A C T A P A L A E O N T O L O G I C A P O L O N I C A
Vol. XIII 1968 No. 2

WACŁAW BAŁUK & GWIDON JAKUBOWSKI

BERTHELINIA KRACHI N. SP., A NEW BIVALVED GASTROPOD FROM THE MIOCENE OF POLAND

Abstract. — A new species of aberrant bivalved gastropods *Berthelinia krachi* n. sp. found in the Lower Tortonian *Pleurotoma* clays at Korytnica (southern slopes of the Holy Cross Mountains, Central Poland) are described. It is infered that the life conditions of these Lower Tortonian gastropods in the Korytnica basin were identical with those of all Recent representatives of the genus *Berthelinia* Crosse.

INTRODUCTION

The specimens of aberrant bivalved gastropods of the genus *Berthelinia* Crosse, 1875, described in the present work, have been found in the *Pleurotoma* clays of Korytnica, for a long time famed for their rich and excellently preserved fauna, mostly molluscs.

The Miocene age of clays from Korytnica, which is situated on southern slopes of the Holy Cross Mountains, does not arouse any doubts and their more accurate stratigraphic position is now determined as the lowermost part of the Lower Tortonian (Krach, 1962).

All the specimens come from one sediment sample whose weight amounted to several hundreds of kg. After washing and letting through a sieve, this sample yielded a vast number of valves of various animals, among which the valves of *Berthelinia* constituted a rarity. This sediment was sampled from the top part of the Korytnica complex of clays, representing a small part (about 20 cm) of the sequence. The sampling was performed in the arable field directly under a layer of soil. The sampling site is situated on the western slope of a flat elevation between the villages Korytnica and Lipa, 180 m north of a road connecting both these localities. No valves of *Berthelinia* were found in many other samples from this vicinity.

GENERAL REMARKS ON THE GENUS *BERTHELINIA* CROSSE, 1875

Systematic position

The structure of shell is a character in which the genus *Berthelinia* Crosse, 1875 clearly differs from other gastropods. The shell consists of two valves and is deceptively similar to that of pelecypods. A spirally coiled protoconch which, as in all gastropods, is single, makes up a fundamental difference which allows one to distinguish the shell of *Berthelinia* from that of a pelecypod. It is situated only in the apical part of the left valve.

This unusual case of homeomorphy was the reason why serious difficulties arose in a correct determination of the systematic position of the gastropods under study. Erecting, on the basis of a single young specimen, the genus *Berthelinia* Crosse (1875) believed that this genus belongs to the class Gastropoda and is very similar to the genera *Hipponix* Defrance, 1819 and *Capulus* Montfort, 1810. However, somewhat later, Crosse and Fischer (1887), availing themselves of a more abundant material, transferred it to the class Pelecypoda, since they observed in this genus the occurrence of two valves, the left and the right ones, which were markedly similar to the valves of pelecypods. Thus, for more than 70 years this genus has been assigned to the class Pelecypoda. It was only in 1959, when live animals of this genus were found, that this riddle could be solved (Kawaguti & Baba, 1959). At present their assignment to the class Gastropoda, subclass Opisthobranchia and order Sacoglossa is absolutely indisputable.

The genus *Berthelinia* Crosse, 1875, now rather broadly understood, comprises the previously separated genera *Ludovicia* Cossmann, 1888, *Anomalomya* Cossmann, 1888, *Edenttellina* Gatliff & Gabriel, 1911, as well as *Tamanovalva* Kawaguti & Baba, 1959 and *Midorigai* Burn, 1960 (cf. Keen & Smith, 1961; Baba, 1961 *a*, 1961 *b*, 1966; Boettger, 1963).

Geographical distribution and stratigraphical range

Recent representatives of the genus under study have so far been found in the following (in order of precedence of findings) regions widely scattered all over the world: 1) North-western coast of Madagascar; 2) coasts of Australia, mostly environs of Melbourne; 3) coasts of the peninsula of Baja California, 4) coasts of Inland Sea in Japan, 5) coasts of the Hawaii Islands, 6) south coasts of Jamaica, and 7) coasts of the Fiji Islands. Except for Madagascar (Dautzenberg, 1895) from which only the valves of *Berthelinia schlumbergeri* Dautzenberg were described, live animals were found in all other regions. In Australia and on the peninsula of Baja California, the discovery of live individuals was preceded by finding of valves. The species *Edenttellina typica* was described by

Gatliff and Gabriel (1911) from the environs of Melbourne, Victoria, Australia and *Edenttellina corallensis* — by Hedley (1920) from the vicinities of Hope Island, North Queensland, Australia. The valves of ?*Scintilla chloris* were described by Dall (1918) from Magdalena Bay on the coast of Baja California, whereas those of the genus *Berthelinia* were found by Keen (1960) on the coast of the last-named peninsula.

The first live individuals were found by Japanese zoologists Kawaguti and Baba (1959) who described them as *Tamanovalva limax* and, at the same time, gave the characteristics of these animals' environment. The knowledge of this environment facilitated the discovery of live Australian (Burn, 1960) individuals of *Berthelinia typica* (Gatliff & Gabriel, 1911), *Midorigai australis* Burn, 1960 and *Berthelinia babai* (Burn, 1965). Later on alive specimens have been found: *Berthelinia chloris belvederica* in the coasts of Lower California Peninsula (Keen & Smith, 1961), *Berthelinia* sp. off the Hawaii Islands (Kay, 1962), *Berthelinia caribbea* in the Jamaica coasts (Edmunds, 1963) and *Berthelinia fijensis* off the Fiji Islands (Burn, 1966).

Before they were found in Recent seas, the valves of bivalved gastropods were already known as fossils. It was on the basis of fossils coming from the Middle Eocene sediments of the Paris Basin that the genus *Berthelinia* was erected by Crosse (1875), who then described the species *Berthelinia elegans*. Later, three other species: *Berthelinia elegans elata, Ludovicia squamula* and *Anomalomya corrugata,* were also described from the Paris Basin (Cossmann, 1888), and *Berthelinia elongata* (Cossmann, 1906) from Eocene of the area situated on the Lower Loire.

In addition to the Eocene sediments of France, the genus *Berthelinia* has so far been known only from the Upper Pliocene of the environs of Adelaide, South Australia from where the species *Berthelinia burni* was described by Ludbrook and Steel (1961).

It is clear from the remarks presented above that both the present distribution and geological history of this group of aberrant gastropods have so far been only incompletely studied. *Berthelinia krachi* n.sp. described in the present paper is the first representative of the genus under study which was found in Miocene and, therefore, it partly fills a considerable gap — from Eocene to Pliocene — in the stratigraphic occurrence of these animals.

DESCRIPTION

Class **Gastropoda** Cuvier, 1797
Subclass **Opisthobranchia** Milne-Edwards, 1848
Order **Sacoglossa** von Ihering, 1876
Suborder **Tamanovalvina** Kawaguti & Baba, 1959

Family **Juliidae** Dall, 1898
Genus *Berthelinia* Crosse, 1875
Berthelinia krachi n.sp.
(Pl. I, Figs. 1-5)

Holotypus: Specimen shown in Pl. I, Figs. 4 *a, b* (left valve), coming from the collections of the first author.

Paratypi: The remaining specimens shown in Pl. I, also coming from the collections of the first author.

Locus typicus: Korytnica, 24 km SSW of Kielce, southern slopes of the Holy Cross Mountains, Central Poland.

Stratum typicum: Lower Tortonian.

Derivatio nominis: krachi — in honour of Professor Wilhelm Krach, an investigator of the stratigraphy and fauna of the Miocene of Poland.

Diagnosis. — Valve distinctly inequilateral, with its anterior part considerably longer and higher than the posterior one. Anteriorly valve is rounded and posteriorly triangular in outline.

Material. — Five left valves (including 1 damaged valve) and 1 right valve.

Dimensions (in mm):

	Length	Height
Left valves:		
Pl. I, Fig. 4 ((holotype) . .	2.65	2.12
Pl. I, Fig. 5	2.58	1.98
Pl. I, Fig. 2	1.95	1.60
Pl. I, Fig. 1	1.00	0.80
Right valve: Pl. I, Fig. 6 . .	1.52	1.03

Description. — *Left valve.* Valve small, thin and distinctly convex, inequilateral in outline, anteriorly considerably higher and with a mildly rounded anterior margin, posteriorly conspicuously narrowed with margin bent at an acute angle. A very slight sinuosity is visible in the posterior part of the ventral margin. Hinge edge slightly bent. Umbo moderately convex with a small spirally coiled protoconch mounted on it. Protoconch sinistrorse, forming $1^1/_2$ of a whorl, its size varying from 0.24 to 0.26 mm in length and 0.18 to 0.19 mm in height. Surface of protoconch quite smooth and strongly lustrous, the boundary between it and the rest of valve quite distinct. In adult specimens protoconch may fall away and, if such is the case, a scar left by it is only visible on the umbo. Outer surface of valve smooth, with growth lines marked on it, some of them more strongly outlined. A slight, somewhat bent ridge runs from umbo towards the posterior margin. In addition, valve when viewed in a strong magnification, reveals — both on its external and internal side — very fine, dense, radial striae. A single, very shallow, subround adductor muscle scar, situated in the anterior part of valve but near its middle, is marked on the internal surface. Slightly above, there

is another, elongated, very narrow and deeper scar running concordantly with the striae mentioned above. It may correspond to the scar of the left retractor muscle of the foot (cf. Baba, 1961 *a*). A hinge plate, separated from the rest of valve with a very narrow groove which slightly extends and becomes deeper from the anterior part towards umbo, runs along the hinge margin. This groove provided room for the ligamentum. Hinge plate terminates, near umbo, in a flat, wide and rounded process ("posterior cardinal" — according to nomenclature of Baba, 1961 *a*) which plays an analogous role as the hinge tooth in pelecypods).

Traces of colouring of valve in the form of light-brown, narrow, wedgelike stripes, radially diverging from umbo, are preserved on the outer surface of two specimens (including the holotype). Their number amounts to 8 in holotype and to 11 in the other specimen. The traces of colouration discovered on the fossil material, coming from the Korytnica clays, are not a rarity. They were also observed on shells of many gastropods and cirripeds (Bałuk & Radwański, 1967).

Right valve. The right valve is almost identical in outline with the left one, except for the sinuosity in the posterior part of the ventral margin which is lacking. Besides, as compared with the left valve, it is more delicate, thinner and flatter. On account of the lack of protoconch on umbo, the posterior section of the hinge margin is seemingly longer than that of the left valve. Outer surface is smooth, with growth lines only slightly marked on it, but without a ridge running from umbo towards the posterior margin of valve. A small, flat socket corresponding to the tooth process of the left valve, is situated on the hinge edge somewhat behind umbo. The adductor muscle scar is invisible.

Remarks. — The shape of valve is an only important character, on the basis of which all species of the genus *Berthelinia* have been distinguished. Although the majority of the species described so far have valves which on the whole are similar to each other, they differ in certain details (general outline, situation of protoconch, etc.).

Berthelinia krachi n.sp. considerably differs in shape from all Eocene species from France and cannot be compared with any of them. It also differs from all Recent forms but, in this case, differences are not so great. A strong inequilaterality of valve, expressed in a shorter and narrower posterior part which takes a triangular outline, is the most important character which differs *Berthelinia krachi* n.sp. from other species. In this respect the new species from Korytnica considerably differs from *Berthelinia typica* (Gatliff & Gabriel) and *Berthelinia limax* (Kawaguti & Baba). The inequilaterality of valve is also emphasized by the situation of protoconch. The valves of *Berthelinia limax* (Kawaguti & Baba) and *Berthelinia chloris belvederica* Keen & Smith have a protoconch, situated more centrally which causes that the section of the

hinge edge behind protoconch is, in these species, considerably longer (as compared to the section situated in front of protoconch).

It is beyond any doubt that, on the basis of the diagnoses of particular subgenera formulated by Keen and Smith (1961), the species from Korytnica should be assigned to the subgenus *Edenttellina* Gatliff & Gabriel, 1911. However, the remark occurs at this occasion that, since the size of valves is not a subgeneric character, it should be omitted from these diagnoses.

Valve growth. The available material, although not very abundant, allows one to conclude on the growth of valve and, consequently, on changes in its shape. This is particularly distinct in two specimens (left valves). On one of them, 1 mm long and 0.8 mm high (Pl. I, Figs. 1 *a-b*), there is visible a single, more strongly marked growth line, which delimits a younger stage 0.67 mm long and 0.52 mm high. In this specimen, one may observe distinct differences in the growth of valve in various directions. The largest growth is recorded on the ventral margin, where it is more conspicuous in the anterior than in the posterior part of the margin. Likewise, the growth is larger on the anterior than on the posterior margin. This results in a gradual change in the shape of valve. If in the smallest stage (delimited by the growth line referred to above) the valve has a shape similar to a rectangle with rounded angles, the entire specimen under study is trapezoidal in outline.

In the other specimen (Pl. I, Figs. 2 *a-b*), whose length amounts to 1.95 mm and height — to 1.60 mm, three distinct growth lines, probably corresponding to the stages of the growth arrest, are visible on the outer surface. The first of them marks the boundaries of a valve which is 0.70 mm long, 0.56 mm high and identical in outline with an analogous young valve of the former specimen. The second line delimits a valve 1.05 mm long and 0.78 mm high and, therefore, almost completely corresponding to the entire former specimen. The third of them makes up a boundary of a valve, whose length amounts to 1.48 mm and height — to 1.15 mm. In this specimen, the differences in the valve growth in different directions are yet more pronounced. The valve takes the shape of an irregular oval with a very high anterior part, whose upper (hinge edge), anterior and lower (ventral) margins form an almost regular semicircle, whereas the posterior part of valve becomes almost completely reduced, so that here the upper and lower margins converge at an angle of about 70°. On older (larger) specimens, the outline of valve is not subject to any changes.

Analogous differences in the outline of valve in young and adult forms have already been observed by Keen & Smith (1961) in *Berthelinia chloris belvederica.*

In comparing the valves of the youngest specimens of the genus *Berthelinia,* 0.50—0.82 mm long, which have hitherto been described,

their considerable mutual similarity may be observed in the species *Berthelinia schlumbergeri* Dautzenberg, *Berthelinia limax* (Kawaguti & Baba) and *Berthelinia krachi* n.sp., whereas *Berthelinia elegans* distinctly differs from them in its markedly lower and longer valve.

REMARKS ON THE ECOLOGY OF THE GENUS *BERTHELINIA* CROSSE, 1875

In all the localities where the alive representatives of the genus *Berthelinia* have so far been found, the environments in which they occurred were almost identical in character (cf. Kawaguti & Baba, 1959; Burn, 1960; Smith, 1961; Keen & Smith, 1961; Kay, 1962; Edmunds, 1963). In all these localities the same features were repeatedly observed such as a very small depth of water (in the Gulf of California only 1.5—2.5 m), a bottom covered with boulders and rock blocks and abundantly overgrown with seaweeds of the genus *Caulerpa*, a water warm and mobile as a result of strong tides, etc. It is of interest that similar conclusions may be reached when analyzing geological conditions under which the specimens of *Berthelinia krachi* n.sp. have been found.

The *Pleurotoma* clays from Korytnica are a deposit whose sedimentation took place in the terminal part of one of the bays of the Tortonian sea which invaded the area of the present Holy Cross Mountains (Radwański, 1969). The sampling site, which the specimens under study come from, was situated only about 230 m from a small island adjoining the shore of the bay. In this region, a quite distinct trace of the shoreline is now delimited by a belt of littoral structures (Radwański, 1964, 1969). The bank of the island was fairly steep, rocky and built of Upper Jurassic limestones. Abundant rubble, preserved until the present, was scattered in the vicinity of this bank. The largest of the boulders preserved reach 0.5 m in diameter and all of them, much the same as the surface of shoreline rocks, are bored by numerous lithophags (Radwański, 1964, 1969).

During the sedimentation of the uppermost part of clays, the depth of sea in the Korytnica bay, and in particular in the coastal zone, was probably not very large and may be estimated at a few metres. This is testified to by the presence of several groups of animals, typical of very shallow waters, which are recorded in these sediments. Close to the shore, the sediment contains abundant crushed shells of *Ostrea* and, furthermore, many shells of the cirriped *Balanus* and gastropod *Diodora*. The sample which the valves of *Berthelinia* come from, contained, among other animals, such very shallow water organisms as chitons and cirripeds *Creusia*. The sampling site cannot be of course treated strictly as a place in which the gastropods under study lived because their valves were probably somewhat scattered over the bottom and might reach this place

being dragged or drifted from parts of the bay situated nearer the shore.

The degree of the salinity of water was undoubtedly approaching that of the normal sea water which is testified to by the presence of such organisms as corals and echinoderms. Although it is impossible to determine the temperature of water, but we may assume that it was fairly high and much the same as that predominant in the southern parts of the present Mediterranean Sea. In the fauna of Korytnica clays, the most philothermic element are the cirripeds *Creusia*, mentioned above, which domicile in corals (Bałuk & Radwański, 1967). Because of the impossibility of their preservation, no reliable evidence is of course available as to the presence of seaweeds in Korytnica bay. We may assume, however, that at least they grew here and there on the bottom of the bay and supplied food to numerous herbivorous gastropods that occurred there.

On the basis of the considerations, presented above, a well-grounded conclusion may be reached that as early as in the Miocene the representatives of the genus *Berthelinia* lived in a very similar if not identical environment as that in which they breed at present.

Palaeozoological Laboratory
of the University of Warsaw,
Warszawa, Al. Żwirki i Wigury, 93

Palaeozoological Laboratory
of the Museum of Earth,
Polish Academy of Sciences
Warszawa, Al. Na Skarpie, 20/26
December, 1967

REFERENCES

BABA, K. 1961 *a*. On the identification and the affinity of Tamanovalva limax, a bivalved Sacoglossan mollusc in Japan. — *Publ. Seto Mar. Biol. Lab.* **9**, 1, 37-62, Sirahama.

— 1961 b. The shells and radulae in Berthelinia, a bivalved Sacoglossan genus. — *Venus, Jap. J. Malacol.*, **21**, 4, 389-401, Kyoto.

— 1966. Gross anatomy of the specimens of the shelled Sacoglossan Volvatella (=Arthessa) collected from Okino-erabu Island, Southern Kyushu, Japan (Nudibranchia). — *Publ. Seto Mar. Biol. Lab.*, **14**, 3, 197-205, Sirahama.

BAŁUK, W. & RADWAŃSKI, A. 1967. Miocene cirripeds domiciled in corals (Wąsonogi mioceńskie żyjące w koralowcach). — *Acta Palaeont. Pol.*, **12**, 4, 455-521, Warszawa.

BOETTGER, C. R. 1963. Gastropoden mit zwei Schalenklappen. — *Verh. Deutsch. Zool. Ges.*, **56**, 403-439, Leipzig.

BURN, R. 1960. Australian bivalve gastropods. — *Nature*, **187**, 4731, 44-46, London-New York.

— 1965. Rediscovery and taxonomy of Edenttellina typica Gatliff & Gabriel. — *Ibidem*, **206**, 4985, 735-736.

— 1966. The opisthobranchs of a caulerpan microfauna from Fiji. — *Proc. Malac. Soc. London*, **37**, 45-65, London.

COSSMANN, M. 1888. Catalogue illustré des Coquilles fossiles de l'Éocène des environs de Paris. — *Ann. Soc. Roy. Malac. Belgique*, **22**, 1-214, Bruxelles.

— 1906. Mollusques éocéniques de la Loire-Inférieure. — *Bull. Soc. Sci. Nat. Ouest France*, Nantes.

CROSSE, H. 1875. Description du nouveau genre Berthelinia. — *J. Conch.*, **23**, 79-81, Paris.

CROSSE, H. & FISCHER, P. 1887. Observations sur le genre Berthelinia. — *Ibidem*, **35**, 305-311.
DALL, W. H. 1918. Description of new species of shells, chiefly from Magdalena Bay, Lower California. — *Proc. Biol. Soc. Washington*, **31**, 5-8, Washington.
DAUTZENBERG, P. 1895. De l'existence du genre Berthelinia Crosse à l'époque actuelle. — *Bull. Soc. Zool. France*, **20**, 37-38, Paris.
EDMUNDS, M. 1963. Berthelinia caribbea n.sp., a bivalved gastropod from the west Atlantic. — *J. Linn. Soc. London., Zool.*, **44**, 302, 731-739, London.
FELIKSIAK, S. 1961. Ślimaki tyłoskrzelne (Opisthobranchia) o małżowej muszli. — *Kosmos A*, **10**, 1, 59-64, Warszawa.
GATLIFF, J. H. & GABRIEL, C. J. 1911. On some new species of Victorian marine Mollusca. — *Proc. Roy. Soc. Victoria*, **24**, 1, 187-192, Melbourne.
HEDLEY, C. 1920. Concerning Edenttellina. — *Proc. Malac. Soc. London*, **14**, 74-76, London.
KAWAGUTI, S. & BABA, K. 1959. A preliminary note on a two-valved Sacoglossan gastropod, Tamanovalva limax n.gen., n. sp., from Tamano, Japan. — *Biol. J. Okayama Univ.*, **5**, 177-184, Okayama.
KAY, E. A. 1962. A bivalved gastropod from the Hawaiian Islands. — *Nature*, **195**, 4836, 96-97, London-New York.
KEEN, A. M. 1960. The riddle of the bivalved gastropod. — *The Veliger*, **3**, 1, 28-30, Berkeley.
— & SMITH, A. G. 1961. West American species of the bivalved gastropod genus Berthelinia. — *Proc. Calif. Acad. Sci.*, Ser. 4, **30**, 2, 47-66, San Francisco.
KRACH, W. 1962. Zarys stratygrafii miocenu Polski południowej (Esquisse de la stratigraphie du Miocène de la Pologne méridionale). — *Roczn. P. T. Geol. (Ann. Soc. Géol. Pol.)*, **32**, 4, 529-557, Kraków.
LUDBROOK, N. H. & STEEL, T. M. 1961. A late Tertiary bivalve gastropod from South Australia. — *Proc. Malac. Soc. London*, **34**, 228-230, London.
RADWAŃSKI, A. 1964. Boring animals in Miocene littoral environments of Southern Poland. — *Bull. Acad. Pol. Sci., Sect, géol. géogr.*, **12**, 1, 57-62, Warszawa.
— 1969. Transgresja dolnego tortonu na wyżyny Polski południowej i utwory z nią związane (Lower Tortonian transgression onto the Middle Poland uplands). — *Acta Geol. Pol.*, **19**, 1, Warszawa (*in print*).
SMITH, A. G. 1961. Notes on the habitat of Berthelinia spec. nov. from the vicinity of La Paz, Baja California, Mexico. — *The Veliger*, **3**, 3, 81-82, Berkeley.

WACŁAW BAŁUK & GWIDON JAKUBOWSKI

BERTHELINIA KRACHI N. SP., NOWY DWUSKORUPKOWY ŚLIMAK Z MIOCENU POLSKI

Streszczenie

W najwyższej części kompleksu dolno-tortońskich iłów pleurotomowych z Korytnicy znalezione zostały skorupki aberantnych ślimaków z rodzaju *Berthelinia* Crosse, 1875. Cechą wyodrębniającą te ślimaki od innych jest budowa muszli. Muszla rodzaju *Berthelinia* składa się z dwóch skorupek i łudząco przypomina

muszlę małża. Zasadniczą jednak różnicę, pozwalającą odróżnić muszlę rozważanych ślimaków od muszli małżów, stanowi spiralnie skręcona protokoncha, która — podobnie jak u wszystkich ślimaków — jest pojedyncza, a znajduje się tylko na wierzchołku lewej skorupki [1]. Ponieważ początkowo znane były tylko same skorupki, podobieństwo to było powodem zaliczania rodzaju *Berthelinia* do gromady Pelecypoda. Dopiero znalezienie przed kilkoma laty (Kawaguti & Baba, 1959) żywych zwierząt pozwoliło prawidłowo ustalić ich pozycję systematyczną.

Ślimaki z rodzaju *Berthelinia* znane są zarówno z mórz współczesnych, jak i morskich osadów kopalnych. Współcześnie znaleziono je w siedmiu rejonach świata, a mianowicie na wybrzeżach: 1) Madagaskaru (Dautzenberg, 1895), 2) Australii, głównie w okolicach Melbourne (Gatliff & Gabriel, 1911; Hedley, 1920; Burn, 1960), 3) półwyspu Kalifornijskiego (Dall, 1918; Keen, 1960; Smith, 1961; Keen & Smith, 1961), 4) Japonii (Kawaguti & Baba, 1959), 5) wysp Hawajskich (Kay, 1962), 6) Jamajki (Edmunds, 1963), oraz 7) wysp Fidżi (Burn, 1966). Z osadów kopalnych rodzaj ten znany był dotychczas z eocenu Francji (Crosse, 1875; Crosse & Fischer, 1887; Cossmann, 1888, 1906) i z pliocenu Australii (Ludbrook & Steel, 1961). Tak więc iły pleurotomowe Korytnicy są pierwszym stanowiskiem rodzaju *Berthelinia* w miocenie.

Skorupki znalezione w Korytnicy różnią się od wszystkich dotychczas znanych gatunków rozważanego rodzaju i stanowią nowy gatunek — *Berthelinia krachi* n. sp. Cechą odróżniającą nowy gatunek od innych jest silna nierównoboczność skorupki: przednia jej część jest znacznie wyższa i dłuższa niż tylna, ma zarys brzegów zaokrąglony, tylna zaś jest silnie skrócona o zarysie trójkątnym.

Współcześni przedstawiciele rodzaju *Berthelinia* żyją na wodorostach *Caulerpa* w morzach bardzo płytkich (o głębokości zaledwie paru metrów, zwykle tuż poniżej poziomu odpływu) i ciepłych, w pobliżu brzegu gdzie dno pokryte jest głazami lub blokami skalnymi (cf. Kawaguti & Baba, 1959; Burn, 1960; Smith, 1961; Keen & Smith, 1961; Kay, 1962; Edmunds, 1963). Analiza warunków geologicznych miocenu zatoki Korytnicy (cf. Radwański 1964, 1969) prowadzi do wniosku, że środowisko, w którym żyła *Berthelinia krachi* n.sp., było bardzo zbliżone lub nawet takie samo, jak gatunków współczesnych.

---

[1] Budowa i rozwój ontogenetyczny dwuskorupkowych ślimaków na przykładzie *Berthelinia limax* (Kawaguti & Baba) opisane zostały w literaturze polskiej przez Feliksiaka (1961).

ВАЦЛАВ БАЛУК & ГВИДОН ЯКУБОВСКИ

BERTHELINIA KRACHI N. SP., НОВЫЙ ДВУСТВОРЧАТЫЙ БРЮХОНОГИЙ ИЗ МИОЦЕНА ПОЛЬШИ

Резюме

В самой верхней части комплекса нижнетортонских плевротомовых глин из Корытницы (южные склоны Свентокржиских Гор) найдены створки аберантных брюхоногих из рода *Berthelinia* Crosse, 1875. Строение раковины является чертой обособляющей эти брюхоногие от иных. Раковина рода *Berthelinia* построена двумя створками и поразительно напоминает раковину пластинчатожаберных. Основной однако разницей, позволяющей отличить раковину обсуждаемых брюхоногих от раковин пластинчатожаберных, является спиральнозавитый протоконх, который — как и у всех брюхоногих — есть одиночный и находится на вершине левой створки. Так как раньше были известны только самые раковины, это сходство было причиной причисления рода *Berthelinia* к классу Pelecypoda. И лишь находка, несколько лет тому назад (Kawaguti & Baba, 1959), живых моллюсков позволила правильно установить их систематическую позицию.

Брюхоногие из рода *Berthelinia* известны из современных морей, а также встречены в ископаемом состоянии. Современно найдены они в семи районах мира, а именно на побережьях: 1. Мадагаскара (Dautzenberg, 1895), 2. Австралии, главным образом в окрестностях Мельберн (Gattliff & Gabriel, 1911; Hedley, 1920; Burn, 1960), 3. Калифорнийского полуострова (Dall, 1918; Keen, 1960; Smith, 1961; Keen & Smith, 1961), 4. Японии (Kawaguti & Baba, 1959), 5. Гавайских островов (Kay, 1962), 6. Ямайки (Edmunds, 1963) и 7. островов Фиджи (Burn, 1966). В ископаемом состоянии род этот до сих пор был известный из эоцена Франции (Crosse, 1875; Crosse & Fischer, 1887; Cossmann, 1888, 1906) и плиоцена Австралии (Ludbrook & Steel, 1961). И так плевротомовые глины Корытницы являются первым пунктом находки рода *Berthelinia* в миоцене.

Створки найденные в Корытнице отличаются от всех известных до сих пор видов этого рода и поэтому авторы описали их как *Berthelinia krachi* n. sp. Признаком отличающим новый вид от иных является значительная неравностворчатость раковины: её передняя часть с округленными краями много выше и длиннее чем задняя, которая сильно сокращена и имеет треугольное очертание.

Современные представители рода *Berthelinia* обитают на водорослях *Caulerpa* в очень мелких морских водоемах (глубиной несколько метров, обыкновенно чуть ниже уровня отлива), и теплых, вблизи береговой линии, на дне покрытом камнями или глыбами скал (cf. Kawaguti & Baba, 1959; Burn, 1960;

Smith, 1961; Keen & Smith, 1961; Kay, 1962; Edmunds, 1963). Анализ геологических условий миоцена Корытницы (Radwański, 1964, 1969) приводит к выводу, что среда обитания *Berthelinia krachi* n. sp. была очень сходная или такая же, как современных видов.

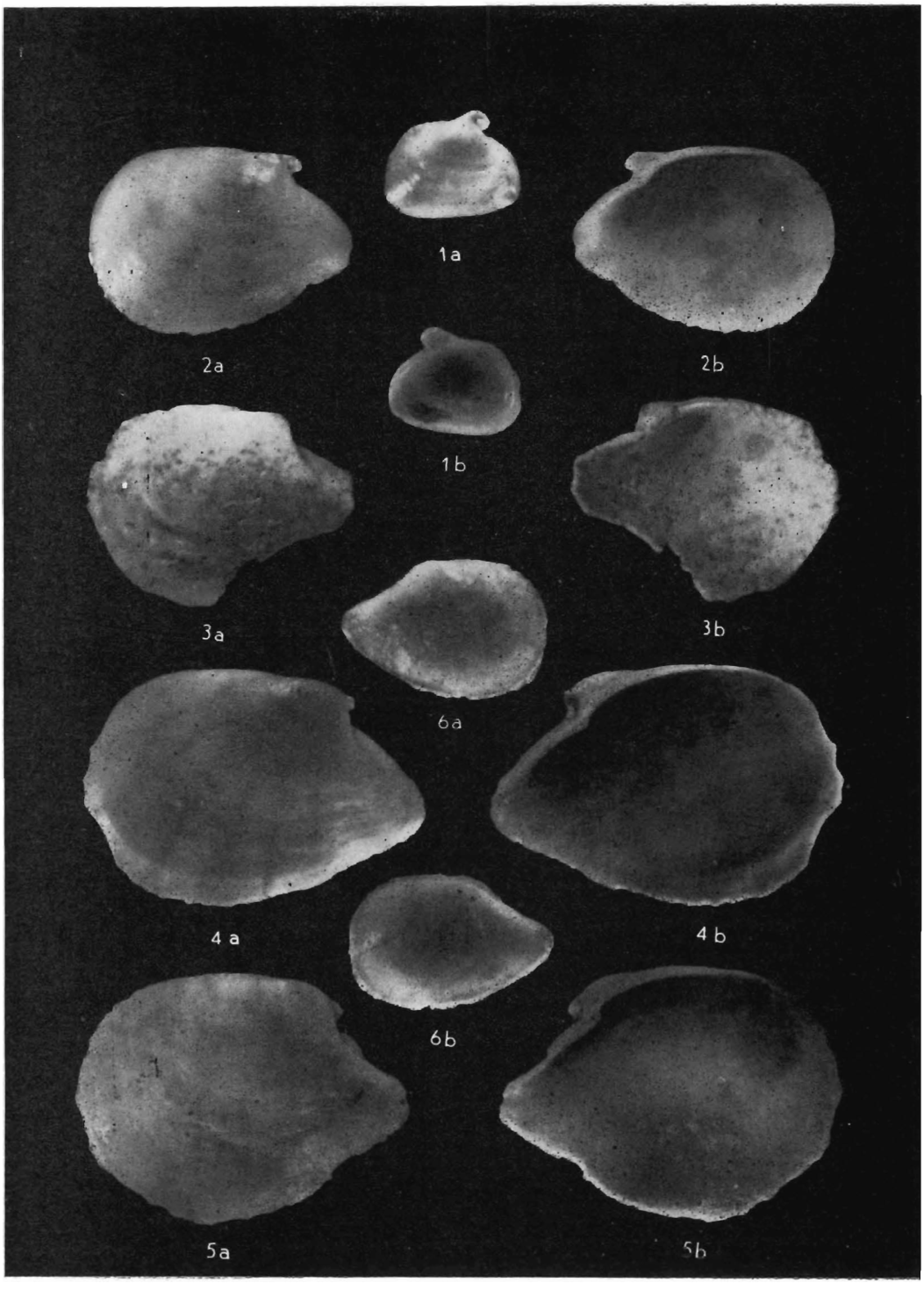
PLATE

Plate I

Berthelinia krachi n.sp.
(Korytnica, Lower Tortonian)

Figs. 1-5. Left valves: *a* external view, *b* internal view.
Fig. 6. Right valve: *a* external view, *b* internal view.

All specimens × 20


1a
2a
2b
1b
3a
3b
6a
4 a
4 b
6b
5a
5b