

ANDRZEJ ŚLĄCZKA

DACTYLODISCUS BESKIDENSIS N.GEN., N.SP. — A MEDUSA
FROM THE CARPATHIAN FLYSCH

Abstract. — Impressions of organisms with radially arranged lobes are recorded in the Lower Istebna Beds on Lake Rożnów in Polish Central Carpathians. They are most similar to those of the medusae. The new genus and species *incertae sedis* *Dactylodiscus beskidensis* n.sp. has been erected for them.

INTRODUCTION

Impressions of problematic organisms with a radial structure¹ have been found on the northern shore of Lake Rożnów in the Lower Istebna Beds which represent the Upper Cretaceous (the Upper Senonian). Similar impressions were described by Zahalka (1957) from the Istebna Beds in Moravia, Czechoslovakia. Also similar were the impressions found by Professor M. Książkiewicz in the Lower Istebna Beds of Western Carpathians (Książkiewicz, 1968). All these localities come from the Silesian unit, except for one specimen, housed at the Laboratory of Young Structures, Polish Academy of Sciences, in Cracow, which comes from the Magura unit at Zaryte in the environs of Rabka and probably also from the Upper Cretaceous deposits.

The specimens under study are housed at the Geological Institute's Carpathian Branch in Cracow, for which the abbreviation I.G. Oddz. Karp. is used. It is the writer's pleasant duty to extend his thanks to Professor S. Dżułyński, Dr. S. Gąsiorowski and in particular, to Doc. S. Czarniecki and Professor A. Urbanek for their help and fruitful discussions of the subject.

OCCURRENCE AND STATE OF PRESERVATION

All specimens, except for one, come from a locality on the northern shore of Lake Rożnów, about 1 km to the south of the hamlet Łazy near Rożnów (Nowy Sącz District).

¹ These impressions have first been found by the writer during a common excursion with M. Radosevic (Czechoslovakia).

Their occurrence is primarily connected with thin-bedded, fine-grained and cross-laminated sandstones (Pl. III, Fig. 3). These sandstones form intercalations in the uppermost part of thick-bedded Lower Istebna sandstones, representing the Upper Senonian (Sokołowski, 1935). Only isolated specimens occur in thick-bedded sandstones. The impressions form very poorly preserved assemblages. In all cases, the side interpreted as the upper side of a specimen is facing downwards. The impressions mostly occur on the upper surface of sandstone beds, much less frequently inside of them and only sporadically on the lower surface of the bed. One of the specimens from the bottom of the bed is deformed (Pl. III, Fig. 1). The impressions which come from the inside of sandstone beds are filled with a gray clay, similar in character to the shale which are intercalated in sandstones. The clay probably comes from a posthumous filling of the medusa's body which took place when it was transported by turbidity currents. The supposition that the baglike inside of the medusa was filled with clay was set forth by Walcott (1898) in the case of the Jurassic medusae from Solnhofen (Germany).

Feeding canals, developed already after the formation of impressions, are visible in several places on some specimens. The presence of these irregularly distributed canals indicates that the medusae under study were sometimes destroyed by clay-eating organisms which might undoubtedly lead to their complete destruction and to the obliteration of their original structure.

The occurrence of the discussed impressions in the flysch deposits should be related to turbidity currents. The medusae might get within the range of such a current in various ways. Freely swimming in the water, they might be caught by a turbidity current and transported from shallow zones to the place of their deposition, or else these might be bathypelagic forms which got into a turbidity current in the final part of its way. At present, a mass accumulation of bathypelagic medusae is observed near the bottom (Emery, 1960). The possibility should also be taken into account that directly before the formation of a turbidity current medusae were accumulated on a muddy-sandy margin of the cordillera and only from that place transported, together with the detrital sediment, deep into the basin. Such a mass accumulation of medusae on the shore has been observed by the present writer on the Black Sea.

As indicated by the character of sandstones, the current which transported medusae was not very strong and had a small discharge of water, much the same as its turbulences which might otherwise tear the body of a medusa. Due to their large surface and small weight, the medusae mostly sank to the bottom already after the deposition of the main mass of sand. Since during some periods of its life, the body of a medusa becomes more elastic and leathery (Walcott, 1898); this might be an additional factor which protected it during the transportation. The flat po-

sition of the specimens may be explained in part by the fact that, as an effect of a traction current (the occurrence of the diagonal bedding in sandstones), the medusae were so arranged as to offer the least possible resistance to the force of current.

A wide distribution of the organisms under study in the flysch basin, which took place more or less simultaneously at the end of the Cretaceous, is an interesting phenomenon. According to hitherto known data, they occur from the Middle Carpathians to Moravia. The lack of such or similar fossils in extra-Carpathian deposits of the same age precludes the possibility of a violent ingression of this species from adjacent areas into the Carpathian flysch basin. On the other hand, this species seems likely to be an endemic form, which rapidly developed but rather violently become extinct.

DESCRIPTION

Incertae sedis

Genus *Dactylodiscus* n.gen.

Type species: Dactylodiscus beskidensis n.sp.

Type horizon: Upper Senonian sandstones from the Lower Istebna Beds.

Type locality: Łazy near Rożnów, Nowy Sącz District.

Derivation of the name: Gr. *dactylos* = finger, *discos* = disc — after a dislike shape of specimens and the occurrence of digital processes.

Diagnosis. — A monotypic genus whose characteristics correspond to those of the species.

Dactylodiscus beskidensis n.sp.

(Pls. I—II; Text-figs. 1,2)

1957. *Paleosemaeostoma geryonides* v. Huene; B. Zahalka, p. 294, Pl. 1, Figs. 1—3.

Holotype: I.G. Oddz. Karp. Nos. 1—2/17; Pl. I, Fig. 2; Text-fig. 1.

Type horizon: Upper Senonian sandstones from the Lower Istebna Beds.

Type locality: Łazy near Rożnów, Nowy Sącz District.

Derivation of the name: After the geographical name of the part of the Carpathians which the specimens come from.

Material. — Eighteen, mostly fragmentary specimens, including fourteen of the upper(?) and four of the lower(?) surface.

Diagnosis. — A form round in outline, 1—2 mm thick and 20—50 mm in diameter, composed of 8 to 14 convex lobes extending towards the periphery and separated from each other by narrow furrows. Marginal zone narrow, flat. Convex, probably upper surface, with a few (to five) narrower, usually shorted digital lobes. Concave, probably lower surface

has near its outer margin numerous, small, triangular lobes. Four small convexities occur near the central part.

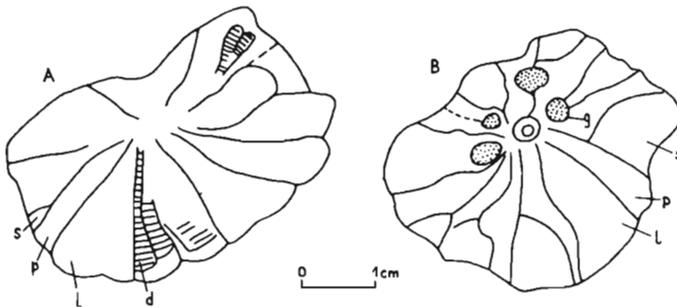


Fig. 1. — *Dactylodiscus beskidensis* n.sp. holotype. A schematic drawing of the upper(?) (A) and lower(?) surface: *l* lobes of the first (B) order, *s* lobes of the second order, *p* a lobe with parallel sides, *d* digital processes, *g* elevations, perhaps gonads.

Description. — Impression round in outline, the lower and upper surfaces are differently developed. The lobular structure is their common feature. Lobes convex, converging centrally, with outer margins terminating semicircularly (Pl. I, Figs. 1, 2; Pl. II, Figs. 3, 4). In most specimens, the number of lobes is rather indeterminable, usually amounting to 12 and probably not exceeding 14. Their outer, peripheral width amounts to 3—12 mm. A narrow (reaching 3 mm), flat, marginal zone (*v*), sometimes concentrically wrinkled (Pl. I, Fig. 2a; Pl. II, Fig. 3) occurs around. In some of the specimens, the marginal zone is invisible. In the parts nearer the middle of the specimen, the lobes are sometimes transversally wrinkled. In the specimens, which come from the inside of sandstone beds, these wrinkles are indistinct or do not occur at all.

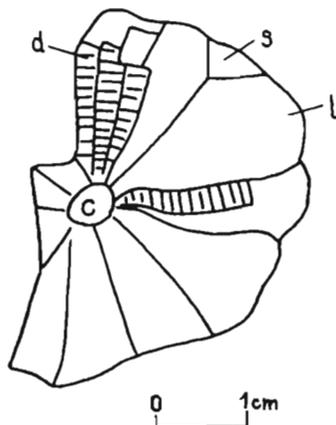


Fig. 2. — *Dactylodiscus beskidensis* n.sp. A schematic drawing of the upper surface (explanations — see Text-fig. 1).

PLATES
I—II

Plate I

Dactylodiscus beskidensis n.sp.

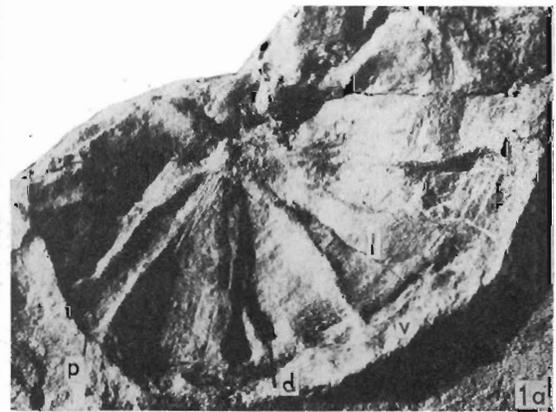
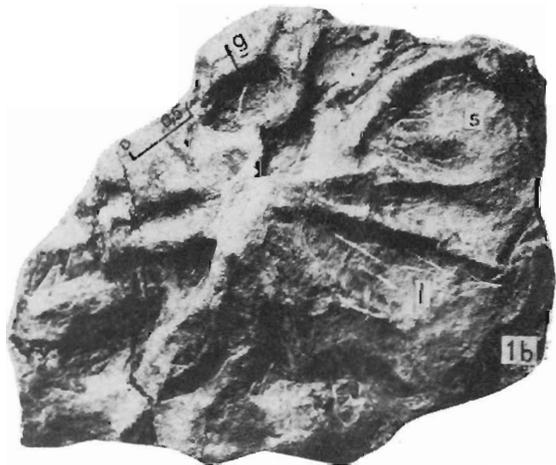
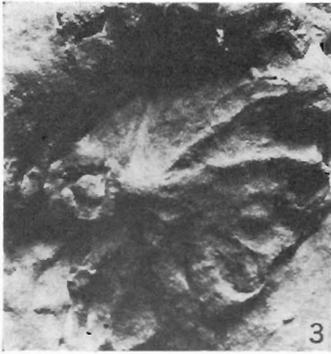
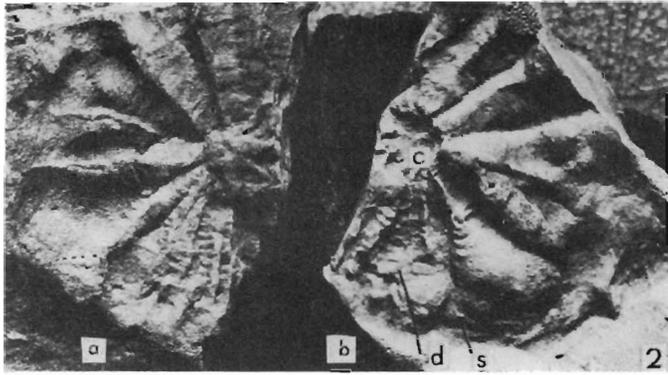
Fig. 1. *a* view of the upper(?) surface, *b* its mould.

Fig. 2. Holotype, No. 1—2/17; *a* upper(?) surface, *b* lower(?) surface.

Fig. 3. A deformed specimen on the lower surface of a bed.

Fig. 4. The upper surface of a specimen. The explanations of the letters — as in Text-figs. 1—2.

Łazy near Rożnów, Upper Senonian



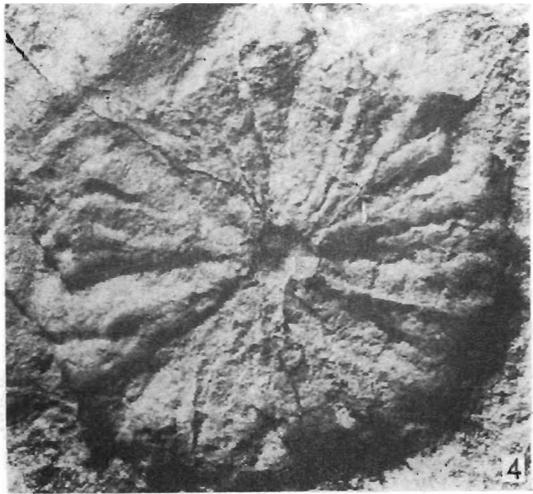
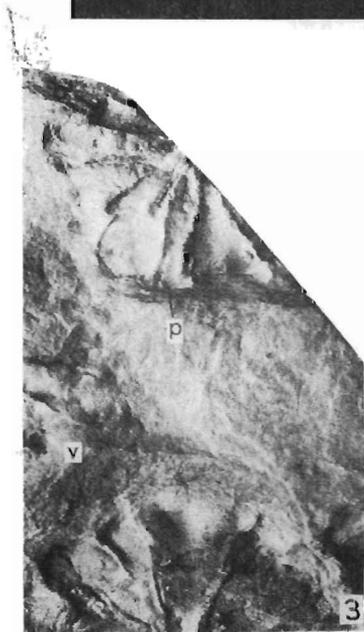
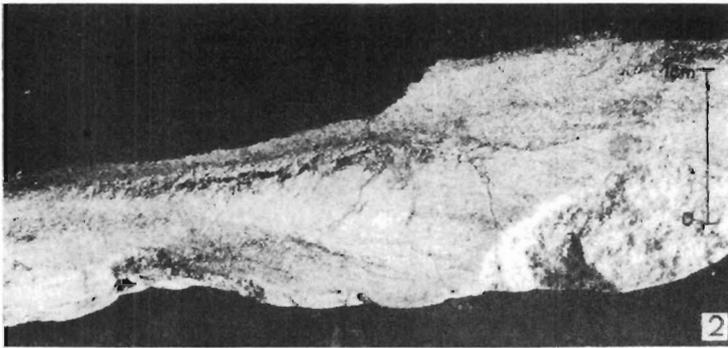


Plate II

Dactylodiscus beskidensis n.sp.

- Fig. 1. The upper(?) surface of a specimen with an exceptionally large central part.
- Fig. 2. A transverse section through the central part of *D. beskidensis* and the surrounding sandstone. The lack of disorders in the diagonal bedding indicates the lack of stem or a canal leading from the centre.
- Fig. 3. Two fragmentary specimens, the upper one with deformed lobes, the lower having distinct marginal flattenings (*v*) which may correspond to vellum.
- Fig. 4. A view of the upper(?) surface of a specimen. The explanations of the letters — as in Text-figs. 1—2.

Fig. 1—3 — Łazy near Rożnów, Fig. 4 —
Rabka-Zaryte; Upper Senonian

The upper(?) surface of specimens are slightly convex or flat and, in the case when the specimens occur on the upper surface of sandstone, they are slightly concave. On the upper(?) surface, one or two narrower (1.5—3 mm wide) lobes with parallel sides (*p* in Text-fig. 1a; Pl. I, Figs. 1, 3; Pl. II, Fig. 3) occur between triangular lobes. Triangular lobes of the second order (*s* in Text-figs. 1a, 2; Pl. I, Fig. 1), whose accurate number cannot be determined, sporadically occur in the marginal part. The occurrence of narrow lobes 1.5 to 2 mm wide and usually slightly shorter than the radius of the specimen (*d* in Text-figs. 1a, 2; Pl. I, Figs. 1, 2a; Pl. II, Fig. 3) is a characteristic feature of the upper(?) surface. They are uniform in width over their entire length. Their terminations are rectilinear and not semicircular as in those described above. Their position is variable in one and the same specimen, but they are usually grouped in one part only (Pl. I, Figs. 1, 2a; Pl. II, Fig. 3). In the specimens which come from the upper surface of the beds, these lobes display distinct, transverse wrinkles (Pl. I, Fig. 2a; Pl. II, Fig. 1). They are situated on the lobes proper and connected with them only in the center or near it, which enables a supposition that they are a certain type of processes. A small, rounded concavity (*c*), 2—3 mm in diameter (Text-fig. 2; Pl. I, Figs. 1, 2), occurs in the central part.

No processes occur on the lower surface which is more or less concave. Accessory, triangular lobes of the second order (*s*), much larger and more numerous than those on the upper surface, may be observed between the lobes proper (of the first order). They are not connected in a visible way with the central part (Text-fig. 1b; Pl. I, Fig. 2b). Three or four depressions to 5 mm in diameter (*g* in Text-fig. 1b; Pl. I, Fig. 2b), varying in shape and asymmetrically arranged around the central part, occur on one of the specimens.

Discussion. — The writer is inclined to agree with Zahalka's (1957) view that the described fossils are impressions of medusae, although they lack some of the characters typical of them such as a definitely radial symmetry, distinct manubrium and arms. The lobes of *D. beskidensis* are to the greatest extent similar in appearance to the lobes of medusae. Two types of lobes (of the first and second order), particularly well developed on the lower side, may correspond to the inner and outer lobes as is the case of the genus *Kirklandia* Caster, 1945 (Caster, 1945; Ślącza, 1964). The furrows which separate particular lobes may correspond to the primary and secondary canals, as e.g. those in the families Probosciodactylidae or Cladonemidae (Russel, 1953), although they may well be only the furrows which separate particular lobes, as e.g. those in some of the Narcomedusae. Furthermore, the flat zone, which surrounds of the specimens, seems to be an impression of vellum sometimes having concentric wrinkles.

A fairly complex pattern on the lower surface suggests that we have to do with a subumbrellar impression. The asymmetric depressions (*g* in Pl. I, Fig. 2b and Text-fig. 1b) may be impressions of gonads, although it is not unlikely that they represent arms. Their origin is obscure and, besides, they are visible not on all impressions.

The presence of wrinkles on the surface of some lobes may be explained as a result of a posthumous deformation of a medusa's soft body. On the surface of the specimens which come from the inside of beds (Pl. I, Fig. 2; Pl. II, Fig. 3), these wrinkles are indistinct probably because of a deposit which covered the animals and prevented their posthumous deformation.

It is not unlikely that the differences in the shape of radial grooves and lobes in various specimens were caused by the differences in the consistency of a medusa's body during the deposition. In the case in which the body was hard, it left markedly deeper impressions of lobes and more distinct radial grooves (Pl. I, Figs. 1, 2a) while a more jelly-like body left shallower impressions of lobes with irregular depressions occurring in them and with narrower and shallower radial grooves (Pl. II, Fig. 3).

The presence of digital lobes on the upper surface (*d* in Figs. 1, 2) is not very typical of the medusae. They are likely to correspond to tentacles which, for instance, in some of the Narcomedusae do not grow out of the margins, but from the central part of the shield.

Dactylodiscus considerably differs from all medusae described so far. Zahalka's (1957) view that the impressions of the type here described belong to *Paleosemaeastoma geryonides* (v. Huene) is unacceptable, since this species is devoid of the lobes of the second order and the peripheral flatness and, besides, it displays a different structure of the central part. On the other hand, *D. beskidensis* is devoid of the central stem (Pl. II, Fig. 2), and the transverse section through its axial part is different of that of *P. geryonides* (cf. Huene, 1901; Rürger, 1933).

Dactylodiscus distinctly differs from other Cretaceous medusae (Maas, 1902; Caster, 1945; Harrington & Moore, 1956; Ślącza, 1964), while it is similar to some of the Jurassic medusae, such as e.g. „*Medusina*” *liassica* Rürger-Haas (Rürger & Rürger-Haas, 1926), *Acalepha deperdita* Beyrich (Walcott, 1898) and *Atollites caucasicus* Sobolev (Babanova, 1963). The differences are, however, so large that no generic similarity may here be found. A certain similarity occurs between *D. beskidensis* and some specimens of the species *Laotira cambria* (Walcott, 1898).

The comparison of the fossil under study with Recent medusae and the determination of its taxonomic position encounter fundamental difficulties. The characters on which the modern classification is based (including the ontogenetic development, the presence and development of stratocysts and marginal processes), are not preserved in the specimens

found. Some of the morphological characters preserved may be an only basis for comparisons.

Because of the presence of vellum and the lack of a distinct tetrameric symmetry, *Dactylodiscus beskidensis* is to the greatest extent similar to the hydromedusae.

*Geological Institute
Carpathian Branch,
Kraków, Grzegórzecka 81
May, 1971*

REFERENCES

- BABANOVA L. J. 1963. Discovery of the medusa *Atollites caucasicus* Sobolew in the Middle Jurassic of Crimean Mountains. — *Palaeont. Journ.*, 1, 139—140, Moskwa. (in Russian).
- CASTER K. E. 1945. A new jellyfish (*Kirklandia texana* Caster) from the Lower Cretaceous of Texas. — *Paleont. Americana*, 3, 168—220, Itaca N.Y.
- EMERY K. O. 1960. *The Sea off Southern California*. J. Wiley Sons Ins. New York, London.
- HARRINGTON H. J. & MOORE R. C. 1956. Scyphomedusae, Trachylinida, Medusae incertae sedis, In: R. C. Moore (ed.), *Treatise on Invertebrate Paleontology; Part F, Coelentrata*. — *Geol. Soc. Amer. & Univ. of Kansas Press*, Lawrence, Kansas.
- HUENE F. von 1901. Kleine palaontologische Mitteilung. I *Medusina geryonides*. — *Neues Jb. Mineral. Geol. Pal. Jahrg.*, 1901, 1—12, Stuttgart.
- KSIAŹKIEWICZ M. 1968. O niektórych problematykach z fliszu Karpat polskich (część II). On some problematic traces from the Flysch of the Polish Carpathians. — *Rocz. Pol. Tow. Geol.* 38, 3—17, Kraków.
- MAAS O. 1902. Über Medusen aus dem Solnhofener Schiefer und der unteren Kreide der Karpathen. — *Palaeontographica*, 48, 319, Kassel.
- RUSSEL F. S. 1953. *The Medusae of the British Isles*. 1—530, Cambridge.
- RÜGER L. 1933. Medusen aus dem württembergischen unteren Dogger und Bemerkungen über die Stammgeschichte der Medusen. — *Jahrsb. oberrhein. Ver., N.F.*, 24, 100—108, Stuttgart.
- RÜGER L. & RÜGER-HAAS P. 1926. *Palaeosemaeostoma geryonides* v. Huene eine sessile Meduse aus dem Dogger von Wehingen in Württemberg und *Medusina liasica* nov. sp., eine coronatenähnliche Meduse aus de mittleren Lias von Hechingen in Württemberg. — *Sitzungsab. Heidelberg. Akad. Wiss. Math. Nat. Kl.*, 15, 1—22, Heidelberg.
- SOKOŁOWSKI S. 1935. Geologia doliny Dunajca między Tropiem a Kurowem. — *Kosmos*, 60, 49—93, Lwów.
- ŚLĄCZKA A. 1964. Meduza z fliszu karpackiego — *Kirklandia multiloba* n. sp. (Jellyfish from the Carpathian Flysch — *Kirklandia multiloba* n. sp.) — *Rocz. Pol. Tow. Geol.*, 34, 479—486, Kraków.
- WALCOTT CH. D. 1896. *Fossil Medusae*. — *U.S. Geol. Survey Monogr.*, 30, 201, Washington.
- ZAHALKA B. 1957. Nalez medusovite formy v kride beskydske. — *Vestník Ú.Ú.G.*, 32, 294—296, Praha.

ANDRZEJ ŚLĄCZKA

DACTYLODISCUS BESKIDENSIS N.GEN., N.SP. — MEDUZA Z FLISZU
KARPACKIEGO

Streszczenie

Opisano pod nazwą *Dactylodiscus beskidensis* n.gen., n.sp. odciski meduzopodobnych organizmów, znalezionych przez autora w Łazach, nad jeziorem Rożnowskim, w Polskich Karpatach Środkowych. Występują one w warstwach dolnoistebniańskich, reprezentujących senon górny.

Zbadano 18 okazów, z których 14 przedstawia zapewne powierzchnię górną, a 4 — dolną. Są to odciski organizmów dyskoidalnych, okrągłych, o średnicy zmiennej, w granicach od 20 do 50 mm, i grubości od 1 do 2 mm. Dyski utworzone są z rozszerzających się ku obwodowi, wypukłych płatów w liczbie od 4 do 14. Na powierzchni przypuszczalnie górnej, wypukłej, można wyróżnić wypukłą strefę marginalną z zaznaczonymi długimi płatami trójkątnymi oraz krótszymi i węższymi palcowatymi. Na powierzchni przypuszczalnie dolnej, wklęsłej, prócz płatów schodzących się w środku, widać przy brzegu zewnętrznym płyty trójkątne, nie dochodzące do części centralnej, w pobliżu której występują 4 niewielkie wypukłości.

Opisana forma różni się znacznie od wszystkich dotychczas znanych meduz kredowych. Różni się ona również od meduz współczesnych. Ze względu na obecność u *Dactylodiscus beskidensis* żagielka zdaje się on zbliżać do hydromeduz.

АНДЖЕЙ СЛЕНЧКА

DACTYLODISCUS BESKIDENSIS N. GEN., N. SP. — МЕДУЗА
ИЗ КАРПАТСКОГО ФЛИША

Резюме

Под названием *Dactylodiscus beskidensis* n. gen., n. sp. описаны отпечатки медузообразных организмов, найденных автором в местности Лазы на побережье Рожновского озера, в Польских Средних Карпатах. Они встречаются в нижнеистебнянских слоях, относящихся к верхнему сенону.

Было изучено 18 экземпляров, 14 из которых представляет, по вероятности, верхнюю поверхность, а 4 — нижнюю. Они представлены отпечатками дискообразных, округлых организмов переменной диаметра от 20 до 50 мм, толщиной

1—2 мм. Диски состоят из выпуклых лопастей в количестве от 4 до 14, расширяющихся от центра к окружности. На предполагаемой верхней поверхности наблюдается выпуклая маргинальная зона с выделяющимися удлиненными треугольными лопастями и более короткими и узкими пальцеобразными лопастями. На предполагаемой нижней, вогнутой поверхности, кроме лопастей сходящихся в центре, у внешнего края заметны треугольные лопасти, не достигающие центральной части, вблизи которой находятся 4 небольших выпуклости.

Описанная форма существенным образом отличается от всех ныне известных меловых медуз. Она отличается и от современных медуз. Наличие у *Dactylodiscus beskidensis* паруса уподобляет ее с гидромедузами.
