

were determined with high precision in the Fourier domain, we get the peak resolution

$$R = \frac{2(t_1 - t_2)}{\sigma_1 + \sigma_2} \quad (3)$$

Fig. 1A shows the C_7 and iso- C_8 gas chromatograms of the peaks obtained by using variable oven temperature. At 120 C both peaks are practically overlapped, and the determination of the peak area is not possible. We get principally the same picture by using an analog to digital converter output 1B. Fig. 1C shows the same peaks after the FFT. The plot contains 128 points. It shows that FFT sharpening may split an almost overlapped peak into two peaks, and this treatment enables to estimate the peak area ratio and retention time. At the same time the side band intensity increases and the overlapping of peaks decreases. The accuracy of the peak area which depends on the resolution is shown in Fig. 2. We can see that the FFT deconvolution gives more accurate results than the resolution using perpendicular drop (commonly used with integrators).

Taking into consideration that the FFT resolution compared with other methods gives more possibilities and determines more accurately the peak retention time and areas, the FFT data handling in gas chromatography is very helpful.

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Academy of Sciences of the Estonian SSR,
Institute of Chemistry

Received
Feb. 13, 1975

EESTI NSV TEADUSTE AKADEEMIA TOIMETISED. 24. KÕIDE
KEEMIA * GEOLOGIA. 1975, NR. 4

ИЗВЕСТИЯ АКАДЕМИИ НАУК ЭСТОНСКОЙ ССР. ТОМ 24
ХИМИЯ * ГЕОЛОГИЯ. 1975, № 4

УДК 567 : 551.734(571.586)

Elga MARK-KURIK

A TOOTH-PLATE FROM THE LOWER DEVONIAN OF KOTELNY ISLAND

Elga MARK-KURIK. NAMBARPLAAT KOTELNOI SAARE ALAMDEVONIST

Эльга МАРК-КУРИК. ЗУБНАЯ ПЛАСТИНКА ИЗ НИЖНЕГО ДЕВОНА ОСТРОВА КОТЕЛЬНОГО

Among the Early Devonian vertebrate remains collected in the Sokolova locality, Kotelny Island, New Siberian Archipelago (see Mark-Kurik, 1974), a peculiar small tooth-plate is of much interest. It has been found

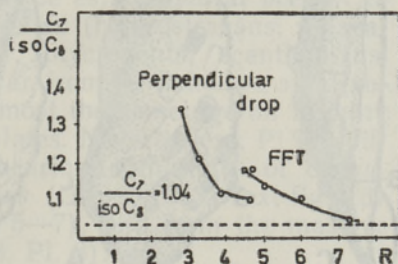


Fig. 2. The difference of peak areas ratio before and after FFT from the real weighed value.

in the dark-grey limestone of the marine Pshenitsyn Formation of the Gedinnian-Siegenian age (see Черкесова, 1974). The specimen is included under the No. Pi 999 in the collection at the Geological Museum of the Academy of Sciences of the Estonian SSR.

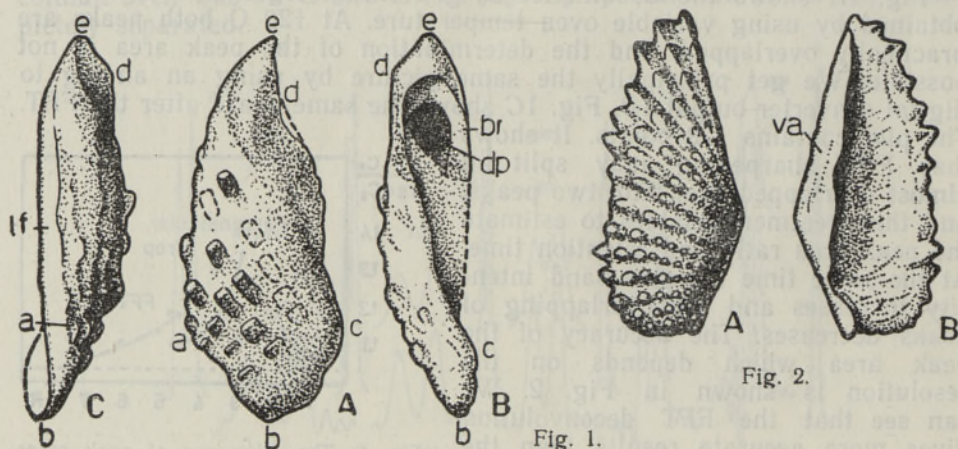


Fig. 2.

Fig. 1.

Text-fig. 1. A lower right tooth-plate Pi 999, $\times 6.5$. Sokolova, Kotelny Island; Early Devonian, Gedinnian-Siegenian, Pshenitsyn Formation. A — dorsal, B — labial, C — lingual view (all views made perpendicularly to each other); br — brim, dp — depression, lf — lingual facet.

Text-fig. 2. Lower left tooth-plate of *Dipterus serratus* (Eichw.), Pi 1000, $\times 6.5$. At 166 m of Raigla boring core, Estonia; Middle Devonian, Eifelian, Narva Formation. A — dorsal, B — ventral view; va — ventral smooth area.

Of various tooth-plates known in fossil fishes, the specimen Pi 999 reveals some similarities to the tooth-plates of lungfishes, on one hand, and to those of bradyodont holocephalians, on the other. When compared with those plates, the specimen can be identified as a lower (mandibular) tooth-plate from the right jaw ramus. The tooth-plate Pi 999 (Text-fig. 1) is asymmetrical, elongated (the maximum length being 8 mm) and twisted along its longitudinal axis. It bears a number of widely spaced blunt-topped pin-like teeth, the largest ones being 0.6—0.8 mm long. For comparison, a dipnoan tooth-plate of almost the same size, 6.5 mm long, can be presented (Pi 1000, Text-fig. 2). This fan-shaped plate, belonging to *Dipterus serratus* (Eichw.), is slightly vaulted and covered with numerous teeth of variable size and abutting bases, placed in radial rows, 15 in number. In specimen Pi 999 the well-separated teeth are situated on the dorsal and lingual surfaces of the plate (Text-fig. 1A, C) and seem to form 4 longitudinal rows. The first row at the anterior end of the posterior medial edge (Text-fig. 1, a—b) consists of two small teeth. The other rows contain 6 teeth, at most (some of them have suffered). The ventrally placed lingual facet (Text-fig. 1C, lf) lacks teeth, and so is the case with the labial (lateral) surface. The latter cannot be observed in its full length, as the ventrolateral and ventral surfaces of the plate are covered with rock. The labial surface has a deep depression (Text-fig. 1B, dp) surrounded by a smooth brim (br). The concave lateral and ventral surfaces were apparently attached to Meckel's cartilage. As to the lingual facet, it may be analogous to the smooth marginal area on the ventral surface of the tooth-plate of *Dipterus* (Text-fig. 2B, va). The position of

this area relative to the jaw ramus in *Dipterus* is shown by E. Jarvik (1967, Text-fig. 6A, MdT).

Taking into account its twisted shape, the specimen Pi 999 seems to be rather similar to the tooth-plate of bradyodont *Cochliodus* (see Patterson, 1968, Text-fig. 12). However, the latter lacks teeth, and its smooth oral surface is separated by grooves into a number of transversal areas. Another bradyodont, *Menaspis*, has smooth tooth-plates: with these, Pi 999 agrees in general shape (see Bendix-Almgren, 1971, Text-fig. 5B).

As there is only a single specimen of the tooth-plate under consideration, its microstructure cannot be studied. Because of that and for morphological peculiarities as well, it cannot be established at present to which form the plate belongs. Of all vertebrates (heterostracans, palaeacanthaspid, arctolepids?, coccosteomorphs?, ptyctodonts, acanthodians, crossopterygians, paleoniscoids) known so far from the Sokolova and Rybnaya localities, i.e. from two localities of almost the same age on Kotelny Island, only ptyctodonts have paired tooth-plates. Nevertheless, Pi 999 differs markedly from the slender and erected shearing tooth-plates of *Ctenurella* (Ørvig, 1960, Text-fig. 4B), *Rhynchodus* (Gross, 1933, Text-fig. 16) and *Rhamphodopsis* (Miles, 1967, Text-fig. 5—7), and from the massive crushing tritors of *Ptyctodus* (Pander, 1858, Pl. 8).

When some more material is available for study, showing that the tooth-plate Pi 999, and other plates of the same kind, belong to an Early Devonian ptyctodont, new interesting aspects of the affinities of such groups as ptyctodontid arthrodires, holocephalians and dipnoans, will be obtained.

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Received
June, 3, 1975