepidophloios macrolepidotus GOLD.

Vedle toho zjištěny byly též mnohé otisky lepidophloiových kor s velikými jizvami po odpadlých prýtech (patrně nesoucích šištice), zvané *Halonia*.

O Sternbergově *Lepidodendron dichotomum* (tak, jak tomuto pojmu rozuměli D. Štúr, O. Feistmantel, později pak J. Šetlík a autor těchto řádek) bylo po důkladném srovnávání rozmanitých kusů a po podrobném prostudování různých názorů literárních shledáno, že obsahuje dva různé druhy, jeden dlouholistý s polštářky velmi vyklenutými a postrádajícími pár dýchacích otvůrků (parichnos) pod jizvičkami listovými, t. j. původní Preslovo *Lepidodendron longifolium* (které se značně blíží již rodu *Lepidophloios*), druhý pak typ krátkolistý s polštářky jen velmi mírně klenutými a jevícími za dobrého stavu zachování pár dýchacích otvůrků (parichnos) pod listovými jizvičkami, který jest vlastně identický s mladšími větvemi od *Lepidodendron obovatum* STBG. (t. j. též *L. brevifolium* ETT. a *L. Sternbergi* BGT.). Z tohoto důvodu Sternbergův pojem (nikoliv Zeillerův) *L. dichotomum* pozbývá platnosti; třeba jej zařaditi mezi četná synonyma hlavně k *L. obovatum* STBG. Pokud jde o plodní šištice, tu bylo zjištěno, že dlouholistý typ *L. longifolium* PRESL. nese šištice velmi podobné dlouho a širokolupenným šišticím Lepidophloiosů (patrně k němu náležejí šištice zvané Sternbergem *Conites cernuus*), kdežto typ krátkolistý (tedy vlastně mladší větévky od *L. obovatum*) vyznačuje se šišticemi obvyklého lepidostrobového tvaru válcovitého (6—9 cm dl., a kol 2,5 cm silné) s krátkými a k tělesu šištice přitisklými volnými konci sporophyllů, jaké byly i odjinud popsané pro *L. obovatum*. V žádném případě nebylo lze zjistiti spojení některé z obou forem s šišticemi zv. *Sporangiostrobus*, jak jsem před léty podle tvaru listů L. longifolium obdobného sporophyllům Sporangiostrobů a na zá-

kladě častého současného výskytu Sporangiostrobů se zmíněnými Lepidodendry mylně předpokládal. Sporangiostroby nelze tedy pravděpodobně spojovati vůbec se žádným druhem Lepidodender ani Lepidophloiosů. Nutno se v tomto případě poohlédnouti po jiných dlouholistých typech plavuňovitých s vyloučením Sigillarií, jejichž šištice mají svůj zvláštní, od Sporangiostrobů zcela odchylný tvar. Z typů, které se u nás též místy objevují současně v týchž polohách jako Sporangiostroby přicházejí v úvahu nejpravděpodobněji Ulodendra; není vyloučeno, že právě Sporangiostroby tvoří alespoň část oněch plodných větví (již K. Feistmantelovi byly známé Sporangiostroby dichotomicky rozvětvené), po kterých na kmenech Ulodender zbývají známé velké okrouhlé jizvy.

S hlediska stratigrafického jsou nalezené formy takto v našich uhelných oblastech rozšířeny:

Plzeňské, radnické a patrně i lubenské sloje: všechny druhy vyjma *Lepidodendron subdichotomum* STERZEL.

Nýřanské sloje: Pouze *Lepidodendron subdichotomum* STERZEL a *Lepidophloios laricinus* STBG.

Kounovské sloje: Pouze *L. laricinus* STBG. (či snad jemu blízce příbuzné ale sotva čím rozeznatelné formy?).

The Lepidodendraceae of the coaldistricts of Central Bohemia
(A preliminary study).

In this paper all forms of the genera *Lepidodendron* and *Lepidophloios,* which have been collected in the Carboniferous of Central Bohemia are briefly and critically examined and discussed, especially on the basis of the material conserved in the National Museum, Prague. Although, as stated after a detailed study of these collections, they are by no means numerous, the solution of this task was rather difficult, partly for the often astonishing confusion of the opinions in the literature as to the definition even of the most common species, partly for the unusually large material of fossils represented by various slender leafy twigs, larger leafless trunks, as well as parts of older barks, all of which have been mutually compared. Not in the last range some difficulties came also from the character of the literature, concerning this family, which is dispersed not only in greater monographs but also in various scientific journals; nevertheless I hope, that all most important papers concerning our material have been sufficiently examined. The fructifications (cones called Lepidostrobi) are not discussed here; they will be examined separately in another paper. I mention here briefly only some of them as far as they have any importance as to the diagnosis of the various Lepidodendron or Lepidophloios species.*)

*) For example in the case of *Lepidodendron dichotomum* STBG., and the cones called *Sporangiostrobus* (see my papers from 1931 and 1934).

I. The genus of Lepidodendron Stbg.

The description and definition of the genus will not be discussed here, I refer in this respect to some of the well known textbooks (e. g. A. C. Seward 1898/1919, Vol. II, pp. 93, D. H. Scott 1920/23, Vol. I, pp. 111, M. Hirmer 1927, Vol. I, pp. 182). I may only add that A. Renier (1926, pp. 408) proposed to range some lepidodendroid forms with considerably persistent leaves, in which therefore no distinct leaf scars upon the leaf cushions are to be seen (he cites e. g. *L. lycopodioides* [our *L. simile*], *wortheni, belgicum, ophiurus*)**) to the genus of *Ulodendron*. I regard this opinion at the mean time as rather unnatural. Some of such species are also represented among the Lepidodendra of Central Bohemia, e. g. *L. acutum* PRESL and *L. simile* KIDST.

As to the synonymity of the various Lepidodendron species, I refer especially to the „Fossilium Catalogus". II. Plantae, pars 15: W. J. Jongmans: Lycopodiales II. 1929. Further bibliographical notes are mentioned later in the respective discussions and descriptions.

In the whole I stated within the coal basins of Central Bohemia 7 well characterised forms („species"), 1 at present rather obscure form and 2 at the mean time unsufficiently known and rather rare forms, to which I do not venture to ascribe any specific name. They are as follows:

Lepidodendron aculeatum STBG.,

Lepidodendron obovatum STBG. (i. e. *dichotomum* STBG. ex. p., *Sternbergii* BGT., *brevifolium* ETT.),

Lepidodendron longifolium PRESL in STBG. (i. e. *dichotomum* STBG. ex. p.),

Lepidodendron subdichotomum STERZEL (i. e. *dissitum* SAUVEUR et auct. ex p., *loricatum* ARBER, *distans* O. FEISTM.),

Lepidodendron acutum PRESL in STBG. (i. e. *haidingeri* ETT.),

Lepidodendron simile KIDST. (i. e. *elegans* div auct. ex p., *lycopodioides* STBG. et div. auct.),

Lepidodendron ophiurus BGT. (i. e. *elegans* div. auct. ex p., *lycopodioides* div. auct. ex p., *rimosum* STBG.),

„Lepidodendron" (= ? Bothrodendron) selaginoides STBG.,

Lepidodendron sp. A. (aff. *? L. dichotomum* ZEILLER),

Lepidodendron sp. B (aff. *? L. Jaraczewskii* ZEILLER, *? L. fusiforme* CDA.).

Beside these species in special chapters are discussed also some of the terms used very often in the literature as f. inst. *L. dichotomum* STBG., *L. rimosum* STBG., *L. distans* O. FEISTM. and *L. fusiforme* CDA.

**) I do not agree with A. Renier that this form has persistent leaves as the other named forms. Nearly all specimens of *L. ophiurus* BGT. collected in Central Bohemia are always exhibiting small but very distinct leafscars.

1. Lepidodendron aculeatum Stbg.

Figures offering a clear idea of the form:

1886/8 R. Zeiller, Pl. 65.
1899 A. Hofmann-F. Ryba, Pl. 19, fig. 8, 9, 10.
1904 D. Zalesskij, Pl. 1, fig. 1, 6; Pl. 2, fig. 2.
1910 A. Renier, Pl. 4.
1914 E. Bureau, Pl. 36 bis, fig. 2.
1928 V. Šusta, Pl. 53, fig. 1, 2; Pl. 54. fig. 3; Pl. 56, fig. 3; Pl. 75, fig. 16.
1931 K. Novik, Pl. 16, fig. 5; Pl. 17, fig. 1.

The most important discussions and synonyms:

R. Kidston 1886, pp. 155 *(L. aculeatum)*.
R. Zeiller 1886/8, pp. 435 *(L. aculeatum)*.
D. Zalesskij 1904, pp. 3 *(L. aculeatum)*.
F. Fischer 1904, pp. 34 *(L. obovatum* ex parte).
F. Fischer 1905, Nro. 48 *(L. obovatum* ex parte; only fig. [?1], 2, 3, 4 and 5).
R. Kidston 1909/10, pp. 141 *(L. aculeatum)*.
K. Novik 1931, pp. 79 *(L. aculeatum)*.

The following specimens from those described and figured from the coaldistricts of Central Bohemia may be regarded as true *L. aculeatum* STBG.:

K. c. Sternberg, 1825-38:

Lepidodendron resp. *Sagenaria*
obovatum: Vol. I. Pl. 6, fig. 1; Pl. 8, fig. 1. A. a, b.
aculeatum: Vol. I. Pl. 6, fig. 2; Pl. 8, fig. 1. B. a, b.
Vol. II. Pl. 68, fig. 3.
undulatum: Vol. I. Pl. 10, fig. 2.
appendiculatum: Vol. I. Pl. 28 (partially decorticated)
caudatum: Vol. II. Pl. 68, fig. 7.

Aspidiaria
undulata: Vol. II. Pl. 68, fig. 3 (partially decorticated).

K. Feistmantel, 1868:

„Lepidodendronrinde": Pl. II. fig. 1, 4, 5.
Lepidodendron obovatum: Pl. II, fig. 2.
Lepidodendron undulatum: Pl. II, fig. 3.
Aspidiaria undulata: Pl. II, fig. 6.

O. Feistmantel, 1874:

Aspidiaria mit *Sagenaria* in Verbindung: Pl. III, fig. 2.

O. Feistmantel, 1875/76:

Sagenaria
obovata: Pl. 38, fig. 1, 2, 4.
undulata: Pl. 39, fig. 1-4 (slightly deformed and partly decorticated).

A. Hofmann-F. Ryba, 1899:

Lepidodendron

aculeatum: Pl. 14, fig. 8, 9, 10.

obovatum: Pl. 14, fig. 4, 5.

Lepidodendron aculeatum STBG. is one of the most common forms of the lepidodendroid barks, but in spite of that we know it rather incompletely. Meanwile it seems that we know chiefly only barks of older or bigger twigs and trunks, whereas slender or younger especially leaf-bearing twigs just as the fructification cones are till present with utter certainty unknown.

The leaf cushions are of a rhomboidal, longitudinally elongated, and slightly S-like bent shape. They are generally prolonged at their lower end in a curved ridge. The leaf scar is essentially higher than broad (this is the chief difference from the following somentimes very similar form of *L. obovatum* STBG.). Both infrafoliar parichnos scars are always very distinctly developed. In older barks the leaf cushions are stretched farther apart and the free space between them is provided with longitudinal wrinkles parallel with the borders of the cushions in a similar way as known in Sternberg's *„Lepidodendron rimosum"*.

L. aculeatum STBG., as just mentioned, is in many respects very similar to the following *L. obovatum* STBG., which was often the reason that both even in very typical developement have been confounded. Indeed it is very difficult to decide in some cases between both forms.

If we are revising on the basis of the experiences of various authors the original figures by K. c. Sternberg of *L. aculeatum* and *obovatum* (as far as possible also with the aid of his original type specimens), we easely recognise that Sternberg indicated by the name of *obovatum* also some specimens showing very high scars i. e. typical specimens of the true *L. aculeatum*. We meet the same confusion also in other older works e. g. of O. Feistmantel, A. Hofmann and F. Ryba etc. It is than not surprising if some authors proposed to unite both named forms into only one species. The chief representant of this tendency is. F. Fischer (1904 and 1905), who selected for it the name of *L. obovatum*. This step is partly supported by the fact, that from all the figures signed by K. c. Sternberg with the name of *L. obovatum*, only one (Vol. II, Pl. 68, fig. 6.) corresponds safely with specimens, which according to the experiences of all later authors (especially also of R. Zeiller 1886/8) may be defined as true *L. obovatum;* all others must be considered as *L. aculeatum*. F. Fischer's opinion has however not been followed by any of the more prominent palaeobotanists.

Occurrence: *L. aculeatum* STBG. is very common within the whole Radnice coal series. In the Nýřany coal series it is rather doubtful and in the Kounová coal series (upper grey beds) I never have met any specimen till present.

The coal field of Plzeň, northern part (chiefly the Upper Radnice coal measure): Žebnice, Třemošná, Senec.

The coal field of Plzeň, southern part (the Plzeň coal measures [„no. III"'] as well as the Upper Radnice coal measures [„no. II".]): Kamenný Újezd, Blatnice, Nýřany, Nová Lhota (near Dobřany).

The coal field of Merklín (the Plzeň coal measures): Na Výtoni near Merklín.

The coal field of Radnice (the Upper Radnice coal measure as well as the hanging shales [„brousky" and „bělky"] of the Lower Radnice coal measure): Břasy, Svinná, Vranovice, Vejvanov, Lohovice.

The coal field „Na Lísku" near Beroun (the black hanging shales of the coal measure [Upper Radnice c. m.] as well as the horizon of the shales called „brousky" below it): Na Lísku, Strádonice.

The coal field of Kladno (Lány—Kladno—Kralupy; — the Upper Radnice coal measure [„the main Kladno coal measure"]): Kladno, Libušín, Motyčín, Dubí, Vrapice, Brandýsek.

The coal field of Rakovník (the Upper Radnice c. m. as well as the Lubná c. m.): Hostokryje, Lubná, Senec.

2. Lepidodendron obovatum Stbg.

Figures offering a clear idea of the form:

1886/8 R. Zeiller, Pl. 66.
1899 A. Hofmann-F. Ryba, Pl. 14, fig. 6; Pl. 15, fig. 1; (? Pl. 14, fig. 11.).
1904 M. D. Zalesskij, Pl. 1, fig. 7—11, 13, 14; Pl. 2, fig. 4 (and perhaps also the most part of the specimens described as *L. Veltheimii)*.
1910 A. Renier, Pl. 1, 2, 3.
1914 E. Bureau, Pl. 3, fig. 1.
1928 V. Šusta, Pl. 53, fig. 3, 4; Pl. 54, fig. 1; Pl. 55, fig. 1; Pl. 56, fig. 5; Pl. 61, fig. 3; Pl. 62, fig. 2.
1939 W. J. Jongmans, Pl. 24, fig. 63.

The most important discussions and synonyms (see especially R. Kidston 1909/10, R. Zeiller 1886/8, and E. Bureau 1914):

A. Brongniatt, 1928, pp. 85 *(L. Sternbergii)*.
R. Kidston, 1886, pp. 149—152 *(L. Sternbergi* ex p.).
R. Zeiller, 1886/8, pp. 442 *(L. obovatum)*, ? pp. 446 *(L. dichotomum)* excl. synon.
R. Kidston, 1893/94, pp. 558 *(Lepidophloios acerosus* ex p.).
D. Zalesskij, 1904, pp. 5 *(L. obovatum;* — perhaps also most of his specimens described as *L. Veltheimianum*, pp. 21).
F. Fischer, 1904, pp. 54 *(L. obovatum* ex parte).
F. Fischer, 1905, nro. 48 *(L. obovatum* ex parte, only fig. [? 1], 6 and 7).
R. Kidston, 1909/10, pp. 144 *(L. obovatum)*.
E. Bureau, 1914, pp. 47 *(L. obovatum)*.
W. J. Jongmans, 1939, pp. 43 *(L. obovatum)*.

The following specimens from those described and figured from the coaldistricts of Central Bohemia may be regarded as true *L. obovatum* STBG.:

K. c. Sternberg: 1825/38:

Lepidodendron resp. *Sagenaria*
crenatum: Vol. I, Pl. 8, fig. 2 B a, b.
rugosa: Vol. II, Pl. 68, fig. 4.
crenata: Vol. II, Pl. 68, fig. 5.
obovata: Vol. II, Pl. 68, fig. 6, (? Vol. I, Pl. 14, fig. 1—4).
dichotomum: Vol. I, Pl. 1; Pl. 2.

O. Feistmantel, 1875/76:

Lepidodendron dichotomum: Pl. 32, fig. 1.
? Sagenaria obovata: Pl. 38, fig. 1, 3 (this specimen reminds *L. aculeatum* (STBG.).
? Sagenaria aculeata: Pl. 40, fig. 3, 4 (this specimen reminds *L. obovatum* STBG.).

A. Hofmann-E. Ryba, 1899:

? Lepidodendron aculeatum: Pl. 14, fig. 11 (this specimen reminds *L. obovatum* STBG.).
Lepidodendron obovatum: Pl. 14, fig. 6; Pl. 15, fig. 1.

We know from *Lepidodendron obovatum* STBG., in contrary to the foregoing similar species, specimens of older barks and larger trunks as well as slender (or younger) leaf bearing twigs; we know also specimens bearing terminal cones.

The rhomboidal leaf cushions never are S like bent as in L. aculeatum. The leaf scars are relatively low and broad (which is the chief difference between *L. aculeatum* and *obovatum).* The infrafoliar parichnos scars are always very marked just as in *L. aculeatum.* On younger (slednder) branches the leaf cushions are shorter, some times nearly just as high as broad or even broader. Owing to this fact slender branches become very similar to young twigs of *Lepidodendron longifolium* PRESL in STBG. Older barks show sometimes also the appearence of *„L. rimosum"* i. e. their leaf cushions are stretched apart and the spaces between them are longitudinally wrinkled.

The leaves on younger or slender shoots are only about 5 cm long and straight, on older branches they are longer, till about 2,5 dm and it seems that they were rather persistent.

The conelike fructifications are borne terminally at the ends of slender shoots. They are very similar to some cones, which R. Zeiller described as *Lepidostrobus ornatus* (1886; see also A. Renier 1910, Pl. 3.), cylindrical, cca. 2,5 cm in diameter, 6—9 cm long, with an axis nearly 3 mm thick.

As evident from the description, this Lepidodendron type reminds partly *Lepidodendron aculeatum* STBG. (especially older specimens), partly (especially its slender or younger shoots) *L. longifolium* PRESL

in STBG. These circumstances were the reason, why some authors (see also the chapter about *L. aculeatum*, „*L. dichotomum*" and *L. longifolium)* joined *L. obovatum* to *L. aculeatum* (F. Fischer, 1904, 1905) or to *L. longifolium* (R. Kidston 1886 under the name of *L. Sternbergii;* later he separated them again and approved *L. obovatum* as a good species). Others described younger shoots of *L. obovatum* as something essentially different (e. g. C. r. Ettingshausen 1854 under the name of *L. Sternbergii)* or they joined such slender shoots to *L. longifolium* PRESL in STBG. (according to the original Sternberg's view) under the name of *L. dichotomum* (see in K. c. Sternberg 1825/38, D. Štúr 1875/77, J. Šetlík 1922, F. Němejc 1934). At this confusion of synonyms participated already the author of both species K. c. Sternberg as he described slender shoots of *L. obovatum* under the name of *L. dichotomum* and under the name of *L. obovatum* he figured some indisputable specimens of *L. aculeatum.* In fact only one specimen of all, which Sternberg figured as *L. obovatum,* may be safely regarded as true *L. obovatum* (i. e. Pl. 68, fig. 6); it is impossible to state if also his Pl. 14 belongs hereto, as the state of preservation of the respective original type specimen (Nat. Mus. Prague) is by no means convenient.

Occurrence: In this respect *L. obovatum* STBG. agrees nearly completely with the preceeding *L. aculeatum* STBG. We meet it most frequently within the whole coalbearing Radnice series; in the Nýřany coal series it seems to be very rare if not dubious at all. Untill present I never have seen any *L. obovatum* in the Kounov coal series (upper grey beds).

The coal field of Plzeň, northern part (chiefly the Upper Radnice coal measure): Třemošná, Senec.

The coal field of Plzeň, southern part (all discoveries are coming from the Plzeň coal measures [c. m. no. III] or from the Upper Radnice c. m. [c. m. no. II]): Nýřany, Pankrác near Nýřany, Blatnice, Kamenný Újezd, Týnec, Zbuch, Sulkov, Nová Lhota near Dobřany.

The coal field of Merklín (the Plzeň c. m.): „Na Výtoni" near Merklín.

The coal fields of Radnice (the Upper Radnice c. m. as well as in the hanging shales called „brousky" and „bělky" of the Lower Radnice c. m.): Břasy, Chomle, Svinná, Moštice.

The coal field „Na Lísku" near Beroun (the hanging shales of the c. m. [Upper Radnice c. m.]): Na Lísku, Zdejcina.

The coal field of Kladno (Lány—Kladno—Kralupy; the Upper Radnice coal measure [„the Main Kladno" c. m.]): Kladno, Motyčín, Libušín, Pchery, Vrapice, Dubí, Brandýsek, Votvovice.

The coal field of Rakovník (the Upper Radnice c. m.): Lubná.

3. On Sternberg's Lepidodendron dichotomum.

Though some palaeontologists have expressed serious doubts as to the value of Sternberg's term of *Lepidodendron dichotomum* (e. g. E. M. Bureau [1914], R. Kidstom [1886]), a far greater part of them

(including also the author of the present paper) regarded it as a well characterised Lepidodendron species. In a study published recently in the Buletin international de l'Acad. tchèque des sc. (1946), I sufficiently demonstrated that this opinion is to be abandoned (though it was supported by many prominent palaentologists e. g. D. Štúr [1875/77], R. Zeiller [1880, 1886/8] a o.) especially for the following reasons. We may very easely distinguish here specimens showing leaves till over 3,5 dm long and therefore very similar to the leaves of the genus of Lepidophloios, just as others the leaves of which are rather short attaining a length hardly about 8 cm. Studying the sculptures of the leaf cushions, I have stated that the longleafy specimens do not show any infrafoliar parichnos scars, whereas in the shortleafy forms there is always possible to reveal more or less distinctly visible infrafoliar parichnos scars. Sternberg's term of *Lepidodendron dichotomum* includes therefore the following two forms: a shortleafy form with developed infrafoliar parichnos (i. e. Sternberg's [1825/38] Pl. 1 and 2) and a longleafy form without any infrafoliar parichnosscars on the leaf cushions (Sternberg's Pl. 3). This last longleafy form was originally described by Presl as a distinct species *Lepidodendron longifolium,* and even now after a very thorough study of its leaves and leaf cushions we may regard it as a distinct and well characterised independent species; I am describing it in the following under the just mentioned Presel's name. As to the first i. e. the short leafy form, the nearest to the truth stood perhaps R. Kidston in his Catalogue from 1886; unfortunately he altered later rather strongly his point of view (1890, 1893, 1893/4, 1909/10). Kidston originally (1886) regarded the shortleafy specimens of Sternberg's L. dichotomum as identical with *Lepidodendron obovatum* STBG. and joined both under the name of *L. Sternbergi.* Here it must be emphasized, that Kidston regarded his *L. Sternbergi* as not identical with Ettingshausen's *L. brevifolium* (1854), which he identified with *Lepidophloios acerosus* L. H. (just as already supposed by Weiss 1869/72), and further that Kidston did not regard his long leafy *Lepidodendron longifolium* as identical with Presl-Sternberg's longleafy form *(L. longifolium* Pl. 3), but with Ettinshausens *L. Sternbergi* (1854). Thus Kidston's *L. Sternbergi* represents a quite different Lepidodendron type than the same term of Ettingshausen.

As to the original Sternberg's type specimens of his shortleafy form of *Lepidodendron dichotomum* (Sternberg's Pl. 1 and 2) we have to do with joung or slender shoots, which (as I stated in the just mentioned paper from 1946) by no features (leaves as well as the shape and sculptures of the leaf cushions) are to be distinguished from young shoots of the common *L. obovatum.* Therefore I went to the conclusion, that Sternberg's term of *L. dichotomum* represents only a synonymum partly for Presl-Sternberg's *L. longifolium,* partly for younger shoots of *L. obovatum* STBG.; it looses the value of a distinct species.

On account of this experience my previous opinion about the relations of the cones of *Sporangiostrobus* BODE to Sternberg's *Lepidodendron dichotomum* becomes rather problematical. It would be perhaps possible to take into consideration only Presl's *L. longifolium,* because

the cones of *L. obovatum* are well known (see e. g. Reiner, 1910) and even in our coal fields I veryfied such cones in connection with young shoots of *L. obovatum* (i. e. of the short leafy form of *L. dichotomum* STBG.). *L. longifolium* PRESL is very often associated in our Carboniferous beds with *Lepidophloios acerosus* L. H. and sometimes also with *Lepidophloios laricinus* STBG.); very young shoots of both are often rather similar. They are accompanied by two types of great cones: *Conites cernuus* STBG. (with smaller sporophylls) and *Lepidostrobus (Lepidophyllum) lanceolatum* L. H. (with larger sporophyls). As already stated by Kidston, young or cone bearing shoots of *Lepidophloios acerosus* have generally leaf cushions not drooped downwards and this is also the case in all shoots which have been collected in connection with both named cones. Therefore at present I am unable to state with utter certainty, which of both cone types belongs to *L. longifolium*, and which to *Lepidophloios acerosus*. This fact points to a very near relation between Presl's *L. longifolium* and Lindley-Hutton's *Lepidophloios acerosus*, and it attests at the same time very clearly that there is absolutely no relation to the cones of *Sporangiostrobus* BODE as previousely presumed. As to the last, I am now of the opinion that we must look for some relations among other long leafy Lepidophyta, which are also some times associated to the mentioned Lepidodendraceae, e. g. *Ulodendron* a o.

4. Lepidodendron longifolium Presl in Stbg.

Figures offering a clear idea of the form:

1825/38 K. c. Sternberg: Vol. I, Pl. 3; perhaps also Vol. II, Pl. 68, fig. 1. and Pl. A, fig. 16.
1854 C. R. Ettingshausen: only Pl. 26, fig. 1, 2; Pl. 27; Pl. 28.
1875/76 O. Feistmantel: Pl. 32, fig. 2, 4 and perhaps also fig. 5.
1899 A. Hofmann-F. Ryba: Pl. 13, fig. 6, 7.
1904 M. D. Zalesskij: Pl. 4, fig. 6, 10 and perhaps also Pl. 4, fig. 7, 7a.
1914 E. Bureau: Pl. 49, fig. 1, 2.
1922 J. Šetlík: Textfig. 1 (pp. 4).
1934 F. Němejc: Pl. 1, fig. 1, 5 (non 2, 3 nec 4), Pl. 2, fig. 3.

Bibliography and synonyms:

K. c. Sternberg 1825/38: Vol. I — *Lepidodendron dichotomum* ex parte.
? Lepidodendron manebachense.

J. Presl in K. c. Sternberg 1825/38: Vol. II — *Lepidodendron* (resp. *Lycopodites) longifolium.*

Ad. Brongniart 1828: *Lepidodendron longifolium.*
? J. Lindley-W. Hutton 1831/37: *Lepidodendron longifolium.*
C. r. Ettingshausen 1854: *Lepidodendron Sternbergi.*
Lepidodendron dichotomum ex parte.
H. B. Geinitz 1855: *Lepidodendron dichotomum* (syn. ex parte; non fig.).

O. Feistmantel 1875/76: *Lepidodendron dichotomum* ex parte.
D. Štúr 1875/77: *Lepidodendron dichotomum* (syn. ex parte; non fig.).
R. Kidston 1886: *Lepidodendron longifolium.*
R. Zeiller 1886/8: *Lepidodendron dichotomum* (syn. ex parte; ? fig.).
A. Hofmann-F. Ryba 1899: *Lepidodendron Sternbergi* (ex parte).
M. D. Zalesskij 1904: *Lepidodendron sp.*
Lepidodendron dichotomum (ex parte).
Lepidodendron Feistmanteli.
? Lepidodendron Grigorievi.
F. Fischer 1905: *Lepidodendron dichotomum* ex parte.
E. Bureau 1914: *Thaumasiodendron andegavense.*
Lepidodendron dichotomum ex parte.
J. Šetlík 1922: *Lepidodendron dichotomum* ex parte.
? K. Novik 1931: *Lepidodendron Feistmanteli* Zal. (Pl. 15, fig. 6).
F. Němejc 1934: *Lepidodendron dichotomum* ex parte.

This form is characterised by leaf cushions mostly conically vaulted but not as much as in the genus of Lepidophloios; therefore they never are deflected downwards. On younger twigs they are of a nearly rhombic shape, sometimes even broader than high. The bigger (i. e. older) they are, the more elongated are their leaf cushions. On large specimens the leaf cushions are of the same elongated rhomboidal shape like in the most species of the genus of Lepidodendron. The longitudinal median keels are very distinct, the infrafoliar parichnos scars are utterly missing, whereby this species differs essentially from the otherwice very similar form of *Lepidodendron obovatum* STBG. (especially its younger, slender shoots).

The leaves are very long, till over 30—40 cm, which lenth they keep also on younger shoots (thick about 3—4 cm). In this respect they differ from the leaves of younger shoots of *L. obovatum* STBG., which as told are much shorter. In contrary they are very similar to young shoots of *Lepidophloios acerosum* L.-H., especially if we take into consideration also the similarity of their leaf cusions.

As to the shape and sculptures of the leaf cushions and the form of the leaves this form stands the nearest o fall Lepidodendra to the genus of Lepidophloios especially to *Lepidophloios acerosum* L. H. As just stated this similarity is more evident on younger shoots than on bigger and older branches. The leaf cushions on younger shoots are more vaulted than in older specimens, thay are broad and short. According to the direction in which the conical cushions have been impressed into the rock matrix, they show either better their upper, or their lower half; and if in such impression only the upper half showing the ligular pit and the straight upper median keel is visible, than the similarity to the leaf cushions of the genus of Lepidophloios is indeed very striking (in many such cases we are unable to distinguish them with certainty from similar impressions of the true *Lepidophloios acerosum* L. H.), rather more than if showing their lower half, which is provided by the median transversally wrinkled keel. I have pointed out this fact already

in my paper from 1934 (under the term of *L. dichotomum). L. longifolium* appears from this point of view as an intermediary form between the genus of *Lepidodendron* and *Lepidophloios.*

In my paper from 1934 I discussed also all facts prooving the identity of our *L. longifolium* with Bureau's (1914) *Thaumasiodendron andegavense.* W. J. Jongmans (1913/37) regards my opinion about this problem as at the mean time not clearly and safely demonstrated.

Occurrence: *L. longifolium* occurs most frequently within the zone of the whittish shales called „brousky" and „bělky" between the Lower and the Upper Radnice coal measures as well as in the interlayers called „opuka" of the Upper Radnice coal measure. Here and there it appears also in all other zones of the whole Radnice coal series. It is missing in higher series.

The coal field of Plzeň, northern part: Plasy (unknown from which colliery; old Sternberg's material, the precise provenience of which even O. Feistmantel was unable to verify).

The coal field of Plzeň, southern part: Pankrác near Nýřany.

The Radnice coal fields (the upper Radnice coal measure as well as the hanging shales of the Lower Radnice coal measure): Břasy, Svinná, Chomle.

The coal field „Na Štilci" near Žebrák (hanging shales of the Lower Radnice coal measure): Na Štilci.

The coal field of Kladno (the upper Radnice coal measure [„the Main Kladno coal m."]): Kladno, Motyčín, Libušín, Vrapice, Zákolany.

The coal field of Rakovník (the Upper Radnice coal measures as well as the Lubná c. m.): „Na Brantech" near Lubná, Lubná, Rakovník.

5. Lepidodendron subdichotomum Sterzel (Pl. I., fig. 7, 8).

Figures offering a clear ida of the form:

1855 H. B. Geinitz: Pl. 3, fig. 1—12, 13, 15.
1875/6 O. Feistmantel: Pl. 48, fig. 3.
1927 W. Gothan-W. Schriel: Pl. 14, fig. 4, 4a.
1938 W. J. Jongmans: Pl. 117, fig. 11, 12.

Bibliography and synonyms:

H. B. Geinitz, 1855: *Sagenaria dichotoma* (non synon.).
Sagenaria rimosa (non synon.).
O. Feistmantel, 1875/6: *Lepidodendron distans.*
? A. Hofmann-F. Ryba, 1899: *Lepidodendron selaginoides* (ex parte; only Pl. 13, fig. 5).
T. J. Sterzel, 1901: *Lepidodendron subdichotomum* (pp. 106).
W. Gothan-W. Schriel, 1927: *Lepidodendron dichotomum* (non synon.).
W. J. Jongmans, 1938: *Lepidodendron rimosum* (non synon.).

Most probably belong hereto also many of the forms described in

M. D. Zalesskij, 1904, under the names of: *L. dichotomum, rimosum, Zeilleri* and *Grigorievi* (non synon.),

as well as many forms related to Sauveur's *Lepidodendron dissitum* and to Arber's *Lepidodendron loricatum:*

Sauveur, 1848: *Lepidodendron dissitum.*
R. Kidston, 1886 and 1909/10: *Lepidodendron rimosum* (ex parte).
R. Zeiller, 1886/88: *Lepidodendron rimosum* (ex parte).
F. Fischer, 1904 and 1906: *Lepidodendron rimosum* (ex parte). *Lepidodendron serpentigerum* (ex parte).
E. Bureau, 1914: *Lepidodendron rimosum* (ex parte).
F. Stockmans, 1935: *Lepidodendron dissitum* (ex parte).
E. A. N. Arber, 1922/24: *Lepidodendron loricatum.*
R. Crookall, 1929: *Lepidodendron loricatum.*

Except the shape of the leaves this species reminds somewhat *L. longifolium* PRESL. in STBG., as well as *L. ophiurus* BGT.The leaf cushions are only very slightly vaulted, they exhibit no infrafoliar parichnos scars and have well developed median longitudinal keels. On younger shoots their rhombic form is nearly isodiametric, on bigger specimens they are elongated till fusiform; at the same time they become often stretched appart and the free space between them is longitudinally wrinkled. Such older barks are called in the literature as *L. rimosum* or *distans.*

Leaves are on slender younger specimens only about 2,5 cm long, on bigger or older specimens 3,5 till 6 cm. They show thus a certain similarity to *Lepidodendron obovatum* STBG., where they are still longer.

This type of Lepidodendron barks and twigs was best known to T. J. Sterzel (1901). According to the rules of the nomenclature we should name this species as *Lepidodendron distans* O. FEISTM. But O. Feistmantel (1875/6) figured under this name an utterly atypical and indistinctly preserved specimen from the cannel coal of Nýřany (a *„rimosum"* form). Therefore I maintain here at least for the present time Sterzel's name connected with the very excellent figures of H. B. Geinitz (1855).

Most of the authors joined this species to some rather confused terms like *L. dichotomum* STBG., *L. dichotomum* ZEILLER, *L. rimosum* STBG. as well as to *L. dissitum* SAUVEUR. We hawe here mostly to do only with a superficial similarity with some of those forms. The most natural relations may be stated to Sauveur's *L. dissitum,* which may be perhaps regarded as really identical with our form. But this problem inspite of a very detailed study by Stockmans (1935) is notyet to be regarded as quite clear because Stockmans unites with Sauveur's species also some specimens, which without any doubt are quite strange to Sterzel-Geinitz's form, as e. g. Sternberg's *L. rimosum.* This last, as we shal see later (see the chapter about *L. ophiurus* BGT. and *L. rimosum* STBG.), represents only a rather old bark of *Lepidodendron ophiurus* BGT. This is also one of the reasons why I maintained in the nomenclature for the present time Sterzel's name of *L. subdichotomum,*

though according to the nomenclatoric rules Sauveur's term of *L. dissitum* has claim on priority. W. J. Jongmans (1913/1917) states, that at least part (i. e. the better preserved specimens) of Geinitz's and Sterzel's material may be identified with Arber's *Lepidodendron loricatum* (1922, Pl. 13, fig. 27—37); he regards therefore the name of *L. subdichotomum* STERZEL as a superfluous synonymum. Also Croockall's figure of *L. loricatum* (1929, Pl. 20, fig. h) shows that *Lepidodendron loricatum* of the english authors is in fact identical with our Middle European *L. subdichotomum.*

Occurrence: *L. subdichotomum* STERZEL was stated in the coal fields of Central Bohemia only in the Nýřany coal measure series i. e. Westphalian D.

The coal field of Plzeň, northern part: Třemošná (in the cannel coal of the Nýřany coal measure).

The coal field of Plzeň, southern part (cannel coal and the hanging shales of the Nýřany c. m., as well as the hanging shales of the Augustus c. m.): Heřmanova Huť, Vlkýše, Nýřany, Mantov, Týnec, Zbuch, Sulkov.

The coal field of Mirošov (hanging shales of the coal measures): Mirošov.

The coal field of Manetín (hanging shales of the coal measure): Vladoměřice.

6. Lepidodendron sp. — A. (? aff. dichotomum Zeiller) (Pl. II, fig. 3, 4, 5).

I know untill present only some few specimens of older barks showing leaf cushions about 1,5—2 cm long and cca. 0,7—1 cm wide. Some of them are bearing still leaves, which are straight and long (like in *Lepidodendron obovatum* STBG. or *Lepidodendron longifolium* PRESL in STBG.). Though they are not whooly preserved in any specimen, it is sure that they were essentially longer than in *L. obovatum* STBG.

The leaf cushions are at the first sight very similar to those of *L. obovatum* STBG.; they are perhaps only a little more vaulted (a slight ressemblace to *L. longifolium* PRESL). They are of a rather regular, rhomboidal shape. The rather wide and low leaf scars (just as in *L. longifolium* PRESL or *obovatum* STBG.) are situated on the upper half of the cushions. Immediately above the leaf scars the ligular groove and from this upwards an acute median keel, below the leaf scars a very blunt median keel marked by wavy cross wrinkles may be stated. Infrafoliar parichnos scars are missing in the available specimens like in *L. longifolium* PRESL in STBG.

In the whole this at the mean time only uncompletely known type, which I do not venture to unite with any form found till present in Bohemia, shows similarity on the one side with *Lepidodendron obovatum,* on the other side with *Lepidodendron longifolium;* it resembles without any doubt to Zeiller's *Lepidodendron dichotomum* (1880, 1886/88).

As long as we do not know a larger material of specimens (especially slender or younger branches and shoots), I suppose it as more convenient to let this form at present without any special name.

Occurrence: Untill present I verified this form only at the collieries „Na Brantech" near Lubná (the coal field of Rakovník) in horizons corresponding with the Upper Radnice coal measures.

6. Lepidodendron sp. B. (? aff. L. jaraczewskii Zeiller, L. fusiforme Cda.). (Pl. III, fig. 4, 5).

Specimens, which I unite under this term, represent lepidodendroid barks with rather narrow leaf cushions (e. g. 1,5 cm long and only 0,5—0,6 cm wide). I do not yet know any young shoots as well as any older barks. The shape of the leaf cushions in the available specimens is rhomboidal, slightly S-like bent (especially in their lower parts). Their upper half is relatively high. The rather small and low (a little broader than high) leaf scar is situated nearly at ⅔ above the lower end of the respective leaf cushion. Just above the leaf scar the ligular pit and from it upwards a median sharp keel is situated. Below the leaf scar the median keel is less sharp, but always well visible; the cross wrinkles are restricted chiefly to this longitudinal keel. No infrafoliar parichnos scars are to be stated on the leaf cushions in the available specimens and the leaf cushions are limited by simple sharp lines.

At present I am unable to state anything more reliable about the character and size of the leaves, though their bases are in some specimens partly preserved.

According to all mentioned features this Lepidodendron form is very similar to *Lepidodendron ophiurus* BGT., from which it differs essentially only by the character of the lines separating the leaf cushions, which in *L. ophiurus* are marked by longitudinal undulated wrinkles, whereas in our new form they are simple and smooth. In this respect it resembles still more (especially specimens with elongated leaf cushions) to *L. jaraczewskii,* which was described by Zeiller (1886/8, pp. 457, Pl. 67, fig. 3) from the Carboniferous of Northern France.*) Some of our specimens, in which the cross wrinkles below the leaf scars become very unconspicuous, especially specimens with very elongated leaf cushions (just as Zeiller's named species) show a striking similarity with Corda's**) *Lepidodendron fusiforme* (as also pointed out by Zeiller in the case of his L. Jaraczewskii). This last differs from both perhaps only by a more sharply rhombic shape (i. e. limited by straight lines) of its leaf cushions, which of course may represent only a special state of preservation.

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*) This form differs from our L. sp. B. chiefly by a complete lack of cross-wrinkles below the leaf scars.

**) A. J. Corda 1845: Sagenaria fusiformis, pp. 20, Pl. 6, fig. 5.

Occurrence: Specimens which I refer hereto are coming mostly from the Radnice coal series of the Lower grey beds.

The coal field of Kladno (interlayer called „Velká Opuka" of the „Main Kladno coal measure" [Upper Radnice c. m.]): Kladno, Motyčín.

The coal field of Rakovník (coal measures corresponding with the Upper Radnice c. m.): the collieries „Na Brantech" near Lubná.

The coal field of Malé Přílepy near Beroun (the interlayer called „košile" in the Lower Radnice c. m.): Malé Přílepy.

The coal fields of Radnice (the hanging shales as well as the interlayers of the Upper Radnice c. m.): Břasy.

8. Notes on Corda's Lepidodendron fusiforme.

Figures see in:

1845 A. J. Corda: Pl. 17, only fig. 5.

Bibliography:

1845 A. J. Corda: *Sagenaria fusiformis,* pp. 20 and 21.
1886/88 R. Zeiller: see sub *Lepidodendron Jaraczewskii,* pp. 453.
1906 F. Fischer: see sub *Lepidodendron rimosum* STBG.
1914 M. E. Bureau: see sub *Lepidodendron Jaraczewskii,* pp. 114.

This term remains somewhat obscure. Meanwhile we know only the unique Corda's specimen (1845); no other precisely equal specimen has ever been found. Corda describes it as follows: „Pulvinis rhomboideo-fusiformibus, elongatis, utrinque acutis, medio acute carinatis; cicatrice centrali rhombica minuta". In his specimen the leaf cushions are (0,6 cm wide, 3,0 cm long) nearly 5 times as long as wide.

Some authors (F. Fischer 1906) regarded Corda's form as allied to Sternberg's *Lepidodendron rimosum* (i. e. older specimens of *L. ophiurus;* see the next chapter). But from this it differs very considerably in having no stripes of wrinkled bark between the single leaf cushions. Zeiller (1886/8) and after him Bureau (1914) expressed the opinion of some possible relations to *L. jaraczewskii,* to which Corda's specimens are mostly approaching. The only obstacle lies according to those authors in the extreemly sharp rhombic form (straight lines limiting the leaf cushions) of the leaf cushions; in contrary the leaf cushions of the true *L. Jaraczewskii* are (at least partly) slightly S like bent and their side edges are slightly rounded. As already stated (see in *Lepidodendron sp. B.* aff.? *Jaraczewskii),* this feature may be eventually caused by a special kind of fossilisation. Some of our specimens of *„Lep. sp. B."* shows evidently an astonishing similarity with Corda's specimen. But at present on the bases of our rather poor material, this task cannot be solved definitively.

Occurrence: Corda's specimen is preserved in a dark grey coaly shale. The locality is not known with certainty; Corda mentions Chomle near Radnice.

8. Critical notes on the terms of Lepidodendron rimosum Stbg., distans O. Feistm. and serpentigerum König.

We meet specimens corresponding to these terms (as already noted in some species) in various species of the genus of Lepidodendron, if we are studying and comparing critically variousely old specimens of twigs and barks, especially such, where the leaf cushions on account of the growth of the bark tissues are stretched appart. By this way forms are arising, which are exhibiting between their leaf cushions stripes of barks, the surface of which is longitudinally wrinkled.

Originally K. Sternberg described under the name of *L. rimosum* (as I stated after comparing numerous variousely old specimens, barks of big trunks as well as slender shoots of *L. ophiurus* BGT.)*) a specimen of a very old bark of *Lepidodendron ophiurus* BGT., in which the very narrow and fusiform leaf cushions are considerably stretched apart and the resulting broad stripes of bark between them are ornamentated by fine undulated longitudinal wrinkles (see Sternberg's fig. Vol. I, Pl. 10, fig. 1, and Vol. II, Pl. 68, fig. 15). During later times various authors laid at the identification of their discoveries here and there more stress upon the presence of those wrinkled spaces between the leaf cushions than on the character and shape of the last ones. And because the stretching apart of the leaf cushions and the formation of stripes of wrinkled bark between the last ones is a common feature at the increasing in girth of the branches of many species of the genus of Lepidodendron, we find under the term of *Lepidodendron rimosum* STBG. at various authors specimens belonging also to other species than only to that, for which Sternberg originally fixed this name. From this point of view Sternberg's name of *Lepidodendron rimosum* is loosing its peculiar sense as a plant species and becomes only a term for a special growing stage of the Lepidodendron barks in general, which are not yet deprived of their original surface.

A very similar case is also O. Feistmantel's *Lepidodendron distans* (1875/6, Pl. 48, fig. 3; see also sub *L. subdichotomum* STERZEL) from the cannel coal of Nýřany. But in this case we hawe to do (as I stated after comparing it with other Lepidodendron barks and twigs coming from the same stratigraphical horizon) with an old bark of Sterzel's *Lepidodendron subdichotomum,* identical with such forms as described by Geinitz from the Saxonian coal fields as *L. rimosum* (1855, Pl. III, fig. 13, 15).

Finally we must point out, that also *L. aculeatum* STBG. as well as *L. obovatum* STBG. produced in advanced age similar rimosum stages of barks, which are often signed in various museal collections by the name of *L. rimosum.* Such forms are very much approaching to specimens, which many palaeontologists, especially F. Fischer (1906, Nr. 75.) are regarding as *Lepidodendron serpentigerum* Ch. König (1825). The

*) F. Stockmans in 1835 erroneously believed Sternberg's specimen to be identical with *L. dissitum* SAUVEUR (i. e. our *L. subdichotomum* STERZEL).

shape of the leaf cushions of this last sepcies are indeed very similar to those of both already mentioned Lepidodendra, i. e. *L. aculeatum* and *obovatum* (especially to the first of both), they are downwards prolonged in a curved ridge more or less S-like bent and show below their scars very distinct infrafoliar parichnos scars. Without regard to the conditions of the infrafoliar parichnos scars, the most striking difference between König's *L. serpentigerum* and both preceeding forms consists in the presence of especially broad spaces of wrinkled bark between the leaf cushions of König's form.

From the point of view of all just mentioned facts, we may regard all such terms like *L. rimosum* STBG., *distans* O. FEISTM. as well as *L. serpentigerum* KÖNIG, only as terms for certain growing stages (rather old barks) of various species of the genus of Lepidodendron: Sternberg's *L. rimosum* as belonging to *L. ophiurus* BGT., Feistmantel's *L. distans* to *L. subdichotomum* STERZEL (resp. *dissitum* SAUVEUR), *L. serpentigerum* KÖNIG most probably to *L. aculeatum* STBG.

9. Lepidodendron ophiurus Bgt. (Pl. I, fig. 4, 5, 6; Pl. II, fig. 1, 2).

Figures offering a clear idea of the form:

1825/38 K. c. Sternberg, Vol. I, Pl. 10, fig. 1, Vol. II, Pl. 68, fig. 15. *(Lepidodendron rimosum).*
1831/37 J. Lindley-W. Hutton, Vol. I, Pl. 9 *(L. gracile).*
1875/6 O. Feistmantel, Pl. 41, fig. 2, 2a *(Sagenaria microstigma).*
1886/88 R. Zeiller, Pl. 68, fig. 1—6 *(L. ophiurus).*
1899 A. Hofmann-F. Ryba, Pl. 13, fig. 4 *(L. selaginoides),* Pl. 15, fig. 5. *(L. rimosum),* Pl. 15, fig. 4, 6 *(L. fusiforme).*
1914 E. M. Bureau, Pl. 30, fig. 1—4; Pl. 36, fig. 1 (?); cones on Pl. 37, fig. 1 (?); — *L. ophiurus.*

The most important discussions and synonyms:

A. Brongniart, 1822, *Sagenaria ophiurus* (Pl. 4, fig. 1).
A. Brongniart, 1825/38, *Lepidodendron rimosum;* some authors (Kidston, Zeiller) regard as identical also his *L. affinis* (Pl. 56, fig. 2), though this last is very similar to our *L. simile* KIDST.
A. Brongniart, 1828, *Lepidodendron ophiurus.*
J. Lindley-W. Hutton, 1831/37, *Lepidodendron gracile* (Pl. 9.) some authors regards as identical also his Lep. *dilatatum* (Pl. 7, fig. 2) and *Lep. Sternbergi* (Pl. 4. and Pl. 102.).
? Corda, 1845 (see also sub 7. Lepidodendron sp. B.), *Sagenaria fusiformis* (ex parte; only Pl. 6, fig. 5).
von Roehl, 1868, *Lepidodendron rimosum* (ex parte; ? fig.).
K. Feistmantel, 1868, „Lepidodendronrinde" (Pl. 2, fig. 7).
O. Feistmantel, 1875/76, *Sagenaria microstigma, Sag. rimosa, Sag. fusiformis (?).*
R. Kidston, 1886, *Lepidodendron ophiurus.*

R. Zeiller, 1886/88, *Lepidodendron ophiurus, Lep. rimosum* (syn. ex parte, non fig.).
A. Hofmann-F. Ryba, 1899, *Lepidodendron selaginoides* (ex parte), *Lep. rimosum, Lep. fusiforme* (?).
F. Fischer, 1904, *Lep. ophiurus* [F. Fischer regards the following forms as identical with Brongniart's type: *Lycopodiolites ophiurus* STBG., *Lycopodites affinis* STBG. (Pl. 56, fig 2 but not Pl. 68, fig. 9, which he compares with *Lep. volkmannianum), ? Lepidodendron dilatatum* L.-H. (Pl. 7, fig. 2), *Lepidodendron gracile* L.-H. (Pl. 9)].
D. Zalesskij, 1904, *Lepidodendron ophiurus* (synon. ex parte; though Kidston regards his Pl. 5, fig. 1, 2, 4 and 6 as true *L. ophiurus*, I nevertheless suppose that we have here to do with our *L. simile* KIDST.).
R. Kidston, 1909/10, *Lepidodendron ophiurus, L. rimosum* (syn. ex parte).
E. M. Bureau, 1914, *Lepidodendron ophiurus.*
E. A. N. Arber, 1922/24, *Lepidodendron ophiurus.*
K. Novik, 1931, *Lepidodendron ophiurus* (we may regard his specimens in the same sense as Zalesskij's specimens; perhaps his *L. lycopodioides* Pl. 19, fig. 2 belongs also hereto, but not his Pl. 19, fig. 1).
F. Stockmans, 1935, *Lepidodendron dissitum* (ex parte).

Lepidodendron ophiurus BGT. is a rather easely distinguishable shortleafy form. Its leaves are nearly just as long as in the similar form of *Lepidodendron simile* KIDST. i. e. on younger shoots about 0,7 till 1 cm, on older branches 2,5 cm or even more; they are not S-like bent (like in L. simile), but are attached to the branches nearly under a right ungle being only simply archlike bent upwards (sickle-shaped), which gives to the twigs a squarrose appearence. According to various discoveries we may judge, that they have been very long persistent and growing in legth (like in *Lepidodendron simile* KIDST.).

The leaf cushions are relatively narrow. We easely may state even on very young or slender shoots if well preserved between them at least narrow bands of bark provided by undulated longitudinal wrinkles. In older specimens these bands are broader and old barks are of a *rimosum* type.

The cones, as far as it was possible to state, are borne terminally on slender twigs (just as in *L. simile* KIDST. and *acutum* STBG.). They are of a long, cylindrical shape, cca. 15 mm across, with nearly verticillate sporophyls.

The synonymity of this „species" is now enough clear. The chief difficulty lies in the fact, that many of the older specimens or bigger branches have been described under the name of *L. rimosum.* Because this *„rimosum"* stage of *L. ophiurus* is very similar to older or bigger specimens of Sauver's *Lepidodendron dissitum* (resp. Sterzel's *L. subdichotomum),* many errors happened as to the identification of both named species. Further very possible and also rather frequent errors

may be pointed out as to the young or slender twigs of *Lepidodendron simile* KIDST. (that is just the reason why we find in various collections on specimens of this species names like *L. elegans, lycopodioides, selaginoides* a. o., which are synonyms of Kidston's *L. simile)*. In the connection with these and other similar arrors a note of W. J. Jongmans (1913/37, pp. 212, 213, 253, 305) is very interesting; he regards the separation of the „species" of *Lepidodendron lycopodioides* STBG. (*?* ZEILLER), *L. ophiurus* BGT., and *L. simile* KIDST. as unrealisable and therefore the junction of all those forms into only one „species" i. e. *L. ophiurus* as mostly suitable.

Some authors are ranging into the vicinity of the rimosum stage of our L. ophiurus (i. e. Sternberg's *L. rimosum)* also Corda's *L. fusiforme* (f. inst. F. Fischer 1906). It is indisputable, that there are some evident common features (the lack of infrafoliar parichnos scars, the narrow elongated till fusiform shape of the leaf cushions a. o.). But nevertheless *L. ophiurus* may be distinguished (also if only younger twigs are available) by the presence of bands of longitudinally wrinkled bark limiting the single leaf cushions, which in Corda's specimen of *L. fusiforme* are utterly missing, though this specimen represents part of a rather old bark. Therefore I regard Corda's *Lepidodendron fusiforme* as belonging more probably to our *L. sp. B.* (aff. *jaraczewskii* ZEILLER; see also in the foregoing chapter).

Occurrence: *Lepidodendron ophiurus* was stated in the coal fields of Central Bohemia only in the Radnice coal series, I never have found any specimens in higher zones. It is especially frequent in the interlayers of the Upper Radnice coal measure (e. g. in its interlayer called „Velká Opuka" of the coal field of Kladno).

a) Typical forms:

The coald field of Plzeň, southern part (in the hanging shales of the Lower Radnice c. m. as well as in the Upper Radnice c. m.): Týnec, Zbuch, Nýřany.

The coal fields of Radnice (in the Upper Radnice c. m.): Břasy, Vejvanov.

The coal field of Malé Přílepy (the interlayer called „košile" of the Lower Radnice c. m.): Malé Přílepy.

The coal field of Kladno (the Upper Radnice c. m. [i. e. Main Kladno c. m.]): Kladno, Motyčín, Pchery, Libušín, Lány, Votvovice.

The coal field of Rakovník (the Upper Radnice c. m.): Rakovník, Lubná.

b) Barks of the „rimosum" stage (*L. rimosum* STBG.):

The coal field of Merklín (the Plzeň c. m. [i. e. c. m. Nr. III of Nýřany]): „Na Výtoni" near Merklín.

The coal fields of Radnice (the Upper Radnice c. m.): Břasy.

The coal fields of Kladno (the Upper Radnice c. m. [i. e. Main Kladno c. m.]): Kladno, Motyčín, Libušín, Kralupy.

The coal field of Rakovník (the Upper Radnice c. m.): Rakovník, Lubná.

10. Lepidodendron acutum Presl in Stbg.

Figures offering a clear idea of the form:

1854 C. r. Ettingshausen, Pl. 22 and 23 *(Lepidodendron Haidingeri)*.
1886/88 R. Zeiller,*) Pl. 69, fig. 1 *(Lepidodendron Haidingeri)*.

The most important discussions and synonyms:

K. c. Sternberg, 1825/38:

? Lycopodiolites cordatus (Vol. I, Pl. 56, fig. 1),
Lycopodiolites elegans (Vol. II, Pl. 48, fig. 1b),
Bergeria acuta (Vol. II, Pl. 48, fig. 1a),
Bergeria marginata (Vol. II, pl. 68, fig. 16),
Bergeria angulata (Vol. II, Pl. 68, fig. 17),
Bergeria rhombica (Vol. II, Pl. 68, fig. 18),
Bergeria quadrata (Vol. II, Pl. 68, fig. 19).

J. Lindley-W. Hutton, 1831/37:

? Lepidodendron dilatatum (Vol. I, Pl. 7, fig. 2),
? Lepidodendron Sternbergii (Vol. I, Pl. 4; the identity with Kidston's *L. simile* is not excluded),
? Lepidodendron Sternbergii (Vol. II, Pl. 112).

C. r. Ettingshausen, 1854: *Lepidodendron Haidingeri* (Pl. 22, 23).

O. Feistmantel, 1875/76:

? Sagenaria elegans (ex parte; Pl. 37, fig. 3. — it is not excluded that we have here to do with *L. simile* KIDSTON; the leaves are not preserved. O. Feistmantel, as evident from his text, understood under this name *L. Haidingeri* ETT., *L. acutum* STBG., and *L. marginatum* STBG.).

? Bergeria rhombica (ex parte; Pl. 41, fig. 3. — No leaves are here preserved, wherefor the identity with *L. simile* KIDST. is not excluded).

L. Lesquereux, 1879/80: *Lepidodendron lanceolatum.*

R. Kidston, 1886: *Lepidodendron acutum.*

R. Zeiller,*) 1886/88: *Lepidodendron Haidingeri* (Pl. 69, fig. 1).

A. Hofmann-F. Ryba, 1899:

? Lepidodendron Sternbergii (ex parte; Pl. 13, fig. 10),

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*) Ad R. Zeiller 1886/86:

Zeiller says, that his specimens are showing in some places distinct leaf scars on their leaf cushions, like all Lepidodendra with deciduous leaves, which he presents in his fig. 1a. This in evidently a very rare exception, because he remarks at the same time the scars to be mostly wholly indiscernible for the persisting leaves; he refers also to Ettingshausen's figures, where also no leaf scars are visible. Zeiller says further that he knows in the Musée d'hist. nat., Paris, one specimen collected at Radnice, Bohemia (No. 2773), on which such scars in a certain number of leaf cushions are visible, just as on his own specimens from Bully Grenay (Northern France).

? *Lepidodendron elegans* (ex parte; Pl. 14, fig. 2, 3. — Both figures are showing no leaves, wherefore the identity with Kidston's *L. simile* is not excluded; the cited locality of Blatnice near Nýřany is in favour with the last opinion, as from that place many specimens of *L. simile* are known but no one of *L. acutum).*

D. White, 1899: *Lepidodendron lanceolatum.*

R. Kidston, 1909/10: *Lepidodendron acutum.*

J. Šetlík, 1922: *Lepidodendron acutum* (pp. 6; text fig. on pp. 4).

E. A. N. Arber, 1922/24:
Lepidodendron lycopodioides (ex parte),
Lepidodendron lanceolatum.

R. Crookall, 1929:
Lepidodendron lanceolatum,
Lepidodendron acutum.

Lepidodendron acutum PRESL in STBG. is a short leafy type. Its leaves are very long persistent, wherefore the leaf cushions are never exhibiting any rhombic leaf scars, but instead of it 3 small spot like traces (traces of the central vein of the respective leaf and 2 parichnoi) and above them the ligular pit. Therefore many authors believe, that we have here not to do with a true Lepidodendron (Renier). The leaf cushions are of a rhombic till fusiform shape, often nearly just as long as wide or sometimes even broader, but mostly elongated. Their longitudinal keel is only very slightly marked, wherefore they are almost smooth.

The leaves are in their basal part S-like bent, in their upper part archlike curved. On young shoots they do not reach 3 cm and are cca. 3 mm broad; on older resp. bigger branches they reach sometimes more than 5 cm (till about 7 cm) and are often about 0,5 cm broad.

From the point of view of the shape and sculptures of the leaf cushions this „species" resembles undistinguishably to the following *L. simile* KIDSTON, from which it differs essentially only by its greater and broader leaves. Therefore specimens deprived of leaves are nearly always undeterminable. In such cases we must pay very thoroughly attention to younger shoots accompanying such older barks in the respective beds. Cones found in connection with branches of this species are long and cylindrical, relatively thin (only 15 mm across); they are born terminally at the ends of slender, young twigs. Of course it is not quite sure if such rather rare discoveries do not represent only very young and not ripe specimens.

Occurrence: *Lepidodendron acutum* PRESL in STBG. is known from the Radnice coal measure series. It seems to be most freequent within the Upper Radnice c. m. and its stratigraphical equivalents. I have not yet found any specimens in younger horizons.

The coal field of Plzeň, northern part (Upper Radnice c. m.): Plasy (?; precise locality unknown), Třemošná, Žebnice.

The coal field of Plzeň, southern part (precise horizons unknown): Kamenný Újezd, Nýřany.

The coal field „Na Lísku" near Beroun (Upper Radnice c. m. and shales called „brousky" below it): Strádonice, Hýskov, Zdejcina, Na Lísku.

The coal fields of Radnice (shales called „brousky" and „bělky" between the Lower and Upper Radnice c. m. and the Upper Radnice c. m.): Dvorce at Sv. Kříž, Svinná, Břasy, Vranovice.

The coal field of Kladno (Upper Radnice c. m. [i. e. the Main Kladno c. m.]): Kladno, Libušín, Motyčín, Vrapice, Pchery, Brandýsek, Dubí, Zákolany, Votvovice, Mínice, Kralupy, Zeměchy.

The coal field of Rakovník (Upper Radnice c. m.): the collieries „Na Brantech" near Lubná.

11. Lepidodendron simile Kidston. (Pl. I, fig. 1, 2, 3, 9, 10.)

Figures offering a clear idea of the form:

1886/88 R. Zeiller: Pl. 70, fig. 1 *(Lepidodendron lycopodioides)*.
1914 E. M. Bureau: (? Pl. 28, fig. 5), Pl. 30 bis, fig. 11, Pl. 32, Pl. 33, (? Pl. 31, fig. 1), Pl. 34 (with a cone), (? Pl. 37, fig. 2, 3, 4, 5, 7 — cones) — *Lepidodendron lycopodioides*.
1929 W. J. Jongmans: Pl. 20, fig. 41, 42 *(Lepidodendron lycopodioides)*.

The most important discussions and synonyms:

K. c. Sternberg, 1825/38:
Lycopodiolites selaginoides (ex parte; only Vol. I, Pl. 16, fig. 3),
? Lepidodendron affinis (? ex parte; Pl. 56, fig. 2. — The original type specimen is missing and it is not quite sure if we have not to do here with *L. ophiurus* Bgt.; non Vol. II, Pl. 68, fig. 9, which is regarded by F. Fischer a. o. as *L. Volkmannianum*).

A. Brongniart, 1828: *Lepidodendron selaginoides* (ex parte).

J. Lindley-W. Hutton, 1831/37:
Lepidodendron elegans (Vol. II, Pl. 118),
? Lepidodendron Sternbergii (Vol. I, Pl. 4; but it is not excluded that this fig. represents Sternberg-Presl's *L. acutum)*.

O. Feistmantel, 1875/76:
Lycopodites selaginoides (ex parte: Pl. 30, fig. 3, 4, Pl. 31; the original type specimens are missing),
? Sagenaria elegans (ex parte; Pl. 37, fig. 3; it is not excluded, that this specimen is identical with *L. acutum* Presl in Stbg.).

R. Kidston, 1886: *Lepidodendron Sternbergii* (ex parte).

R. Zeiller, 1886/88: *Lepidodendron lycopodioides* (syn. ex parte).

A. Hofmann-F. Ryba, 1899: *? Lepidodendron elegans* (Pl. 19, fig. 1 and perhaps also Pl. 14, fig. 2, 3, and Pl. 15, fig. 9; see also the respective note in the chapter about *L. acutum* Presl-Stbg.).

M. D. Zalesskij, 1904: *Lepidodendron ophiurus* (ex parte — e. g. Pl. 5, fig. 1, 2, [?3], 4, 6, [?7]; non synon.; R. Kidston regards his specimens as *L. ophiurus).*

F. Fischer, 1904: *Lepidodendron selaginoides* (ex parte).

F. Fischer in Potonie, 1905: *Lepidodendron obovatum* (ex parte).

W. J. Jongmans, 1909: *Lepidodendron simile.*

R. Kidston, 1909/10: *Lepidodendron simile.*

M. E. Bureau, 1914: *Lepidodendron lycopodioides* (ex parte; excl. synon.).

E. A. N. Arber, 1922/24: *Lepidodendron lycopodioides* (ex parte).

W. J. Jongmans, 1929: *Lepidodendron lycopodioides* (pp. 32).

K. Novik, 1931: *? Lepidodendron ophiurus* (Pl. 19, fig. 1).

Lepidodendron simile KIDST. is as to the shape and sculptures of its leaf cushions unusually similar to the foregoing species of *L. acutum* PRESL in STBG. Both may be safely distinguished only according to the length and breadth of their leaves. These are here much shorter and narrower than in *L. acutum;* they are alvays characteristically S-like bent (especially in their lower part; — essential difference from young shoots of *L. ophiurus* BGT.). On younger shoots they are about 12 mm long, in older or bigger specimens they are reaching even more than 2 cm. The shoots are dividing under rather very acute angles (also a very important difference from *L. ophiurus,* where the branching of the twigs is fulfilled under rather wide angles). Cones which have been found in connection with twigs, are born terminally, are very long and cylindrical, only about 1,5 cm across with an axis hardly 2 mm thick.

As evident from the notes joined to the synonyms above, this type was for a long time rather obscure. Most of the authors joined its specimens to some similar Lepidodendra under the terms of *L. elegans* BGT., *lycopodioides* STBG., *selagionides* STBG. Unfortunately just these terms especially those of Sternberg are very confused.

Brongniart's *Lepidodendron elegans* (see Brongniart 1828, pp. 85) corresponds only with a part of the specimens originally named by K. c. Sternberg as *Lepidodendron lycopodioides,* later as *Lycopodites elegans* (i. e. Pl. 16, fig. 1, 2, 4, of which fig. 1 and 4 are undeterminable, fig. 2 corresponds to our *Lepidodendron* [*? Bothrodendron*] *selaginoides* i. e. to Sternberg's *L. selaginoides* Pl. 17, fig. 1). Sternberg's terms of *L. lycopodioides* and *L. selaginoides* (see also in the chapter about *L.* [?] *selaginoides)* are thus by no means univocal terms from the point of view of natural plant species. *Lepidodendron lycopodioides* is in the whole an older synonymum of *L. elegans* BGT.; under the name of *L. selaginoides* Sternberg described indeed 2 different and independent „species" i. e. on Pl. 16, fig. 3 our *L. simile* KIDSTON, and on Pl. 17, fig. 1. our *L.* [?] *selaginoides* STBG. Summarizing all: Sternberg's *L. elegans* (i. e. originally *L. lycopodioides)* and *L. selaginoides* are belonging to one species, except 1 specimen (Pl. 16, fig. 3 — our *L. simile* KIDST.), which Sternberg included hereto by error. In contrary it is very possible

(only on the basis of Sternberg's figure because the original type specimen is missing) that Sternberg's *Lep. affinis* Pl. 56, fig. 2. may be also regarded as identical with our *L. simile* KIDST., though many authors (R. Kidston, F. Fischer) consider it as *Lep. ophiurus* BGT. A. Brongniart regarded as true *L. selaginoides* STBG. two of Sternberg's figures i. e. Pl. 16, fig. 3 and Pl. 17, fig. 1, which in fact are quite dissimilar (the first one is our *L. simile* KIDST., the second one *L.* [*?*] *selaginoides* STBG). Because neither Sternberg's nor Brongniart's term of. *L. elegans* are univocal or enough clear, it is impossible to use them in the future for any of the mentioned „species".

Unfortunately we meet the same problem also in the case of the term of *Lepidodendron lycopodioides,* under which our *Lep. simile* KIDST. was very often described by various authors (R. Zeiller 1886/88, E. Bureau 1914, E. A. N. Arber 1922/24). Others regarded it as young shoots of some Lepidodendra allied to *L. obovatum* STBG. and *aculeatum* STBG., e. g. F. Fischer (1904, 1905) and originally also R. Kidston (1866; — R. Kidston joined it to his *L. sternbergii,* which he identified with our *L. obovatum).* R. Kidston changed later essentially his view as to this task; he separated this type from other similar forms (1909/10) pointing out the following 3 circumstances: 1. Sternberg's *L. selaginoides* and *L. lycopodioides* (resp. the later term of *L. elegans*) are in fact identical (he evidently omitted to add: excluding Sternberg's Pl. 16, fig. 3), because they have straight and rather short leaflets like in the genus of Bothrodendron. Various authors joined later to this type unjustly also specimens with longer and S like bent leaves (such leaves are also to be seen in the cited Sternberg's figure 3. on Pl. 16, which fact was evidently omitted by Kidston). — 2. A. Brongniart erroneously (1828/38, Vol. II) regarded *L. lycopodioides* as lower i. e. bigger parts of branches of *Lepidodendron selaginoides.* Brongniart's *Lepidodendron elegans* (Pl. 14), which this author believed to be identical with Sternberg's *L. lycopodioides* (Pl. 16, fig. 1, 2, 4), is indeed something quite different; Kidston named this form as *L. simile.* — 3. With this new form of *Lepidodendron* is perhaps identical also Lindley and Hutton's *L. elegans.* — We must state, that Kidston evidently omitted, that his new form of *L. simile* corresponds wholly to Sternberg's figure of Pl. 16, fig. 3, which Sternberg joined by error to *L. selaginoides.*

All these facts as well as the confused Sternberg's terminology refering to the names of *L. elegans, selaginoides* and *lycopodioides* are no doubt the chief reason, why other authors (R. Zeiller, E. Bureau) described Kidston's type of *L. simile* under one of the Sternberg's names i. e. *L. lycopodioides* (though it would be more convenient to use the term of *L. selaginoides,* under which Sternberg really figured this form [Pl. 16, fig. 3]).

Also W. J. Jongmans (1909, pp. 174) expressed originally a very similar opinion to Kidston's view. He adopted also Kidston's name of *L. simile.* But later in his Fossilium Catalogus (1913/37, pp. 212—213) he refused Kidston's clearly limited term of *L. simile* with regard to some difficulties at the determination of variously preserved specimens and regards as most convenient to unite specimens named by Zeiller

a. o. as *L. lycopodioides* with those of *L. ophiurus* into only one species under the name of *L. ophiurus* BGT. Nevertheless in his later paper (1939) he mentioned this Lepidodendron form again under the name of *L. lycopodioides* pointing at the same time that in its synonymity exists an unusual confusion, wherefore a revision of all forms amassed round this name is highly desirable.

The problem of *Lepidodendron simile* was discussed also very thoroughly by E. A. N. Arber (1922/24). Arber is refusing Kidston's name of *L. simile* as an obscure one and make use of the old term of *L. lycopodioides* STBG. Unfortunately, as we may see from the synonyms cited by him, he joined to it also our similar but great leafy form of *Lepidodendron acutum* PRESL. Further he identifies with it also Lesquereux's *L. lanceolatum* (1879/80, Pl. 63, fig. 3—5a, pp. 369; see also D. White 1899, pp. 192), which hardly differs by something essential from Presl's *L. acutum* (see also R. Crookall 1929, pp. 24, Pl. 3, fig. b, Pl. IV, fig. b, Pl. 20, fig. a). The reason of that may be seen in the almost equal shape of the leaf cushions of both respective species (it is very difficult or even quite impossible to decide, which of his figured specimens belong to *L. simile* or to *L. acutum*, because he figured mostly older specimens deprived of leaves and he does not state, which kind of leafy shoots was accompanying such older barks on the respective localities: — Pl. 10, fig. 1—10, Pl. 11, fig. 10—17, Pl. 2, fig. 18—22). Besides that he cites among the joined synonyms also specimens of evident *L.* (?) *selaginoides* STBG. or even some *Bothrodendra*. The chief importance of Arber's paper may be seen in the explanation of the term of *Lepidodendron lanceolatum* of the british and american authors; he ranged it among *Lepidodendra* with very long persistent leaves (the group of our *L. simile* and *acutum)*.

Occurrence: The stratigraphical distribution of *L. simile* KIDST. in our coal fields of Central Bohemia is similar to that of *L. acutum* PRESL in STBG., i. e. it is restricted to the Radnice coal measure series. I have not yet stated it in higher horizons. From the palaeogeographical point of view it is very interesting, that *L. simile* is more frequent in the western part of the central bohemian carboniferous region (i. e. in the coal field of Plzeň), whereas in its eastern part we find more frequently the great leafy form of *L. acutum* PRESL in STBG. The precise determination of the collected specimens depends chiefly on the knowledge of young, leaf bearing shoots.

The coal field of Plzeň, northern part (coal measures corresponding with the Upper Radnice c. m. as well as still deeper horizons corresponding with the Plzeň coal measures [c. m. No. III of Nýřany]): Žebnice, Třemošná, Bílá Hora.

The coal field of Plzeň, southern part (the Upper Radnice c. m., shales called „brousky" and bělky in the roof of the Lower Radnice c. m. as well as the Plzeň c. m. [no. III of Nýřany]): Blatnice, Kamenný Újezd, Pankrác near Nýřany, Nýřany, Chlumčany.

The coal field of Merklín (the Plzeň c. m.): „Na Výtoni" near Merklín.

The coal fields of Radnice (the Upper Radnice c. m. as well as the shales called „brousky" and „bělky" between the Upper and Lower Radnice c. m.): Břasy, Vranovice, Vejvanov, Chomle, Svinná.

The coal field of Kladno (the Upper Radnice c. m. [called here as Main Kladno c. m.]): Kladno, Motyčín, Buštěhrad, Lány, Zeměchy, Votvovice.

The coal field of Rakovník (the Upper Radnice c. m. and the Lubná c. m.): Rakovník, „Krčelák" near Lubná, „Na Brantech" near Lubná, Lubná.

12. Lepidodendron [? Bothrodendron] selaginoides Stbg. (Pl. II, fig. 6; Pl. III, fig. 1, 2, 3).

Figures offering a clear idea of the form:

1825/38, K. c. Sternberg, Vol. I, Pl. 16, fig. 2, Pl. 17, fig. 1, and most probably also:

1914, E. M. Bureau, Pl. 35, fig. 1, Pl. 36 bis, fig. 1.

The most important discussions and synonyms:

K. c. Sternberg, 1825/38:

? Lycopodiolites elegans (ex parte, only Pl. 16, fig. 2; Fig. 1 and 4 are of a dubious character, perhaps we have to do with partially decorticated specimens bearing no leaves, the identity of which is impossible to be ascertained).

Lycopodiolites selaginoides (Pl. 17, fig. 1).

J. Lindley-W. Hutton, 1831/37: *Lepidodendron selaginoides* (Pl. 12; — R. Kidston regards it as a *Bothrodendron minutifolium,* but he mentions that the figure is in want of details [it is very similar to Sternberg's specimen] undeterminable).

von Röhl, 1868: *Lycopodites selaginoides* (pp. 144, Pl. 6, fig. 4; Pl. 7, fig. 3. R. Kidston regards them as a true *Bothrodendron minutifolium,* which seems to be just).

O. Feistmantel, 1875/6: O. F. figured twigs very similar to Sternberg's type under the name of *Lycopodium carbonaceum* (under his fig. Pl. 30, fig. 1, 2 the name of *Lycopodites lycopodioides* is to be found); they are more slender and therefore still more similar to twigs of a true *Bothrodendron minutifolium.* They are coming from Žacléř.

R. Zeiller, 1886/88: *Lycopodites carbonaceus* O. F. (Pl. 74, fig. 1, pp. 495; we have here to do just as in the case of Feistmantel's specimens most probably with twigs of *Bothrodendron minutifolium).*

R. Kidston, 1909/10: see in this paper his notes in the chapter about *Bothrodendron minutifolium* pp. 162/3.

E. Bureau, 1914: *Lepidodendron selaginoides* (pp. 130, Pl. 35, fig. 1, 2 and 3, Pl. 36, fig. 1, Pl. 36 bis, fig. 1; Bureau's specimens do not differ in any essential feature from Sternberg's type. Bureau regards it as identical with Weiss's *Bothrodendron minutifolium.)*

W. J. Jongmans, 1913/37: see on pp. 293 in his Fossilium Catalogus, II. Plantae, pars 15, Lycopodiales II (1929).

Sternberg's species of *Lepidodendron selaginoides* is at the mean time somewhat obscure as to its generic attribution. There is a question if it is indeed a true representant of the genus of Lepidodendron. Many facts seem to attest rather its *Bothrodendron* character. Till present we do not know enough old or big branches, in which the shape of the leaf cushions would be well preserved. Even the biggest branches known to me (about 3 cm) are always provided with leaves (wherefore the shape of the leaf scars and the sculptures of their leaf cushions are not well visible) and their leaf cushions are not stretched apart.

The leaf cushions are of a rhombic, narrow and elongated till fusiform shape. The leaflets are linear, straight and short, very often more or less adpressed to the branches.

As to both just named features *L. selaginoides* resembles very strongly some Bothrodendra, f. inst. *B. minutifolium* BOULAY. The chief differences may be seen in the following facts: 1. The last youngest twigs of the branches are in Sternberg's species essentially bigger than in the various known Bothrodendra. 2. On the bigger branches of the Bothrodendra the leaf cushions are very soon streched apart and rapidly disappearing; on the finely wrinkled bark only small and oval leaf scars are remaining, whereas in Sternberg's species the leaves as well as the leaf cushions are persistent also on bigger branches. — Nevertheless many authors (W. J. Jongmans 1913/37, E. Bureau 1914) regard this form as directly identical with Boulay's *Bothr. minutifolium*. The whole problem cannot be solved at present with a definitive conclusion; only future collections containing also older barks of bigger trunks will elucidate this task. At present I regard as nearly well ascertained, that this Sternberg's form represents no true Lepidodendron, but most probably a Bothrodendron.

In many monographical descriptive works we often find figures of specimens of leafbearing twigs similar to twigs of our *L. selaginoides*, i. e. dichotomously divided under very narrow angles with short, straight, linear and more or less adpressed leaflets. They are called generally as *Lycopodites selaginoides* (von Roehl) or *Lycopodites carbonaceus* (O. Feistmantel, R. Zeiller). Meanwhile it is impossible to state with certainty their true nature. Generally they are more slender than the twigs of our *L.* (?) *selaginoides* STBG. Most probably they belong partly to the true *Bothrodendron minutifolium* or to some allied forms.

Occurrence: Specimens really identical with Sternberg's type have been collected only in the Radnice coal measure series.

The coal field of Plzeň, southern part (the Upper Radnice c. m. as well as the shales called „brousky" and „bělky" between the Lower a and Upper Radnice c. measures): Blatnice, Kamenný Újezd, Nýřany, Pankrác near Nýřan.

The coal fields of Radnice (shales called „brousky" and „bělky" between the Lower and the Upper Radnice c. m.): Svinná, Přísednice.

The coal field of Kladno (the Upper Radnice c. m. [called here as the Main Kladno c. m.]): Lány, Kladno, Motyčín, Kralupy.

II. The genus of Lepidophloios Stbg.

A detailed diagnosis and description of the genus *Lepidophloios* may be found in the same works, which I have mentioned in the chapter about the genus of Lepidodendron. Between both named genera there are very near relations, especially as to the anatomical structures of their stems. wherefore some authors (R. Kidston 1909/10) expressed the opinion that it would be more convenient to regard it as only a subgenus of the foregoing genus of *Lepidodendron*. At the first sight it differs considerably from the Lepidodendra by the shape of their cones, their unusually long linear leaves as well as by their prolonged leaf cushions. But comparing various Lepidophloios species with some Lepidodendra (see e. g. *L. longifolium* PRESL) we must admit that all such features are gradual and of a rather subordinate kind.

The leaf cushions compared with the relatively flat cushions of the Lepidodendra, are unusually convex and generally growing into some large and thick scale like stalks, which than are archlike drooping downwards and bearing terminally leaves or the respective leaf scars. The degree of this stalk like growing resp. of the drooping downwards of the leaf cushions is different not only in various species, but also on variousely old branches. In general on older resp. bigger branches or trunks the leaf cushions are always very prolonged and eventually deflected downwards, whereas on young or slender shoots or on branches bearing cones they are in some species only inconsiderably inflated or even normal like in the most of Lepidodendra (see R. Kidston 1893/4, 1909/10). The leaf scars are of a narrow, transversally elongated rhombic shape (very similar to those of *Lepidodendron obovatum* STBG.); their sculptures are the same as in Lepidodendra. It is not yet quite certain if there are below them situated also the small infrafoliar parichnos scars like in the most of the Lepidodendra. I never have observed them and I seriousely doubt on their presence, just as R. Kidston (1893/94), though some authors (D. Stur 1875/77, pp. 231; H. Potonié 1897, pp. 233—239) assert to have observed them. Above the leaf scars the ligular groove is generally well marked. — The leaf cushions are on the twigs and trunks densely and spirally arranged like thick and mostly downwards drooping and partially overreaching scales, wherefore only their terminal parts bearing the leaf scars are visible.The shape of their visible terminal parts is rhombic and rather low transversally elongated. Compared with the branches of Lepidodendra, apparently a very strange appearence results by this way.

The leaves, as far as known, are always very long (till more dm), linear and straight. The genus Lepidophloios differs by that from the most of the Lepidodendra, except some special cases e. g. *L. longifolium* PRESL.

Other differences may be observed also as to the cones and sporophylls. They are of unusually stout size, their sporophylls are larger and especially their free parts are leaf like prolonged and broad, generally of a broadly lanceolate shape. But there are some difficulties as to their utilization for diagnostic purposes, because only exceptionally we find them

attached to the branches of the respective Lepidophloios specimens and finally whole cones are rather rare; generally we find isolated sporophylls called *Lepidophyllum*.

As to the synonyms of the various species, I refer just as in the case of the foregoing genus of Lepidodendron to W. J. Jongmans's (1913/37) Fossilium Catalogus II, Plantae, pars 16, Lycopodiales III, 1930.

In the coal fields of Central Bohemia I stated at present only 3 forms: *Lepidophloios laricinus* STBG., *macrolepidotus* GOLDENB. and *acerosus* L. and H. (sensu KIDST. ex p., i. e. *L. carinatus* WEISS. ex p.). Besides we may state here often also big trunks named *Halonia* L. H. showing a system of great circular scars after shoots (bearing eventually cones). The determination of the three named forms carries often some difficulties, because in certain stages of growth (especially slender young shoots and old barks) they are very similar. As to their stratigraphical distribution, I stated *L. acerosum* L. H. and *L. macrolepidotus* GOLDENB. only in the Radnice coal measure series, whereas *L. laricinus* STBG. may be collected according to my experiences beside the Radnice series also in the Nýřany c. m. ser. (i. e. Westphalian D) as well as in the Kounová c. m. ser. (i. e. Stéphanian).

1. Lepidophloios laricinus Stbg.

Figures offering a clear idea of the form:

1886/88 R. Zeiller, Pl. 72, fig. 1—3.
1910 A. Renier, Pl. 9 and 10.
1914 E. Bureau, Pl. 54, fig. 3.

The most important discussions as to the synonyms see especially in the works of R. Kidston (1886, 1893/4 and 1909/10), R. Zeiller (1886/8) and E. Bureau (1914).

Lepidophloios laricinus STBG. according to the original Presl-Sternberg's diagnosis and figures as well as according to all later critical studies (especially by R. Zeiller 1886/88, R. Kidston 1886, 1893/94, 1909/10, E. Bureau 1914 and D. White 1899) is characterised by a very low visible part of the leaf cushions (their greatest part is covered by their mutual superposition and overlaping). These last are only rarely just as high as wide, generally they are much lower and show a sharply rhombic transversally elongated shape. The leaf scars are on the impressions mostly well visible, their greatest part is generally uncovered, and above them the ligular grove is alvays clearly marked. Otherwise the surface of the visible part of the leaf cushions is quite smooth and does not show any median keel nor any other sculptures (this is the chief difference from *L. acerosus* L. H.). Their margins are whole, without any lateral fringes, earlike or any similar outgrowths.

Notes to the synonymity. — This type of Lepidophloios was already so often in the literature examined and discussed, that I regard as superfluous to repeat anew the whole synonymity in this preliminary paper; I mention here therefore only some important notes. The „species" was first defined by K. c. Sternberg (1825/38, Vol. I, Pl. 11, fig. 2, 4), but his figures are a little inacurate, slightly schematised, though otherwise they present a rather good idea of it. Later O. Feistmantel (1875/6, Pl. 33; Pl. 34, fig. 1—5; he refers hereto also Corda's *Lomatophloios crassicaule,* 1845, Pl. I.) as well as A. Hofmann and F. Ryba (1899, Pl. 15, fig. 13, 17) figured further specimens from the coal fields of Central Bohemia, but not all of them are really identical with Sternberg's specimen. In O. Feistmantel's work only Pl. 33, fig. 2 and 3 (loc. Nýřany) may be regarded as true *L. laricinus* STBG.; fig. 1 of the same Plate coming most probably from the horizon between the Lower and Upper Radnice coal measures (shales called „brousky" and „bělky") of the coal fields of Radnice, has the visible parts of its leaf cushions too high and showing slight median keel like sculptures, whereby it corresponds rather to Corda's *Lomatophloios crassicaule,* which is regarded at the mean time as older bark specimens (with especially great leaf cushions) of *Lepidophloios acerosus* L. H. Specimens figured by the same author from Žacléř Pl. 34, fig. 1—4 (l. c.) show distinctly marked median keels and they must be regarded therefore also as *L. acerosus* L. H. though otherwise the visible parts of the leaf cushions are of a very similar shape like those of *L. laricinus* STBG. Feistmantel's (ibid.) Pl. 47 certainly does not correspond with our species; here we have to do without any doubt with *Bothrodendron punctatum* L. H. — Hofman-Ryba's (1899) figures of the specimens from Nýřany (mines near Kamenný Újezd, Pl. 15) are partly mere decorticates, the precise identification of which is quite impossible (fig. 14, 16, 17), partly they show distinct median keels (especially fig. 15); thus perhaps only fig. 13 may be regarded as a true *L. laricinus* STBG., though even this fig. show (fig. 13 a) at some places a slight median keel like relief.

From all these just mentioned points of view it will be necessary to correct the lists of synonyms presented till present by various authors, from which I regard as the most important and serious those of R. Kidston (1886, 1893/4, and 1909/10), R. Zeiller (1886/8) and E. Bureau (1914). In these papers we find also many critical remarks about the relations of the so called *Halonia* L. H. to our species.

As told before, many authors (f. inst. also O. Feistmantel 1875/6) joined to our *L. laricinus* STBG. also Corda's *Lomatophloios crassicaule* (1845). But this form has the visible parts of its leaf cushions much higher compared with those of the typical specimens of *Lepidophloios laricinus* STBG. Therefore Kidston's opinion (1893/4), who regards it as older barks of *Lepidophloios acerosus* L. H. (see also in the chapter about *Lepidophloios acerosus* L. H.) is perhaps more just. M. Hirmer (1927) adopted evidently the same point of view. — In some cases it is indeed very difficult to decide, to which of both named species such old barks are to be joined, especially because the median keels as well as other sculptures of their leaf cushions are generally less sharply marked.

E. Bureau (1914) regards such specimens, which are comparable with Corda's form (i. e. with rather high visible part of leaf cushions), as a separate distinct species, *Lepidophloios crassicaulis* Schimp. (pp. 178, Pl. 56, fig. 1—4); he says but nothing about their relations to some eventual younger shoots.

Occurrence: Sternberg's *Lepidophloios laricinus* has from the stratigraphical point of view a considerably wide extension. In the coal fields of Central Bohemia, I know it from the whole Radnice coal measure series as well as from that of Nýřany. As to its occurrence in the Stephanian Kounov coal measure series we need at the mean time reliable documents, but some discoveries in the surroundings of Plzeň (loc. Malý Krkavec) attests its presence also in this horizon.

The coal field of Plzeň, northern part (the Upper Radnice coal measure): Třemošná.

The coal field of Plzeň, southern part (the Radnice as well as the Nýřany coal measure series): Nýřany, Kamenný Újezd, Mantov, Sulkov.

The coal field of Merklín (the Plzeň coal measures [i. e. c. m. No. III of Nýřany]): „Na Výtoni" near Merklín.

The coal field of Mirošov (the Nýřany coal measures): Mirošov.

The coal field of Na Lísku near Beroun (the shales called „brousky" below the coal measure [Upper Radnice c. m.]): Strádonice.

The coal field of Malé Přílepy near Beroun (the shales called „brousky" and „bělky" of the hanging wall of the Lower Radnice c. m.): Malé Přílepy.

The coal fields of Radnice (the Upper Radnice coal measure and the shales called „brousky" and „bělky" between the Uppwer and Lower Radnice c. m.): Břasy, Svinná, Vejvanov.

The coal field of Kladno (the Upper Radnice c. m. [called here the Main Kladno c. m.]): Kladno, Motyčín, Vrapice.

The coal field of Rakovník (the Lubná c. m. as well as the Upper Radnice c. m.): Hostokryje, „Na Brantech" near Lubná, Lubná, „V Krčeláku" near Lubná.

2. Lepidophloios acerosus L. H.

Figures offering a clear idea of this form see before all in:
1910, A. Renier, Pl. 8.

and further also:

1893/4, R. Kidston, Pl. 1, fig. 1, 1a, Pl. 2, fig. 9.
1914, E. A. N. Arber, Pl. 28, fig. 20.
1917, R. Kidston, Pl. 2, fig. 5.
1934, E. Simson-Scharold, Pl. 1, fig. 5, 6.

Discussions as to the synonyms see especially in:
R. Kidston: 1886, 1890, 1890/91, 1891, 1893/94, 1917.
E. A. N. Arber: 1914.

This form of Lepidophloios barks is at first sight very similar to the foregoing Sternberg's species, especially if we have to do with young or slender shoots. It may be distinguished by two important features: 1. The visible parts of the leaf cushions are much higher. 2. The leaf cushions show a distinct median keel stretching from the ligular groove. Unfortunately both these features are not always clearly marked. The median keel becomes especially with the increasing age of the respective branches less distinct, wherefore if old barks are at hand, it is often very difficult to decide, to which of both species *(L. laricinus* or *L. acerosus)* they are to be joined.

From the coal fields of Central Bohemia this form has not yet been mentioned in any paper, though some figures presented by O. Feistmantel as well as by Hofmann and Ryba under the name of *L. laricinus* remind it (as already stated in the foregoing chapter on *L. laricinus)* very strongly. It seems according to our list of localities that it was omitted only by error and that in contrary in deeper zones (i. e. in the Radnice coal measure series) it is rather abundant and perhaps even more frequent than the true *L. laricinus* STBG.

Some english authors, especially R. Kidston, ascribe to this type of stems cones, which have been described by C. R. Ettingshausen under the name of *Lepidodendron crassifolium* (1854, Pl. 21, fig. 4, 5) and which are identical with O. Feistmantel's *Lepidodendron dichotomum* (1875/6, Pl. 32, fig. 5), as well as with Sternberg's *Conites cernuus* (1825/38, Pl. 29, fig. 1, 2). But in fact Kidston figured a cone much more robust than that of Ettingshausen or Sternberg; its sporophylls are considerably larger, till 7—9 cm long (R. Kidston 1893/4, Pl. 1, fig. 1 — i. e. the form of *Lepidophyllum majus)*. The sporophylls of Ettingshausen's, Feistmantel's and Sternberg's specimens are only about 2 till 3 cm long. Therefore we may suppose that such cones belong to more (in our case at least to two) different species. The leaf cushions of the branches on which such cones are borne are not stalk like prolonged and deflected, but only convex having the same normal orientation as in the Lepidodendra, especially like in young or slender shoots of *L. longifolium.* This fact was also observed by R. Kidston in some species of Lepidophloios f. inst. in *L. scoticus* KIDST., where he observed similar transitions from leaf cushions of lepidodendroid character to those of Lepidophloios even on young sterile shoots. On account of the great similarity of the slender branches of our Lepidophloios species resp. also of those of our *Lepidodendron longifolium,* it is impossible at present to state with certainty, to which of these species our mentioned cones belong (see also in the chapter on „L. dichotomum Stbg.").

About the relations of our *L. acerosus* to Corda's *Lomatophloios crassicaule* (1845), I already have mentioned all important in the chapter about *L. laricinus.* According to the fact that the visible parts

of its leaf cushions are higher than in normal specimens of *Lepidophloios laricinus* STBG., and that they are provided with slightly marked blunt median keels, I suppose in accordance with R. Kidston, that we have here to do without any doubt with old trunks of *L. acerosus* L. H.

Kidston and Arber identified with this species also Ettingshausen's *Lepidodendron brevifolius* (1845, Pl. 24, fig. 4, 5; Pl. 25; Pl. 26, fig. 3). I regard this opinion as erroneous, though I had no possibility to study the respective original type specimens. Ettingshausen's figures are not enough accurate, many important details are missing; e. g. they present no satisfactory evidence as to the keel like relief, the eventual presence of infrafoliar parichnos scars a. o. Nevertheless the kind of the branching of the shoots on his Pl. 24, fig. 4, 5 and the rather short leaves on Pl. 25 and 26, fig. 3 support strongly the presumption, that these specimens belong as slender shoots (see also Sternberg's specimens on Pl. 2) to *Lepidodendron obovatum* STBG.

As to Weiss's (1869) *Lepidophloios carinatus* (pp. 155), which is regarded by R. Kidston (1893/4) also as a synonymum of *L. acerosus* L. H., it may be added at present only, that Weiss united under this name at least two distinct forms: the just mentioned Ettingshausen's *Lepidodendron brevifolium* and Goldenberg's *Lepidophloios laricinus* (non STBG; 1855/62, pp. 45, Pl. 15, fig. 9 — the figure is signed with the name of *L. macrolepidotus),* as well as Schimper's *L. laricinus* (1869/74, Pl. 60, fig. 11, 12). Both last forms (Goldenberg's as well as Schimper's *L. laricinus)* are regarded by Kidston as true *L. acerosus.* Weiss's term of *L. carinatus* becomes thus only a synonymum of Lindley and Hutton's *L. acerosus,* partly also of *L. obovatum* STBG.

Occurrence: This species is restricted in the coal fields of Central Bohemia only to the Radnice coal measure series. In some places it seems to be more abundant than the true Sternberg's *L. laricinus.*

The coal field of Plzeň, northern part (the Upper Radnice coal measure): Třemošná, Žebnice.

The coal field of Plzeň, southern part (the Upper Radnice c. m. as well as the shales called „brousky" and „bělky" between the Upper and Lower Radnice c. m.): Pankrác near Nýřany.

The coal field of Merklín (the Plzeň c. m. [i. e. c. m. No. III of Nýřany]): „Na Výtoni" near Merklín.

The coal field „Na Lísku" near Beroun (the Upper Radnice c. m.): „Na Lísku" at Zdejcina near Beroun.

The coal field of Malé Přílepy near Beroun (the interlayer called „košile" of the Lower Radnice c. m.): Malé Přílepy.

The coal field of Kladno (the Upper Radnice c. m. [„Main Kladno c. m.]): Kladno, Motyčín, Zákolany, Kralupy.

The coal field of Rakovník (the Upper Radnice c. m.): „Na Brantech" near Lubná.

3. Lepidophloios macrolepidotus Goldenb.

Figures:

1855/62 F. Goldenberg — only Pl. XIV, fig. 25.
1880 L. Lesquereux, pp. 424; ? fig. (Pl. 68, fig. 2).
1890 B. Renault-R. Zeiller (non fig.).
1906 R. Zeiller, pp. 152 (non fig.).
1928 R. G. Koopmans (in W. J. Jongmans).

Discussions and synonyms:

R. Kidston, 1893/94, as well as his notes in the chapter about *L. laricinus* STBG. in his work from 1909/10.

This form is also very similar to *L. laricinus* STBG. Its leaf cushions are smooth without any keel like sculptures. The chief differences may be seen in the following features: The free part of the leaf cushions are higher than in the typical specimens of *L. laricinus* STBG., their front side is archlike curved (not pointed), their leaf scars generally are not visible being covered with the neighbouring leaf cushion; The ligular groove is like in *L. laricinus* well marked. These features are evidently caused by a somewhat different kind of drooping downwards of the leaf cushions, which are still more prolonged than in *L. laricinus,* as shown especially clearly by Koopmans (1828 — in W. J. Jongmans) on material from the dolomitic coal balls from the coal fields of Netherland.

By some authors (R. Kidston 1909/10, 1893/94) very often serious doubts have been expressed as to the independence of this species and especially the great similarity to older trunks of *L. laricinus* has been pointed out. On the other hand some evidently different specimens have been united by error with it (e. g. R. Zeiller 1906, B. Renault-R. Zeiller 1890). The reason lies without any doubt in the fact, that Goldenberg figured under this name (1855/62) also specimens of another Lepidophloios species; only his Pl. 14, fig. 25 may be regarded as representant of an independent species, the true *L. macrolepidotus.*

Occurrence: *Lepidophloios macrolepidotus* Goldenb. was rather rarely collected in the coal fields of Central Bohemia. At present I know specimens only from the Radnice coal measure series.

The coal field of Plzeň (precise horizon unknown): Kamenný Újezd.

The coal fields of Radnice (in the hanging shales of the Upper Radnice coal measure as well as in the shales called „brousky" and „bělky" between the Lower and Upper Radnice coal measures): Břasy, Svinná.

The coal field „Na Štilci" at Žebrák near Hořovice (shales called „bělky" and „brousky" in the hanging of the Lower Radnice c. m.): „Na Štilci" near Žebrák.

The coal field of Kladno (the Upper Radnice c. m. [i. e. the „Main Kladno c. m."]): Kladno, Motyčín.

Halonia L. H.

The term of *Halonia* L. H. represents no independent plant genus. As it was already sufficiently stated (see f. inst. A. C. Seward 1898/1919, M. Hirmer 1927 a. o.), we have to do mostly with stems or bigger branches of some members of the genus of Lepidophloios (especially *L. laricinus* STBG., and *acerosus* L. H.) provided by a system of spirally arranged great circular scars of the twigs bearing perhaps fructificating cones. It seems therefore that Lepidophloios trees distinguished themselves by a remarcable cauliflory.

The specimens of Halonia are very often slightly decorticated, showing mostly rather badly preserved leaf cushions, wherefore the identification of the respective Lepidophloios species is often very difficult. I have stated 2 types of such stems in the coal fields of Central Bohemia. Both represent evidently various growing stages:

a) Specimens with relatively closely arranged scars, distant only about 3—4,5 cm rarely till 6,5 cm. They are generally at the same time provided with longitudinal blunt ribs, which are sometimes traversing even the Halonial scars. These ribs are in some specimens only very slightly marked or even quite indistinct. — Specimens of this kind are known to me from the Radnice, as well as from the Nýřany coal measure series: Nýřany, Mirošov, Vranovice, Dubí near Kladno, Motyčín, Kralupy.

b) Specimens with very (till more dm) distant scars. In such specimens no traces of any longitudinal ribs are to be observed. — The stratigraphical distribution of this type is the same as that of the foregoing one: Nýřany, Kamenný Újezd, Lubná, „Na Brantech" near Lubná, Chomle, Mirošov.

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VYSVĚTLIVKY K TABULKÁM. — DESCRIPTION OF PLATES.

Tab. I. — Plate I.

Obr. 1. — *Lepidodendron simile* KIDST. Loc.: „Pankrác" u Nýřan. — Obz.: Keramické bělavé lupky mezi svrchn. radnickými a spodní radn. slojí. — Coll.: Geol. pal. odd. Nár. mus., Praha (Akc. č. 22265/1925.) — Zmenš. 1/3.

Obr. 2 a 3. — *Lep. simile* KIDST. — Loc. a obz. jako u obr. 1. — Coll.: Geol. pal. odd. Nár. mus., Praha. (Akc. č. 23534.) — 1/1.

Obr. 4. — *Lep. ophiurus* BGT. — Loc.: důl Ronna, Hnidousy u Kladna. — Obz.: Proplast Vel. opuka ve hlavní sloji kladenské. — Coll.: Geol. pal. odd. Nár. musea, Praha (Akc. č. 23596/1931.) — 1/1.

Obr. 5. — *Lep. ophiurus* BGT. — Loc. a obz. jako u obr. 4. — Coll.: Geol. pal. odd. Nár. mus., Praha (Akc. č. 24564/1936.) — 1/1.

Obr. 6. — *L. ophiurus* BGT. — Loc.: Malé Přílepy u Berouna. — Obz.: Proplast „košile" ve spodní radnické sloji. — Coll.: Geol. pal. odd. Nár. mus., Praha (Dr. J. Šetlík, 1921). — 1/1.

Obr. 7. — *Lep. subdichotomum* STERZEL. —Loc.: Mirošov. — Hor.: Nýřanské sloje. — Coll.: Geol. pal. odd. Nár. musea, Praha. (Akc. č. 22017). — 1/1.

Obr. 8. — *L. subdichotomum* STERZEL. — Loc.: důl Masaryk Jub., Červený Újezd u Nýřan. — Obz.: sloj nadložní nýřanské serie. — Coll.: Geol. pal. odd. Nár. musea v Praze. (Akc. č. 22083/1923, Dr. J. Šetlík.) — 1/1.

Obr. 9. — *Lep. simile* KIDST. — Loc.: „Pankrác" u Nýřan. — Obz.: Keramické bělavé lupky mezi svrchn. radnickými a spodní radn. slojí. — Coll.: Geol. pal. odd. Nár. mus., Praha. (Akc. č. 22157/1924). — 1/1.

Obr. 10. — *Lep. simile* KIDST. — Loc. a obz. jako u obr. 9. — Coll.: Geol. pal. odd. Nár. musea v Praze. (Akc. č. 23534.) — 1/1.

Fig. 1. — *Lepidodendron simile* KIDST. — Loc.: „Pankrác" at Nýřany. — Hor.: The whitish fire clays between the Upper and the Lower Radnice coal measures. — Coll.: Geol. pal. dep. of the Nat. Mus. Prague (Acc. n. 22265/1925). — About 1/3 nat. size.

Fig. 2 and 3. — *Lep. simile* KIDST. — Loc. and hor. as in fig. 1. — Coll.: Geol. pal. dep. of the Nat. Mus., Prague. (Acc. n. 23534.) — Nat. size.

Fig. 4. — *Lep. ophiurus* BGT. — Loc.: Coal mine Ronna, Hnidousy near Kladno. — Hor.: the interlayer „Velká opuka" of the Main Kladno coal measure. — Coll.: Geol. pal. dep. of the Nat. Mus., Prague. (Acc. n. 23596/1931.) — Nat. size.

Fig. 5. — *Lep. ophiurus* BGT. — Loc. and hor. as in fig. 4. — Coll.: Geol. pal. dep. of the Nat. Mus., Prague. (Acc. n. 24564/1936.) — Nat. size.

Fig. 6. — *Lep. ophiurus* BGT. — Loc.: Malé Přílepy near Beroun. — Hor.: The interlayer "košile" of the Lower Radnice coal measure. — Coll.: Geol. pal. dep. of the Nat. Mus., Prague. (Dr. J. Šetlík, 1921.) — Nat. size.

Fig. 7. — *Lep. subdichotomum* STERZEL. — Loc.: Mirošov. — Hor.: The Nýřany coal measures. — Coll.: Geol. pal. dep. of the Nat. Mus., Prague. (Acc. n. 22017.) — Nat. size.

Fig. 8. — *Lep. subdichotomum* STERZEL. — Loc.: Coal mine Masaryk Jub., Červený Újezd near Nýřany. — Hor.: The "hanging" coal seam of the Nýřany coal measure series. — Coll.: Geol. pal. dep. of the Nat. Mus., Prague. (Acc. n. 22083/1923, Dr. J. Šetlík.) — Nat. size.

Fig. 9. — *Lep. simile* KIDST. — Loc.: "Pankrác" at Nýřany. — Hor.: The whitish fire clays between the Upper and the Lower Radnice coal measures. — Coll.: Geol. pal. dep. of the Nat. Museum, Prague (Acc. n. 22157/1924). — Nat. size.

Fig. 10. — *Lep. simile* KIDST. — Loc. and hor. as in fig. 9. — Coll.: Geol. pal. dep. of the Nat. Mus., Prague (Acc. n. 23534). — Nat. size.

Tab. II. — Plate II.

Obr. 1. — *Lep. ophiurus* BGT. — Část exempláře vyobrazeného na tab. I, obr. 5, zvětšená $^3/_1$.

Obr. 2. — *Lep. ophiurus* BGT. — Část exempláře vyobrazeného na tab. I, obr. 6, zvětšená $^3/_1$.

Obr. 3, 4 a 5. — *Lep. sp. A* (aff. *Lep. dichotomum* ZEILLER). — Loc.: Doly Na Brantech (Ludvík) u Lubné (u Rakovníka). — Obz.: Keramické bělavé lupky („brus") sloje Ib lubenského pásma. — Coll.: Geol. pal. odd. Nár. musea, Praha. (Obr. 3 — Akc. č. 23544/1931, obr. 4 — Akc. č. 23608/1931, obr. 5 — Akc. č. 23543/1931.) — $^1/_1$.

Obr. 6. — *„Lepidodendron" selaginoides* STBG. — Dolení konec větve Sternbergova originálu *Lycopodiolites elegans* (1825: Tab. 16, obr. 2). — Loc.: Svinná u Radnic. — Obz.: Bělky a brousky ve stropu spodní radnické sloje. — Coll.: Geol. pal. odd. Nár. musea v Praze. (Inv. č. orig. 40.) — $^1/_1$. — Viz též tab. III, obr. 2.

Fig. 1. — *Lep. ophiurus* BGT. — Part of the specimen figured on Pl. I, fig. 5, enlarged about $^3/_1$.

Fig. 2. — *Lep. ophiurus* BGT. — Part of the specimen figured on Pl. I, fig. 6, enlarged about $^3/_1$.

Fig. 3, 4 and 5. — *Lep. sp. A* (aff. *Lep. dichotomum* ZEILL.) — Loc.: Colliery "Na brantech" (Ludvik) at Lubná (near Rakovník). — Hor.: Fire clay bed of the coal seam no. Ib of the Lubná coal measure series. — Coll.: Geol. pal. dep. of the Nat. Museum, Prague. (Fig. 3: Acc. n. 23544/1931; fig. 4: Acc. n. 23608/1931; fig. 5: Acc. n. 23543/1931.) — Nat. size.

Fig. 6. — *"Lepidodendron" selaginoides* STBG. — Lower part of Sternberg's type specimen of *Lycopodiolites elegans* (1825: Pl. 16, fig. 2). — Loc.: Svinná near Radnice. — Hor.: The bed of "brousky" and "bělky" ("Schleifsteine") in the roof of the Lower Radnice coal seam. — Coll.: Geol. pal. dep. of the Nat. Museum, Prague (Inv. n. 40). — $^1/_1$. — See also Pl. III, fig. 2.

Tab. III. — Plate III.

Obr. 1. — *„Lepidodendron" selaginoides* STBG. — Sternbergův original 1825, tab. 17, obr. 1. — Loc.: Svinná u Radnic. — Obz.: Bělky a brousky ve stropu spodní radnické sloje. — Coll.: Geol. pal. odd. Nár. musea, Praha. (Inv. č. orig. 42.) — Zmenšeno as $^1/_{2.5}$.

Obr. 2. — Cf.: *„Lepidodendron" selaginoides* STBG. — Sternbergův original *(Lycopodiolites elegans)* 1825. Tab. 16, obr. 2. — Loc. a obz. jako u obr. 1. — Coll.: Geol. pal. odd. Nár. mus., Praha. (Inv. č. orig. 40.) — Zmenšeno as $^1/_3$. (Viz též tab. II, obr. 6.)

Obr. 3. — *„Lepidodendron" selaginoides* STBG. — Loc.: „Pankrác" u Nýřan. — Obz.: Bělavé keramické lupky mezi svrchní a spodní radnickou slojí. — Coll.: Geol. pal. odd. Nár. musea, Praha. (Akc. č. 23534.) — Zmenšeno as $^1/_3$.

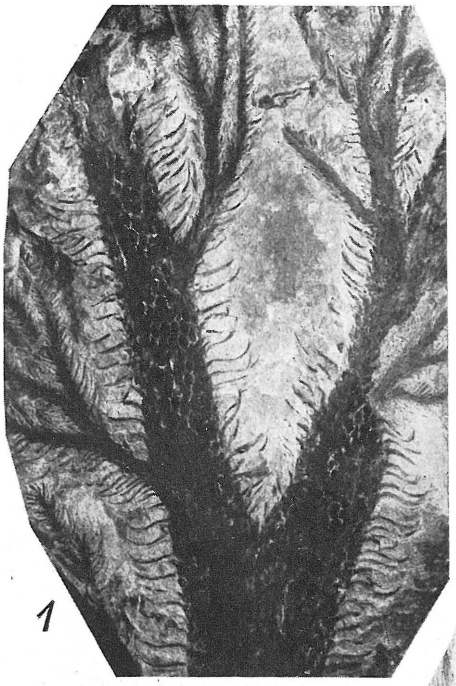
Fig. 1. — *"Lepidodendron" selaginoides* STBG. — Sternberg's type specimen 1825, Pl. 17, fig. 1. — Loc.: Svinná near Radnice. — Hor.: The bed of "bělky" and "brousky" ("Schleifsteine") in the roof of the Lower Radnice coal seam. — Coll.: Geol. pal. dep. of the Nat. Museum, Prague (Inv. n. 42). — About $^1/_{2.5}$ nat. size.

Fig. 2. — Cf.: *"Lepidodendron" selaginoides* STBG. — Sternberg's type specimen *(Lycopodiolites elegans)* 1825, Pl. 16, fig. 2. — Loc. and hor. as in fig. 1. — Coll.: Geol. pal. dep. of the Nat. Museum, Prague (Inv. n. 40). — About $^1/_3$ nat. size. (See also Pl. II, fig. 6.)

Fig. 3. — *"Lepidodendron" selaginoides* STBG. — Loc.: "Pankrác" at Nýřany. — Hor.: The whitish fire clays between the Upper and the Lower Radnice coal measures. — Coll.: Geol. pal. dep. of the Nat. Museum, Prague (Acc. n. 23534). — About $^1/_3$ nat. size.

Obr. 4, 5. — *Lepidodendron sp. B.* (aff. *L. jaraczewskii* ZEILL.) — Loc.: Malé Přílepy u Berouna. — Obz.: Proplast (bělavý) zv. „košile" ve spodní radnické sloji. — Coll.: Geol. pal. odd. Nár. musea, Praha. (Dr. J. Šetlík, 1921). — $^1/_1$.

Fig. 4, 5. — *Lepidodendron sp. B* (aff. *L. jaraczewskii* ZEILL.) — Loc.: Malé Přílepy near Beroun. — Hor.: The whitish interlayer "košile" of the Lower Radnice coal measure. — Coll. Geol. pal. dep. of the Nat. Museum, Prague (Dr. J. Šetlík, 1921). — Nat. size.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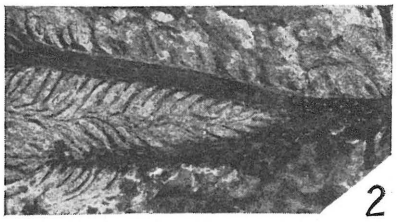
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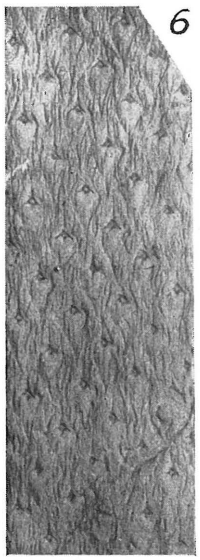
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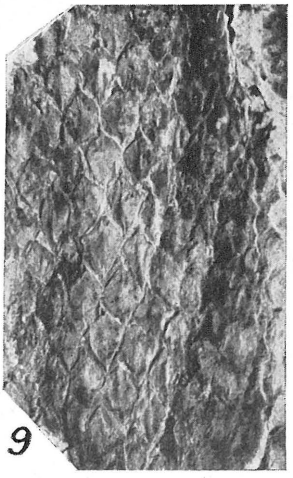
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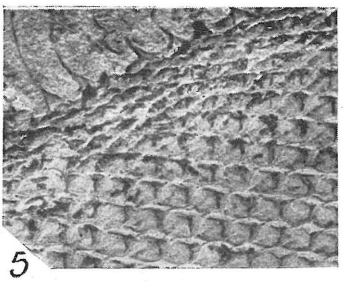
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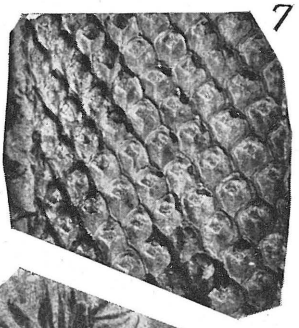
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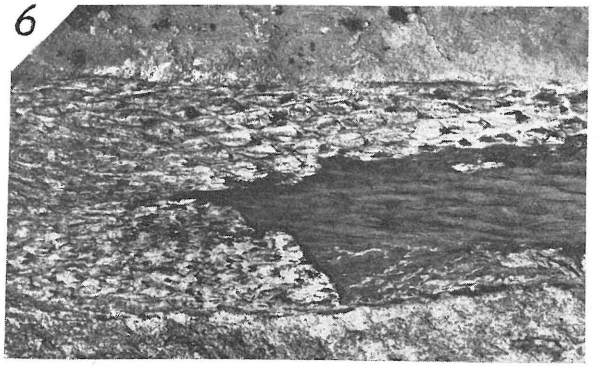
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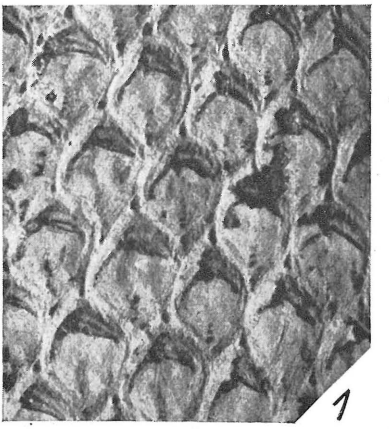
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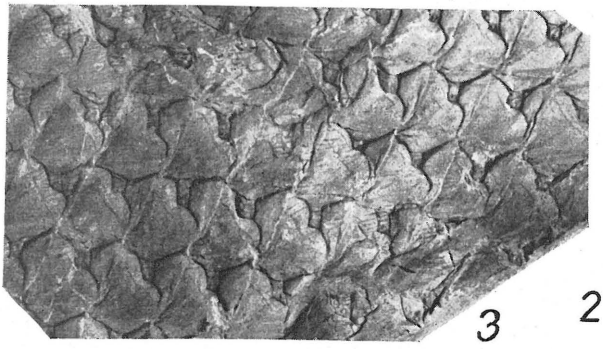
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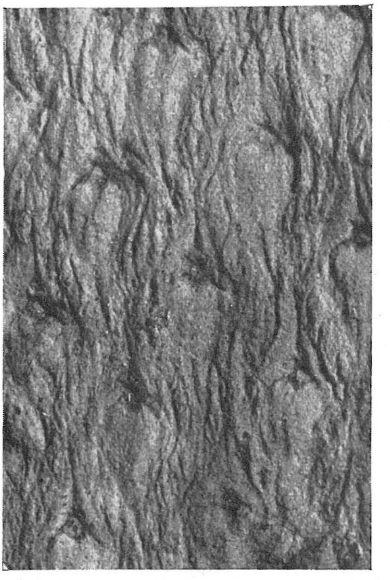

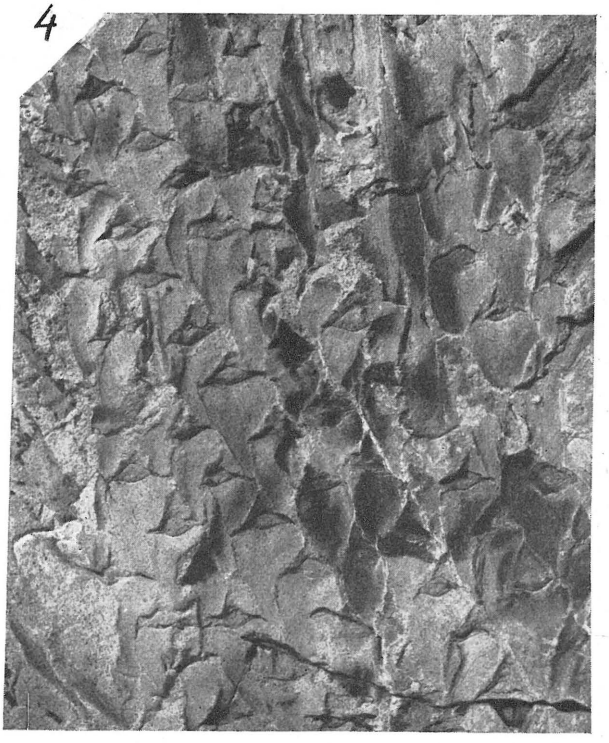
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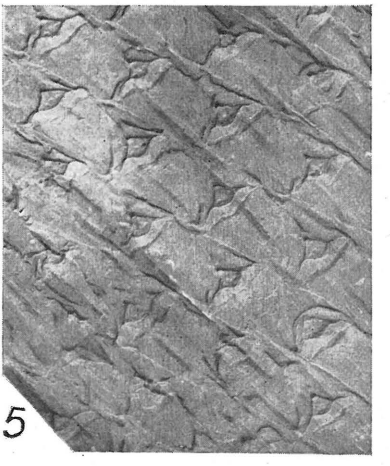
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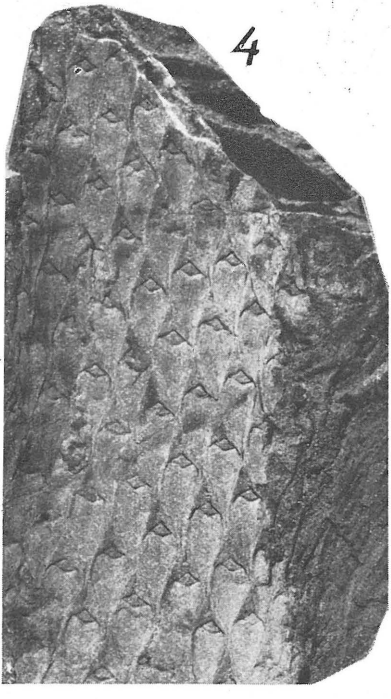
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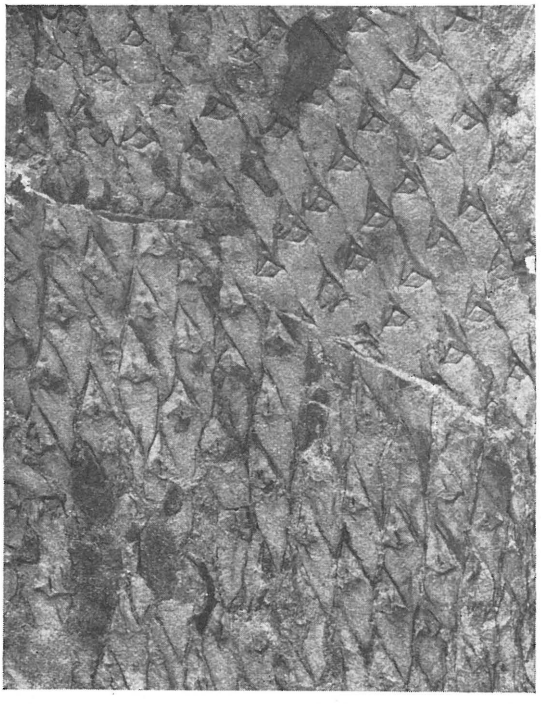
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