

ИЗВЕСТИЯ
АКАДЕМИИ НАУК СССР

-446 F

СЕРИЯ БИОЛОГИЧЕСКАЯ

BULLETIN DE L'ACADÉMIE DES SCIENCES DE L'URSS

SÉRIE BIOLOGIQUE

№ 3

31908



ИЗДАТЕЛЬСТВО АКАДЕМИИ НАУК СССР

Москва * 1940 * Moscow

18 НОЯ. 1940

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TWO NEW PALAEONISCID GENERA, EURYNOTOIDES AND
AMBLYPTERINA, FROM THE UPPER PERMIAN OF KARGALA
(BASIN OF THE URAL R.)

Among the collection of Permian fishes from Kargala near Chkalov (formerly Orenburg) described by Eichwald (1860) and preserved in the Paleontological Museum of the Leningrad University I have found an undetermined fish allied to *Plectrolepis* Agass. (= *Eurynotus* Agass. 1834, non Kirby 1819):

Eurynotoides Berg, n. g. (fam. Palaeoniscidae). Figs. 1—4.

Differs from *Plectrolepis* principally in having a zone of small irregular scales below the dorsal fin. Opercular larger than subopercular. Antepercular present. Scales not serrated posteriorly. A very large characteristically sculptured scute before the anal fin. Cheek bones, and head bones generally, with short longitudinal ridges. A vertical crista on opercular and subopercular. — A single species:

Eurynotoides eyprinion Berg, n. sp. Figs. 1—4.

Holotype: N: 1/2860, Eichwald collection, Paleontological Museum, Leningrad University. A nearly complete fish without the anterior portion of the head and major part of the caudal fin. Length of the sample 52 mm. Upper Permian, Kazanian stage, Kargala.

The body is fusiform, the depth of body equalling 20 mm. The scales are quadrangular, in the middle of flanks higher than broad, but towards the belly becoming broader than high. The flank scales are anteriorly well imbricated, posteriorly slightly imbricated, ventrally scarcely imbricated.

The scales are smooth posteriorly, not serrated. Each scale, especially the anterior ones, has 5—6 faint ridges. There are about 58 vertical rows of scales between the gill opening and base of the middle caudal rays. About 30 horizontal rows of scales off the hind end of the pectoral fin, and 12—13 horizontal rows of scales between the lateral line and the origin of the ventral fin. There is a zone below the dorsal fin, where the scales abruptly become much smaller and irregularly arranged. No such zone is present above the anal base. There are no ridge scales before the dorsal fin, except for one or two triangular ones immediately before the dorsal base. But behind the dorsal fin ridge scales (as in *Plectrolepis* also) are present (Fig. 3). A very large, unpaired, characteristically sculptured scute is situated at the base of the anal fin (Fig. 1); besides, before that scute, there is present another scale much smaller and probably paired.

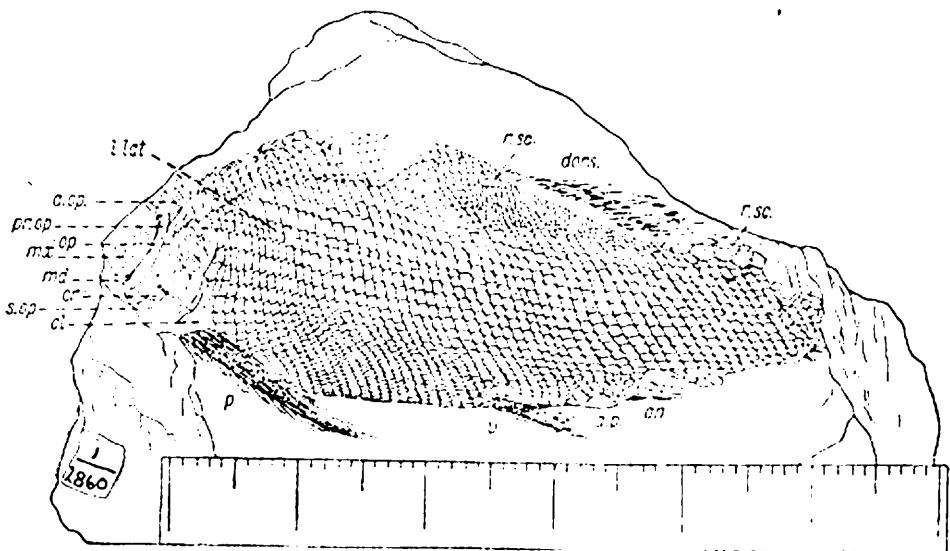
The dorsal fin, originating before the vertical line of the origin of the ventrals, consists of not less than 40 closely set rays which are densely jointed from the base and probably ramified at their tips. The anal fin commences below $\frac{3}{5}$ of the dorsal and consists of 15 rays of the same nature as those of the dorsal fin; its first ray is supplied with long narrow sculptured fulcra. The pectoral fins are long, with a narrow base; they consist of about 12 densely jointed rays which are ramified at their tips; the first pectoral ray has closely set fulcra; length of pectorals $16\frac{1}{2}$ mm, distance between origin of pectoral and that of ventral $21\frac{1}{2}$ mm. Length of ventral fin (Fig. 4) $8\frac{1}{2}$, distance between origin of ventral and that of anal 11 mm; the ventrals are short-based, they consist of 10 jointed rays, which are ramified at their

tips; the first ray is supplied with well developed fulcra. Remains of some anterior rays of the lower caudal lobe are to be seen.

Both dermal head bones and scales are covered with ganoine. A nearly vertical preopercular is well preserved; its upper end is bent backward. A small trian-



Фиг. 1. *Eurynotoides suprinion* Berg. n. sp. Каргала. Голова. Голова № 1/2800, Геол. каб. Ленинградск. унив. Увеличено. — Kargala. Holotype № 1/2800, Pal. Mus. Leningrad Univ. Enlarged

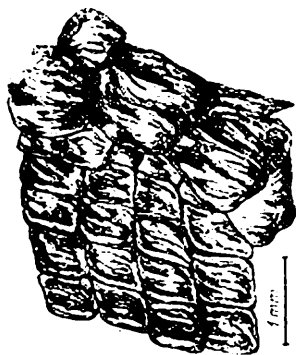


Фиг. 2. *Eurynotoides suprinion*. Рисунок (как и рис. 3 и 4) сделан А. В. Хабаковым. Figure by A. W. Shabakov. *an* — анальный плавник (anal fin); *a. op* — anteoperculum; *a. p* — анальная жучка (anal scute); *cl* — cleithrum; *cr* — гребень на operculum и suboperculum (crista on opercular and subopercular); *dors.* — спинной плавник (dorsal fin); *l. lat* — linea lateralis; *md* — mandibula; *mx* — maxillare; *op* — operculum; *p* — грудной плавник (pectoral fin); *pr. op* — преоперкулум; *r. sc* — жучки (ridge scales); *s. op* — субоперкулум; *v* — брюшной плавник (ventral fin)

gular anteopercular is situated between the upper end of preopercular and the opercular. The opercular is large, larger than the subopercular and is ornamented with

short longitudinal (in respect to the body axis) ridges. The same sculpture is to be seen on some other bones of the cranial roof and cheeks. On the opercular and subopercular, in their middle part, there is a crista (Fig. 2, *cr*) parallel to the gill slit. Both opercular and subopercular are bent backward, in conformity with the situation of the preopercular.

There are at present known four genera belonging to the group of *Plectrolepis*: 1) *Plectrolepis* Agassiz 1844, type *Pl. rugosus* Agass.—*Pl. crenatus* (Agass.); = *Eurynotus* Agass. 1834, type *Eu. crenatus* Agass., the type from the Lower Carboniferous, scales arranged regularly; 2) *Paraeurynotus* Chabakov 1927,



Фиг. 3. *Eurynotoides cyprinion*. Жучки за спиным плавником и чешуи под ним. Ridge scales behind the dorsal fin and scales below them.



Фиг. 4. *Eurynotoides cyprinion*. Брюшной плавник. Ventral fin

Upper Carboniferous or Permian of Kuznetsk Coal basin, scales below the dorsal, and above the anal arranged irregularly; 3) *Eurynotoides* Berg 1940 scales below the dorsal arranged irregularly, Upper Permian of the Ural basin; 4) *Proteurynotus* Moy-Thomas and Dyne 1938, as *Plectrolepis* but the dorsal fin shorter, Lower Carboniferous.

Plectrolepis (*Eurynotus*) was until recently referred to the *Platysomidae*. But Aldinger (1937, p. 353) showed that in *Pl. crenatus* (Agass.) the scales are built on the same plan as in the typical *Palaeoniscidae*, e. g., in *Elonichthys*, whereas the scales of *Platysomus* have quite another structure, consisting only of bony layers and having no cosmine, nor ganoine. Moy-Thomas and Dyne (1938, p. 470) reached also the conclusion that *Plectrolepis* is allied to the *Palaeoniscidae*.

As pertains the genera *Platysomus* Agass., *Cheirodus* Mac Coy and *Cheirodopsis* Traq., they constitute a distinct family *Platysomidae* and suborder *Platysomoidei* (Berg, 1940, p. 401).

Amblypterina Berg, n. g. Fig. 5.

Body fusiform. Dorsal fin long, longer than anal. Small round irregularly arranged scales below the dorsal and above the anterior part of the anal fin. Rays of dorsal, anal, and caudal closely set, densely jointed and distally branched. Anal commencing below the hind third of dorsal. Pectorals of about 30 unjointed rays, with conspicuous lobe covered with small round scales. Ventrals unknown. Lower caudal lobe with well developed fulcra. Head unknown. No ridge scales, except three before the origin of dorsal; ridge scales behind the dorsal gradually becoming the fulcra of the upper caudal lobe. A scute before the anal. No ridge scales behind the anal. Scales with faint striae. Scales on the middle of flanks higher than broad.

Type: *Palaeoniscus costatus* Eichwald, 1860, p. 1583, pl. LV, fig. 10, a, b, c.

Amblypterina costata (Eichwald)

H o l o t y p e: № 93/107. Museum of the Mining Academy, Leningrad. Fish without head and ventrals but with complete scaling. Length of the sample 158 mm.

Locality and horizon. Copper mines of Kargala, lower course of the Sakmara R., tributary to the Ural R., north of Chkalov (formerly Orenburg). Kazanian stage, Upper Permian.

Description. The total length of the fish (including the missing head) was about 20 cm. The body is fusiform and rather high. Depth of body before dorsal fin 42 mm., behind anal 15 mm. Length from the anterior end of scaling till the base of the middle caudal rays 107 mm. The caudal peduncle is short (whereas in *Eurynotoides* it is long).



Фиг. 5. *Amblypterygia costata* (Eichwald). Каргала. Тип в Горном институте № 93/107. Нар. вел. — Kargala. Type in the Mining Academy, № 93/107. Nat. size. P — рудной пластинке (pectoral fin)

There are about 60 transverse rows of scales. The lateral line is inconspicuous. The scales on the middle of flanks are higher than broad; upwards and downwards they become lower. Below the dorsal fin there are several rows of irregularly arranged small round scales, which replace abruptly the regular rows of rhombic scales. The small scales are in advance of the dorsal fin for some distance. The same small scales are to be seen above the anal fin, but the number of rows are fewer, 3–4 anteriorly, 2 posteriorly, and the small scales do not reach the hind margin of the anal base. It is noteworthy that similar small round not contiguous scales are present at the base of the pectoral fin. There are no dorsal ridge scales excepting three large scutes before the dorsal fin; they are elongated and supplied with longitudinal cristae. The ridge scales behind the dorsal fin pass gradually into the dorsal caudal fulcra. There are no fulcra behind the anal fin.

The anterior flank scales are ornamented with 6–7 faint longitudinal (in the sense of the body axis) striae, directed somewhat downward. The lower flank scales before the anal fin have 5–6 such striae. Internally the flank scales are supplied with a strong longitudinal rib, continuing from one scale to the other. The scales articulate with one another by the peg-and-socket articulation.

The dorsal fin situated in the posterior part of the body contains about 50 closely set rays, which are densely jointed and distally articulated. The posterior rays are markedly shorter than the anterior ones. The anal fin originates below the hind third of the dorsal. 18 rays are preserved; there were present not much more of them, because a large ribbed scute is situated not far from the origin of the anal fin. The anal rays are densely jointed and distally articulated. The anal fin when applied to the body must have reached, by its tip, the origin of the caudal fin. Caudal fin. The upper lobe is longer than the lower one. The body prolongation is long and narrow. The caudal rays are closely set and ramified from the middle of their length; they are densely jointed; the first joints are longer than the second and the following ones, the first joints being superiorly about three times longer, inferiorly about four times longer than the following joints. The pectoral fins are preserved partially, in front of the scaling. The tips of rays are

broken off. About 30 non-articulated rays (and not ramified, as far as seen) rays are present. A large lobe protrudes into the base of the pectoral; it is covered with small round irregularly arranged scales, which are not contiguous with one another. It is evident that there are at the pectoral base small scales of the same nature as at the bases of the dorsal and anal fins. At the anterior margin of the lobe a long and narrow ossified radial is to be seen; its length measures about $3\frac{1}{2}$ mm., its breadth is less than 1 mm. The lobe may have contained from 8 to 10 such radials. A scaly lobe protruding into the pectoral fin and having 11—12 rod-like radials is described in the Palaeoniscoid genus *Cornuboniscus* White from the Middle Culm (barren Coal) Measures of England (White, 1939, p. 48—49, fig. 4; p. 53, fig. 9). **Ventral fins** are not preserved.

In front of the anterior margin of the scaling there is displayed a reprint of an oblong bone, which may be the frontal. It bears a peculiar reticulate structure.

There are many Upper Carboniferous and Permian genera of Palaeoniscoid fishes possessing the same peculiar scaling — small irregular scales below the dorsal and above the anal. The Upper Carboniferous *Paramblypterus* Sauvage (1888, p. 82; 1889; type *Palaeoniscus decorus* Egerton 1850) differs from *Amblyptera* in having the whole base of the anal fin covered with small irregular scales; its anal fin is longer than the dorsal (*D* 35—38, *A* 40—42), etc. The structure of the pectoral fin is quite characteristic for *Amblyptera*.

I wish to thank Dr Chabakov for most figures added to this paper as well as for some valuable criticism.

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Л. С. БЕРГ. ДВА НОВЫХ РОДА РЫБ ИЗ PALAEONISCIDAE, EURYNOTOIDES И AMBLYPTERINA, ИЗ ВЕРХНЕПЕРМСКИХ ОТЛОЖЕНИЙ КАРГАЛЫ

1. Среди коллекций верхнепермских рыб из Каргалинских рудников в низовьях р. Сакмары, в свое время обработанных Эйхвальдом и ныне хранящихся в Геологическом кабинете Ленинградского университета, я обнаружил рыбу, близкую к *Plectrolepis* Agassiz (= *Eurynotus* Agassiz 1834, non Kirby 1819),

но не определенную Эйхвальдом (1860). Приношу благодарность проф. П. А. Православлеву за разрешение использовать этот материал и А. В. Хабакову за исполнение фиг. 2—4 к этой статье, а также за некоторые ценные критические замечания.

Eurynotoides Berg, n. g.

Под спинным плавником зона мелких, неправильно расположенных чешуй. Над анальным чешуи расположены нормально, однако над самой передней частью анального плавника имеется небольшое количество мелких чешуй. Operculum крупнее, чем suboperculum. Верхний край праеoperculum отогнут назад, равно как и верхний край operculum. Чешуи сзади не зазубрены. Перед анальным плавником большой скульптурированный щиток. На крышечных костях и вообще на костях головы скульптура из коротких продольных валиков. Вертикальный гребень на operculum и suboperculum. 1 вид:

Eurynotoides surprinion Berg, n. sp. Длина образца 52 мм. Казанский ярус Каргалы. Около 58 вертикальных рядов чешуй. В спинном плавнике не менее 40 лучей. Анальный из 15 лучей, грудной из 12, брюшной из 10. Фиг. 1—4.

II. Среди коллекций Эйхвальда, хранящихся в музее Горного института, имеется тип рыбы из верхнепермских отложений Каргалы, описанной Эйхвальдом как *Palaeoniscus costatus* Eichw. Исследование ее показало, что она принадлежит к особому роду. Я весьма признателен Б. В. Наливкину за возможность исследовать тип этого вида и А. В. Хабакову за предоставление фотографии типа.

Amblypterina Berg, n. g.

Тело веретенообразное. Спинной плавник длинный, длиннее анального. Под спинным плавником и над передней половиной анального неправильно разбросанные мелкие округлые чешуи. Анальный плавник начинается под задней третью спинного. Грудные плавники с крупной, вдающейся в них лопастью, покрытой мелкими округлыми чешуями; в них около 30 нечленистых лучей. На нижней лопасти хвостового плавника хорошо развитые крупные фулькры; вероятно, фулькры имелись на всех плавниках. Увеличенных чешуй (жучек) на спине за затылком нет, кроме трех перед началом спинного плавника; за спинным плавником жучки, переходящие в «фулькры» верхней лопасти хвостового плавника. Чешуи с нежными ребрышками. Посреди боков тела высота чешуй больше их длины. Тип и единственный вид: *Palaeoniscus costatus* Eichw.

Amblypterina costata (Eichwald) 1860. Синонимике см. выше, стр. 416.

Голотип: № 93/107 музея Горного института, рыба без головы и брюшных плавников, длина образца 158 мм. Около 60 поперечных рядов чешуй. В спинном плавнике около 50 лучей. В анальном плавнике сохранилось 18 лучей; их не могло быть много больше. В лопасти, вдающейся в грудной плавник, сохранилось у переднего края одно длинное и узкое окостеневшее radiale; таких radialia в лопасти могло помещаться 8—10. Фиг. 5.