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
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GEOEMYDA EUREIA (WEGNER), TESTUDINES, EMYDIDAE, FROM A NEW LOCALITY IN POLAND

Abstract. — A description is here given of remains of *Geoemyda eureia* (Wegner) from Rębielice Królewskie near Kłobuck, which is the third locality of this fossil species in Polish territory. Other fossil representatives of genus *Geoemyda* are also discussed and some comments made on the biology of *G. eureia* (Wegner) and its habitat.

INTRODUCTION

The material here considered has been discovered at Rębielice Królewskie near Kłobuck (NW of Częstochowa), by Mr. Z. Mossoczy of the Geological Survey of Poland (Instytut Geologiczny). Tortoise remains and bone fragments of other vertebrates have been recovered from dark red clay in a karst doline, in a quarry of Jurassic limestones. The clay has a deep red colour, so characteristic of terra rossa. Tortoise shell fragments are not very abundant in the studied material. They are poorly fossilized, hence the bone structure of the detached plates is excellently preserved. Unfortunately, the tortoise remains are represented by isolated shell plates only.

The age of these remains has not thus far been determined, most likely, however, they are Pliocene, in any case not older than the Pleistocene-Pliocene boundary.

All the fragments described here below have been kindly handed over to the writer by Mr. Mossoczy, to whom the warmest words of thanks are being conveyed. They belong to the collection of the Geological Survey of Poland.

DESCRIPTION

Material. — Left epiplastron of a large individual, entoplastron and non-typical neural of an adult specimen, suprapygals, marginals belonging to several individuals of various size, bone plates and bone fragments, and a young pygale.

Fragments of plastrons. — The epiplastron is in an excellent state of preservation. Its shape is characteristic of the here considered species: the so-called epiplastral lips show distinct ridge-like thickenings on the inner surface near the intersection of the gularo-humeral furrow. This thicken-

ing, typical of species *Geoemyda eureia* (Wegner), is observable on the outer surface of the plastron as a conical process of the border of the anterior lobe (fig. 1). Characteristic, slightly undulate imprints of scutes are discernible on the surface.

The shape of the entoplastron is typical of genus *Geoemyda* Gray (fig. 2). It resembles a triangle with the top directed to the epiplastrons,

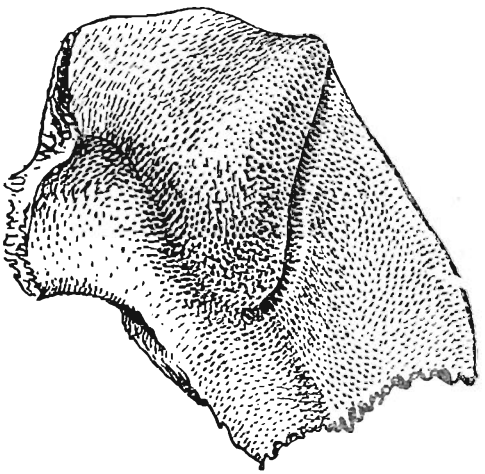

Fig. 1. — *Geoemyda eureia* (Wegner), inner surface of epiplastron; ca. × 2.3.

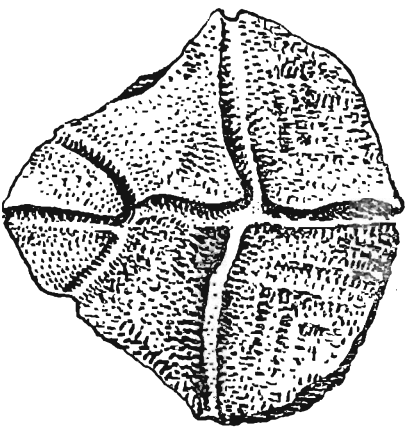

Fig. 2. — *Geoemyda eureia* (Wegner), entoplastron; ca. × 2.3.

and the base vaulted like a crescent. The entoplastron is medially crossed by a clearly distinct humero-pectoral furrow. The impressions of furrows and the internal structure of the plate are readily discernible. Our entoplastron is moderately thick and massive, indicating an old individual.

Since the above epiplastron and entoplastron belonged to individuals of the same size whose plastrons seem normal, it was possible fairly approximately to reconstruct the anterior plastral lobe (fig. 3).

Fragments of carapace. — The preserved fragmentary carapaces and plastrons are likewise characteristic of the here studied species.

The second neural only has an asymmetric shape, non-typical of the considered form. Plates of this shape, however, are sporadically encountered in recent representatives of *Geoemyda*. This plate is somewhat like a quadrangle with sides not parallel, slightly vaulted, and three of the angles bluntly truncated, thus giving a semblance of three additional sides. They resemble the octagonal plates characteristic of genus *Testudo* Linné, commonly occurring as abnormal structural features in fossil and recent representatives of this genus (fig. 4). The remaining neurals have

a shape typical of genus *Geoemyda*. Their antero-lateral borders are namely considerably better developed than the short postero-lateral borders. In the majority of plates the inner surface and the processes joining the plates with the vertebrals are well preserved.

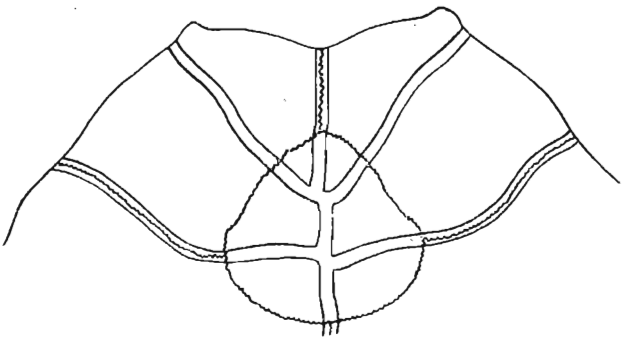

Fig. 3. — *Geoemyda eureia* (Wegner), reconstruction of anterior lobe of plastron.

The costals in our material are fragmentary only. Their lateral borders are parallel. The degree of the vaulting in the costals does not suggest the presence of lateral borders in the carapace (Seitenkiel). Deep

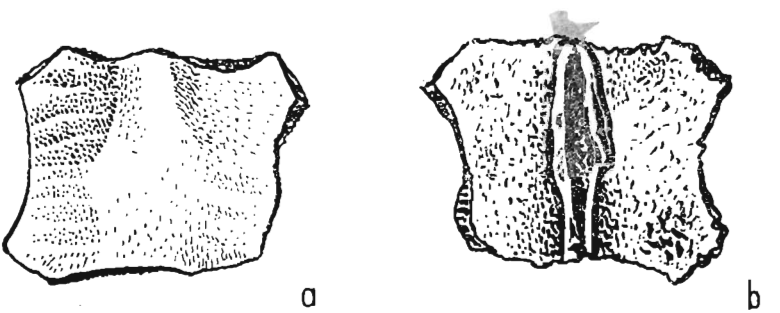

Fig. 4. — *Geoemyda eureia* (Wegner), asymmetric and non-typical neural plate; *a* outer side, *b* inner side; × 2.3.

folds encircling the areola of horny scutes are very distinct on the outer surface of these plates. The structure of the horny scute on the surface of 8th costal (fig. 5) is particularly conspicuous.

The marginals are fairly numerous. The 8th marginal, belonging to an adult though not particularly large-sized individual, is noteworthy. It is characterized by the flange of the outer free border which constitutes a part of the postero-lateral border of the carapace. A deep incision in this border and the coarseness of the sculpture of horny layers of scutes

encircling the areola (fig. 6) are distinct features here. Deep notches of the flanged postero-lateral borders of the carapace are characteristic of living species *Geoemyda annulata* (Gray).

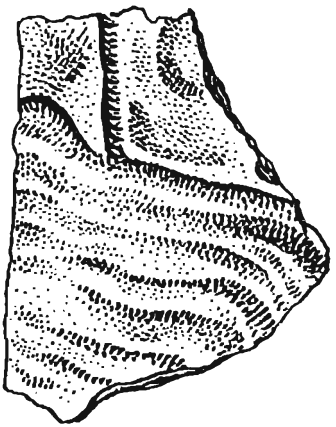

Fig. 5. — *Geoemyda eureia* (Wegner), eighth costal plate; × 2.3.

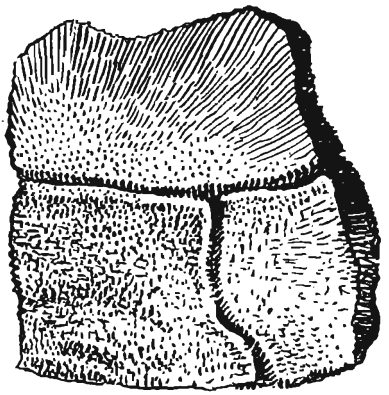

Fig. 6. — *Geoemyda eureia* (Wegner), one of the marginals of the carapacial bridge; × 2.3.

The shape of the suprapygal plate is typical of many emydids. It is hexagonal with symmetric borders. Its outer surface is quite smooth, without signs of imprints of the horny scute. Since this plate lacks features typical of the studied species, it may be a fragmentary shell of some other emydid from the same site.

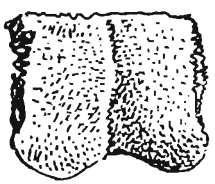

Fig. 7. — *Geoemyda eureia* (Wegner), inner surface of a pygal plate of a small individual.

The pygal plate belonged to a small and young individual. It is with a caudal notch characteristic of *Geoemyda eureia* (Wegner), being identical with pygal plates of this species from Nowa Wieś Królewska near Opole, Silesia (fig. 7).

GENERAL CONSIDERATIONS

Systematic position of the described remains

All the above described fragments, with the exception, maybe, of the suprapygal plate, are doubtlessly conspecific. On the morphology of the entoplastron and of the neurals these remains are referred to genus *Geoemyda*.

The present writer refers the tortoise remains from Rębielice Królewskie to species *Geoemyda eureia* (Wegner) on evidence supplied by

comparative studies of the here described tortoise shells, with numerous fragmentary shells of that species from Nowa Wieś Królewska described for the first time by R. N. Wegner (1913), and with a shell fragment of that tortoise from Węże near Działoszyn on the Warta (M. Młynarski, 1955).

The systematic position of the studied specimens is, therefore, as follows:

Order Testudinoidea
Family Emydidae
Genus *Geoemyda* Gray, 1834
Geoemyda cf. *eureia* (Wegner, 1913).

The above fossil remains differ from most of analogous fragmentary shells of *Geoemyda eureia* (Wegner) in stronger surface ornamentation (morphology of horny scutes) and in slightly larger dimensions. These remains are, however, too fragmentary to suggest conclusions regarding the occurrence in Rębielice Królewskie of a separate variety or species. Similarities to analogous shell fragments of *Geoemyda eureia* are so conspicuous that the noted here differences may reasonably be referred to the individual variability of the studied specimens, maybe connected with local ecological conditions.

Fossil representatives of genus Geoemyda

The fossil representatives of genus *Geoemyda* are mainly those recorded from the Tertiary of Europe. Probably the oldest remains of that genus have been collected from the Eocene of Saxony. They are *Geoemyda ptychogastroides* Hummel and *Geoemyda saxonica* Hummel, recorded from the same locality and described by K. Hummel (1935) from brown coal deposits.

Remains described by R. W. Hooley (1905) under the name of *Geoemyda headonensis* (Hooley) come from Upper Eocene beds of England. In Hummel's opinion (*op. cit.*), they bear strong morphological resemblance to the Saxonian *Geoemyda ptychogastroides* Hummel, from which they are supposed to differ mostly in the lack of the vertebral border.

Remains of *Geoemyda sopronensis* (Boda), (A. Boda, 1927; E. Thenius, 1952) are well known from the Pannonian beds of Hungary and from the Pliocene in the vicinity of Vienna. This tortoise has been largely reported upon in chelonological literature in view of the non-typical structure of the horny scutes of carapace. The symmetry and apparent regularity of these scutes is by Boda (*op. cit.*) regarded as a generic feature. T. Szalai (1934), M. F. Glaessner (1926) and E. Thenius (1952), however, are of the opinion that in the holotype described from Hungary we have a case of individual abnormal structure of carapacial scutes.

Numerous but, unfortunately, mostly fragmentary remains of *Geoemyda eureia* (Wegner) have thus far been recorded from Poland. The holotype of this species, described in 1913, was collected at Nowa Wieś Królewska. Abundant remains of *G. eureia* have been recovered from freshwater Miocene clays of that locality, and still continue to be reported from there, together with numerous remains of other vertebrates. The whole fauna there is distinctly tropical. Vertebrate remains, collected at Nowa Wieś Królewska since the end of the World War II, will — when worked out — most probably contribute to the knowledge of that interesting fauna. In every probability, all the tortoise remains from that site belong to the same species — *Geoemyda eureia*. This is confirmed by the views held by Glaessner (1926) and Thenius (1952), who have included into the synonyms of that species another form, by Wegner (1913) described under the name of *„Clemmys pacheia"*.

A shell fragment of that species was in 1955 described by the present writer from the Pliocene bone breccia at Węże near Działoszyn on the Warta (Młynarski, 1955). Hence, the here described remains bring up to three the number of Polish localities of that species.

Specific features, in which *Geoemyda eureia* differs from other fossil representatives of that genus, are those concerning the morphology of epiplastrons and the general appearance of the carapace. The carapace of that tortoise was distinctly vaulted and smooth, lacking any visible traces of costal and vertebral borders, so characteristic of many fossil and living geoemyds.

Other noteworthy fossil representatives of that genus in Europe are species cited by Glaessner (1926), namely: *Geoemyda*(?) *brevicosta* (Portis) and *G.* (?) *michelotti* (Portis) from the Pliocene of Piemonte, and *G.* (?) *lignitorum* (Portis) from the molass beds of Switzerland (Miocene). In all these forms described by A. Portis (1882) the neurals are distinctly of the "*Geoemyda*" type. Other generic features have not been observed on the basis of accompanying photographs. Since, as has previously been ascertained by Glaessner (1926), the number of the "*Geoemyda*" type of neurals in representatives of other emydids varies from one to several — this is not a sound basis for the determination of the systematic position of the studied tortoise forms.

From among Asiatic species the most noteworthy is that of *Geoemyda tricarinata sivaliensis* (Lydekker), described by R. Lydekker in 1889 from the renowned Siwalik Hills of India. That tortoise had a relatively flat carapace with three distinct keels which are likewise characteristic of the living species *Geoemyda tricarinata* Blyth and *G. trijuga* (Schweigger).

From Japan genus *Geoemyda,* or another form with similar morphological features, has been described from Eocene beds by H. Matsumoto (1929) under the name of *Geoemyda (Geoliemys) takasago* Matsumoto. According to Hummel (1935), the neurals of this tortoise are not typical of the studied genus and cannot, most likely, be referred to it (*op. cit.*, p. 465). In the holotype described by Matsumoto (1929), only the 6th and 7th neurals are actually of the "*Geoemyda*" type. In the writer's opinion, this does not justify the assignment of these remains to the discussed genus, without, however, excluding — as is suggested by Matsumoto himself — the possibility of the erection for this form of a new genus or species (*Geoliemys* Matsumoto).

The "*Geoemyda*" type of neurals is also observed in species *Senryuemys kiharai* Shikama, described by T. Shikama (1953, 1956) from the Senryu Coal Mine in the district of Nagasaki. In the mentioned tortoise there are the 4th, 6th and 8th neurals. In view of the numerous and frequent irregularities, noted in the structure of carapace in both mentioned forms, there can be no question of these tortoises being closely related with *Geoemyda.*

Climate and habitat

The fossil remains of *Geoemyda eureia* (Wegner), discovered so far, should evidently be placed in various geological times and under distinctly various environmental conditions, differing in the composition of their fauna. So far the richest finds of that species are from the freshwater clays at Nowa Wieś Królewska. Tortoises from that locality are distinguished by relatively small dimensions and poor surface ornamentation of the horny scutes. The Pliocene bone breccia at Węże near Działoszyn has yielded comparatively scanty remains of the considered species. Hence the present writer was at one time of the opinion that, in the environment which existed at Węże, *Geoemyda eureia* was a rarely occurring form, which was then becoming extinct in those regions owing to the gradual cooling of the climate, as was also the case with representatives of indeterminate species of genus *Clemmys* Ridgen. In the Pliocene environment at Węże, the adaptation of the emydids occurring there is clearly to land existence. *Emys wermuthi* Młynarski, described by the writer in 1956, is a striking example of this adaptation. In Rębielice Królewskie we are dealing with a similar adaptive process of the studied tortoise species. As has already been mentioned more than once the plates in these tortoises are more massive and display more distinct surface ornamentation, corresponding to the structure of horny scutes; this indicates further adaptation to a land existence. It is well known that living representatives of *Geoemyda,* with the probable exception of a few

species (for ex. *Geoemyda spinosa* [Gray]), are not at all closelly associated with aquatic environment. Some of them, such as *Geoemyda annulata* (Gray) and *G. punctularia* (Daudin) are typical continental forms and this is reflected in all their morphological features. The habits of these animals somewhat resemble those of forest tortoises of genera *Terrapene* Merrem (Emydidae) and *Testudo* Linné (Testudinidae).

Most likely the ecological and climatic conditions prevalent at Węże during the Pliocene resembled those of Rębielice. The fauna of these two localities apparently shows close resemblance which will probably be confirmed upon more detailed investigation of other vertebrate remains from Rębielice Królewskie.

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Kraków, September 1958

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NOWE STANOWISKO *GEOEMYDA EUREIA* (WEGNER), TESTUDINES, EMYDIDAE W POLSCE

Streszczenie

Notatka niniejsza zawiera opis fragmentów pancerzy żółwia słodkowodnego z rodziny Emydidae, z gatunku *Geoemyda* cf. *eureia* (Wegner), pochodzących z miejscowości Rębielice Królewskie koło Kłobucka. Jest to już trzecie stanowisko w Polsce, w którym znaleziono szczątki tego gatunku.

W części ogólnej notatki dokonano przeglądu dotychczasowych kopalnych przedstawicieli rodzaju *Geoemyda* Gray, znanych z terenów Europy i Azji. Następnie poświęcono uwagę porównaniu dotychczasowych stanowisk *Geoemyda eureia* oraz przypuszczalnym warunkom, jakie panowały w tych miejscowościach.

OBJAŚNIENIA DO ILUSTRACJI

Fig. 1 (p. 92)

Geoemyda eureia (Wegner), wewnętrzna powierzchnia płytki epiplastralnej; ca. × 2,3.

Fig. 2 (p. 92)

Geoemyda eureia (Wegner), płytka entoplastralna (entoplastron); ca. × 2,3.

Fig. 3 (p. 93)

Geoemyda eureia (Wegner). rekonstrukcja przedniego płata plastronu.

Fig. 4 (p. 93)

Geoemyda eureia (Wegner), niesymetryczna i nietypowa płytka neuralna: *a* strona zewnętrzna, *b* strona wewnętrzna; × 2,3.

Fig. 5 (p. 94)

Geoemyda eureia (Wegner), płytka kostalna c8; × 2,3.

Fig. 6 (p. 94)

Geoemyda eureia (Wegner), jedna z płytek marginalnych mostowej części karapaksu; × 2,3.

Fig. 7 (p. 94)

Geoemyda eureia (Wegner), wewnętrzna powierzchnia płytki pygalnej małego osobnika; × 2,3.

МАРИАН МЛЫНАРСКИ

НОВОЕ МЕСТОНАХОЖДЕНИЕ *GEOEMYDA EUREIA* (WEGNER), TESTUDINES, EMYDIDAE, В ПОЛЬШЕ

Резюме

Настоящая заметка содержит описание фрагментов панцырей пресноводной черепахи *Geoemyda* cf. *eureia* (Wegner) из семейства Emydidae, найденных в местности Рембелице Крулевске близь Клобуцка. Упомянутое местонахождение является третьим местом в Польше, в котором были найдены остатки этого вида.

В общей части заметки автор дает обзор известных до настоящего времени европейских и азиатских представителей рода *Geoemyda* Gray. Затем обращается внимание сравнению известных до сих пор местонахождений *G. eureia* и условиям, предположительно господствующим в этих местностях.