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EIGHTH INTERNATIONAL CARTOGRAPHIC CONFERENCE
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**OPTIMUM AMOUNT OF INFORMATION
ON GEOGRAPHICAL SCHOOL WALL-MAPS**

Paper submitted
by Senior Research Associate
Eng. Nikola Bambaldokov

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Sofia, 217, 9-ti september boul.

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The amount of information on a map depends upon the number of mapped objects and phenomena on it and the way in which they are graphically represented to secure their reading. The factors which determine the amount of information are: the number of elements making up the content of the map, the number of mapped objects, the distribution, kind and colour of its conventional signs and inscriptions, as well as the colour of its background. They are all directly connected with the character of the mapped region, the purpose for which the map is intended and the scale of the map.

We should note in this connection that in cartographic literature there is a definite gap as to the objective criteria determining the optimum amount of details on a map. While one does come upon the number of elements making up the content of a given type of map (most often its special content) in the places where they are examined in the respective cartographic and special literature, the amount of mapped objects in many cases is determined in a very general way, either by norms for the number of objects per unit area, or as a percentage of all objects, depending upon the scale. It is well-known, however, that the distribution of mapped objects and phenomena is hardly susceptible to such a manner of dosing. As to the other factors determining the amount of details on maps, it should again be said that they are comparatively cursorily examined in cartographic literature, and, what is more important, are quite generally referred to the

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different types of maps.

The theory of information and cartographic automation and other contemporary scientific trends put forward the question of the amount of details on a map on a somewhat different basis, but insofar as school maps are concerned, which are intended as school aids in the teaching of geography at educational establishments, it may be said that outdated principles are used, reflecting the flaws of the subjective vision of different authors, editors and compilers.

When we say of a map that it is a school map, it should be a map unambiguously intended for teaching and for the acquisition of a concrete material taught in a given course of study, department or theme, i.e. the map should have a strictly defined purpose and the amount of details on it should take into consideration the material being taught. On the basis of the purpose for which they are intended, it is necessary to establish objective criteria for the amount of details, which should be determinative in the construction of school maps.

Necessary prerequisites for the establishment of such objective criteria for the amount of details on geographical school wall-maps⁺ are:

1. A certain optimum number of geographical school maps for different purposes for the different age groups and capacities of the students, necessary for the whole course of study of geography at the educational establishments.

⁺ Including all other wall illustration map materials, used in the teaching of geography.

2. An optimum scale.

3. Unity in the principles governing the appearance, delineation, representation, colour pattern, ect. of school wall maps.

The first prerequisite is necessary with a view fully to cover the material taught, in subject-matter and volume, as provided in the respective study programmes. Moreover, a physical map must first of all show certain elements, which are the object of study in physical geography; an economic map, on the other hand, must show certain economic elements which are the object of study in economic geography. The general physical geographic and complex economic maps of given territories serve only to examine and characterise their general natural, resp. economic situation. In all other instances when separate elements of the natural environment are examined (climate, vegetation, etc.), as well as when the political subdivision of the branches and sub-branches of the economy are studied, special maps have to be used the content of which is best suited to the respective lectural units.

Practice has hitherto shown that when the number of maps for the study of geography is small, it becomes necessary to transfer elements of another type of maps to the content of a given type of maps. This leads to changing the subject-matter of the maps. Inappropriate titles outside the generally accepted classifications by themes are apt to occur, or a confusing combination of elements in the content of a concrete map is obtained.

In view of the fact that in the different classes both a different number of elements of the content of a given type of maps are studied as well as a varying quantity of objects, it is necessary to make school maps

intended for different purposes for the different age groups and possibilities of students.

In practical teaching in many instances a school map is used in the initial, intermediary and upper courses of the schools, as well as in the higher educational establishments. If, in view of the universal use of the maps, the amount of details on them takes into consideration the higher course of studies, it will be difficult to set apart the content necessary for the initial and intermediary course during the lesson. That is why, the optimum number of maps necessary for the teaching of geography should be divided both by themes and by classes.

A very essential prerequisite for the establishment of objective criteria for the amount of details on the maps is the selection of an optimum scale. A basic requirement for the scales of the geographical school wall maps is that they should secure the possibility for a clear image and for an easy reading of their content from the distance from which the students observe them. At the same time there should be coordination between the scales of the maps. On the other hand, this presupposes that the maps of a certain territory, irrespective of the theme mapped, should be in the same scale. The same scale makes it possible to build up in the students a correct spatial mental picture of the situation and correlation between the geographical objects and enables them to make comparisons. On the other hand, for the maps of the different territories similarity or a suitable rate frequency of scales should be sought.

Unity in the principles governing the appearance, delineation, etc.

of the geographical school wall maps is also a necessary prerequisite for the establishment of objective criteria for the optimum amount of details on them.

A basic requirement for all school maps is that the cartographic information contained in them should be represented by such a use and combination of cartographic pictorial means that the most essential elements of their content should most easily be apprehended by the students. The size, form, colouring and combination of the different conventional signs should be best suited to the physiological peculiarities and possibilities of the visual apparatus of students.

In this connection a basic factor is the taking into consideration of the students' acuteness of eyesight, i.e. their ability to apprehend the graphic image. For the different ages this acuteness is different, beginning with 0.9 for students at the age of 7 - 8, and coming up to 1.15 for students at the age of above 15. This makes necessary the corresponding use of conventional signs of different size. The other factor connected with the physiology of vision is the selection of the colour combination of the maps or the taking into consideration of the varying capacity of the visual apparatus with respect to colours. The latter must be selected most of all with a wavelength within the range of 494 to 585 millimicrons, which is optimal for the possibilities of human visions.

A very essential moment in the unity of principles governing the shaping up of geographical school wall maps in the unification of the conventional signs for representing their content. These signs, evolved on the

basis of graphic semiology and with due account taken of the physiological peculiarities of the vision of students, lead to a quick and easy apprehension of the material taught.

Taking into consideration the material contained in the study programmes in geography and the above-indicated prerequisites for the establishment of objective criteria for determining the optimum amount of details in the geographical school maps, we can say that it should be examined mainly in two aspects:

1) Amount of details in the geographical school maps with regard to the necessary elements, specific for the content of the different kinds of school maps.

2) Amount of details in the geographical school maps with regard to the number of depicted objects.

The criteria themselves are determined by two basic factors:

- a cartographic factor - determining the objective distribution of cartographic phenomena on the basis of their quantitative and qualitative characteristics, and

- a pedagogical factor - determining the necessary objects to be apprehended by students in the process of study of geography.

Naturally, these two factors cannot be examined in isolation, and should, in general, overlap but in some cases, in view of the study programmes, certain elements may be eliminated.

When we examine the elements of the content of a given type of maps we know that regardless of the territory which they cover, they are similar.

We may see differences only as a result of the different scale of the mapping and the character of the region. With the increase in scale, the number of elements also increases. There is a logical gradation, beginning with the most generalized categories in the maps of the world down to the detailed maps of individual countries or parts of them. In almost general sense this gradation can be expressed as a transition from the general to the particular. On the other hand, the number of necessary elements should not be assessed in an absolute way, because in a given type of maps of certain regions a number of elements of their content may be absent not because they are not needed, but because they are altogether lacking in this particular region.

Thus, as objective criterion for the amount of details in the geographical school maps with regard to the necessary elements in their content, we must take the concrete theme in a degree of detail in conformity with the pedagogical requirements of the respective course of study.

As to the general geographical elements in the thematic school maps, their selection should rest upon their relation to the given themes, namely:

- general geographical elements representing part of the special content of the maps;

- general geographical elements which help the construction and representation of the special content of the maps and

- general geographical elements serving as orientation points in the special content of the maps.

The introduction of general geographical elements unrelated to the

themes in unnecessary , because they divert the attention of the students, overload the maps and hinder teaching and the acquisition of the concrete studied material.

In examining the second aspect of the amount of details in the geographical school maps, namely, the amount of details with respect to the amount of objects represented, it should be underlined that here again of decisive significance is the purpose for which the maps are intended.

In the material contained in the study programmes and in the respective geography textbooks, and consisting of a text, pictures and sketch maps, we find the selected number of objects to be mapped which will have to be obligatorily included in the respective geographical school maps.

Naturally, the studied objects have their quantitative and qualitative characteristics, which in their turn are a necessary prerequisite for their study. But in order to have a harmonious unity of two basic factors underlying the amount of details in every geographical school map, in addition to the studied objects, all remaining objects with analogous qualitative and quantitative characteristics have also to be introduced within the scope of the mapped territory. Thus we shall objectively obtain the minimum amount of details on a given geographical school map with respect to the quantity of represented objects.

To a great degree all objects that are to be mapped can be classified and those studied in the geography classes can be divided into certain categories, which are included in the minimum amount of details on the geographical school maps.

In view of our practice until now, the necessity makes itself felt of introducing additional information on the maps with a view to expanding the knowledge of students. That is why we think that if in addition to the minimum amount of details in the geographical school maps, we introduce also the respective objects from the category following that which is being studied, we shall have an objective criterion for the optimum amount of details on the geographical school maps with respect to the quantity of depicted objects.

If the information of the geographical objects is systematized according to its quantitative and qualitative characteristics (which can be done quite easily automatically, with the aid of the electronic computer), the editorial and compiling work on the school maps could be substantially facilitated and cut down.

Thus, taking into consideration the above preliminary conditions and criteria for an objective amount of details on the geographical school maps with regard to the necessary elements and the quantity of depicted objects, cartographic practice could produce geographical school maps of still higher value, which would meet the modern requirements of the teaching and learning of geography at the educational establishments.