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PROPOSALS FOR THE INTERNATIONAL COMMISSION ON STRATIGRAPHY

Abstract: As a member of the I. U. G. S. International Commission on Stratigraphy the author presented three proposals for discussion in Montreal in the year 1972, concerning the establishment of a particular Subcommittee for the determination of boundaries between Epochs, further a proposal for official acknowledgment of Regional chronostratigraphic units and finally he has taken an attitude to the stratigraphic code of Hedberg, suggesting the introduction of hierarchy among the concepts bio-, litho-, and chronostratigraphy.

Резюме: Автор как член Стратиграфической комиссии ИУГС подал в Монреале в 1972 году три предложения касающиеся с одной стороны основания отдельных подкомиссий при установлении границ между стратиграфическими единицами, с другой стороны предложение официального признания хроностратиграфических единиц и наконец высказал свои примечания к стратиграфическому коду Гедберга, где предлагается введение иерархии между понятиями био-, лито-, и хроностратиграфии.

As a *ex officio* member of the International Commission on Stratigraphy of the I. U. G. S., I submitted for discussion at the meeting of this Commission in Montreal in 1972 three proposals. These concern the organization of Subcommittee for the establishment of boundaries of different Series and Epochs, the acceptance of Regional Stages as a chronostratigraphic concept and the introduction of hierarchies into the stratigraphic classification and terminology.

1. Proposals for organization of Subcommissions for the solution and establishment of boundaries of different Series or Epochs

Numerous Subcommissions and Committees of the I. U. G. S. International Commission on Stratigraphy are intensively working on the solution of stratigraphy of certain Epochs. In a certain stage of knowledge of regional and global stratigraphy of the Epochs as such necessarily rises the problem of delimitating the former to older or younger Epochs. Nevertheless, these problems can no longer be studied within the framework of these Committees and it is necessary that the Subcommissions and Commissions among themselves consider these questions so that the established boundary may be acceptable.

It is and it will not be possible to start with globally satisfactory modern definitions of larger stratigraphic units (e. g. Neogene, Paleogene, Quaternary) without the establishment of boundaries (namely the lower boundaries) of these Epochs. Of course, it would not be correct, if for the solution of the question of the boundary Neogene/Quaternary INQUA should be competent and similarly, the Subcommittee for Paleogene stratigraphy should not be concerned with the solution of the boundary Paleogene/Neogene.

In my opinion it is necessary for these questions to organize gradually, according to the stage of knowledge and urgency, special Subcommissions consisting of members,

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concerned with boundary Epochs. Here, a good example is the Working group on Neogene/Quaternary boundary, on the session of which in 1972 took part specialists on Neogene as well as on Quaternary.

Specifically, from the viewpoint of the problems of Tertiary, at present, the organization of a special Subcommission for the problem Paleogene/Neogene boundary would be appropriate. The stages of knowledge of both Epochs are to day such that it would not be useful to postpone the solution of these problems. The organization of a mixed Subcommission of the Paleogene/Neogene boundary would enable the Subcommission on Paleogene, as well as the Subcommission on Neogene to elaborate a modern definition of both these Epochs. (Proposal sent to the President of the International Commission on Stratigraphy, Academician V. V. M e n n e r, January 30, 1972.)

The Subcommissions, organized for the establishment of boundaries may be only temporary, until they fulfil their mission. The establishment of boundaries will be, on the basis of most recent knowledge, up to a considerable extent a matter of convention of the organic world to the remaining evolution of the lithosphere.

2. *Proposals for official acceptance of Regional Stages as a chronostratigraphic concept*

Younger Periods, particularly the Tertiary give rise to specific problems for stratigraphic terminology and nomenclature. This is mainly due to the fact that in the Tertiary culminated the fractioning of marine biogeographic provinces. As a result the interregional global correlation is much more difficult, as compared to older Periods (where it is possible to work for instance with Graptolites, Trilobites or even Ammonites in a world scale). In the stratigraphic nomenclature of the Tertiary we see therefore, the largest number of stages and stratotypes which express always the paleobiological character restricted to a certain region. No Tertiary stratotype, particularly in the Neogene, will probably be universally valid on the whole planet as a standard sequence, representing a certain Period. To a certain extent, the stratotypes of the Tertiary always have *only a regional validity*. This is why in North America, on New Zealand, in Japan, in the boreal and the mediterranean Europe or in the Paratethys the stages differ both in their name and also in the paleobiological and chronological content.

Our aim is undoubtedly the determination of interregional stages of the Tertiary which would thus be globally valid for our planet. There exists an effort in this direction on the basis of the evaluation of plankton, ostracods and other suitable organic groups, the absolute age, paleomagnetism etc.

The creation of interregional (global) Stages or Super-Stages, valid for our whole planet is a matter of extreme necessity and importance. The whole geologic public of the world is expecting it from us.

On the other hand, it is necessary to realize that the equivalent, exact in age and content of these global Super-Stages of the Tertiary will not be identified with *necessary precision* everywhere. Their lower boundary may be established by the first occurrence of a certain evolutionary stage of some genus of organisms, in futher future also by the exact absolute age; all this will probably have to be done on the basis of sediments of the ocean bottom, i. e. without a readily accessible stratotype.

The equivalent content of these Super-Stages will be nevertheless at least partially accessible to us on the continents where it may be expressed by stratotypes. We must realize though, that these will be stratotypes of regional validity.

I consider it necessary therefore to pay increased *attention in the stratigraphic no-*

nomenclature and terminology to Regional Stages which practically constitute and will constitute also in the future a visible content of the planned global Super-Stages accessible for investigation at any time.

I recommend therefore to accept for official use the names *Global-Stage* and *Regional Stage*. It is my opinion that the Global-Stage need not have a stratotype of its own. Its lower boundary is conventional and it is established in accordance with the actual knowledge of the evolution of an organism or organisms (e. g. the first appearance of *Præorbulina*) or by some other marker. On the other hand, the Regional Stage which is valid always for a certain bioprovince only, must have its own stratotype which expresses the paleobiological character and the character of the facies of the bioprovince and where possible, also its relation to the Global Stage of the Tertiary.

It must be noted here that the Regional Stages in the Tertiary are not to be understood only as lithostratigraphic units in the sense of a Group or a Formation but as real chronostratigraphic units, provided they are paleobiologically sufficiently elaborated, completed with data of the absolute age and their time relation to Global Stages is established.

I suppose, therefore, that the acceptance of this proposal will facilitate the work of the stratigraphers on the world scale as well as the work in prospecting; it guarantees at the same time in part the continuance of the nearly one hundred year old tradition in nomenclature, and, on the other hand, does not prevent the possibility for unifying the world stratigraphy of the Tertiary.

3. *Proposal for the introduction of hierarchies into the stratigraphic classification and terminology*

It is my opinion that *any principle, concerning stratigraphy should be based on the integrational function* of the latter in geological science. The most important function of stratigraphy is the creation of possibilities for an interregional (global) *correlation*. As the possibility of a correlation is dependent on the possibilities of comparing sediments and formations which originated *at the same time*, the correlation requires as a basis a stratigraphy chronological in nature and independent of the range and development of the formations in a broader sense. The only real stratigraphy which satisfies these requirements is the stratigraphy which is generally described to day as „*chronostratigraphy*“.

All other „stratigraphies“, such as the biostratigraphy, lithostratigraphy, tectostratigraphy, ecostratigraphy, radiometric stratigraphy etc. constitute more or less suitable *methods* by which it is possible to arrive to the only real chronological stratigraphy.

I recommend to accept consistency of the *hierarchy of the importance of the stratigraphic terminology and to differentiate consistently the methods from the aim*.

A global and primary importance should be ascribed to the chronological stratigraphy. In the hierarchical division of methods, in order to arrive to the chronological stratigraphy it is necessary to ascribe *at present* primary importance *to the biostratigraphic methods and to the methods of stratigraphy based on the absolute age and on paleomagnetism*.

The other types and methods of „stratigraphy“, such as the lithostratigraphy, tectostratigraphy and other are dependent on diastrophic phenomena to such an extent that they do not offer real possibilities for a global correlation and are predominantly only of local or regional importance.

In the oldest formations of our planet is lithostratigraphy frequently the only method. It is necessary to accept this circumstance.

Nevertheless the principles of stratigraphy in themselves, nor its methods, can be based in perspective on this defficiency of our knowledge in the methodology. We do not recommend therefore to place lithostratigraphy on the same level of importance as biostratigraphic or radiogeologic methods.

Review by O. SAMUEL.

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