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PRINCIPLES OF CONSTRUCTION OF CORAL SYSTEM

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Any system of organic world must be natural, strictly genealogical. Laws of formal logics can not be used in taxonomy. Both palaeontological and neontological evidence should be taken into account, when a system of classification is set up. For systematic purpose one should not attach much importance to one feature only; it is necessary to use the whole complex of feature selecting only those, which are stable in this case.
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In 1859 Ch. Darwin in his "Origin of Species" noted that any system of the organic world must be strictly genealogical to be natural. That means that each taxonomic system should be based not only on the results of investigations on morphology of individual organisms and their ontogeny, but also on the phylogeny of the group, on its historical development taking into account the entirety of palaeobiographic data.

While classifying palaeontological objects we are limited essentially to different peculiarities of skeleton morphology and ontogeny and partly to the results of reconstruction of the mode of life of fossil organisms. In other words, palaeontological taxonomists do not deal with genotypes, but only with phenotypes, which, due to the state of preservation are composed of limited number of phenes. Nevertheless, systematics of extinct animals should be in conformity with that of recent groups related to them and it is inadmissible to create any "special" taxonomic principles referring to a "special position" of palaeontology among other sciences.

Undoubtedly, palaeontology operating with such a powerful factor as time must play a primary role in investigating the history of life. But at the same time we should consider and make a full use of all the achievements of modern biology. Attempts to build systems without taking into account the results of investigations on extinct representatives of those taxa, which exist now are doomed to failure. So, if palaeontology studies evolution and classifies the organic world through time and neontology does it at the recent chronological level, the success can be achieved

by an ergodic approach, i.e. by assuming that there is no difference between the past and the present in a certain sense.

While classifying fauna and flora one should not rely on formal logic. Animate nature is so rich, diverse, variable that strict, severe laws, which are true for lifeless objects absolutely do not apply in this case.

The only way to build a phylogenetic scheme is to begin with the most ancient representatives of the group, taking into account all known data on their descendants. Thus in case of corals it is necessary to start from their Cambrian and Vendian (?) representatives. But one should keep in mind that their rank, defined by the diversity of recent fauna is a class, no higher and no lower. Neglection of this principle may be leading to mistakes (Iwanowski 1978). A typical example of underestimation of palaeontological data can be a system accepted in "Zhizn zhivotnych" (Naumov and Pasternak 1968) whereas when drawing up a systematic scheme of corals in "Osnovy Paleontologii" (1962) its authors did not sufficiently take into account the data on neontology.

The main systematic unit in both palaeontology and neontology is species. The existing opinion that, the main taxonomic unit in neontology is a species while in palaeontology it is a genus can be explained by the fact that palaeotaxonomists who can use neither genetic nor, very often, ecological criteria distinguish the so-called "morphological species".

The morphological species is an artificial unit, which can include several different species, which cannot be distinguished solely on the basis of their fossil remains. That is why it is the genus and not the species that serves as the main unit in palaeotaxonomy, but it should be remembered that sometimes such genera can be polytypical species.

Species is the lowest and at the same time the only objective taxonomic unit. The higher taxa are subjective, as it is possible to ascribe them different systematic ranks. In nature there is no individual, uniting all features of all species of the same genus.

When the specific category emphasizes uniqueness, isolation and difference, the higher categories emphasize similarity of groups of species. That also introduces subjectivity into the notion of a genus and other higher categories (but not natural groups of fauna). This is what mainly makes them different from species.

Taxonomic feature is a peculiarity of the taxon representative, by which it differs from representatives of another taxon. On the one hand this feature is an indicator of relationship, on the other hand, it has a diagnostic function.

Taxa are distinguished on the basis of common derivative (synapomorph) features, but not on the basis of ancestral ones (if they are homologous to those of ancestral taxon). Complex structures (axial column, types of dissepiments and trabeculae) have a larger weight than simple ones, even if the latter are greater in number. Features which are not subject to changes (for example, the above mentioned ones) have a small weight for the taxa of species category and have a large weight for those of higher categories and vice versa. A feature occurring often, but sporadically has a small weight.

One and the same phenotypical feature in different cases can have different weight depending on its stability. So, the type of colony in some corals allows one to discriminate a genus, but in others it has no taxonomic value. That is why systems of rugose corals based on one, very characteristic feature (for example, on the structure of septa and walls or on the difference of life forms) proved to be a failure.

Each species might be considered as a separate, adaptive zone, therefore other ecological criteria, for example, the ability for symbiosis (*Moyerolites, Parafavosites* from the Silurian tabulates) can be used to distinguish species.

As expressed to a various degree in various groups, asexual reproduction (budding) might be considered a feature characteristic of all corals. Even if some representatives of a genus (for example, Silurian *Rhizophyllum*) have a solitary form of growth, it is possible, that under certain conditions one of their species would produce primitive colonies (*R. elongatum*) and therefore special generic names for such forms are not grounded.

Divergence, convergence, parallel evolution and iteration are widespread in the history of corals (Iwanowski 1977) and these patterns should be taken into account, when drawing up systematic schemes of any rank.

REFERENCES

IWANOWSKI, A. B. 1977. Quelques aspects de l'évolution des rugueux. 2nd Intern. Symp. Corals and Fossil Coral Reefs, Paris 1975. — *Mém. B. R. G. M.*, **89**, 62—64.

— ИВАНОВСКИЙ, А. Б. 1978. Система кораллов (Anthozoa). — *Палеонт. Ж.*, **1**, 25—30.

(NAUMOV, D. V. and PASTERNAK, F. A.) НАУМОВ, Д. В., ПАСТЕРНАК, Ф. А. 1968. Кишечнополостнуе. *In*: Жизнь животных. Беспозвоночные. **1**, 223—326. Издат. Просвещение, Москва.

(SOKOLOV, B. S.) СОКОЛОВ, Б. С. (ред.). 1962. Губки, археоциаты, кишечнополостные, черви. *In*: Основы палеонтологии. 485с. Издат. Академии Наук СССР, Москва.