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ON A NEW SPECIES OF EMYDID-TORTOISE FROM THE PLIOCENE
OF POLANDStudy on the Tertiary bone-breccia Fauna from Weże
near Działoszyn in Poland

PART VII*

Abstract. — An additional discovery has recently been made in the Weże bone-breccia of more perfect remains of a Pliocene tortoise, previously identified by the writer with *Emys orbicularis* L. This find justifies the erection of a new species for which the name of *Emys wermuthi* n. sp. is suggested.

INTRODUCTION

In his earlier papers dealing with the tortoise fauna from the Pliocene of Poland (Młynarski, 1953, 1955), the present writer has described and assigned to the recent species of *Emys orbicularis* (L.) quite a number of fairly well preserved freshwater tortoise remains. Yet, as was pointed out in the two cited papers, the fossil remains of these tortoises differ from the living representatives of that species by such features as the shape of supracaudal shields and a more vaulted carapace. These characters, however, were regarded as of no material significance and referable to individual specific variations. It is known that, in individuals from species *Emys orbicularis*, pretty numerous variations of the shape of shields and bone plates are rather frequently recorded, differing distinctly from the regular type of structure common to this species. For example, large old individuals of *Emys orbicularis* occur with supracaudal shields resembling those observable in the Weże specimens.

In the end part of his paper on the fossil remains of *Emys orbicularis* (1955), the present writer has suggested that on the ground of the here mentioned differences the described remains are perhaps assignable to another fossil species, maybe never thus far recorded. This suggestion is

* See note on p. 135.

fully confirmed on specimens of the same form, collected only quite recently. On this ground the writer deems it necessary to revise his previous opinion regarding the systematic position of the fossil Pond Tortoise remains from Weże, here considered. Since comparative studies made of these forms and those of living, fossil and sub-fossil tortoises from the Emydidae subfamily have shown important differences between the forms thus far recorded and the material here considered, the writer thinks there is justification for their specific separation. The name by which he wishes to designate the new species is that of Dr. Heinz Wermuth, a German chelonologist.

DESCRIPTION

Emys wermuthi n. sp.

(fig. 1 - 3)

1953. *Emys orbicularis* (L.); M. Mlynarski, Pond tortoise *Emys orbicularis* (L.) from the Pliocene of Poland, fig. 9, pl. II.
1955. *Emys orbicularis* (L.); M. Mlynarski, Tortoises from the Pliocene of Poland, fig. 19, 20.

Holotype. — Carapace, almost perfect, in a satisfactory state of preservation, wanting a fragment of the caudal part only; also posterior lobe of plastron (No. 290).

Paratype. — 1. Fragment of anterior lobe of plastron (No. 200).
2. Fragment of caudal end of carapace (No. 202).

Material. — 1. Fragment of posterior lobe of plastron and fragments of plates of carapace (No. 201). 2. Large fragment of carapace showing a mould with impressions of costals and neurals (No. 204). 3. Mould impression of carapace and large fragments of costals and marginals (No. 205). 4. Fragment of a crystalline calcite mould of carapace (No. 203). 5. Fragment of lateral part of carapace (No. 273). 6. Fragment of carapace (No. 273).

Carapace. — The holotype's carapace is imperfect. It lacks a large portion of the caudal end and also that part posterior from approximately the third costal on the right side. The anterior border of carapace also slightly damaged. The surface of the preserved plates is in a very satisfactory condition. Both, the sutures of the bones and those of the shields are distinctly shown. Inside of carapace filled with crystalline calcite of a deep red colouration.

The *nuchal* is a large hexagonal plate with a trapezoidal contour. Its anterior free border being damaged, the nuchal shield furrow is hardly discernible on the surface.

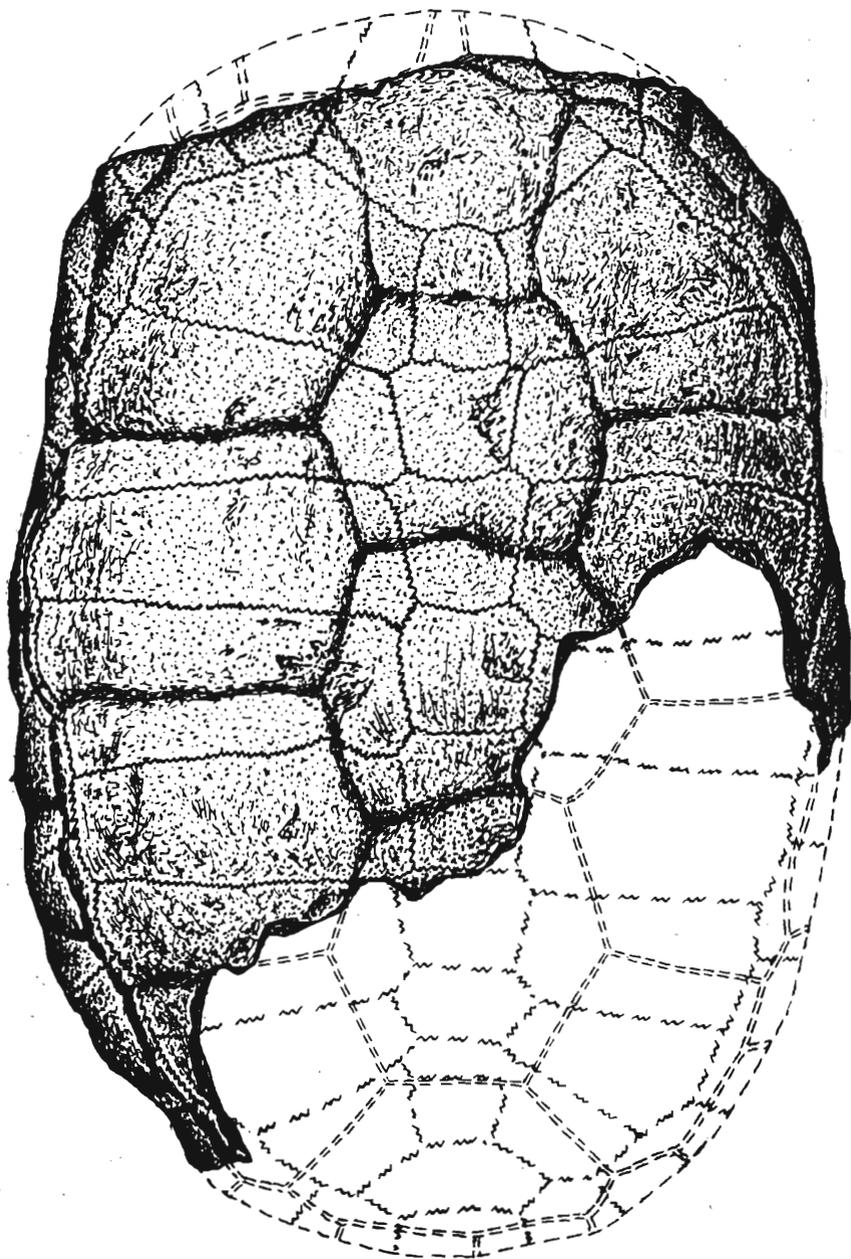


Fig. 1. — *Emys wermuthi* n. sp. (holotype), carapace; nat. size. Wanting parts of specimens indicated by broken lines.

The *neurals* 1st to 6th are preserved in the holotype specimen. 1st neural is an elongate quadrangle with vaulted borders. 2nd to 5th neurals are hexagonal, displaying a shape characteristic in the majority of emydids, to say: postero-lateral borders of neurals are distinctly longer than the antero-lateral, resulting in the cranial border being longer than that of the caudal border. All neurals are relatively wide. The 5th neural is imperfect. Its preserved fragment does not present a typical appearance, neither does the 4th neural. This may possibly be an irregular splitting of the bone plates, pretty frequently recorded in tortoises.

The *costals* 1st to 5th entire, also fragments of the 6th and 7th. All costals are markedly wide. Satisfactorily preserved costals on the left side of carapace are shown to resemble in shape the costals of genus *Testudo*. To say: in its lateral part united with the marginals the 2nd costal is distinctly wider as compared with the 3rd, whereas the width of the vertebral part of the 3rd somewhat exceeds that of the 2nd. This shape of costals doubtlessly correlates with the strongly vaulted carapace.

The *marginals* 1st to the 8th have been preserved, also small fragments of the 9th. They are high and wide. Approximately along the midline the surface of the marginals is traversed by furrows of the costal and marginal shields. On the right side, in the region of the 3rd and 4th marginals the carapacial surface is nodose and sinuous. These irregularities must have existed during the lifetime of the given individual, having most probably developed already in the embryonic stage.

The *nuchal shield* may be restored on the furrow of the right side cranial border of the carapace only, this being in a most unsatisfactory state of preservation. It is short and stunted.

The *vertebral shields*. The contour of the whole vertebral shields I-III, also that of a fragment of shield IV may be restored on the preserved furrows. In relation to their width these shields are distinctly elongate, particularly so in the case of shield I.

The *costal shields*. Casts of shields I and II and a fragment of shield III. These costal shield are exceptionally wide, being considerably wider than the corresponding vertebral shields.

The *marginal shields*. The contours of shields I - VIII may be restored on the furrows which are in a satisfactory state of preservation. The shields are low and narrow. Their anterior borders are vaulted. Fragments only have been preserved of shields I, II and III. About one third of shield V on the left side of carapace is traversed by a supplementary non-typical furrow. On the right side, shield V is also small and non-typical.

Plastron. — Whole *hypoplastrals* and *xiphiplastrals* in a satisfactory state of preservation, damaged in the anal part only. The hypoplastrals

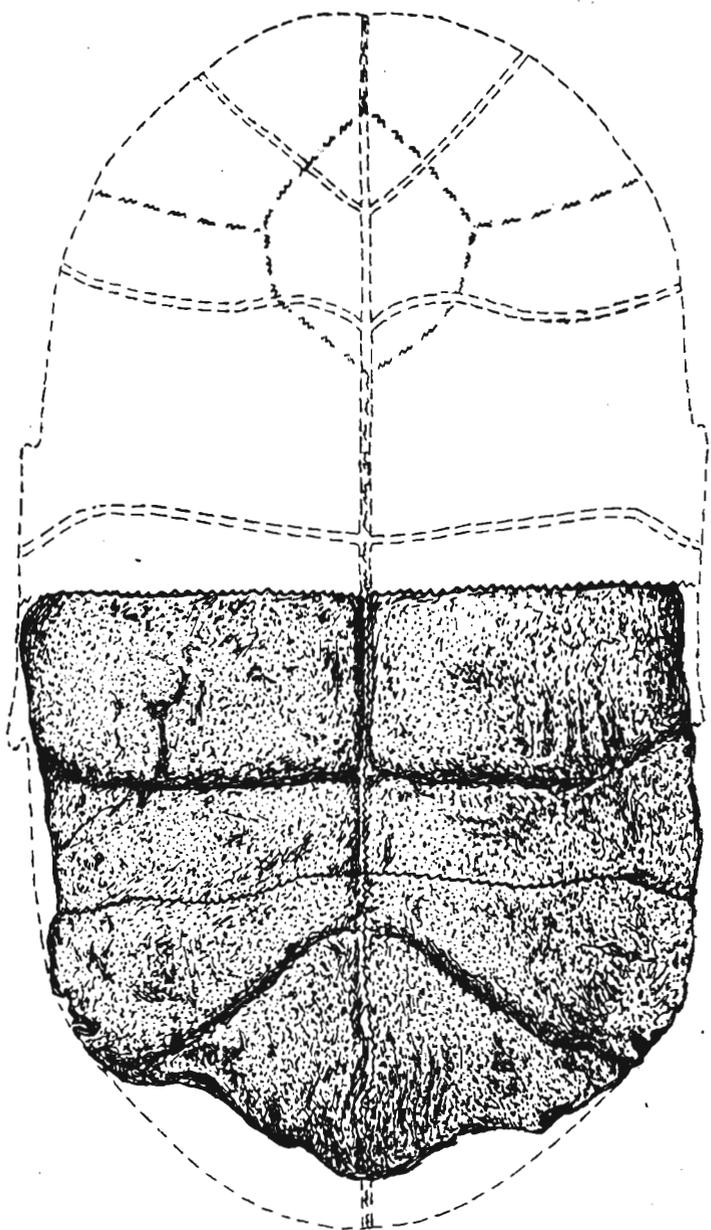


Fig. 2.—*Emys wermuthi* n. sp. (holotype), plastron; nat. size. Wanting parts of specimens indicated by broken lines.

are wide, distinctly rectangular. The abdomino-femoral furrow is clearly shown on their surfaces. From the preserved fragment of xiphiplastrals it may be concluded that they were gently rounded in the anal part and without anal notches. The femoro-anal furrow is easily discernible.

The contours of a fragment of the *abdominal shield*, of the whole *femoral shield* and of the *anal shields* may be restored on the preserved furrows. All the shields here approximately agree in shape with corresponding shields of the living species *Emys orbicularis*.

Holotype dimensions (in mm):

Length of carapace	150
Width of carapace measured at the junction of the hyo- and hypoplastrals (the bridge)	97
Height of carapace measured on section of a wire-made model	56
Length of posterior lobe of plastron	80
Width of posterior lobe of plastron	90

An exhaustive description of the remaining material was given in a paper published by the present writer in the year 1953, also containing measurement results obtained for the several plates and shields of the shell.

GENERAL CHARACTERISTICS OF *EMYS WERMUTHI* N. SP.

This turtle was of a moderate size, with markedly vaulted carapace, steep in its lateral region, flattened in the vertebral region. No vertebral or lateral borders are shown. In the caudal part the width of the carapace almost equals that of the cranial part. The nuchal shield is small. The costal shields distinctly wider than the corresponding vertebral shields. The supracaudal shields are high, rather large and with rounded cranial borders (compare with fig. 4 on p. 552 of the writer's paper published in 1953). Carapacial borders are indistinctly shown and very slightly flanged. Plastron is united to the carapace by ligaments and cartilage. It is very broad and probably agrees well with the contour of the carapace. Mobility of plastral lobes unknown.

Figures 1 and 2 represent the reconstructions of the plastron and carapace of *Emys wermuthi*, made on the 1:1 scale on remains of holotype and of specimens, described by the writer in 1953. Parts wanting in the holotype have been restored on remains here assigned to paratypes since they belonged to undoubtedly adult individuals with approximately the same dimensions. The preserved posterior plastral lobe of the holotype agrees precisely with the contour of the posterior plastral lobe of remains No. 201. This fully confirms the correctness of the reconstruction of

that part of the shell as figured on page 197 (fig. 19) of the writer's paper published in 1955.

Locality: Bone-breccia from Węże near Działoszyn (Poland).

Horizon: Pliocene.

GENERAL REMARKS

Emys wermuthi n. sp. is in the first place comparable to the Recent species *E. orbicularis* with which it had previously been identified by the present writer.

From the living Pond Tortoise it differs by its contour, greater vault of carapace and dimensions. Differences in carapacial vaulting of the two turtles here considered are clearly seen in the cross section (fig. 3) of the shell constructed of wire after J. E. Mosimann's method (1955). The vaulted structure of the carapace is responsible for the difference in the contour of the supracaudal shields, mentioned in the author's earlier papers. The carapace of *Emys wermuthi* is not broadened out to such an extent in the caudal region, as it is in the case of *E. orbicularis*. Differences of shell dimensions and proportions of the two here studied species are clearly shown in the attached comparative table. The numerical data are the average dimensions obtained from measurement of a dozen and more of *E. orbicularis* shells and of all available *E. wermuthi* remains, after reconstruction of the wanting parts of these two species.

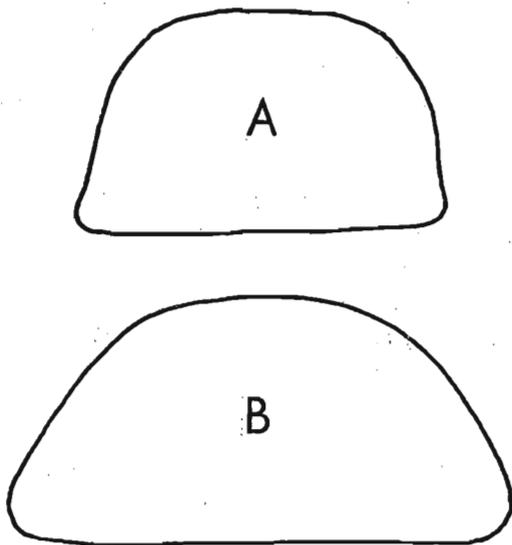


Fig. 3. — Cross sections of shells of *Emys wermuthi* n. sp. - A and *Emys orbicularis* (L.) - B; $\times 0.5$.

Average dimensions for the species

	<i>E. orbicularis</i>	<i>E. wermuthi</i>
Shell height index = $\frac{\text{shell height}}{\text{shell length}}$ =	≈ 0.36	≈ 0.37
Shell width index = $\frac{\text{shell width}}{\text{shell length}}$ =	≈ 0.72	≈ 0.64

Similar differences as to dimensions and contour of the shell also occur between *E. wermuthi* and another living species, the *E. blandingii* (Holbrook).

Of the fossil species recorded from Europe, our species displays certain similarities with *E. heeri* (Portis) described by Portis (1882) from Mollasse Vaudoise¹. This species is characterised by its strongly vaulted carapace resembling those of the land tortoises. It differs from our specimen by its larger dimensions, a markedly distinct and well flanged shell border, and a not altogether identical carapacial section.

The difference between *Emys razoumowskii* (Pictet & Humbert) from the mollasse of Switzerland and *Emys wermuthi* lies foremost in the contour of plastron. The contour of carapace in the vertebral region differs too (Pictet & Humbert, 1856). The assignment of *Emys razoumowskii* to genus *Emys* Duméril is somewhat doubtful (Pictet and Humbert, l. c., place it with genus *Cistudo*) for want of evidence as to how the shell shields are united.

Emys strandi Szalai has been recorded by T. Szalai (1934) from the Eocene of Hungary. On evidence of his description this turtle differs from *Emys wermuthi* by the distinct anal notches of its xiphiplastrals. According to Szalai's views expressed in his papers published in 1934 and 1935 a tortoise whose fossil remains from the London Clay were described by A. Newton (1862), is the oldest representative of genus *Emys*, and the probable ancestor of the Recent Pond Tortoise. This supposedly is an error, since Newton (l. c.) does not at all suggest an Eocene provenance of his turtle, but simply states that the fossil turtle remains collected in Great Britain before 1862 are of ancient age. When looking through the excellent litograph drawings illustrating the above mentioned work, the present writer was led to the conclusion that the described remains are referable to *Emys orbicularis* and that it was perhaps the first sub-fossil find of this species within Great Britain.

The oldest remains of genus *Emys* are probably those recorded from the Eocene of France. In 1935, *Emys grepiacensis* Bergounioux was described from the „formation stampienne de Venerque". These remains differ from the Weze species by a more distinctly elliptic contour of the carapace. *Emys grepiacensis* rather resembles *E. heeri*.

Emys aquitanensis Bergounioux has been collected from the Miocene beds of Sansan. This tortoise is characterised by its markedly irregular arrangement of the neural plates and scutes. Its contour approaches that

¹ The writer here takes the liberty of expressing his thanks to Dr. Samuel Schaub of the Naturhistorisches Museum in Basel and to Mrs. Dr. Schmorff of the Lausanne Museum for the plaster holotype cast of *Emys heeri*, so kindly supplied by them.

of the here considered species. Still, a comparison of these turtles is hardly possible, since the holotype of *Emys aquitanensis* apparently represents a badly preserved pathological individual whose carapace is not well known (Bergounioux, 1935, p. 158, fig. 36).

Outside of Europe genus *Emys* s. str. has thus far been recorded only from the Pleistocene of North America, to say *Emys twentei* Taylor (1943). This tortoise differs from our species by its exceptionally wide neurals, which may be an individual character of the studied specimen. *Emys twentei* also has a more flattened carapace. In all probability it is the fossil ancestor of *Emys blandingii* (Holbrook), a living Pond Tortoise of North America.

SYSTEMATIC POSITION

The characteristic vaulted carapace of *Emys wermuthi* is doubtlessly connected with the Pliocene habitat of this species. Xerothermic conditions of climate must have prevailed at Weże during the formation of the bone-breccia which yielded the here studied fossil remains. This is also testified by the presence of abundant fossil remains of land tortoises of genus *Testudo* (Młynarski, 1955). On the morphology of the shell it may be inferred that the turtle here under consideration was better adapted to a life on the land than the living *Emys orbicularis* or even perhaps *Emys blandingii*.

Emys wermuthi is referable to the same group of fossil representatives of genus *Emys* to which have been assigned all forms displaying a vaulted carapace (*Emys heeri*, *E. razoumowskii*, *E. grepiacensis* and others). All these turtles had stronger ties with a land existence than the Recent species. We cannot, therefore, regard the species of *Emys wermuthi* as the ancestor of the Recent Pond Tortoise. Moreover, the latter has been recorded already from the Pliocene of Hungary and Germany (Szalai, 1934, 1935; Heller, 1936). *Emys wermuthi* is a form which, under favourable bio-ecologic conditions, has undergone a re-adaptation to a land life. Signs of a re-adaptation of this kind, exhibited by representatives of the subfamily Emydidae, are also encountered in representatives of genera *Terrapene* Merrem and *Geoemyda* Gray. The external appearance of the former approaches *Emys wermuthi* in what size and contour of carapace are concerned. This resemblance is particularly distinct in the case of *Terrapene llanensis* Oerlich, a Pleistocene species from Kansas. On the other hand, however, the vertebral border of this species is very indistinctly shown (see Oerlich, 1953, p. 36). In a paper published in 1955, the present writer has made a suggestion that ancestors of *Terrapene* are to be sought among species of *Emys*, with a vault-

ed carapace („the *heeri* group“). He was led to this belief on the authority of the monograph by O. P. Hay (1908, p. 360). This view now seems incorrect. In Dr. Wermuth's opinion, *Terrapene*, notwithstanding certain similar characters, represents a more primitive structural type than *Emys* (letter communications). With regard, therefore, to the fossil remains of *Emys wermuthi* there may only be taken into account a certain, though significant, yet doubtlessly convergent resemblance to *Terrapene*, associated with similar mode of life and biologic conditions. *Emys wermuthi* is a step in the evolution of the emydids on their way toward re-adaptation to land environment.

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MARIAN MLYNARSKI

NOWY GATUNEK ŻÓŁWIA Z PLIOCENU POLSKI

Streszczenie

Praca zawiera opis nowego gatunku żółwia z podrodziny Emydidae, pochodzącego z plioceńskiej brekcji kostnej miejscowości Węże koło Działoszyna. Gatunek ten nazwałem imieniem chelonologa niemieckiego Dra Heinza Wermutha.

Szczałki *Emys wermuthi* n. sp. uważałem dotychczas za należące do współczesnego *E. orbicularis* (L.). Jednak na podstawie świeżo znalezionych fragmentów oraz po nowym, gruntownym zbadaniu dość dużego materiału, uważam za konieczne zrewidować me poprzednie poglądy (M. Młynarski, 1953, 1955). Istotną różnicą pomiędzy współczesnym żółwiem błotnym a kopalnym *E. wermuthi* jest kształt pancerza (fig. 2). Poza tym *E. wermuthi* jest żółwiem nieco mniejszych rozmiarów.

Z kopalnych gatunków, należących do rodzaju *Emys* s. str., gatunek z Węzów wykazuje podobieństwo do form o wypukłym pancerzu, jak np. *E. heeri* (Pontis) („grupa *heeri*“).

E. wermuthi nie jest w żadnym razie przodkiem współczesnego żółwia błotnego *E. orbicularis*. Jest to prawdopodobnie osobna, dobrze przystosowana do życia lądowego forma z rodzaju *Emys*. Podobieństwo *E. wermuthi* do przedstawicieli rodzaju amerykańskiego *Terrapene* Merrem, o którym wspominam w swej pracy z 1955 r., ma charakter wyłącznie konwergencyjny i było zapewne związane z podobnym trybem życia i jednakowymi warunkami bio-ekologicznymi wymienionych żółwi.

OBJASNIENIA DO ILUSTRACJI

Fig. 1 (p. 155)

Emys wermuthi n. sp. (holotyp), karapaks; wielk. nat. Liniami przerywanymi zaznaczono brakujące części okazów.

Fig. 2 (p. 157)

Emys wermuthi n. sp. (holotyp), plastron; wielk. nat. Liniami przerywanymi zaznaczono brakujące części okazów.

Fig. 3 (p. 159)

Profile poprzeczne pancerzy *Emys wermuthi* n. sp. (A) oraz *Emys orbicularis* L. (B); $\times 0,5$.

МАРИАН МЛЫНАРСКИ

НОВЫЙ ВИД ЧЕРЕПАХИ ИЗ ПЛИОЦЕНА ПОЛЬШИ

Резюме

Настоящая работа содержит описание нового вида подсемейства Emydidae из плиоценовой костной брекчии из местности Венже близ Дзялошина у р. Варты. Вид этот назван именем германского специалиста по черепахам, др. Гейнца Вермута (Heinz Wermuth). Автор считал остатки *Emys wermuthi* n. sp. принадлежащими к современному *Emys orbicularis* (L.). На основании вновь найденных фрагментов и после тщательного исследования довольно большого материала, автор считает необходимым подвергнуть пересмотру прежние заключения (Млынарски, 1953, 1955). Существенным отличием современной болотной черепахи от ископаемой *E. wermuthi* является форма панцыря (см. фиг. 2). Кроме того *E. wermuthi* является черепахой несколько меньших размеров.

Среди ископаемых видов относящихся к роду *Emys* s. str., вид из Венже сходен с формами обладающими выпуклым панцырем, как напр. *Emys heeri* Portis („группа *heeri*“).

Emys wermuthi ни в коем случае не является предком современной болотной черепахи *E. orbicularis*. Это, по всей вероятности, особая форма рода *Emys*, хорошо приспособленная к условиям наземного существования. Сходство *E. wermuthi* и представителей американского рода *Terrapene* Merrem, о котором упоминал автор в своей работе 1955 года, исключительно конвергентного характера и, по всей вероятности, связано со сходным образом жизни и одинаковыми био-экологическими условиями указанных черепах.
