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FERDINAND PRANTL A BOHUSLAV RŮŽIČKA:

STRABA NOV. GEN., NOVÝ MLŽ Z ČESKÉHO DEVONU

STRABA NOV. GEN., A NEW DEVONIAN PELECYPOD FROM BOHEMIA

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Straba nov. gen., nový mlž z českého devonu

Straba nov. gen., новый пластинчатожаберный моллюск чешского девона

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Studiu ctenodontních mlžů českého staršího paleozoika bylo až dosud věnováno málo pozornosti. Vedle J. Barranda (1881), který se zmínil o některých formách ve svém klasickém díle o fauně *Barrandienu,* zabýval se jimi podrobněji vlastně jen L. Přab (1934). V této práci podáváme popis dalšího zajímavého rodu — *Straba* nov. gen., který pokládáme za nový a který současně považujeme za představitele zvláštní podčeledi *Strabinae* nov. subfam. uvnitř jednotné čeledi *Ctenodotnidae* Dall.

Popis a diskuse tohoto nového rodu dává nám současně příležitost, abychom se zmínili o některých závažných nedostatcích, s jakými jsou jednotlivé formy ctenodontních mlžů popisovány a vymezovány. Upozorňujeme zejména na nesprávné a nedostatečné charakterisování zámků, způsobu zahnutí nebo zakřivení zámkové plochy, typu vrcholu a typu svazu a pod., které nebývají v dosud podaných rodových i druhových diagnosách ctenodontních mlžů jednoznačně a správně charakterisovány. Navazujeme tak na připomínky, které v tomto směru podal i Th. Sorgenfrei (1936), H. G. Schenck (1936), MacNeil (1937) a jiní.

Rod *Straba* nov. gen., za jehož genotyp označujeme druh *S. bohemica* nov. spec., zahrnuje drobné mlže s klenutými, subovoidálními souměrnými miskami, s hladkým povrchem a drobnými, prosogyrními, mimostředně umístěnými vrcholy. Zámková plocha je lomená a její přední a zadní část svírá vždy zřetelný, tupý úhel (120—140°). Zuby ctenodontního typu. Jsou v přední části zámkové plochy výraznější a nepravidelnější, nežli v části zadní. Na levé misce přecházejí zuby nepřerušeně z přední části zámkové plochy do části zadní. Naproti tomu na pravé misce je tato souvislost zřetelně přerušena větší hlubokou zubní jamkou, která odpovídá zvětšenému zubu v misce levé. Svaz vnější, který někdy vniká svým spodním okrajem do zámkové plochy. Area nevyvi-

nuta. Průběh plášťové čáry znám jen nedokonale. Utvářením zámkové plochy, jejím lomením v tupém úhlu a charakteristickým ozubením liší se rod *Straba* nov. gen. od všech známých ctenodontních prvohorních mlžů, a proto jej blíže nesrovnáváme s ostatními, diagnosticky namnoze nepřesně vymezenými rody.

Uvnitř rodu *Straba* nov. gen. rozlišujeme pak tři samostatné podrody. Vedle typického podrodu — *Straba (Straba)* nov. subgen., jehož subgenotypem je genotyp celého rodu — *Straba (Straba) bohemica* nov. spec., rozeznáváme ještě podrod *Straba (Strabina)* nov. subgen. a *Straba (Strabiella)* nov. subgen.

První z nich, *S. (Strabina)* nov. subgen., jehož subgenotypem je druh *S. (Strabina) formosa* nov. spec., liší se od typického podrodu hlavně význačnou lištou, která se vytrácí na zadní straně vrcholu a která přechází přes zuby přední části zámkového okraje, aby vytvářela ve vnitřní části misky přepážku lemující vnější okraj předního svalového vtisku. Podrod *S. (Strabiella)* nov. subgen., jehož subgenotypem je druh *S. (Strabiella) holynensis* nov. spec., liší se od typického podrodu hlavně výraznými, složitými zuby v přední části zámkové plochy a j. znaky.

V středočeském středním devonu je rod *Straba* nob. gen. zastoupen celkem pěti druhy a to: *Straba (Straba) bohemica* nov. spec., *S. (Straba) barrandei* nov. spec., *S. (Straba) kettneri* nov. spec., *S. (Strabina) formosa* nov. spec. a *S. (Strabiella) holynensis* nov. spec. Všechny tyto druhy pocházejí z téhož obzoru vápenců chotečských — $g\gamma_2$ a z téhož naleziště. Jsou tedy přísně synpatrické a synchronní.

Podle našeho názoru jsou to formy vesměs více méně blízce příbuzné, které patří k stejnému základnímu morfologickému typu. Jejich morfologické rozlišení proběhlo však během kmenového vývoje již dříve, v důsledku různého přizpůsobování rozmanitým podmínkám vnějšího prostředí. Druhotným přizpůsobením témuž biotopu uplatnily se však u nich i tendence konvergentní, takže je můžeme považovat i za formy druhotně vývojově opět zblížené. Jsme si ovšem vědomi toho, že jednotná lithologická povaha vápenců chotečských — $g\gamma_2$ nevyjadřuje původní životní podmínky a že zjištěné společenstvo je pouze nekrocenosou.

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Изучению ктенодонтных пластинчатожаберных чешского древнего палеозоя до сих пор было уделено мало внимания. Кроме Ж. Барранда (1881), упоминавшего о некоторых формах в своем классическом труде о фауне *Баррандиена,* ими занимался более подробно лишь Л. Пфаб (1934). В этой статье мы подаем описание дальнейшего интересного рода — *Straba nov. gen.*, который считаем новым представителем особого подсемейства *Strabinae nov. subfam.* в среде семейства *Ctenodontidae* DALL. Описание и дискуссия этого нового рода дает нам также возможность упомянуть о некоторых важных недостатках, сопряженных с описанием и определением отдельных форм ктенодонтных пластинчатожаберных вообще. Мы обращаем внимание, главным образом, на направильную и недоста-

точную характеристику замков, формы изгиба или искривления замочной площадки, типа верхушки и связки и т. п., которые до настоящего времени в родовых и видовых диагнозах не излагались вполне правильно и безоговорочно. При этом мы подчеркиваем замечания, предложенные по этому поводу Ф. Соргенфрейем (1936), Х. Г. Шенкем (1936), Мак Нейлем (1937) и др.

Род *Straba nov. gen.*, генотипом которого мы считаем вид *S. bohemica nov. spec.*, объединяет мелких пластинчатожаберных со сводчатыми, субовоидными, симметрическими створками, с гладкой поверхностью и мелкими прозигирными эксцентрически расположенными макушками. Его замочная площадка изломлена, а ее задние и передние части образуют всегда заметный тупой угол (120—140°). Зубы ктенодонтного типа. В передней части замочной площадки они развиты более выразительно и менее правильно, чем в задней. На левой створке зубы переходят непрерывно с передней части замочной площадки в заднюю. Наоборот, на правой створке непрерывность заметно нарушена большой зубной ямкой, которая отвечает увеличенному зубу левой створки. Внешняя связка иногда проникает своим нижним краем в замочную площадку. Area отсутствует. Форма палиальной линии известна недостаточно. По образованию замочной площадки, её излому в тупом углу и характеру зубного аппарата род *Straba nov. gen.* хорошо отличается от всех уже известных ктенодонтных пластинчатожаберных палеозоя, а потому мы его не сравниваем подробно с остальными, во многих случаях недостаточно точно определенными родами.

В среде рода *Straba nov. gen.* мы различаем три самостоятельных подрода. Наряду с типичным подродом *Straba (Straba) nov. subgen.*, субгенотипом которого является генотип всего рода — *Straba (Straba) bohemica nov. spec.*, мы различаем еще подроды *Straba (Strabina) nov. subgen.* и *Straba (Strabiella) nov. subgen.* Первый из них, *Straba (Strabina) nov. subgen.*, субгенотипом которого является вид *S. (Strabina) formosa nov. spec.*, отличается от типичного подрода главным образом характерным ребрышком, которое исчезает на задней части верхушки и переходит через зубы передней части замочного края, образуя во внутренней части створки перегородку, окаймляющую внешний край переднего мускульного отпечатка. Подрод *S. (Strabiella) nov. subgen.*, субгенотипом которого является вид *Straba (Strabiella) holynensis nov. spec.*, отличается от типичного подрода главным образом выразительными сложными зубами в передней части замочной площадки и другими признаками. В среднечешском девоне род *Straba nov. gen.* представлен пятью видами, а именно: *Straba (Straba) bohemica nov. spec., S. (Straba) barrandei nov. spec., S. (Straba) kettneri nov. spec., S. (Strabina) formosa nov. spec.* и *S. (Strabiella) holynensis nov. spec.*

Все эти виды были обнаружены в одном и том же горизонте хотечских известняков $g\gamma_2$ и на одном и том же местонахождении — Голыне. Они являются, таким образом, вполне синпатричными и синхронными. По нашему мнению, все эти формы являются более или менее близкородственными и относятся к одному и тому же основ-

ному морфологическому типу. Их морфологическая диференциация произошла, однако, в течении типового развития уже раньше, как следствие приспособления к разным условиям внешней среды. В результате вторичного приспособления к условиям данного биотопа у них развилась, однако, конвергентная тенденция, и благодаря этому мы можем считать их формами вторично эволюционно сближенными.

Мы принимаем, конечно, во внимание, что однообразие литологического характера хотечских известняков не выражает первоначальных жизненных условий и что установленное нами сообщество является всего лишь некроценозом.

Перевод В. Денисенко

Straba nov. gen. a New Devonian Pelecypod from Bohemia

INTRODUCTION.

Little attention has been paid so far to the ctenodontid Pelecypods of the Early Paleozoic of Bohemia. Besides J. B a r r a n d e (1881), who mentioned many forms in his classical work, only L. P f a b (1934) has really dealt with them in any greater detail.

In the present paper we give the description of another genus—*Straba nov. gen.*—which we regard as new and which we consider at the same time the representative of a separate group—*Strabinae nov. subfam.* within the family *Ctenodontidae* D a l l.

The description and discussion of this new genus give us at the same time the opportunity to speak of what we consider to be some serious defects in the prevailing way in which the individual forms of ctenodontid Pelecypods and allied forms are defined and described. The generic diagnoses of the great majority of genera established up till now we regard as incomplete or imperfect because they do not sufficiently take into account all the characteristic distinguishing generic features. This inaccuracy in the generic and specific diagnoses then often causes different forms to be associated only according to the morphological resemblance of the valves and a general analogy in the structure of the dentition, while they are not phyletically more closely allied and belong to different genera or even groups.

The Shortcomings of Publications Dealing with the ctenodontid Pelecypods.

First of all we wish to draw attention to the advantages which in the description of fossil molluscs are offered by the use of a numerical expression of the shape of pelecypod valves in a rectangular system of coordinates and their graphical integration as proposed recently by M. D o p i t a & B. R ů ž i č k a (1953). The use of this method excludes

namely the possibility of distorting the true shape of the valves, which is unavoidable by the method of description hitherto used as well as by photographic or drawn reproduction.

In the generic diagnoses of many lamellibranchiats and especially of ctenodontid Pelecypods the character of the cardinal margin as a whole is often given incorrectly, without regard to the configuration of the individual teeth, as was pointed out already by Th. Sorgenfrei (1936), H. G. Schenck (1936), a. o. In many cases the type of dentition is mentioned only in general, and often this description is not accompanied by any adequate figuring, e. g. in the publications of L. Beushausen (1895) and many others. These reproductions are very often too schematic or also idealised, and do not do justice to the real character of the dentition. Usually also the adequate taxonomic value is not attached do the mode of curving and bending of the hinge plate. In many descriptions we often find only a mere statement, e. g. "hinge plate curved," etc.

Also the type of the beak is in the generic diagnosis not shown as it should be, so that at present we know in most ctenodonts and allied genera forms with all types of bending of the beak. In this respect it will in our opinion be quite indispensable to supplement and define the generic diagnoses given up till now. We think therefore that we are justified in saying that though such emendations in the generic diagnoses will necessarily bring about a breaking up of many existing genera of ctenodontid Pelecypods into further genera, it will at the same time also correct the prevailing views on their phylogeny and ontogenesis, and will also enable us to get nearer to their natural system. Finally, as pointed out especially by MacNeil (1937), also the configuration of the ligament is of value for judging of the taxonomic and phyletic relations between some taxodont Pelecypods. On the other hand an incorrect systematic valence is often attributed to the course of the pallial line which in fact is only an indicator of the ecology of these forms and cannot be regarded as a taxonomic phenomenon.

The objections raised above against the definition and description of the different fossil ctenodont forms apply of course also to the forms from the Early Paleozoic of Bohemia, to the classical work of Barrande as well as to the work of L. Pfab (1934). Also this last-mentioned, relatively recent work of L. Pfab (1934) shows many of the imperfections mentioned above. First of all L. Pfab, who bases his study on the publications of L. Beushausen, does not evaluate these publications critically, and the ctenodont genera from the Ordovician of Bohemia established by him (*Praeleda* Pfab, *Praenucula* Pfab, *Pseudocyrtodonta* Pfab) will in our opinion have to be revised, and their generic diagnoses supplemented. But in his paper L. Pfab rightly stresses the character of the dentition and the shape of the individual teeth. Quite incorrectly, however, he tries to schematise them, and to establish their evolution, or transition, from one type to another. Actually the development of the types of dentition and their mutual transitions are much more complicated and will require a more careful and longer study.

Terminological Notes

In this paper we have to use or to propose some new morphological terms which we use in our description of the forms of the genus *Straba nov. gen.*

First of all we distinguish between the *anterior hinge plate* and the *posterior hinge plate,* because the dentition of the anterior hinge plate differs from the dentition of the posterior hinge plate. Besides these two plates enclose together an angle, which seems to us to be an important criterion for the phylogenetic and ontogenetic evolution. For this angle we propose therefore the name of *hinge angle.* We believe that it will be possible to use these new terms with advantage not only in connection will all representatives of the family *Ctenodontidae* Dall but also in connection with the other families of taxodont lamellibranchiats close to it.

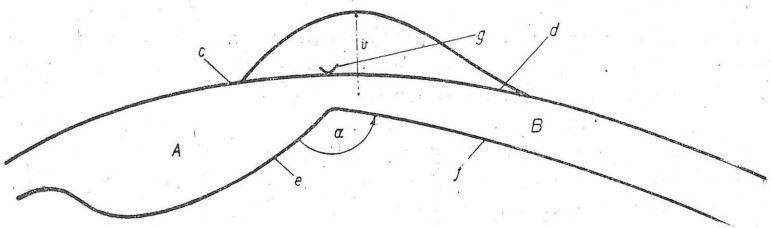

Fig. 1. — The diagrammatic picture of the beak and of the hinge plate in *Straba* nov. gen.
A — the anterior hinge plate, *B* — the posterior hinge plate, *C* — the upper margin of the anterior hinge plate, *D* — the upper margin of the posterior hinge plate, *E* — the lower margin of the anterior hinge plate, *f* — the lower margin of the posterior hinge plate, *f* — the lower margin of the posterior hinge plate, *g* — the oldest portion of the beak, *v* — the umbonal height, *α* — the hinge angle.

Further we propose the term and name *umbonal height,* by which we understand the distance between the highest point of the beak and its base, i. e. the place where the beak passes into the valve proper. Also this height with respect to the upper margin of the hinge plate can serve as an important guide for determining the phyletic relations.

The Preservation and Preparation of the Material.

The material here described derives from the Middle Devonian of Central Bohemia (Choteč Limestones — $g\gamma_2$) and was obtained by washing the so-called "*white beds*" of this complex in the vicinity of the village of Choteč, W of Prague. The term "*white beds*" is not a stratigraphical term in the Devonian of Bohemia. Collectors and geologists call by the above name, because of the characteristic whitish colouring, places where the Devonian limestones are in the immediate vicinity of dislocations more or less soft, decomposed and decalcified, so that

the well preserved small fossils can easily be detached from them by washing.

To the pelecypod valves and similarly to some other fossils there clings, however, rather firmly also after washing here and there decomposed rock material or organogenic detritus of other forms. This we removed by boiling the valves in concentrated KOH with following mechanical preparation. Because of the fragility and brittleness of the valves it was, however, not possible in all cases to remove the remnants completely, and thus to ascertain always the course of the pallial line and the posterior muscle impressions. Part of the valves is primarily incompletely preserved, with the ventral border broken off. The oldest and relatively most massive parts of the valves with the umbo and the hinge plate are best preserved. The dentition is mostly distinct and the individual teeth are well preserved.

On none of the specimens studied was the ornamentation of the outer surface of the valves preserved. Probably it was formed only by fine, concentrically arranged growth lines.

Ctenodontidae Dall, nov. emend.

Ctenodontidae Dall, 1913, nov. emend.

Type-genus: *Ctenodonta* S a l t e r, 1852, Niagaran, N. Y.

Diagnosis: Valves of nuculoid shape. The hinge plate forms either a smooth arc, or it is immediately below the umbo more or less sharply broken, so that the lower margins of the hinge plates join under a blunt hinge angle. The individual teeth are simply or compoundly broken, or also unbroken. The anterior row of teeth passes either gradually into the posterior row, or in the place on the right valves where the two rows meet there is a rather large socket which corresponds to an enlarged tooth in the right valve. The teeth of this valve then run continuously from the anterior hinge plate to the posterior hinge plate. Area lacking. The ligament is external or partly reaches with its inferior margin into the hinge plate. It is opistodetic, of alivincular type, without exterior resilium. Pallial line simple or sinupaliate.

Remarks and Relations: Our new genus *Straba nov. gen.* agrees in all fundamental features with the definition of this family, nevertheless we could not place it in it directly without supplementing the existing diagnosis in the way suggested above. At the same time we have also to propose the division of the family *Ctenodontidae* D a l l provisionally into two subfamilies, the typical subfamily *Ctenodontinae* (D a l l) and the new subfamily *Strabinae nov. subfam.* We remark in advance that on the basis of a more detailed analysis and revision of the other genera belonging to the family *Ctenodentidae* D a l l this family will inevitably have to be divided into further subfamilies.

Stratigraphical Distribution: The representatives of this family are known from the Ordovician to the Trias. With a query it is reported also from the Cambrian (*Ctenodonta* S a l t e r).

Strabinae nov. subfam.

Type-genus: *Straba nov. gen.* Middle Devonian, Bohemia.

Diagnosis: Small pelecypods of the family *Ctenodontidae* D a l l, characterised by an unequal dentition of the right and left valves. On the left valve the teeth of the anterior hinge plate are directly continued by the teeth of the posterior hinge plate, and the first tooth of the posterior hinge plate is strikingly enlarged, usually subcircular. On the right valve the teeth of the anterior hinge plate are separated from the row of teeth of the posterior hinge plate by a socket which corresponds to the enlarged tooth mentioned above of the left valve. The other teeth are usually simply, more rarely compoundly broken, or straight. Hinge plate under the umbo broken, so that anterior and posterior hinge plates enclose an obtuse angle. Area lacking. Ligament external, of alivincular type, without exterior resilium. Sometimes, however, it reaches partly with its inferior border into the hinge plate.

Remarks and Relations: The typical subfamily *Ctenodontinae* (D a l l) differs from the subfamily *Strabinae nov. subfam.* established above chiefly by the arcuately bent hinge plate and by the fact that on both valves the teeth pass from the anterior hinge plate to the posterior hinge plate. The individual teeth are usually simply, more rarely compoundly broken, or straight.

In the other features the two subfamilies approach each other very closely. They agree in the whole characteristically nuculoid shape of the valves as well as in the alivincular type of the ligament, without exterior resilium, and also in the other subordinate features.

In the original diagnosis of the family, and therefore also of the typical subfamily, there is further given as a characteristic feature the simple course of the pallial line. This is, however, not the rule according to our findings; besides we cannot ascribe to this feature due to ecological conditions the taxonomic valence of a distinguishing feature, as is well known, especially for higher taxa.

Stratigraphical Distribution: Up till now the representatives of this family have been ascertained only in the Middle Devonian of Bohemia.

Straba nov. gen.

Genotype, here designated, the species *Straba bohemica* nov. spec.

Derivatio nominis: Proper name *Straba* (Czech), the name of a Czech prophetess in Czech myth.

Stratum typicum: Middle Devonian (Choteč Limestones — $g_{\gamma 2}$).

Locus typicus: Holyně, W of Prague, Central Bohemia.

Diagnosis: Shell equivalve, more or less inequilateral, subovoidal, elongated, moderately arched, with a smooth surface. Beaks prosogyr, small, always impressive, placed excentrically in the anterior part of the valves. The umbonal height projects beyond the cardinal margin and with their oldest nuclear portion the beaks are sometimes arched over it. Anterior hinge plate short, lobately enlarged, posterior hinge plate elongated, narrower than the anterior one. Inferior borders of the

hinge plates meeting in a hinge angle of 120—140°. Teeth in the anterior hinge plate more impressive and more irregular than the teeth in the posterior hinge plate. They are straight, more or less simply but also compoundly broken. Teeth of the posterior hinge plate usually simply broken. On the left valve the row of teeth passes gradually from the anterior hinge plate to the posterior row. On the right valve this row is interrupted by a larger, deep socket corresponding to the first, enlarged tooth on the posterior hinge plate of the left valve.

The ligament is external, but sometimes penetrates with its inferior border into the hinge plate.

Of muscular impressions have been ascertained up till now only the anterior impression. It is of a subtrigonal to lobate shape and placed nearer the margin of the valves. The complete course of the pallial line could not be established. In the parts preserved of the valves this pallial line is fine, not too deep, without any prominent ridges.

The ornamentation of the outer surface of the valves was not ascertained with certainty. It seems to have been formed of fine concentric growth lines.

Remarks and Relations: The genus *Straba nov. gen.* differs by the characteristic configuration of the hinge plates, their hinge angle, and their dentition very markedly from all described ctenodont pelecypods known to us. Therefore we desist from giving any more detailed comparison with the other genera, of which many, as already said, need revision and new diagnostic definition.

Within the genus *Straba nov. gen.* we can distinguish according to the different configuration of the dentition three natural morphological groups, which we designate as separate subgenera because we regard these differences as taxonomically very important. Therefore we distinguish in addition to the typical subgenus *Straba (Straba) nov. subgen.* still the further subgenera *Straba (Strabina) nov. subgen.* and *Straba (Strabiella) nov. subgen.*

Stratigraphical Distribution: Middle Devonian, Central Bohemia.

Straba (Straba) nov. subgen.

Subgenotype, by subsequent designation of the genotype, *Straba (Straba) bohemica nov. spec.*

Stratum locusque typicum: Choteč Limestones — $g\gamma_2$, Middle Devonian, Central Bohemia.

Diagnosis: The representatives of this typical subgenus are especially characterised by their anterior hinge plate being relatively broad, lobate to irregularly rectangular. The teeth of this anterior hinge plate are usually straight, ridge-shaped, or they are stronger, ovoidal to subcircular and on some of them there is just a faint intimation of a simple break whose point is directed towards the beak of the valve. The teeth of the posterior hinge plate are as a rule regular, small, usually simply broken, with the points likewise directed towards the beak. The anterior teeth are rounded on the surface, the posterior teeth only moderately rounded to subtetragonal.

In the other features the subgenus *Straba (Straba) nov. subgen.* agrees with the definition of the whole genus.

Remarks and Relations: The subgenus *Straba (Strabina) nov. subgen.* established simultaneously is distinguished from this typical subgenus *S. (Straba) nov. subgen.* mainly by the morphologically characteristic, narrow ridge which peters out on the posterior side of the beak of the left valve, crosses the teeth of the anterior hinge plate, and forms in the inner part of the valve a ridge-like septum which delimits the inner margin of the anterior muscle scar. The other subgenus, *Straba (Strabiella) nov. subgen.* is distinguished from the typical subgenus mainly by the compound, impressive teeth in the anterior hinge plate, which in the subgenus *Straba (Straba) nov. subgen.* are replaced by ridge-shaped to subovoid, simple teeth with only an indication of a simple break.

In addition to the subgenotype *S. (Straba) bohemica nov. spec.* we reckon to this typical subgenus still two further species which we designate as *S. (Straba) barrandei nov. spec.* and *S. (Straba) kettneri nov. spec.*

Occurrence: The same as for the genus.

S. (Straba) bohemica nov. gen.

(pl. II, fig. 1—2, 5, pl. III, fig. 3—4)

Holotype, here designated, the specimen figured as fig. 1—2 on pl. II.
Derivatio nominis: bohemicus (L.) = named after the land of origin.
Stratum locusque typicum: Choteč Limestones — $g_{\gamma 2}$, Middle Devonian, Holyně, W of Prague, Central Bohemia.

Diagnosis: The holotype is a right, small, incomplete, transversally arched valve, extended almost in the length on the posterior side, of elliptical to subovoidal shape. Height about 4.5 mm. Length not measurable in view of the incompleteness of the specimen.

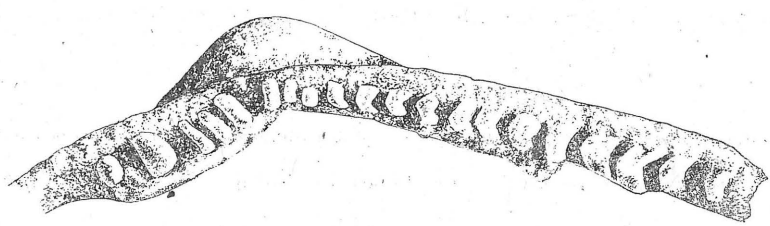

Fig. 2. — *Straba (Straba) bohemica* nov. spec. 16X, the beak and the dentition of the right valve.

The anterior border of the valve develops from the relatively short, moderately arched hinge line, and is formed by a broadly to tongue-like arched arc which passes gradually into the broadly curved border of the valve. The transition of the inferior border of the valve into its posterior border as well as its major part are not preserved.

The posterior hinge line is moderately arched, almost straight, incomplete in the youngest part.

The place of the maximum arching of the valve lies approximately in the first upper fourth of its height. The beak, even when well developed, is small, rounded at its highest point. Its oldest nuclear part is small, pointed. The beak is markedly prosogyr, moderately arched over the hinge line. It is placed excentrically, nearer the anterior border of the valve. The arched middle part of the beak passes gradually into the arching of the valve itself. The beak is separated from the anterior side of the valve by an impressive depression so that the limit between the beak and the side of the valve is sharp. From the posterior side of the valve the beak is separated only by a very shallow, slightly indicated depression so that it may be said to pass almost directly into this side without any perceptible limit.

The anterior hinge plate is short and encloses with the posterior hinge plate a hinge angle of about 130°. The inferior border of the anterior hinge plate is moderately arched and passes in a broad arc into the inner margin of the valve. It gives rather the impression of an elongated lobe than of a rectangle. Its length is about 1.3 mm., max. height about 0.5 mm.

The teeth rise distinctly from the anterior hinge plate. They are distinctly simple, unbroken. The first, the second and the third tooth are smaller, the fourth and the partly developed fifth tooth are again larger, stronger. Their cross section is rounded. They all decline in the direction towards the beak. The sockets of the first three teeth are narrow, deep, the following ones wide.

The teeth of the posterior hinge plate do not form the direct continuation of the teeth of the anterior hinge plate. There is a distinct socket between the two, which corresponds to a bigger tooth in the opposite valve.

The posterior hinge plate is relatively large. Its oldest teeth are small, simple, unbroken, with a tendency to decline towards the umbo. In cross section they are rounded. Beginning with the fourth tooth the teeth are simply broken, almost regular, with the points directed towards the beak. In contradistinction to the first three teeth they have, however, a very low, flattened cross section.

Area not developed. Ligament apparently external; it does not penetrate more distinctly the hinge line.

The muscle scars and the course of the pallial line are not visible in the holotype. The substance proper of the valves is preserved. It is very brittle, without any more perceptible ornamentation of the outer surface. Very fine concentrical growth lines alone are present.

The left valve figured as paratype on pl. II as fig. 5 is only incompletely known. Only the anterior hinge plate and the greater part of the posterior hinge plate are preserved. The left valve seems to have been relatively more arched than the right valve.

The inferior border of the anterior hinge plate has not been completely prepared in this left valve, so that it gives the impression as if it passed into the inferior margin of the posterior hinge plate in a continuous, even though only narrow arc. A thorough preparation could not be carried out in view of the great brittleness of the valve.

The upper margins of the hinge plates meet in a broad, continuous arc similarly as in the right valve.

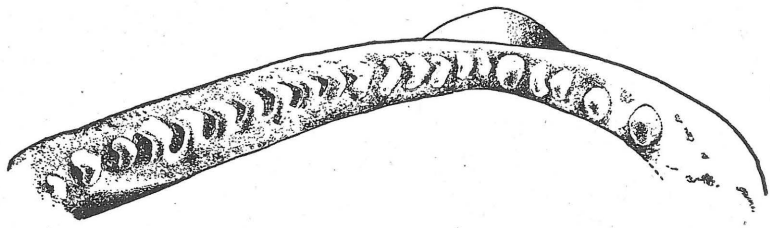

Fig. 3. — *Straba (Straba) bohemica* nov. spec. 16×, the beak and the dentition of the left valve.

The teeth of the anterior hinge plate are relatively strong and are placed nearer its lower margin. The first tooth is large, impressive, ovoidal, arched, and projects to a considerable extent above the hinge plate. The second and the third tooth are less impressive and show a moderate tendency to a simple break, with the points directed upwards. The fourth and the fifth tooth are again more impressive, subovoidal to subcircular, and protrude considerably above the hinge plate.

Remarks and Relations: Apart from the left and right valves (holotype and paratype) described above we had no other material at our disposal.

S. (Straba) bohemica nov. spec. is distinguished from the species *S. (Straba) barrandei nov. spec.* chiefly by the different shape of the beak and the unbroken, broader, more impressively rounded teeth in the anterior hinge plate. Also the whole shape of the valves is different in the two species. *S. (Straba) bohemica nov. spec.* has the valves more impressively elliptic, extended in the length in a backward direction, whereas *S. (Straba) barrandei nov. spec.* has shorter, subovoidal to subcircular valves, more extended in the height. *S. (Straba) kettneri nov. spec.* is characterised in contradistinction to the species *S. (Straba) bohemica nov. spec.* by a different total shape of the valves just as by the character of the beak and the different dentition.

Horizon and Locality: Choteč Limestones, $g\gamma_2$. Middle Devonian. Holyně, W of Prague, Central Bohemia.

S. (Straba) barrandei nov. spec.

(pl. I, fig. 1—6, pl. II, fig. 3—4, pl. III, fig. 1—2, pl. IV, fig. 2)

Holotype, here designated, the incomplete right valve figured here as fig. 1—2 on pl. I.

Derivatio nominis: Named in honour of J. Barrande, the founder of modern paleontology in Bohemia.

Stratum locusque typicum: Choteč Limestones — $g\gamma_2$, Middle Devonian, Holyně, W of Prague, Central Bohemia.

Diagnosis: The holotype is an incomplete, small, arched right valve, transversally extended to the posterior side, of subovoidal shape. Height 7 mm., lenght 9 mm. (We wish to mention that in the preparation the

posterior side of the valve broke off as shown in text fig. 5. The length of the valve was measured before this occurred on the almost complete specimen. The anterior border of the valve is broadly arcuate and passes almost uninterruptedly into the unflattened inferior border. In the place where the axis of maximum arching cuts the inferior hinge line is the centre of a relatively gentle arc which represents the extreme extension of the valve in a downward direction. This small arc passes into a straight line which forms the lower margin of the lower border of the valve. The latter then passes gradually into a small, tongue-shaped arc which forms the lateral extension of the posterior side of the valve. The posterior hinge line of the valve is moderately bent and develops gradually from the tongue-shaped arc of the lateral extension of the valve. When we judge the shape of the valve as a whole, then the anterior part of the valve from the imarginary axis of maximum arching shows more the character of an arc, whereas the lower side has more the shape of an ellipsis.

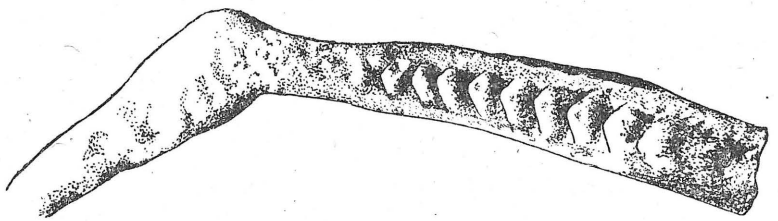

Fig. 4. — *Straba (Straba) barrandei* nov. spec. 16X, the beak and the dentition of the right valve.

Beak small, arched, rounded at the highest point. Its oldest, indistinct part is small, pointed, slightly prosogyr. The arching of the beak over the hinge line cannot be ascertained in the holotype. The height of the beak exceeds, however, distinctly the hinge line, though only slightly. The position of the beak is excentrical, approximately in the second fifth of the length of the valve, nearer its anterior side.

The arched middle part of the umbo passes gradually into the arching of the valve proper.

From the anterior as well as from the posterior side of the valve the beak is separated by only gentle and unimpressive depressions in the arching, without exterior groove or any more impressive furrow.

The anterior hinge plate meets with its inferior border the inferior border of the posterior hinge plate under an angle of about 130°.

The anterior hinge plate is relatively short, rectangular; in the holotype it is 1.5 mm. long and about 1.5 mm. high. The posterior hinge plate is in the holotype only incompletely preserved.

The teeth on the anterior hinge plate are indistinct. It seems, however, that they were ridge-shaped, with broad sockets. At a stronger magnification they seem to be gently simply bent, with the tips directed towards the beak of the valve. The teeth of the posterior hinge plate are in the oldest part, nearer the beak, likewise little distinct. They

seem to have been very small. From analogy to the later, better preserved teeth we conclude that they were likewise simply broken, with the tips directed towards the beak of the valve. The teeth preserved have the inferior arms longer than the upper arms, which are moderately reduced. In a cross section these teeth are rounded and protrude rather considerably over the hinge line proper.

Area not developed. The ligament is external and does not penetrate characteristicaly the hinge line. Muscle scars indistinct. Pallial line indistinct. In the places of the assumed anterior muscle scar there rises from the substance of the valve a regular, hemispheric ridge which seems to have supported the anterior adductor. The substance of the valve is preserved, very brittle, partly decalcified. The valve seems to have been decorated on the outer surface by fine concentric growth lines.

The right, likewise incomplete valve of this species is figured as paratype on pl. 6, fig. I.

The beak of this valve is more distinctly separated from the anterior side of the valve by a deeper depression in the arching. But even so no more impressive groove or furrow is developed.

Anterior hinge plate of the right valve well preserved.

Teeth for the larger part worn, but of a clearly ridge-shaped character. They are narrow, with broad sockets, placed almost perpendicular on the border of the hinge plate, gently and simply broken, with the points directed towards the umbo of the valve. The teeth of the posterior hinge plate are likewise worn and were indubitably ridge-shaped.

Pallial line and muscle scars indistinct. The semicircular ridge ascertained in the left valve in the place of the assumed anterior muscle scar is not visible in the right valve.

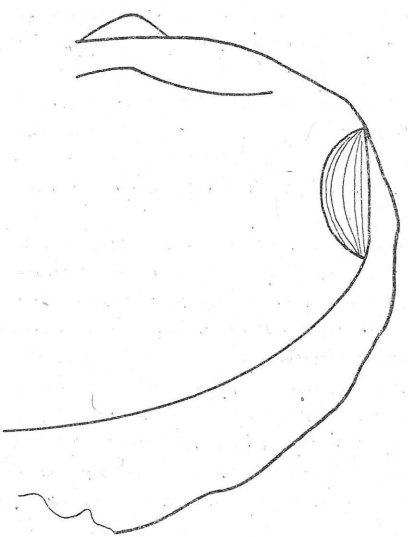

Fig. 5. — *Straba (Straba) barrandei* nov. spec. The left valve, showing the anterior muscle scar and the pallial line.

Remarks and Relations: In addition to the holotype and paratype described above we know still two further right valves which correspond completely to the description given above.

On another left valve a minute subtriangular anterior muscle scar is preserved, as figured in fig. 5.

The species *S. (Straba) barrandei nov. spec.* differs from the species *S. (Straba) bohemica nov. spec.* described above chiefly by the general shape of the valves, which in the latter species are more extended horizontally, more elliptic, whereas the valves of the species *S. (Straba) barrandei nov. spec.* are subovoidal to subcircular, more extended in height, so that their length is only by $^1/_6$ greater than their width. Also the beak is in this species less markedly prosogyr than in *S. (Straba) bohemica nov. spec.* Further differences between the two species have been mentioned already above.

The species *S. (Straba) kettneri nov. spec.* differs from the species here described chiefly by the shape of the beak, the arching of the valves, and the characteristic dentition, which is more reminiscent of the species *S. (Straba) bohemica* nov. spec.

The species *S. (Straba) barrandei nov. spec.* is by its general shape also rather reminiscent of the Ordovician form which J. B a r r a n d e [1881, pl. 272, III, fig. 9 (non 1—8, 10—16)] described under the name of *Nucula applanans,* B a r r. It differs, however, from it especially by the beak of B a r r a n d e's form being opistogyr, whereas the beaks of the species *S. (Straba) barrandei nov. spec.* are prosogyr. A further difference appears also in the dentition. J. B a r r a n d e's specimen has simply broken teeth, where the points of the teeth of the posterior hinge plate are directed towards the beak of the valve, whereas the points of the teeth of the anterior hinge plate are directed from the beak of the valve in the direction towards its anterior margin. The dentition of this form is thus formed by teeth uniformly oriented. L. P f a b (1934 — p. 222) placed it together with other specimens described under the same specific name in the typical subgenus *Ctenodonta (Ctenodonta)* S a l t e r, 1852. But he placed in the same subgenus besides opistogyr forms also prosogyr forms, i. e. forms whose dentition corresponds to an entirely different type. In S a l t e r's original diagnosis of the genus *Ctenodonta* S a l t e r, 1852, the type of the umbo is not given, just as the type of the dentition is not more accurately characterised. As neither L. B e u h a u s e n (1895) nor later authors supplemented the generic diagnosis of *Ctenodonta* S a l t e r in this sense, it will be necessary to subject it to a revision, to point out its differences from similar genera, and if necessary to establish separate subgenera within this genus.

Occurrence the same as that of the species *S. (Straba) bohemica nov. spec.*

S. (Straba) kettneri nov. spec.

(pl. II, fig. 6, 8, pl. IV, fig. 4)

Holotype, here designated, the incomplete right valve figured here as fig. 6 on pl. II.

Derivatio nominis: Named in honour of Academician R. Kettner, to whom we owe much of the progress of present-day Czech geology.

Stratum locusque typicum: Choteč Limestones — $g_{\gamma 2}$, Middle Devonian. Holyně, of Prague, Central Bohemia.

Diagnosis: The holotype is a small, arched, incomplete right valve, longitudinally extended posteriorly. Part of the anterior as well as of the posterior margin of the valve and its whole inferior margin are broken off. Thus its accurate shape and exact measurements cannot be given.

The preserved part of the anterior margin of the valve is moderately lobate and develops gradually from the relatively short, moderately arched anterior hinge line. The inferior margin of the valve as part of the posterior margin are broken off. The part preserved of the posterior margin is moderately arched, and though it passes gradually into the anterior margin it nevertheless gives the impression as if it came to a break at an obtuse angle close under the beak, in the place where the superior margins of the hinge plates meet.

The place of maximum arching of the valve is approximately in the middle of the preserved part of the valve.

The beak is small, arched, rounded in the highest nuclear part. It is distinctly prosogyr, and its oldest part is moderately bent over the hinge line. The height of the beak exceeds moderately but distinctly the hinge line it is only slightly shifted excentrically towards the anterior side of the valve. The arching of the beak on the anterior side passes gently into the arching of the valve proper.

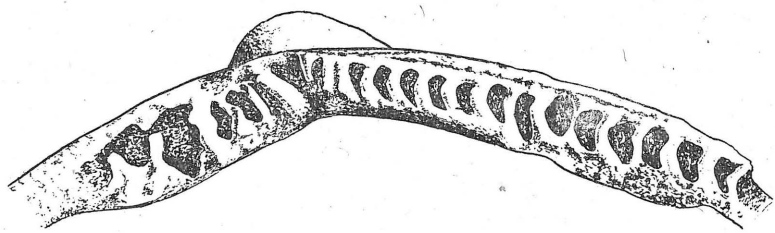

Fig. 6. — *Straba (Straba) kettneri* nov. spec. 16X, the beak and the dentition of the right valve.

The beak is separated from the anterior side of the valve by a deep furrow so that the limit between it and the valve is marked, sharp. A deep furrow separates the beak also from the posterior side of the valve, but at its margins this furrow passes gradually into the beak proper as well as into the posterior side of the valve.

The anterior hinge plate meets with its posterior margin the posterior margin of the posterior hinge plate under a hinge angle of about 140^0.

The anterior hinge plate is short, and its lower margin is moderately arched, almost straight, and passes in a gentle arc into the inner margin of the valve. The general shape of this anterior hinge plate is elongated lobate. In the holotype the anterior hinge plate is about 1.6 mm. long and at most 0.7 mm. broad. The posterior hinge plate is longer and narrower than the anterior hinge plate, and its lower and upper margins are parallel to each other.

The individual teeth of the anterior hinge plate are not quite distinct in the holotype. But they are indubitably narrow, ridge-like, irregularly broken, and their points are directed towards the beak of the valve. The sockets of the first four teeth are narrow and deep. The first tooth is stronger, simple, unbroken. The second and the third tooth are completely preserved; both are very narrow, ridge-like, simply broken. The fourth touth is stronger than the preceding teeth, with indications of being irregularly broken. The further teeth are too unfavourably preserved to allow of any accurate description. The surface of all teeth is corroded, with the exception of the fourth tooth, which is rounded.

The teeth of the anterior hinge plate are placed somewhat to the side of the length axis of the hinge plate and are somewhat nearer to its lower margin. The teethless margin of the anterior hinge plate is rounded. The upper margin is slightly, but distinctly broader than the lower margin.

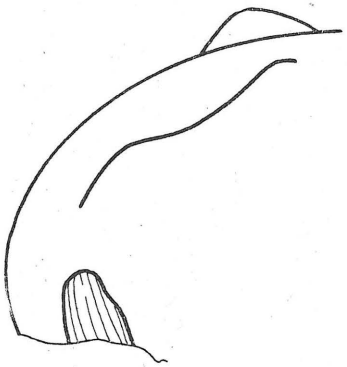

Fig. 7. — *Straba (Straba) kettneri* nov. spec. The right valve showing the anterior muscle scar and partially the course of the pallial line.

The teeth of the anterior hinge plate do not continue gradually to the posterior hinge plate. Between the two there is a deeper socket corresponding to a larger tooth in the opposite valve. The teeth of the posterior hinge plate are rather small and regularly arranged. The anterior teeth here are somewhat indistinct, in profile apparently flat or only moderately rounded. The first tooth of the posterior hinge plate is placed somewhat to the right of the oldest part of the beak, i. e. in the direction towards the posterior margin of the valve. It is very short, well developed, simple, unbroken. The two following teeth show only a moderate tendency towards a simple break, with the tips directed

towards the beak of the valve. The other teeth, as far as they are preserved in the holotype, are simply broken. On the whole it may be said that the teeth of the posterior hinge plate are less prominent than the teeth of the anterior hinge plate, and their upper arms are partly reduced. The teeth are situated in the middle of the posterior hinge plate and only moderately approached to its lower margin. The upper, teethless margin of the hinge plate is moderately arched. The lower, likewise teethless margin of the hinge plate is somewhat broader, almost flat. Two narrow, not too deep furrows are visible on it. The first of them runs out from under the beak, and after a short course ends in the hinge line. The second is visible already before the ending of the first furrow and runs subparallelly with the row of teeth. These furrows are indubitably the traces left of a partial penetration of the ligament into the hinge plate.

Area not developed. The greater part of the anterior muscle scar is preserved in the holotype. It is relatively large, lobate to elliptic. The course of the pallial line, just as the posterior muscle scar, are not preserved.

On another, likewise incomplete valve we can observe a beak similarly configurated as in the right valve just descibed. The dentition is, however, only imperfectly preserved. In the anterior hinge plate the first two teeth are indistinct. The following ones are small, simply broken, almost straight, ridge-like, with broad sockets. The transition of the teeth from the anterior hinge plate to the posterior hinge plate is obviously gradual, but cannot be studied more in detail because of the imperfect preservation. Also the teeth of the posterior hinge plate are only indistinctly preserved. It can only be said of them that they are small, minute, simply broken, and that their tips are directed towards the beak of the valve. Also the anterior muscle scar is rather indistinct. It rests, however, indubitebly in a very shallow pit. Pallial line indistinct.

Remarks and Relations: The species *S. (Straba) kettneri nov. spec.* is on the whole rather reminiscent of the species *S. (Straba) bohemica nov. spec.* described above. But it is distinguished from the latter by the arching of the valves as well as by the character of the dentition and the shape of the beak which is markedly separated from the surface of the valve proper.

Occurrence the same as of the preceding species.

Straba (Strabina) nov. subgen.

Subgenotype, here designated, the species *Straba (Strabina) formosa nov. spec.*

Derivatio nominis: Derived from the generic name *Straba* by changing the ending to *-ina.*

Locus stratumque typicum: Choteč Limestones — $g\gamma_2$. Middle Devonian. Holyně, W of Prague, Central Bohemia.

Diagnosis: Subgenus of the genus *Straba nov. gen.,* characterised by the following features: Anterior hinge plate relatively short, lobate, passing sharply into the inner margin of the valve. Here there rises from it a characteristic, morphologically striking narrow ridge which borders the anterior margin of the anterior muscle scar.

The teeth of the anterior hinge plate are strong, very distinct, subovoidal to subcircular in outline, with a rounded surface. Some of them show a moderate tendency to a simple break turned in the direction towards the umbo of the valve.

Anterior muscle scar subelliptical, relatively straight. Posterior muscle scar and pallial line unknown.

Remarks and Relations: This new subgenus is established on the species *S. (Strabina) formosa nov. spec.*, which we erect at the same time on the basis of the holotype, which is an incomplete left valve. Though we do not yet know the right valve of this species, which would supplement the diagnosis of this species and subgenus, we regard the characteristic features of the left valve mentioned above as sufficient for establishing a separate subgenus.

From the typical subgenus *Straba (Straba) nov. subgen.* as well as from the subgenus *Straba (Strabiella) nov. subgen.* the subgenus *Straba (Strabina) nov. subgen.* here established is distinguished by the morphologically characteristic, narrow ridge, which in the left valve gradually develops on the posterior side of the beak, passes the teeth of the anterior linge line, and forms in the inner part of the valve a ridge-like septum which delimits the inner margin of the anterior muscle scar.

Occurrence the same as of the typical subgenus.

Straba (Strabina) formosa nov. spec.

(pl. II, fig. 7, pl. IV, fig. 3)

Holotype, here designated, the incomplete left valve figured here as fig. 7 on pl. II.
Derivatio nominis: formosus (l.) = graceful, after its aspect.
Locus stratumque typicum: Choteč Limestones — $g_{\gamma 2}$. Middle Devonian. Holyně, W of Prague, Central Bohemia.

Diagnosis: Left, minute, incomplete valve, with part of the inferior and posterior margins broken off. The anterior margin develops gradually from the short, almost straight, only moderately arched hinge line. It has the shape of a well arched, rather narrow lobe. The transition from the anterior margin to the incompletely preserved inferior margin of the valve is gradual. The preserved anterior part of the valve is therefore as a whole broadly elliptical in outline. The place of the maximum arching is approximately in the first third of the assumed total height of the valve.

Beak small, arched, rounded at the highest point. Its oldest, nuclear portion very small, pointed. The exact position of the beak cannot be accurately determined because of the incompleteness of the valve. It seems, however, to have been moderately excentrical and shifted towards the anterior side of the valve.

The arching of the middle part of the beak passes gradually into the arching of the valve proper. The height of the beak exceeds distinctly though only slightly the hinge line. The beak is separated from the anterior side of the valve by a deep furrow which forms only a gradual bend in the arching of the valve. A similar, still gentler bend in the arching separates the beak from the posterior part of the valve.

Hinge angle about 120°. Anterior hinge plate relatively short, close under the beak rather narrow, then lobately broadened. It passes sharply into the interior margin of the valve, and thus forms a morphologically prominent ridge which borders the inner margin of the anterior muscle scar. The length of the anterior hinge plate, measured to the point where it passes into the inner margin of the valve is in the holotype 1.8 mm. Its maximum height is about 0.5 mm.

Posterior hinge plate not too broad, with an almost straight inferior margin.

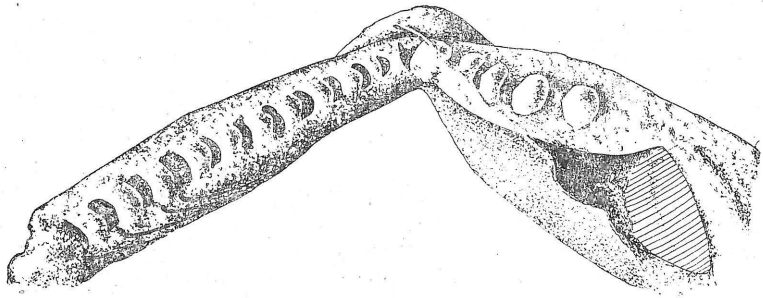

Fig. 8. — *Straba (Strabina) formosa* nov. spec. 16×, the beak and the dentition of the left valve.

The individual teeth of the anterior hinge plate distinct, strong, with a rounded surface, and morphologically rising above the hinge plate. The upper, teethless, part of this hinge plate, which continuously broadens in the direction from the beak, is flat, not furrowed. First tooth rather large, subovoidal to subcircular, characteristically prominent, placed close under the umbo. Second and third tooth much narrower, with a tendency to a simple break, with the points directed towards the umbo. The lower branches of these teeth as compared with the upper branches are rather considerably reduced. The sockets are rather deep, regular. Fourth and fifth tooth again more marked than the two preceding teeth. They have slightly indicated points directed towards the beak of the valve.

Anteriorly to the anterior hinge plate there runs a morphologically characteristic, narrow ridge which peters out in the posterior side of the beak. It passes the upper part of the first tooth, the lower branch of the second and third tooth, and penetrates farther into the inner part of the valve. Here it forms a ridge-lige septum which delimits the inner margin of the anterior muscle scar. Then it peters out in the inner part of the valve.

The teeth of the posterior hinge plate are tiny, fairly regular, placed approximately in its length axis. They rise only moderately above the hinge plate. They are simply broken, and their points are directed towards the beak. The sockets are likewise small, regular. Oblique furrows directed towards the beak run out on the inner side of the hinge plate from the youngest sockets.

In about the middle of the preserved length of the hinge line we

see on the inner side of the valve a short, fairly broad ridge, which begins under the posterior hinge plate and after a short course peters out again in the concavity of the inner valve. But it is not visible on the outer side of the valve.

The anterior muscle scar is subelliptical, relatively straight. It is delimited on its inner side by a ridge-like septum starting from the beak, and on the other side by a morphologically striking ridge which originates by the sharp setting-in of the lower margin of the anterior hinge plate on the inner margin of the valve.

Posterior muscle scar, pallial line, and the whole right valve unknown.

Occurrence as in the preceding species.

Straba (Strabiella) nov. subgen.

Subgenotype, here designated, the specices *S. (Strabiella) holynensis nov. spec.*

Derivatio nominis: The name is derived from the generic name *Straba* by changing the ending to *-iella.*

Locus stratumque typicum: Choteč Limestones — $g_{\gamma 2}$. Middle Devonian. Holyně, W of Prague, Central Bohemia.

Diagnosis: Subgenus of the genus *Straba nov. gen.,* which is oharacterised by the following features: Anterior hinge plate relatively short, tongue-shaped. Posterior hinge plate straight, elongated. Teeth of the anterior hinge plate remarkably broad, subtetragonal in outline, markedly simply and compoundly broken. The points of the simply broken teeth as well as the middle points of the more compoundly broken teeth are directed towards the beak of the valve.

The teeth of the posterior hinge plate are likewise simply or also compoundly broken, and their tips are also directed towards the umbo of the valve.

Remarks and Relations: We establish this subgenus on the species *S. (Strabiella) holynensis nov. spec.,* known up till now only from the holotype, which is an incomplete right valve. Nevertheless we regard the characteristic dentition of this form as a sufficiently evidential distinguishing character for the establishment of a separate subgenus.

From the typical subgenus *Straba (Straba) nov. subgen.* this new subgenus is distinguished especially by its marked and compound teeth in the anterior hinge plate. These teeth are in the subgenus *Straba (Straba) nov. subgen.* ridge-like to lamellar, more or less straight, with an only slightly marked tendency to a simple break. In the subgenus *Straba (Strabiella) nov. subgen.* they are on the contrary remarkably broad, usually subtetragonal in outline, and characteristically simply and compoundly broken.

Also from the subgenus *Straba (Strabina) nov. subgen. Straba (Strabiella) nov. subgen.* is distinguished by its dentition on the anterior hinge plate. In the latter subgenus the teeth are ovoidal or subcircular in outline, and only some of them show an indication of a tendency to a simple break. The subgenus *Straba (Strabiella)* further lacks an inner ridge-like septum, which is so characteristic for *S. (Strabina) nov. subgen.* whereas the well-preserved hinge line of the right valve of the

species *S. (Strabiella) holynensis nov. spec.* does not indicate the existence of such a septum in the opposite valve.

Occurrence as in the preceding forms.

Straba (Strabiella) holynensis nov. spec.

(pl. I, fig. 7, pl. IV, fig. 1)

Holotype, here designated, the incomplete right valve figured here as fig. 7 on pl. I.

Derivatio nominis: Name derived from the name of the locality — *Holyně.*

Locus stratumque typicum: Choteč Limestones — $g_{\gamma 2}$. Middle Devonian. Holyně, W of Prague, Central Bohemia.

Diagnosis: Small, incomplete right valve, transversally extended to the posterior side, of subovoidal outline. Height of the holotype 6.2 mm., length 7.5 mm. Anterior margin of the valve broadly arcuate, passing gradually into the unflattened lower margin of the valve. Approximately in the place where this margin is cut by the axis of maximum arching it turns relatively sharply upwards towards the posterior margin of the valve, which, however, is not preserved in the holotype.

The place of maximum arching is approximately in the middle of the total height of the valve. Beak minute, markedly arched, rounded at the highest point. Its oldest nuclear portion is pointed. Beak characteristically prosogyr, moderately bent over the hinge line, but its height exceeds considerably the hinge line. It is situated excentrically nearer the anterior margin of the valve. From the anterior part of the valve the beak is separated by a deep, sharp indenture which, however, does not pass into the valve proper. From the posterior part of the valve the beak is separated by a deep, rounded depression whose margins pass gradually into the posterior part of the valve and into the beak.

Hinge angle about 140°. Anterior hinge plate relatively short, tongue-shaped. Its length is in the holotype 1.6 mm., max. height about 0.6 mm. The posterior hinge plate has been only incompletely preserved.

On the anterior hinge plate are five rather irregular teeth. The first, third and fourth are much more strongly developed than the second and fifth. First tooth simply broken, with a partly reduced upper branch. Its point is directed towards the beak. The second to fifth teeth are threefold broken, of W-shape. The middle points of these teeth are likewise directed towards the beak.

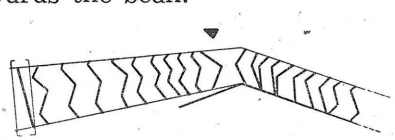

Fig. 9. — *Straba (Strabiella) holynensis* nov. spec. The diagrammatic picture of the dentition in the anterior and posterior hinge plate.

As the appended diagrammatic figure shows the course of the bending of the teeth is not at all regular, and thus it cannot be said that the shape of one tooth conditions the configuration of the following tooth.

The teeth of the posterior hinge plate are smaller. Of the five teeth preserved the first four are sharply broken, with the points directed towards the beak. The fifth tooth is broken twice. Here too there is nothing to indicate that the configuration of one tooth would influence the configuration of the following tooth.

The outline of the teeth in the anterior and in the posterior hinge plate is subtetragonal. Area lacking. The ligament is external and penetrates only partly the posterior hinge plate. Its lower margin is here situated in a narrow, not too deep furrow. This furrow opens close under the beak, and runs almost parallel with the upper limit of the teeth of the posterior hinge plate. Close before its opening it broadens somewhat. Thus it forms a small depression which is below delimited by two minute ridges which develop from the upper margin of the anterior and of the posterior hinge plate. Their function was obviously to support the lower margin of the ligament.

Anterior muscle scar impression indistinct. Pallial line unknown as the very brittle mass of the valve does not allow the complete removal of the rock matrix on its inner side.

Outer side of the valve smooth, without any traces of a surface ornamentation.

Remarks and Relations: The holotype described above of the species *Straba (Strabiella) holynensis nov. spec.* is reminiscent by the general shape of the valve of the species *Nucula contrastans* Barrande (1881, pl. 271, II, fings. 9—11). But it is distinguished from this Ordovician species by having the beak shifted nearer to the middle of the hinge line, a neotypic anterior margin of the valve, and a curving of the lower margin of the valve into a gentle arc. The posterior margin of the valve, which is broken off in the holotype, was apparently broadly extended in tongueshape. The posterior margin of Barrande's species forms in contradistinction to this a broad arc. The beaks of both forms are prosogyr considerably similar.

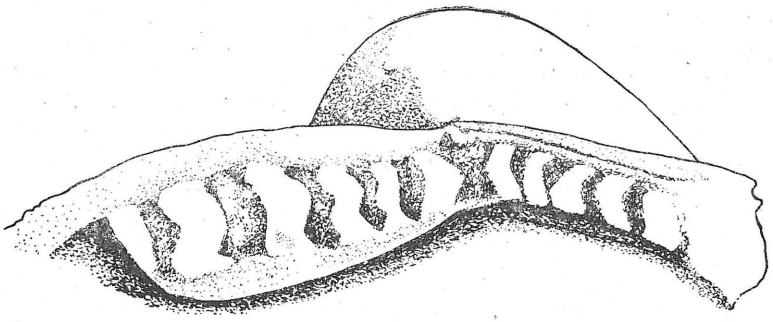

Fig. 10. — *Straba (Strabiella) holynensis* nov. spec. 16X. The beak and the dentition of the right valve.

M. Neumayer (1891) later placed this species to his genus *Myoplusia* Neumayer, and recently L. Pfab (1834) lists it among the representatives of his genus *Praeleda* Pfab. Simultane-

ously he placed to Barrande's species *N. contrastans* also his further species, *Nucula applanans* Barrande (1881 — 273, III, figs. 13—16, non 1—12) as its partial synonym.

The genus *Praeleda* Pfab (1934), whose genotype is the species *Nucula compar* Barrande, 1881, is in our opinion based on an insufficient generic diagnosis. It is obvious from the diagnosis that the author places to the same genus forms which only resemble each other by the general shape of their valves, but which really have no closer phyletic affinity. Thus he places to his genus forms whose outline of the valves is "... Ctenodonta-artig oder, wie *Leda,* das Hinterende immer mehr oder wenig verlängert. Mantelbucht immer vorhanden. Wirbel prosogyr oder opistogyr...". Thus the position of the genus *Praeleda* Pfab cannot be regarded as real, as specimens of the same genus cannot have already from a phyletic point of view once prosogyr and once opistogyr beaks. In the description of the genotype of the genus *Praeleda* Pfab further says that the species *Praeleda compar* (Barr.) has "... den Wirbel vor der Mitte gelegen, dorsoventral eingerollt, oder höchstens mit fast unmerklicher Drehung zum hinteren Schalenende...". Thus, however, he shows at the same time that he places in his group *Praeleda* Pfab simultaneously, and really in the first place, forms whose beaks are almost orthogyr. It will therefore be necessary to supplement and correct the generic diagnosis of the genus in question, and at the same time it will also be necessary to separate the forms with prosogyr and epistogyr beaks into separate subgenera and genera, or to transfer them to other genera already previously established. The separation of these forms from the genus *Praeleda* Pfab is also necessary because they have an entirely different type of dentition. According to L. Pfab (1934, p. 231) the forms placed by him to this genus have two different types of dentition. In the first type, which is developed also in the genotype of the genus, the individual teeth are composed of two branches which meet in an almost right angle. Their points are here directed towards the anterior side of the hinge plate as well as to the posterior part towards beak of the valve.

In the second type, which is developed also in the species *N. applanans* Barr., the points of the teeth are also directed in the posterior hinge plate towards the beak of the valve, but the teeth of the anterior hinge plate are developed only as simple, unbroken ridges whose tips are inclined towards the beak of the valve. The author's assumption that the simple, unbroken teeth of the anterior hinge plate were formed by evolution, i. e. by the reduction of the upper branch of originally broken teeth whose tips were directed towards the beak of the valves, does not seem justified in this case, as we do not know of any transitions in this type which would indicate this. On the contrary according to our findings it is the lower branches of the broken teeth which show a tendency to reduction, not the upper branches.

Similarly as the type of the dentition is not clearly defined, so also the type of its ligament is not clearly established for the genus *Praeleda* Pfab, though H. G. Schenck (1936), MacNeil (1937) a. o. have emphasised its taxonomic importance for the taxodont pelecypods.

According to the original generic diagnosis the ligament is of two types within the genus *Praeleda* P f a b. I. "Mit äusserem Band und Mantelbucht, II. mit beginnender Bandeinwanderung und Mantelbucht". The bend mentioned of the pallial line is, however, not proved in type II, but as the author says, is "... in Analogie zur *Praenucula* wahrscheinlich".

All these facts entitle us to the opinion that the genus *Praeleda* P f a b, 1934, is in reality only an artificial assemblage of heterogenous forms which taxonomically belong to different, phyletically unrelated genera and subgenera.

Occurrence the same as for the species described above.

CONCLUSIONS

All species described above of the genus *Straba nov. gen. [i. e. Straba (Straba) bohemica nov. spec., S. (Straba) kettneri nov. spec., S. (Straba) barrandei nov. spec., Straba (Strabina) formosa nov. spec.,* and *S. (Strabiella) holynensis nov. spec.)* derive from the same horizon of the C h o t e č L i m e s t o n e s — $g\gamma_2$ (Middle Devonian) and from the same locality (Holyně, W o f Prague). They are therefore all strictly synpatric and synchronic.

In our opinion they are forms which are throughout very closely allied and which belong to one basic morphological type. Their morphological differentiation apparently took place, however, already earlier by phyletic differentiation in consequence of different adaptation to different external life-conditions. By secondary adaptation to life in the same biotop later also convergent tendencies manifested themselves in these forms so that we can regard them also as forms evolutionally again secondarily approached to each other. In their synpatric and synchronic occurrence we see therefore an example of an old convergence of some allied taxodont Devonian pelecypods which took place already in the Devonian. We are of course aware that the uniform lithological character of the limestone-matrix does not express the original ecological life-conditions, and that the association ascertained is only a necrocenosis.

The approximate general picture of the formal assemblage has been refer the reader. We wish to remark that a similar simultanous occurrence of independent though more or less very closely allied forms was ascertained in this locality and in this horizon also in some other animal groups, e. g. in the gastropods, as proved by the occurrence described by R. H o r n ý (1954) of three closely allied species of the genus *Palaeozyga* H o r n ý, or of two species of the genus *Devonozyga* H o r n ý, etc. It is not excluded that also in these cases we have secondary evolutional convergence.

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EXPLANATION OF THE PLATES

Plate I.

Fig. 1. — *Straba (Straba) barrandei* nov. spec. 8×. The inner side of the right valve.
Fig. 2. — *Straba (Straba) barrandei* nov. spec. 8×. The outer side of the right valve.
Fig. 3. — *Straba (Straba) barrandei* nov. spec. 8×. The same, dammaged.
Fig. 4. — *Straba (Straba) barrandei* nov. spec. 8×. The outer side of the left valve.
Fig. 5. — *Straba (Straba) barrandei* nov. spec. 8×. The inner side of the left valve.
Fig. 6. — *Straba (Straba) barrandei* nov. spec. 8×. The inner side of the right valve.
Fig. 7. — *Straba (Strabiella) holynensis* nov. spec. 8×. The inner side of the right valve.

The horizon and locality of all the specimens figured here: Choteč Limestones — $g\gamma_2$. Middle Devonian. Holyně, W. of Prague, Central Bohemia.

Plate II.

Fig. 1. — *Straba (Straba) bohemica* nov. spec. 8×. The right valve, outer side.
Fig. 2. — *Straba (Straba) bohemica* nov. spec. 8×. The outer side of the right valve.
Fig. 3. — *Straba (Straba) barrandei* nov. spec. 8×. The inner side of the right valve.
Fig. 4. — *Straba (Straba) barrandei* nov. spec. 8×. The outer side of the right valve.
Fig. 5. — *Straba (Straba) bohemica* nov. spec. 8×. The inner side of the left valve.
Fig. 6. — *Straba (Straba) kettneri* nov. spec. 8×. The inner side of the right valve.
Fig. 7. — *Straba (Strabina) formosa* nov. spec. 8×. The inner side of the right valve.
Fig. 8. — *Straba (Straba) kettneri* nov. spec. 8×. The inner side of the right valve.

The horizon and the locality of all the specimens figured here: Choteč Limestones, $g\gamma_2$, Middle Devonian. Holyně, W. of Prague, Central Bohemia.

Plate III.

Fig. 1. — *Straba (Straba) barrandei* nov. spec. 11×. The beak and the dentition of the right valve.
Fig. 2. — *Straba (Straba) barrandei* nov. spec. 11×. The beak and the dentition of the left valve.
Fig. 3. — *Straba (Straba) bohemica* nov. spec. 11×. The beak nad the dentition of the right valve.
Fig. 4. — *Straba (Straba) bohemica* nov. spec. 11×. The beak and the dentition of the left valve.

The horizon and the locality of all the specimens figured here: Choteč Limestones, $g\gamma_2$, Middle Devonian. Holyně, W. of Prague, Central Bohemia.

Plate IV.

Fig. 1. — *Straba (Strabiella) holynensis* nov. spec. 11×. The beak and the dentition of the left valve.
Fig. 2. — *Straba (Straba) barrandei* nov. spec. 11×. The beak and the dentiton of the right valve.
Fig. 3. — *Straba (Strabina) formosa* nov. spec. 11×. The beak and the dentition of the right valve.
Fig. 4. — *Straba (Straba) kettneri* nov. spec. 11×. The beak and the dentition of the left valve.

The horizon and the locality of all the specimens figured here: Choteč Limestones, $g\gamma_2$. Middle Devonian. Holyně, W. of Prague, Central Bohemia.

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REDAKTOR IVAN KLÁŠTERSKÝ

F. Prantl a B. Růžička:

STRABA NOV. GEN., NOVÝ MLŽ Z ČESKÉHO DEVONU
STRABA NOV. GEN., A DEVONIAN PELECYPOD FROM BOHEMIA

V květnu 1954 vydalo svým nákladem v počtu 1100 výtisků Národní museum v Praze
Vytiskl Knihtisk, n. p., základní záv. 01 v Praze III - Cena brožovaného výtisku 12,70 Kčs
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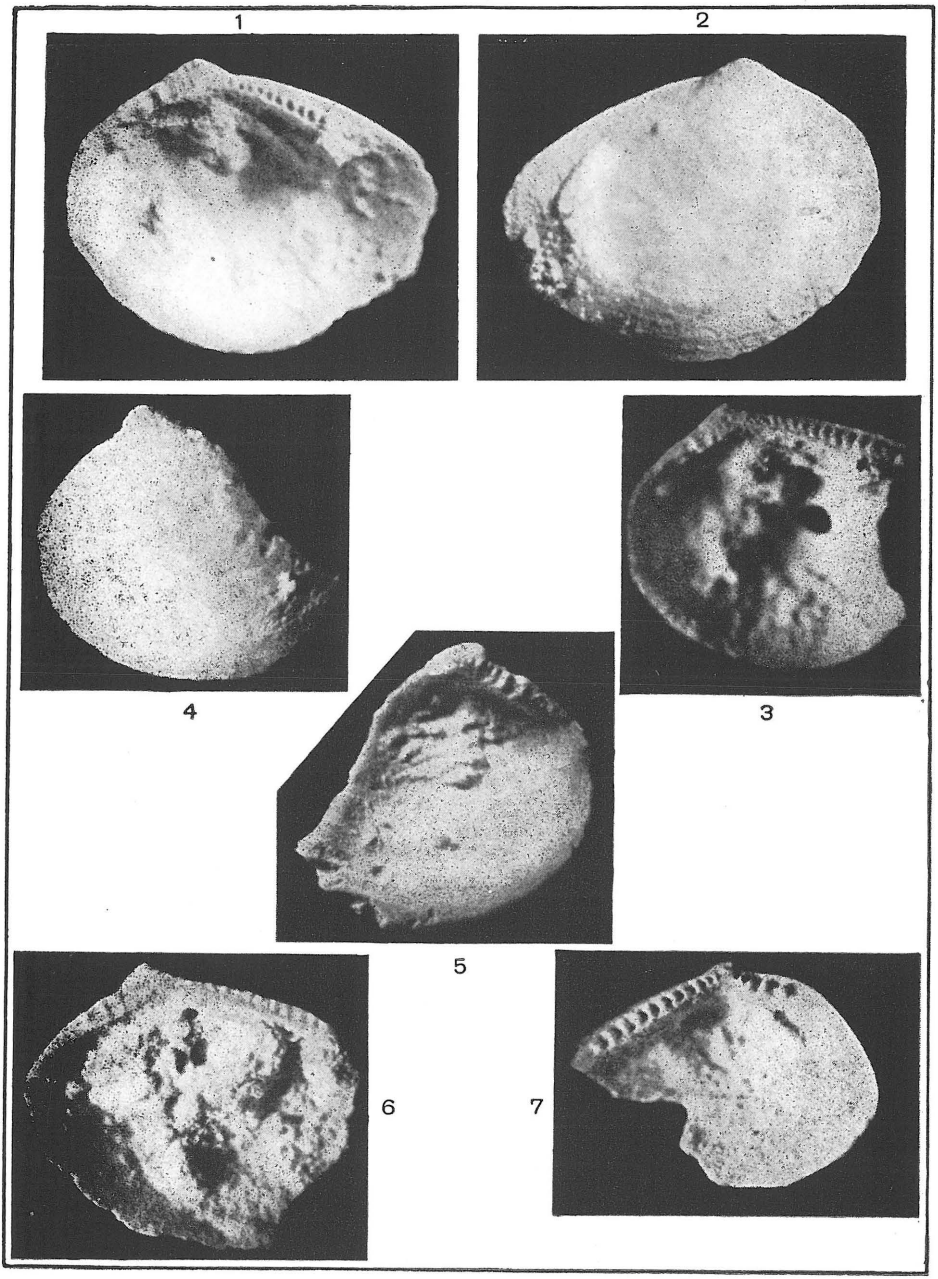
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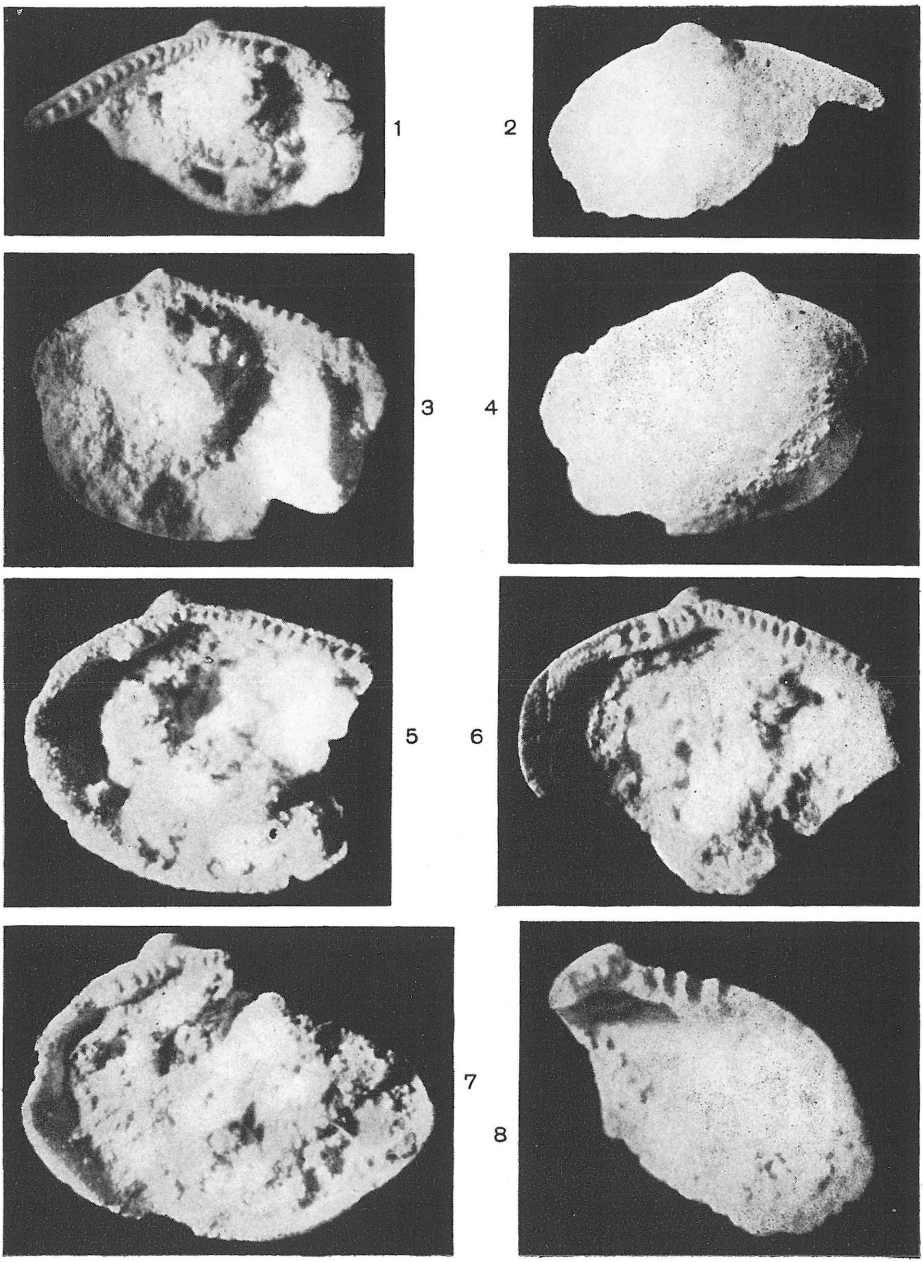
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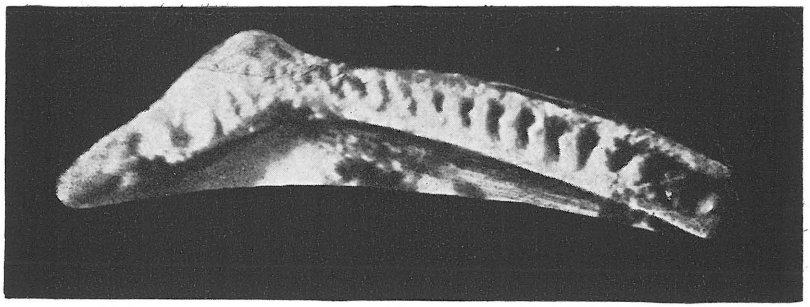

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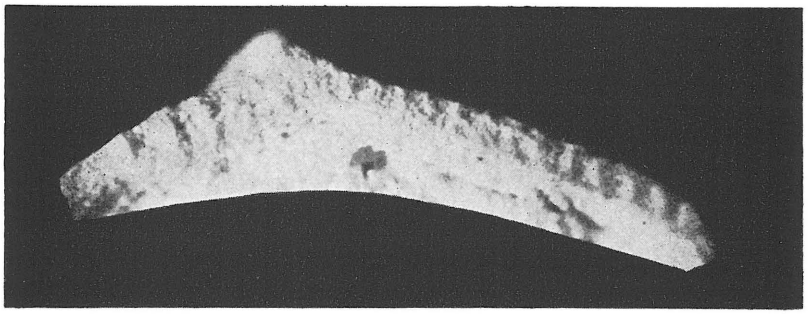

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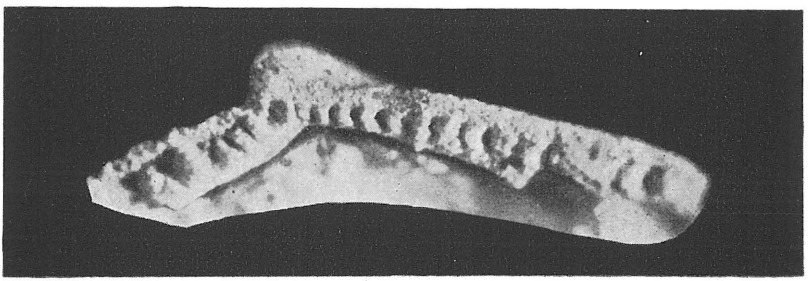

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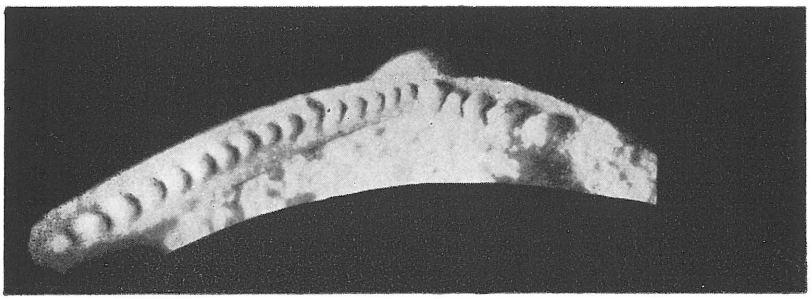

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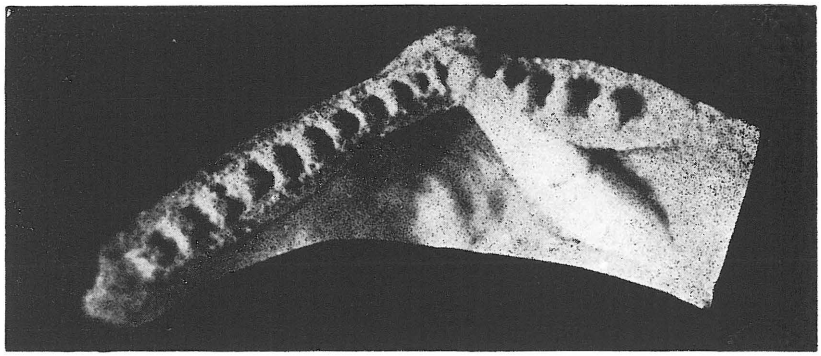

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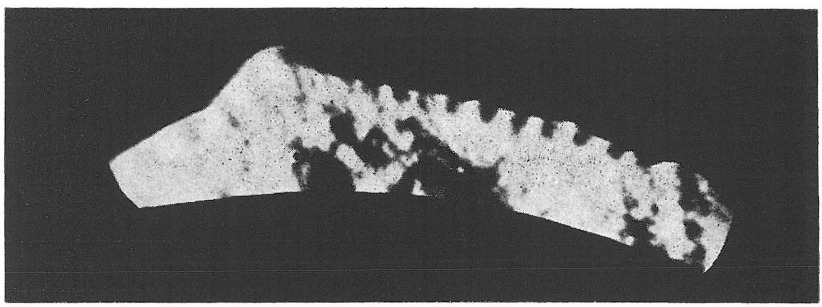

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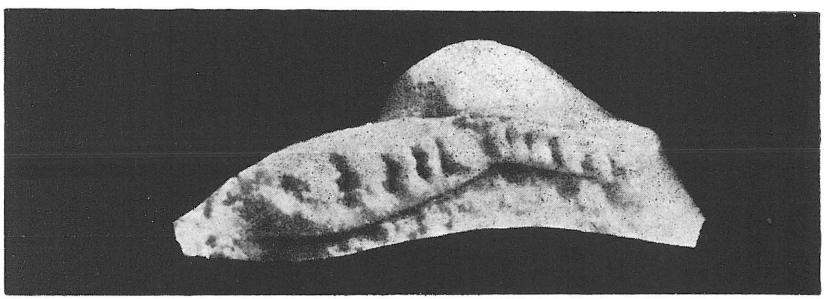

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