

A C T A   Z O O L O G I C A  
C R A C O V I E N S I A

Tom XXIII

Kraków, 31. XII. 1978

Nr 6

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**Tortoises (*Emydidae* and *Testudinidae*) from the Miocene of Przeworno in Silesia (Poland)**

[Pp. 79—92, pl. XVI—XX, 4 text-figures]

**Żółwie (*Emydidae* i *Testudinidae*) z miocenu Przeworno na Śląsku (Polska) \***

**Abstract.** Shell remains of tortoises from the Przeworno fossil fauna of Upper Vindobonian-age are described. This is the first time that the presence of some members of the genus *Ptychogaster* POMEL, 1847 included in the species *Ptychogaster buechelbergense* KUSS, 1958 has been discovered in Poland. *Geoemyda eureia* (WEGNER, 1913) and some unidentified land tortoises of the family *Testudinidae*, probably belonging to the genus *Testudo* LINNAEUS, 1758, have also been found present. The importance of the occurrence of the above-mentioned species to the ecological interpretation of the localities Przeworno I and II is discussed. The systematic position of the genus *Ptychogaster* (*Ptychogastrini*) is also discussed and revised.

I. INTRODUCTION

Shell remains of tortoises are fairly often met with in the Miocene of Przeworno. They occur both at the locality Przeworno II, commonly called „upper”, and at Przeworno I, referred to as „lower” (GŁAZEK, OBERC and SULIMSKI, 1971). Przeworno I provided tortoise remains, collected earlier by Dr SULIMSKI and delivered to our collection and for investigation.

Unfortunately, the tortoise shell fragments collected in 1970—1975 are in a bad state of preservation and of minor taxonomic importance. Some of them were even damaged at the time of excavation and preparation. It was only in 1976, during an excavation made at Przeworno II, that we succeeded in obtaining material which at last made it possible to determine the systematic position more closely. In that year we came upon a rock crevice, at the bottom of

\* Praca wykonana w ramach problemu resortowego MR. II. 3.

which there were some well-preserved large fragments of shells and one almost complete shell of a small individual. These specimens must have got into the crevice after death, since neither the skulls nor any bones of the limb skeleton occurred with them. The best-preserved specimen of a tortoise of the genus *Ptychogaster* was found at the very bottom of the crevice, protected from above and from below by big rocky blocks. The crevice was filled up with characteristic hard brown-grey loam.

If large shell fragments predominate at Przeworno II, so far only isolated plates have been found at Przeworno I.

All the bone remains, notably those of tortoise shells, are very soft and delicate. They are not only liable to be damaged during excavation and preparation, but even very slight scratches or pricks leave lasting traces, which, e. g. in specimen 1 of *Ptychogaster buchelbergense* KUSS resemble marks left by the teeth of predators (Pls. XVI—XX). On the other hand, a few real marks of bites can be seen in the case of *Geoemyda eureia* (WEGNER) (specimen 1). However, I do not think that a chelonophage occurred at this locality. They are simply marks of the teeth of flesh-eating mammals which tried unsuccessfully to bite the tortoise shell, as do, e. g. dogs and foxes.

The material used in this study comes both from the excavation carried out under the direction of Dr SULIMSKI quite a few years ago and from excavations carried out every year by the Institute of Systematic and Experimental Zoology, Polish Academy of Sciences. The material is stored in the collection of fossil vertebrates of this institute in Cracow.

## II. LOCALITY

The localities Przeworno I and II have been described by GLAZEK, OBERC and SULIMSKI (1971). These authors determined the age of both localities as Younger Vindobonian (Middle Miocene). More information about the age and nature of the fauna of Przeworno has been given by GALEWSKI and GLAZEK (1973) and KOWALSKI and ZAPFE (1974). Some notes on the stratigraphy of Przeworno II can be found in papers by KUBIAK (1975) and MLYNARSKI (1976). In this last paper I present general data concerning the herpetofauna of Przeworno and its similarity to the Miocene fauna of Opole, which is well known thanks to a monographic publication by WEGNER (1913). The similarity of the mammalian faunas of these two localities is mentioned by other authors (KOWALSKI and ZAPFE, 1974).

There are considerable differences between the herpetofaunas of Przeworno II („upper”) and Przeworno I („lower”). I think that here we are concerned with two different biotopes existing in the same geological period. The herpetofauna of Przeworno I may be defined in general as that of an open xerothermic area, perhaps in the nature of a steppe. Elements typical of a warm and damp area of scrubs or perhaps even woods prevail in the herpetofauna of Przeworno II.



## III. DESCRIPTION OF MATERIAL

Superfamily: *Testudinoidea* BAUR 1893

Family: *Emydidae* GRAY, 1825

Subfamily: *Emydinae* GRAY, 1825

Tribe: *Ptychogastrini* DE STEFANO, 1917

*Ptychogaster* POMEL, 1842

*Ptychogaster buchelbergense* KUSS, 1958

(Diagnosis: KUSS, 1958, p. 52; MLYNARSKI, 1976b, p. 84)

Material: 1. Shell of a small but adult specimen, 12 cm long, nearly complete but with pygal and cervical parts damaged (No. Rf. 178/76). 2. Heavily damaged and compressed fragmentary pygal parts of the carapace and plastron of an adult specimen, more or less the same size (No. Rf. 179/76). Both specimens from Przeworno II and found near each other.

## Description

On the basis of the above material the appearance of the shell can be reconstructed fairly well and its structure partly detected. The bony plate sutures are not preserved in specimen 1, but they are very well seen in specimen 2, which permits the reconstruction of the pygal region of the carapace. On the basis of the whole of material it was possible to reconstruct the shape of the whole shell and its epidermal shields (Fig. 1).

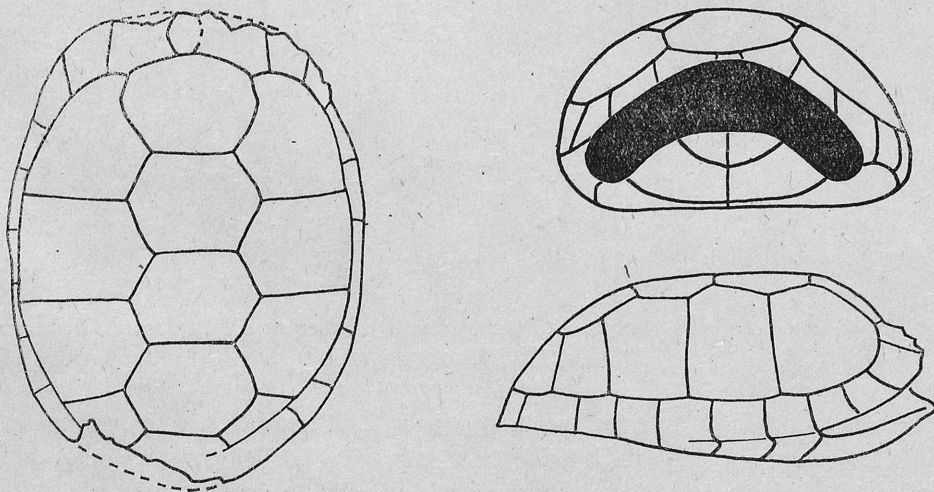


Fig. 1. *Ptychogaster buchelbergense* KUSS from Przeworno. Reconstruction. Del. K. MALCZEW-SKI

The carapace is oval and symmetrical in shape, somewhat resembling the carapace of the European Pond Tortoise (*Emys orbicularis* (LINNAEUS)). Its dorsal part is lightly flattened, which is visible in photographs and in Fig. 1. The external surface of the carapace and plastron is quite smooth, without any perceptible sculpture of the epidermal shields. There is no keel marked on the carapace, while the sulci of shields are well seen, allowing the reconstruction of their shape. The cervical (all the names of bony plates and horny shields are the same as in MLYNARSKI, 1976b) has not been preserved, because the carapace margin of the cranial part was damaged at the time of excavation. Some perceptible traces, though invisible in the photograph, suggest that it was relatively broad and tapering towards the front. The peripheral margin of the carapace is even, neither serrated nor bent, and somewhat wider in the cranial and caudal regions. The peripherals are higher than the marginals (specimen 2). Specimen 2 shows also the shape of pleurals V—VII and neurals IV—VI. The pygal region of the carapace, including the pygal, metaneural II and, pressed into the cast, metaneural I, is preserved but displaced by an angle of 90°. Notwithstanding, it was possible to reconstruct the appearance of the whole pygal region together with the epidermal shields (Fig. 2). The shape of the shields and the course of their sulci on the surface of the pygal are typical of the emydines (sensu McDOWELL 1964). They also agree with the diagram given by KUSS (1958, p. 53, Fig. 1). Compared with metaneural II, the pygal is small and rectangular. Metaneural II is trapezoidal, symmetrical and without any divergencies and distortions. Metaneural I, damaged and displaced, was very small, smaller than the pygal, and slightly oval in shape. The sulci of the postcentral were present only on the pygal, without passing on to the metaneurals. We do not know exactly what shape the neurals were and how many they were, whereas the shape of the pleurals was typical of the emydids.

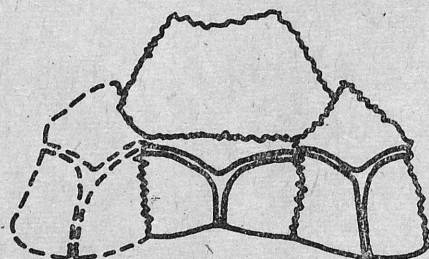


Fig. 2. Pygal region of the carapace (*Ptychogaster buechelbergense* KUSS from Przeworno).  
Del. K. MALCZEWSKI

The plastron is better preserved in specimen 1. It is united to the carapace by a broad and strong bridge with no distinct edge (keel). The upward bend of the anterior lobe, characteristic of *Ptychogaster*, is visible in the gular part. The epiplastra are well developed and the epiplastral lips massive and narrowed in the medial line. Unluckily, neither here are the bone sutures preserved, but



exclusively the sulci of the epidermal shields. The posterior lobe is not preserved in specimen 1. It was loosely joined to the anterior part of the plastron by means of a synchondrosis and must have been detached from it soon after the death of the animal. This is a common phenomenon in *Ptychogaster*. Only the very badly damaged, movable posterior lobe with its external surface destroyed is preserved in specimen 2. Its caudal part was mildly rounded, without an anal notch. Thus we were able to perform a reconstruction of the whole plastron.

### Discussion

The remains of both specimens described belonged to members of one species. Their membership in the genus *Ptychogaster* is unquestionable; it is indicated by the general habitus of the shell and the details of its structure, above all, the mixed-type junction of the plastron with the carapace. In the case of the first specimen the complete ankylosis, the utter ossification and union of shell plates with each other, leading to the disappearance of sutures, also points to membership in this genus.

On the basis of the general habitus, chiefly of the carapace shape, I include the tortoise from Przeworno in the species *Ptychogaster buchelbergense* KUSS, which has been described by KUSS (1958) from the Lower Miocene clays at Büchelberg in Pfalz (Germany). The specimens from Przeworno correspond with the holotype of this species also in size, but they differ somewhat from it in their slightly smaller cervical notch and complete lack of the anal notch in the posterior lobe of the plastron (in this case it is just a typical character of *Ptychogaster*). However, the foregoing characters are not significant here and do not authorize us to erect a new species. All these and similar differences lie within the limits of differences between populations and even inside a population of the same species.

The locality at Büchelberg is much younger than the locality at Przeworno, but this is of no major importance either in this case or in the case of turtles in general and cannot make the basis for erecting a separate new species, either.

*Ptychogaster buchelbergense* KUSS belongs to the group of small Miocene members of the genus under discussion. In spite of a number of differences demonstrated by BACHMAYER and SCHAFER (1959) it is a form closely related or perhaps even identical with *Ptychogaster grundensis* BACHMAYER & SCHAFER from the Upper Miocene (Lower Tortone) of Lower Austria. The perfectly well preserved shell (holotype) of this species has nearly identical dimensions with those of the first specimen from Przeworno. It differs from *Ptychogaster buchelbergense* KUSS in its rather indistinct cervical notch and somewhat different outline of the carapace, i. e. its carapace is weakly but perceptibly narrowed laterally with the peripheral margin of its cranial and caudal parts broadened (op. cit., Pl. 2, Fig. 4). This very shape of the carapace is characteristic of the members of the genus *Ptychogaster* from the freshwater molasse of Switzerland, e. g. *Ptychogaster heeri* (PORTIS) or *Ptychogaster wischbergense* BRÄM. As regards

the species from Austria, there is only one specimen known. Its structure shows some pathological, teratological characters, probably connected with the advanced anchylosis of the bone sutures. The carapace is not symmetrical about the longitudinal axis and excessively, unnaturally vaulted. For this reason it is impossible to determine the systematic position of this species more closely as long as we have only one specimen at our disposal.

According to KUHN (1964, pp. 97—101), the genus *Ptychogaster* contains as many as 28 species. All of them have been described exclusively from Europe and all of them are in fact very similar to *Ptychogaster emydoides* POMEL (typus generis).

Subfamily: *Batagurinae* GRAY, 1870

Tribe: *Geoemydini* GRAY, 1869

*Geoemyda* GRAY, 1834

*Geoemyda* aff. *eureia* (WEGNER, 1913)

(Diagnosis: WEGNER, 1913, pp. 213—217; KHOSATZKY and MLYNARSKI, 1966, pp. 405—407)

Material: 1. A heavily damaged, large shell fragment consisting of the anterior parts of the carapace and plastron of a big specimen (No. Rf. 181/76); 2. Isolated shell fragments of several small specimens: nuchal, left hyoplastron, neurals I and II and small indeterminate fragments (No. Rf. 182/76). 3. A damaged left hyoplastron and largely destroyed right xiphiplastron, probably of the same small specimen (No. Rf. 183/76). All these remains were excavated at Przeworno II in 1975 and 1976.

Description

In the material listed above the remains of the first specimen are particularly noteworthy. Although they are heavily damaged, the details preserved are of essential taxonomic importance. They are only partly prepared and are united by means of fragments of the cast. Out of the carapacial plates, the nuchal is well preserved. It has no distinct cervical notch. The cervical is pyriform, characteristic of the members of this species. The external surface of the carapacial and plastral plates is smooth with a very subtle, indistinct sculpture of the epidermal shields. The nuchal is also preserved in specimen 2. It is a detached plate of a small specimen, whose shell was about 12 cm long. The external surface of this plate is damaged and a trace of the cervical is present only on its internal side. In specimen 1 the neuralia are crushed and ill-preserved so that it is difficult to reconstruct their shape. There are two isolated plates preserved in our material. The N-II of a big specimen has a particularly characteristic „geoemydal” shape. The pleurals Pl-I to Pl-III are visible in the first specimen, their shape being typical of the emydids, with a fairly distinctly vaulted carapace.



- The extant peripherals indicate that they formed an even, unserrated edge of the carapace.

The plastron is united with the carapace by a broad bridge. Judging from the first specimen, we may suppose that the two lobes were permanently connected to each other and to the carapace by bony junctions. The epiplastra form a broad margin but are damaged in the gular part, which cannot be reconstructed. The well-seen entoplastron is diamond-shaped and its lower part is

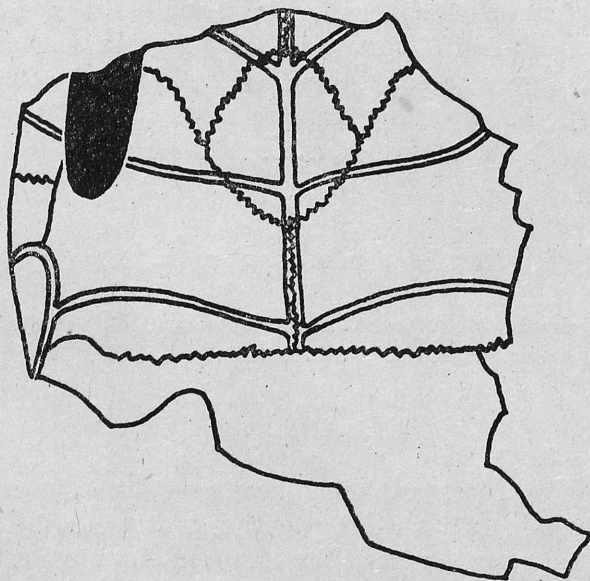


Fig. 3. *Geoemyda* aff. *eureia* (WEGNER) from Przeworno. Del. K. MALCZEWSKI

traversed by the humeropectoral sulcus. The hyoplastra were united with the hypoplastra by a strong suture, along which specimen 1 has been broken (Fig.3). The sulci of shields are well preserved in this specimen. The gulars are narrow and triangular, the pectorals somewhat narrower than the abdominals. Unfortunately, the hind part of the plastron has not been preserved. It should be emphasized that in all the specimens the bone sutures are conspicuous and there are no anchyloses.

#### Discussion

The remains of tortoises described above show features characteristic of the genus *Geoemyda*, i. e. the habitus of shell, the shape of neurals (N-II), the structure and shape of the nuchal with the cervical and of the ectoplastron. The shell length of these animals did not exceed 15 cm. The foregoing characters and the smooth surface of the fairly strongly domed carapace suggest that these remains belonged to the species *Geoemyda eureia* (WEGNER), which is also indicated by the even, not serrated peripheral margin and the shape of the ento-

plastron. However, since our material is, as yet, rather fragmentary, the systematic position of this form cannot be regarded as absolutely certain.

*Geoemyda eureia* (WEGNER) is one of the better known species of the genus being discussed. It has been described from the Upper Miocene of Opole by WEGNER (1913), but its systematic position has been repeatedly revised. So far this species is known only from Silesia. It is typical of the Miocene of this country. The information about the occurrence of the same form at Weże I (MŁYNARSKI, 1955) is not certain (KRÓSATZKY and MŁYNARSKI 1966, p. 407). The species characteristic of that geological period is *Geoemyda mossoczyi* MŁYNARSKI, known from several Pliocene and Early Pleistocene localities of Central and East Europe. Surely these two species are closely related to each other (MŁYNARSKI, 1964). They probably inhabited somewhat different environments, although they were both, above all, terrestrial forms.

### *Emydidae* gen. & spec. indet.

Material. A fragmentary anterior part of the carapace of a big specimen, with the nearly complete and well-preserved nuchal (No. Nf. 180/76).

### Description

Among the remains of tortoises found together with specimen 1 of *Ptychogaster buechelbergense* KUSS in 1976 special attention is attracted by a well-preserved large fragment of the cranial part of the carapace of a big specimen. It consists of the nuchal and peripherals I and II with a fragment of the pleural. The nuchal does not form a fairly distinct cervical notch and the cervical is barrel-shaped, like that in *Ptychogaster grundensis* BACHMAYER & SCHAFER. The impression of this shield in the internal surface of the edge of the nuchal is concave and slim, considerably narrower than on the external side. The surface of the plates is quite smooth and the preserved fragment of the peripheral margin is even, without any tendency towards being undulated or serrated. These remains belonged to the biggest specimen of the group of tortoises found at Przeworno so far, its shell approached 18 cm in length.

### Discussion

The tortoise shell remains described briefly above have a typical structure of the *Emydidae*, but their close identification is very problematic. Some characters, e. g. the very delicate bone sutures and the shape of the cervical would point to the fact that we are concerned with a member of the genus *Ptychogaster*. It cannot be excluded utterly, either, that these carapacial fragments belonged to a distinctly bigger specimen of *Ptychogaster buechelbergense* KUSS. This is contradicted by the structure of the nuchal and cervical, apparently different from



the structure of these parts of the shell in the first specimen of this last species. The morphology of the fragment under discussion differs distinctly also from the remains of *Geoemyda* aff. *eureia* (WEGNER). In this connection it might be supposed that a third emydid species, perhaps also a member of *Ptychogaster*, occurred at Przeworno II. However, it seems hardly probable that as many as two species of this very genus lived in one small area. On the other hand, it is possible that a member of still another genus occurred there.

Family: *Testudinidae* GRAY, 1822

*Testudo* LINNAEUS, 1758

*Testudo* sp.

Material: 1. The rather heavily damaged right hyoplastron and fragmentary pleural plate (Pl-II) of a very big specimen; 2. a fragment of the left xiphiplastron with traces of the abdominofemoral sulcus and small carapacial fragments of other specimens (leg. Dr A. SULIMSKI, 1970, No. Rf. 184/76); 3. the fragmentary right hyoplastron and well-preserved right xiphiplastron of the same specimen and indeterminable shell fragments (leg. Dr H. KUBIAK, 1970, 1970, No. Rf. 185/76); Przeworno I.

#### Description

Some remains of big terrestrial tortoises have been found, as has already been mentioned, in the „lower” locality (Przeworno I). These were big animals with a stout shell. Their remains differ at first sight from those of the tortoises from Przeworno II both in thickness and in the distinct sculpture of the epidermal layer. This sculpture is well seen, e.g. in the pleural fragments. It is very characteristic of land tortoises. The hyoplastron of specimen 1 is particularly massive, its thickness being up to 15 mm. Traces of the narrow pectoral are preserved on its external side. These remains represent the biggest tortoise ever found at Przeworno. Its shell length may have approached 30 cm. Specimen 2 was somewhat smaller, but even then it reached 25 cm in length. The xiphiplastron is preserved

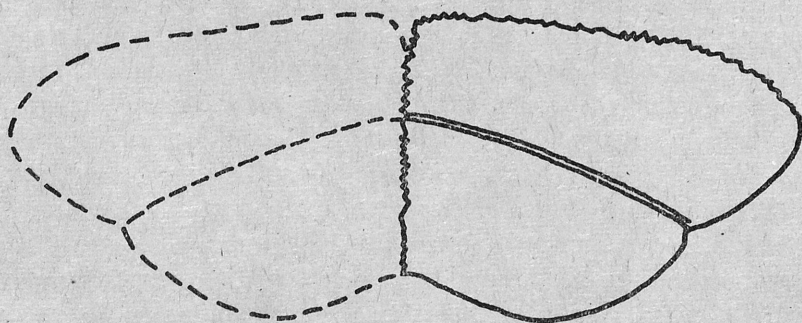


Fig. 4. Xiphiplastra of the land tortoise from Przeworno. Del. K. MALCZEWSKI

whole and it has permitted us to reconstruct this part of the plastron (Fig. 4). The shallow and very weak anal notch is here noteworthy. This plate, too, is very massive, its thickness at the external edge adjacent to the hypoplastron is 13 mm. The sulci of shields are very poorly marked on the external surface. The left xiphiplastron of the same specimen, like the above-mentioned xiphiplastron, has its surface very much ground off. Both these fragments underwent grinding and all their edges were blunted in the course of fossilization.

### Discussion

The shell fragments described briefly undoubtedly belonged to some land tortoises (*Testudinidae*). This is indicated by their shape, massive structure, surface sculpture and size. At Przeworno I there probably lived one species of the genus *Testudo* LINNAEUS. As early as the Miocene the members of this genus were numerous in Europe (cf. AUFFENBERG, 1974). Some of them even attained considerable dimensions, e. g. *Testudo csakvarensis* SZALAI, 1934, the form related to or identical with *Testudo kalksburgensis* TOULA, 1896 from the Sarmatian of Austria and Hungary. Nevertheless, the presence of some members of the genus *Geochelone* FITZINGER, 1835, which constitutes the main evolutionary branch of land tortoises, cannot be completely excluded. However, the relatively small size of our tortoises contradicts the occurrence of this genus at Przeworno. So far, neither „small” (shell length to 25 cm) nor „medium-sized” (shell length to 40 cm) forms, so characteristic of the Tertiary herpetofauna of Asia and North America, are known from the Tertiary of Europe (AUFFENBERG, 1974; MLYNARSKI, 1976b).

### IV. ECOLOGICAL INFERENCES

The tortoise fauna of Przeworno is clearly terrestrial in nature but, as has already been mentioned, it is distinctly differentiated.

Members of the genera *Ptychogaster* and *Geoemyda* occur at Przeworno II. The first of them was a decidedly terrestrial form, but it lived in the vicinity of water, in marshy and damp areas (cf. BRÄM, 1952; KUSS, 1958; BACHMAYER and SCHAFER, 1959). These authors' suppositions are also confirmed by our finds. The tortoises of the genus *Ptychogaster* seem to have lived in scrubs, at the edge of forests, on the banks of larger or smaller reservoirs of quiet water. The habitat and behaviour of *Ptychogaster* may be compared with those of the modern Asiatic members of the genera *Geoemyda* and *Cuora*. These last tortoises, in spite of their strongly domed carapace, can sometimes stay and hunt in water. However, according to the breeders of these animals, even in them this character was sometimes very individual or attached to a certain period of the year. Finally, *Ptychogaster* may have occupied a similar ecological niche to that of the modern members of *Terrapene*, e. g. *Terrapene carolina bauri* TAYLOR,



1895, living in Florida. The members of *Geoemyda eureia* (WEGNER) inhabited a similar or even identical environment. This tortoise, too, had a remarkably convex carapace, which is regarded as an evidence of adaptation to terrestrial life. As regards the emydids, this criterion alone is not quite reliable (SCHUBERT-SOLDERN, 1962). In our case a fairly important feature is the similarity of *Geoemyda eureia* (WEGNER) to the South-East-Asiatic members of the subgenus *Heosemys* STEJNEGER 1902 (sensu KHOSATZKY and MLYNARSKI, 1966). Summing up these considerations, I must state that the presence of the genera *Ptychogaster* and *Geoemyda* at Przeworno II points to the existence of a damp, scrub or forest environment with small reservoirs of stagnant water, producing favourable living conditions for amphibians of the species *Latonia* cf. *seiffriedi* H. v. MEYER, 1843 (= *Discoglossus giganteus* WETTSTEIN-WESTERHELM 1955), which abounded here (MLYNARSKI, 1976b, pp. 9—10).

The locality Przeworno I, in which only remains of big land tortoises occur must have been completely different in character. It was an open locality, poorly wooded, covered by xerothermic vegetation on a hard rocky substratum. It might be compared with the present-day hilly regions of the Balkan and Iberian Peninsulas. The massive structure of the shell plates and the strong sculpture of their epidermal shields indicate the adaptation of these tortoises just to such an environment. This very environment is also suggested by the presence of remains that belonged to big lizards of the family *Anguidae*, closely resembling the members of the genus *Ophisaurus* DADUIN, 1803. These lizards have not, as yet, been found at Przeworno II. The characteristic grinding of the edges of the tortoise shell plates indicates the existence of a rapid river or stream in the neighbourhood of this environment.

#### V. SYSTEMATIC POSITION OF *Ptychogastrini*

In a previous publication (1976b) I included the members of the genus *Ptychogaster* in the Eurasian subfamily *Batagurinae*, in which I was guided, above all, by the geographical distribution of this group of tortoises. Their inclusion in the *Batagurinae* was also suggested by the would-be affinity between *Ptychogaster* and *Geoemyda*, mentioned by older authors (e. g. HUMMEL, 1935). This systematic position should now be changed on the basis of, among other things, the remains of *Ptychogaster* from Przeworno.

Both in our case (cf. Fig. 2) and in the case of the holotype of *Ptychogaster buchelbergense* KUSS (KUSS, 1958, p. 53, Fig. 1a) the pygal region of the carapace has a structure typical of the *Emydinae* (MLYNARSKI, 1976b, p. 81 Fig. 76), defined by McDOWELL (1964). In her paper on the skulls of the genus in question F. DE BROIN (1970) does not mention the occurrence of the batagurinal process on the basioccipital bone. In the diagrammatic drawings of the ventral side of the skull (F. DE BROIN, p. 81, Fig. 1) the basioccipital does not bear any traces of this small process and in this connection the skull may be regarded as

typical of the *Emydinae*. In her considerations this authoress also draws attention to the similarity of the skulls of *Ptychogaster* to that of the modern European pond tortoise (*Emys orbicularis* (LINNAEUS)). In conclusion, the whole group *Ptychogastrini* should be included in the „American” subfamily *Emydinae*. This having been taken into account, the systematic division of the family *Emydidae* presents itself as follows:

Family: *Emydidae* GRAY, 1825

a) Subfamily: *Batagurinae* GRAY, 1870, emend. McDOWELL, 1964

Tribe: *Geoemydini* GRAY, 1869; emend. MLYNARSKI, 1976

Tribe: *Sakyini* OKHIKVADZE, 1968; emend. MLYNARSKI 1976,

Tribe: *Batagurini* GRAY, 1970; emend. MLYNARSKI, 1976

b) Subfamily: *Emydinae* GRAY, 1825; emend. McDOWELL, 1964

Tribe: *Ptychogastrini* DE STEFANO, 1917; emend. MLYNARSKI, 1976

Tribe: *Emydini* GRAY, 1825

The members of the genus *Ptychogaster* cannot be regarded as related and, all the more, ancestral to the genus *Geoemyda*, as was suggested by earlier authors (cf. v. REINACH, 1900; HUMMEL, 1935; BRÄM, 1952, and others). The morphological similarity of these animals is connected with their adaptation to the identical or very similar, more terrestrial than aquatic, ways of life. It is therefore based on convergency. On the other hand, we may speak about a relationship between *Ptychogaster* and *Emys* A. DUMÉRIEUX 1806. It is visible not only in the general habitus of the shell (e. g. *Ptychogaster heeri* (PORTIS)) but also in many structural details, like the type of junction of the hind plastral lobe, the shape of the plastral lobes and the structure of the skull, described by F. DE BROIN (1970). In spite of these characters *Ptychogaster* cannot be regarded as ancestral to the modern European Pond Tortoise. The *Ptychogastrini* form a very specific group, characterized by an exceptional tendency, so far unique among fossil and modern tortoises, towards the complete osteosis of the shell soon after the attainment of maturity. This character never occurs in *Emys orbicularis* (LINNAEUS), in which the sutures are preserved even in very aged specimens. Hyperostosis and, associated with it, ankylosis may have been the character that limited the adaptive possibilities of the *Ptychogastrini*. It inhibited the growth of the shell and caused its frequent distortions, as, e. g. in the case of *Ptychogaster fejervaryi* (SZALAI, 1930) or *Ptychogaster grundensis* BACHMAYER & SCHAFER, mentioned already above. It probably brought about the extinction of these tortoises and influenced the brevity of their phylogenetic life (the *Ptychogastrini* occur virtually only in the Miocene). The effect of climatic changes must have



been less important. After all, the members of the genus *Geoemyda* endured the changes between the Miocene and Pliocene very well and adapted themselves to the new climatic and ecological conditions. Finally, *Emys orbicularis* (LINNAEUS), persisting without any morphological changes since the Pliocene, has shown its uncommon adaptive possibilities.

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## STRESZCZENIE

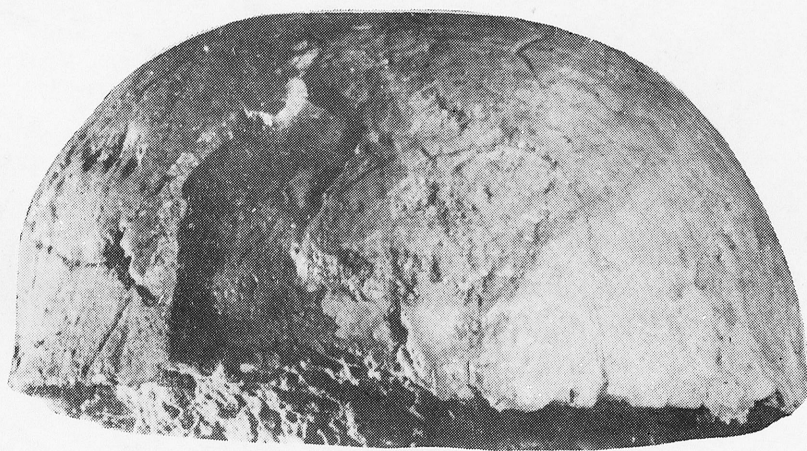
Szczątki żółwi zebrane w Przewornie w ciągu ostatnich lat pozwoliły na dokładniejsze wykazanie występujących form. Żółwie z rodziny *Emydidae* reprezentowane są przez gatunek *Ptychogaster buchelbergense* KUSS, 1958. Jest to pierwsze pewne znalezisko żółwia z rodzaju *Ptychogaster* POMEL, 1847 na terenie Polski. Zachował się prawie cały pancerz omawianego zwierzęcia. Dzięki temu można było dokładniej ustalić jego stanowisko systematyczne. W naszym materiale stwierdziłem też obecność gatunku *Geoemyda eureia* (WEGNER, 1913) opisanego z górnego miocenu Opola (Nowa Wieś Królewska). Oba wymienione gatunki występują tylko na stanowisku Przeworno II (GŁAZEK, OBERC i SULIMSKI 1971). Ze stanowiska Przeworno I pochodzą szczątki pancerzy żółwi lądowych (*Testudinidae*), należących prawdopodobnie do przedstawicieli rodzaju *Testudo* LINNAEUS, 1758, charakterystycznych dla wielu miocenских stanowisk Europy.

W części ogólnej ustaliłem stanowisko rodzaju *Ptychogaster* w systemie żółwi. Jak okazuje się, są to typowi przedstawiciele *Emydinae*, a nie jak przypuszczano *Batagurinae*. Na podstawie szczątków żółwi uzupełniłem również charakterystykę ekologiczną omawianego stanowiska.

Plate XVI to XX

*Ptychogaster buchelbergense* Kuss from Przeworno (natural size 12 cm.)





*M. Mlynarski*  
*Phot. K. Jakubek*







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ISBN 83—01—00430—4

ISSN 0065—1710

Redaktor zeszytu: doc. dr habil. Z. Bocheński

PAŃSTWOWE WYDAWNICTWO NAUKOWE — ODDZIAŁ W KRAKOWIE — 1978

Nakład 800+80. Ark. wyd. 1,5. Ark. druk.  $1\frac{4}{10}$ +5 wklejek. Papier ilustr. kl. V 70×100 71 g  
Zam. 345/78 Cena zł 10.—

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