

**SOME REMARKS ON THE TERM "THANATOCOENOSIS" ESPECIALLY
"ANTHROPOGENIC THANATOCOENOSIS",
WITH PARTICULAR REFERENCE TO FISH REMAINS**

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ABSTRACT: The paper discusses the nature of a series of complex and often misunderstood taphonomical terms by reviewing the criteria which helped define them. A short review is also made of the types of associations where fish remains are most likely to be found.

KEYWORDS: NOMENCLATURE, TAPHONOMY, ARCHAEOZOOLOGY, FISHES

RESUMEN: En el trabajo se lleva a cabo un repaso crítico a la compleja nomenclatura tafonómica valorando las características y razones de ser de algunos términos con vistas a diferenciarlos de otros similares. Asimismo se realiza una somera valoración del tipo de asociaciones de fauna susceptibles de proporcionar restos de peces.

PALABRAS CLAVE: NOMENCLATURA, TAFONOMIA, ARQUEOZOOLOGIA, PECES

The term "thanatocoenosis" was created by Wasmund (1926). He was one of the first who pointed out the correspondence between such death communities and biocoenoses as well as their differences. Nevertheless some confusion arose with this term and related ones. It was Böger (1970) who classified them. Recently König (1983) made some proposals concerning terminology and classification. The following description refers partly to Böger, but the classification in detail is influenced by discussions with Dr. J. Lepiksaar or is partly even taken from him. Herewith I propose to use this terminology in the future. But beyond the description of this classification I want to show what type of thanatocoenoses may contain fish remains.

At first I will return to Wasmund: According to the term "biotope" which is connected with the term "biocoenosis" he created the name "thanatotope" in relation to thanatocoenosis. In his opinion thanatotope and biotope are congruent terms if a death community is autochthonous; but that is not true: In this case thanatotope and biotope have indeed in common the same area but the additional factors or at least a part of them which lead to burial and correspondingly form a thanatocoenosis is different from those which form a biocoenosis.

The processes which lead to a death community and are responsible for its composition are taphonomic ones. General taphonomic processes are termed "biostratonomy" and "diagenesis" (Müller, 1957). Biostratonomy describes the fate of an organism from its death to the definite inclusion of the carcass or parts of it in a substratum. It is influenced by several factors: endogenous ones are, for instance, the size of the organism as well as the stability and the shape of its bones; examples for exogenous factors are sorting by streaming water and utilization of animals by man. Diagenesis describes the multiple processes which influence a sediment during the time of deposition, that means also the embedded organisms or remains of organisms. In the case of subfossil

remains such processes which lead to modification or decomposition are mainly chemical ones. Here endogenous factors are, for instance, the chemical composition of the embedded material and its stability, exogenous ones are the mode of embedding, the character of the substratum, the degree of ventilation, and the humidity.

These taphonomic processes - how varied they may be in detail - are always responsible for the formation of a thanatocoenosis, but in the case of those which are influenced by man - or in a different way by predators - another process precedes the above mentioned ones. I name it "primary selection", which means the selection of species for nourishment or other purposes.

If such selection is partly based on trade, then the resulting death community can lose its zoogeographical limitation which is normally given by the surrounding biocoenoses, whose components are partly integrated into this death community. Thus, a loss of zoogeographical limitation can only be caused by man.

A thanatocoenosis can also lose its normally clear association to a certain faunal historic phase by late intrusives like burrowing micromammals. Another possibility is disturbance of the stratification of a site by such animals or man (Gautier, 1987).

The fourth taphonomic level following after diagenesis is the "secondary selection". It contains all those influences on a death community which are caused by the excavator and the archaeozoologist. But these influences are not responsible for the formation of the death community.

Thanatocoenosis must be divided in autochthonous and allochthonous ones and accordingly they are specified (Figure 1):

- An autochthonous one is named "necrocoenosis", that means a community of dead organisms or parts of them which are embedded there, where these organisms had lived before.

- An allochthonous one should normally be named "taphocoenosis", that means tomb community; the elements of a taphocoenosis are carcasses or parts of them which are transported by anorganic agents (e.g. water) or by animals from the death-place to the burial-place.

- An "ichnocoenosis", that means traces of animals, can be autochthonous - a foot print for instance - or allochthonous like gnawing-marks on a bone.

- A special allochthonous thanatocoenosis is the "anthropogenic thanatocoenosis". It is for example influenced by primary selection unlike most other types of thanatocoenoses. Beyond that this term takes special biostratonomic features into account which are connected only with man. These are based on specific sorting mechanisms according to the utilization of an animal or the trade with animal-parts. The result can be, for instance, an overrepresentation of special skeletal elements or parts of elements in the case of workshop refuse, a special composition of a bone assemblage in the case of remains of kitchen garbage, or the whole skeleton is preserved in the case of sacrifices and so forth.

An anthropogenic thanatocoenosis is formed by man only and an ichnocoenosis is also biogenic in any case, whereas a necrocoenosis as well as a taphocoenosis can be either biogenic or abiogenic (Figure 1).

It must also be mentioned that a taphocoenosis - and in most cases also an anthropogenic thanatocoenosis - develops gradually, while a necrocoenosis is normally caused by a catastrophe, in other words, a sudden event. Furthermore it must be considered whether a death community is monospecific or polyspecific (Lepiksaar, pers. comm.).

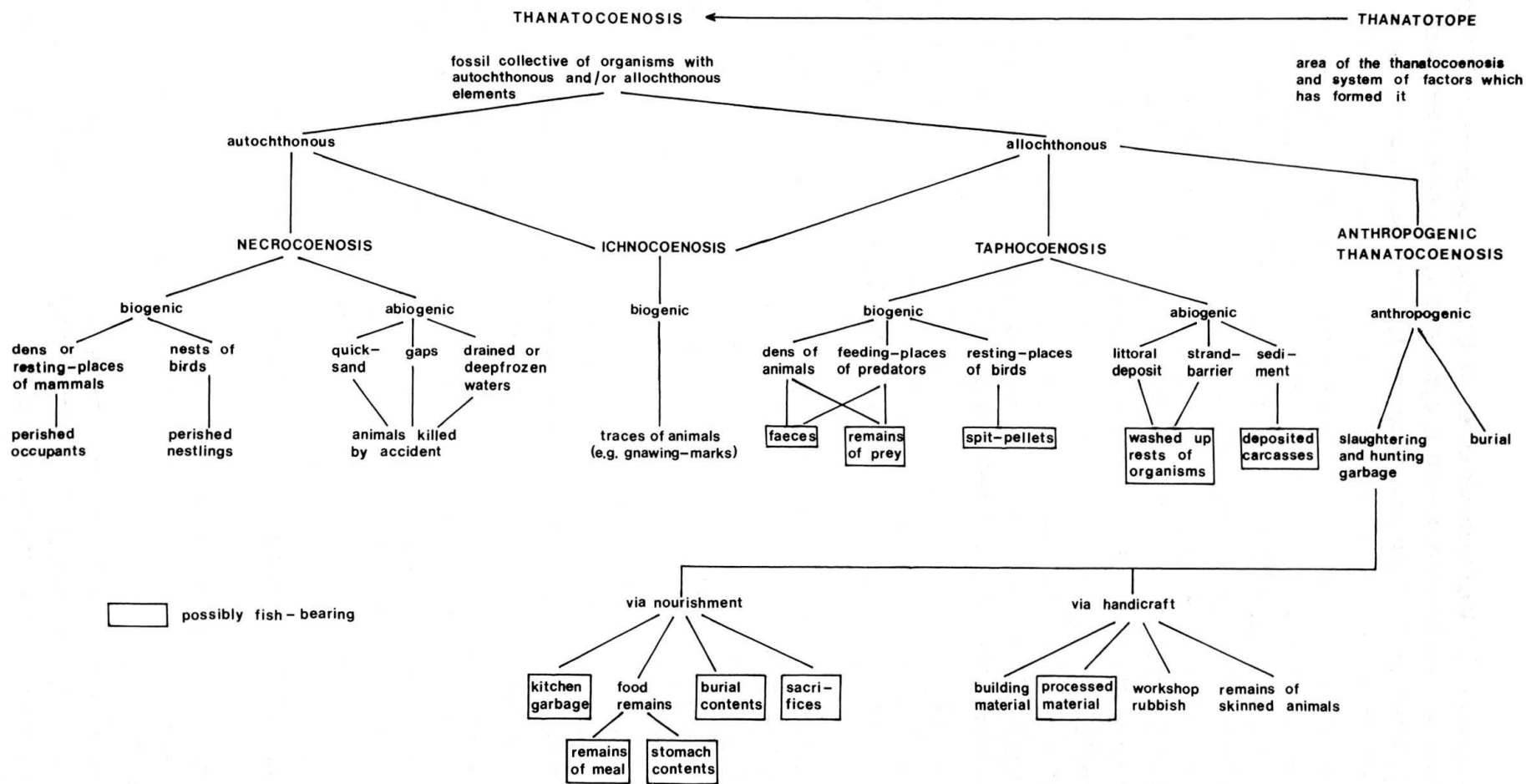


FIGURE 1. Structures of a thanatocoenosis with reference to Böger (1970) and Lepiksaar (pers. comm.).

If one considers the agents which can form the various types of thanatocoenoses one will notice that fish remains are missing or nearly missing in necrocoenoses. That is due to their habitat: They are waterliving and mostly pelagic animals. A dead fish will sink to the bottom thus leaving the three-dimensional environment he lived in. But beyond that in most cases the carcass will be transported far away by water drift before sinking. The only case in which fishes are part of a necrocoenosis occurs when one takes a whole water body as the living area and thus regards the remains of dead fishes as autochthonous elements (Heinrich, 1981). I think that is correct only if the water body in question is a relatively small one.

Such a case, which can be considered a necrocoenosis, is described by Lepiksaar (1967) with regard to the Skedemosse-lake. Due to the limited size and age of tench (*Tinca tinca*) identified there he comes to the conclusion that in the shallow lake now and then a climatic catastrophe occurred, so that, perhaps, during severe winters the lake was deep frozen and the fishes died of suffocation (Figure 1; see also Liljegren, 1982).

In nearly all taphocoenoses, in biogenic as well as abiogenic ones, one can normally expect fish remains (Figure 1; marked by rectangles). They can be constituents of owl-pellets and of remains of preys in case of biogenic thanatocoenoses (e.g. Lepiksaar 1983) as well as components of a sediment or a littoral deposit in case of abiogenic ones (e.g. Lepiksaar 1979).

In anthropogenic thanatocoenoses fish remains are expected mainly in the rubric "slaughtering and hunting garbage" (Figure 1) in connection with nourishment like kitchen garbage, remains of sacrifices (e.g. Teichert, 1974), stomach contents (e.g. Jonsson, 1986) and so forth.

Fish remains can only sometimes be connected with handicraft such as figurines worked out of the cleithrum of haddock (*Melanogrammus aeglefinus*) which are known from Icelandic local art (Kristjansson, 1985). Another example which I found in a folk museum in Schleswig-Holstein is an ensemble of fishbones, mainly of cod (*Gadus morhua*), forming a bouquet.

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