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## TEACHING OF THE MAP READING SKILL

A fast progress of knowledge in the present days causes that school-taught facts quickly become outdated. Hence the importance of school in teaching the skill of self-education by means of different sources of information. Training pupils to be able to handle a word, number, or an image starts already at the very basic levels and in different subjects of their school education. The skill of individual map reading is taught only during geography classes and it is exclusively geography teachers who are responsible for its effects. However, despite the abundancy of didactic literature concerning maps, as well as the great number of problems for pupils accompanying manuals and exercise books, pupils still stumble upon great difficulties in map reading and map-derived conclusions.

In order to ascertain the nature and causes of those difficulties research on the type of mistakes made by the finalists of the Geography Competitions (mainly aged 18—19) was carried out. Geography Competitions have been annually organised in Poland since 1974. Pupils of all types of secondary schools, who have mastered the Lycée geography course, together with the given complementary literature can take part in them. The competitions are carried out in three grades, consequently classifying the best competitors for each of the preceding ones. The General Polish Committee formulates the problems of all the steps of the competition and guarantees equal conditions of their marking. The uniform test system constitutes a perfect ground for the research. Pupils interested in geography undertake the tests voluntarily and with a great deal of positive motivation, which accounts for the accuracy of the research. The pupils come from different milieus, and they were prepared by different teachers; still, they answer the same questions, in the same period of time, and their results are estimated according to one common detailed instruction. The finalists undoubtedly represent pupils of high geography knowledge and their achievements can be

regarded as the maximum of possibilities of talented pupils in the conditions of the actual skill education.

The research results are not pleasing. The solutions of problems are not devoid of numerous mistakes. The frequency of certain types of mistakes and their occurrence among different groups of pupils suggest that mistake causes are to be sought among the factors common for pupils and teachers from all over Poland. Such a source of errors was found, first of all, in the pupils' books; they are used by pupils during classes, at home, for self-education before the competitions, as well as by teachers who, similarly as their pupils, take over some thinking habits or algorithms of procedures. Other sources were detected in the teaching programme uniform for all the country and in didactic literature for teachers.

Having analyzed the contents of these sources the scholars arrived at a conclusion about a strong dependence of pupils' mistakes on the content and methodological correctness of the pupils' books as far as the introduction and training of certain skills are concerned (contents, number, schemes and frequency). The causes of the mistakes are frequently rooted in the very basic educational levels, i.e., already when the pupils are to handle the map for the first time. Besides, the manuals lack a uniform, general conception which would concern all levels of skill teaching. A clear influence of didactic literature can be seen here. Teaching programmes and manuals contain popular and worked out phases and methods of skill introduction and practice. Most likely teachers themselves do not realize these instruction of different didactic value, dispersed in different books, which cover but a fragment of the process and rarely refer to the whole of it. One cannot find anywhere such a whole process which would take into account the perceptive possibilities of pupils and educational conditions.

The research served to elaborate the conception of the teaching of the skill of handling general-geographic maps, as well as contour line, geological, and climatic ones. In general, these kinds of maps are sufficient for the presentation of the school geography course, whereas the ability of reading them prepares pupils for the contact with other types of maps.

According to the above conception the first step is to prepare pupils for reading general-geographic maps (Table 1) and is undertaken in the forms I—III (age 7—9); systematic education in reading such maps is carried out since the introduction of a separate subject of geography, i.e., in the IVth form (age 10). Practical outdoor classes and plan drawing aim at teaching patterns of spatial images and orientation (conscious-

ness of direction), as well as at introducing scale and direction in plans and maps. Gradual replacement of plans by maps of constantly smaller scale serves to incite the necessity of comparing their contents in view of spatial relations and different ways of presentation. The introduction of small-scale maps is preceded by the introduction of the notion of geographic coordinates and their function in the maps. The ways of reading general-geographic maps do not differ from the methods of reading the ones executed by means of signatures and line and surface extensions. Therefore a sufficient introduction and development of the skill of the reading of the general-geographic maps will serve, at the same time, as a preparation for reading maps presenting different phenomena of nature and economy.

Having practised elementary skills to such a degree that they would enable pupils to accomplish new tasks one may proceed to introduce a new element into a map, that is the third dimension (height). Teaching the notion of height starts also with practical outdoor exercises (Table 2). Through drawing a topographical profile and contour-line plan we pass on to teaching the ways of representing the element in question on a map. Considerable difficulties pupils face in reading contour-lined maps may be diminished thanks to comparing the map contents with reality or block-diagrams (models and drawings). Gradual advancing to the work on maps with a smaller scale consists of the exercises which take into account the progressing generalization of a contour-line drawing as well as the change of the way of map reading.

Geological and climatic maps, in turn, require a different kind of preparations. Through outdoor observations and elaboration of its results, pupils ought to get a command of adequate images which subsequently are transferred directly to the map of a small scale (e.g. maps of Poland). In this case the stage of working with detailed maps is omitted. The representation of a proper generalization of the phenomena should be acquired by means of the exercises with sections and block-diagrams (Table 3) as well as climatic charts (Table 4).

The stage when geological sections and block-diagrams are applied may prelude to the usage of geological maps. It depends on the structure of the education programme according to which teaching of fairly difficult elements of geology might be transferred to final forms of primary and initial ones of secondary school. Pupils' preparation for reading geological maps together with sections covering the Earth interior is also the preparation for using other maps supplemented with such sections as soil and geomorphological maps.

Table 1

Suggestion of the application of plans and general-geography maps in teaching space images and notions

	<i>Source of information</i>	<i>Stages of observing reality</i>
<b>Reality</b>	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <b>School and its surroundings</b> </div>	<p><b>Observation</b> of reality and <b>Elaboration</b> of the results of directed observation and measurements</p>
<b>Symbolic image of reality</b>	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <b>Class-room plan</b> scale 1 : 100                 </div>	<p><b>Transformation</b> of the results of observation of the area within the pupils' sight into a symbolic image</p>
	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <b>School surroundings plan</b> scale 1 : 1000                 </div>	<p><b>Comparison</b> of plan with the area observed in different time</p>
	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <b>Town plan</b> </div>	<p><b>Comparison</b> of plan with the area observed in different time and with its image created indirectly (description, illustration)</p>
	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <b>Tourist map</b> scale e.g. 1 : 75 000                 </div>	<p><b>Comparison</b> with map of the reality observed and known indirectly</p>
<b>Generalized, symbolic image of reality</b>	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <b>Maps of Poland and other countries,</b> scale e.g. 1 : 700 000                 </div>	<p><b>Recreation</b> of the image of reality known indirectly</p>
	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <b>Globe</b>      <b>Maps of continents and the world</b> </div>	<p><b>Imaginary recreation</b> of the image of reality known only indirectly</p>

Comparison of reality with is symbolic image

Recreation of the image of reality on the basis of maps

Table 2  
Suggestion of the application of profiles and hypsometric maps in understanding height and topographical features

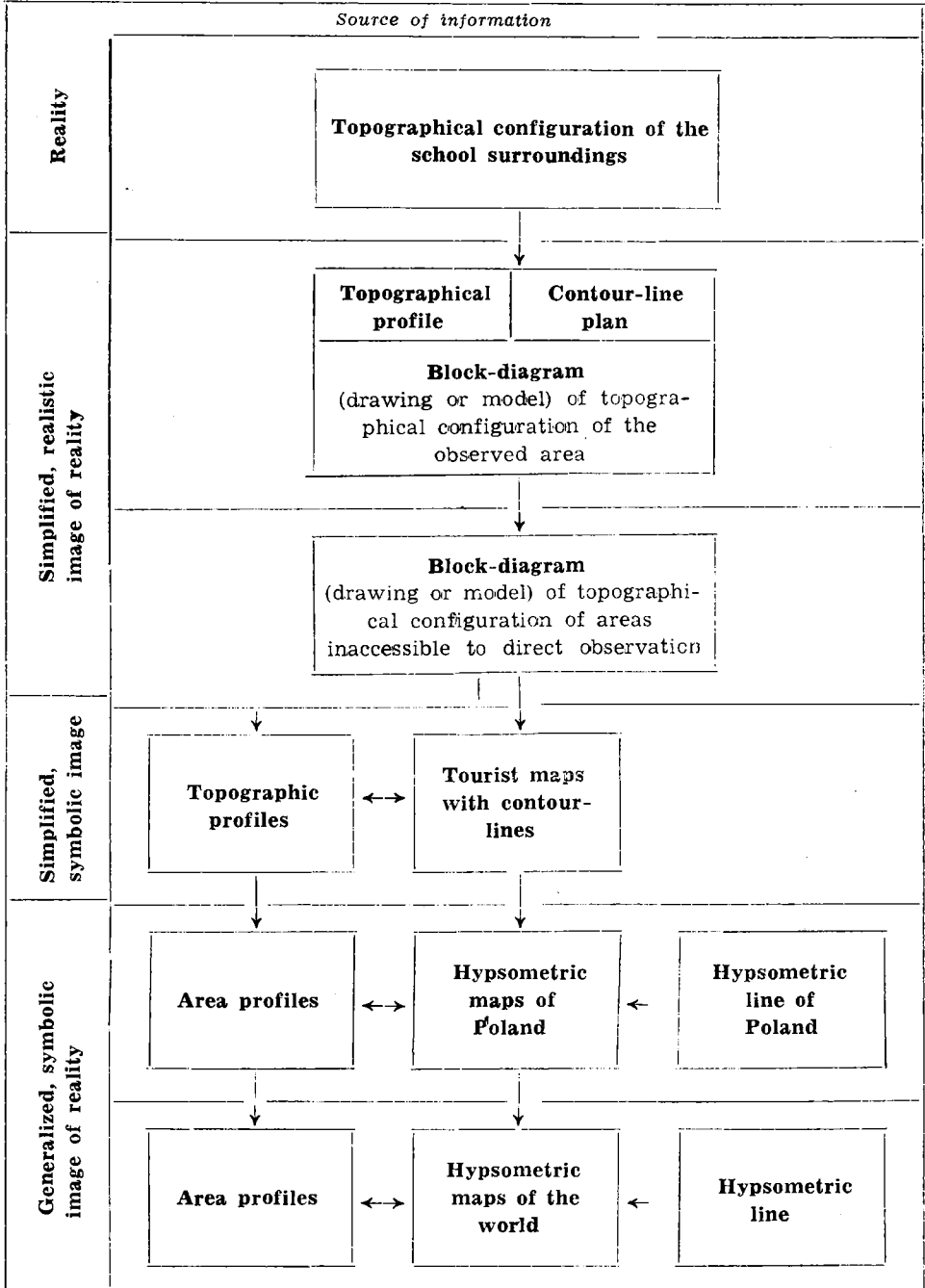


Table 3

Suggestion to apply block-diagrams of sections and geological maps in teaching elements of geology and geomorphology

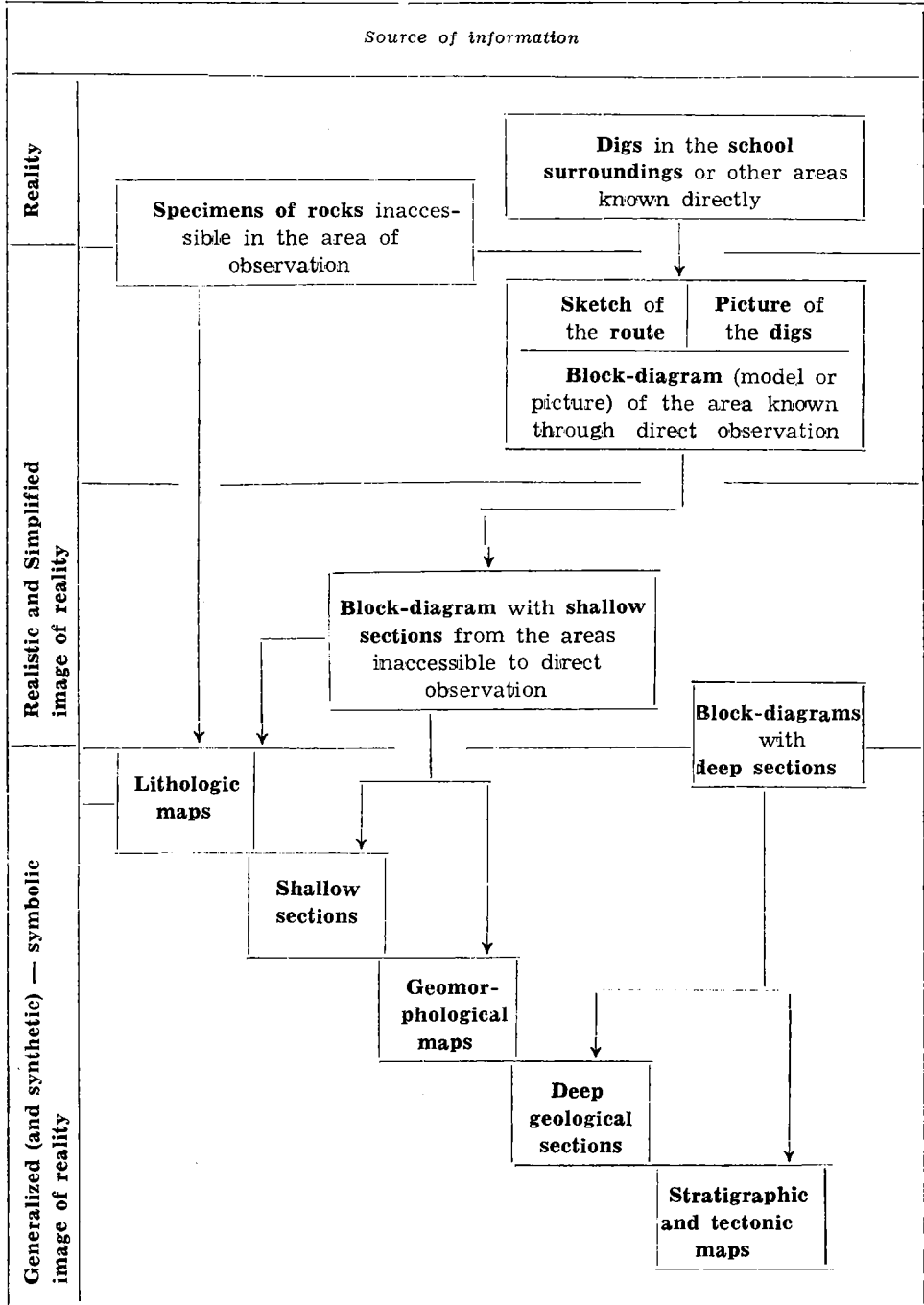




Table 5

Suggestion of pupils preparation for individual map reading and its application in geography teaching

Education program-me	Maps executed by means of signatures and distances	Hypsometric and contour line maps	Maps executed by means of isorithms, cartodiagrams, cartograms and motion bands	Geological, geomorphological and soil maps.	Contents of problems
Teaching of geography of Poland	Outdoor exercises. Class-room plan. School surroundings plan.				Teaching of space and map orientations.
	Town plan	Outdoor exercises. Area profiles. Contour line plan.			Mostly analysis of map contents
	Tourist maps	Tourist contour line maps. Area profiles.	Observation, measurement. Tables and diagrams with meteorological data.	Outdoor exercises. Geological and soil sections.	
	General geographical map of Poland	Hypsometric map. Area profiles. Hypsometric line.	Tables and diagrams with data concerning climate, population and economy.		Sections and block-diagrams.
			Tables and dia-		

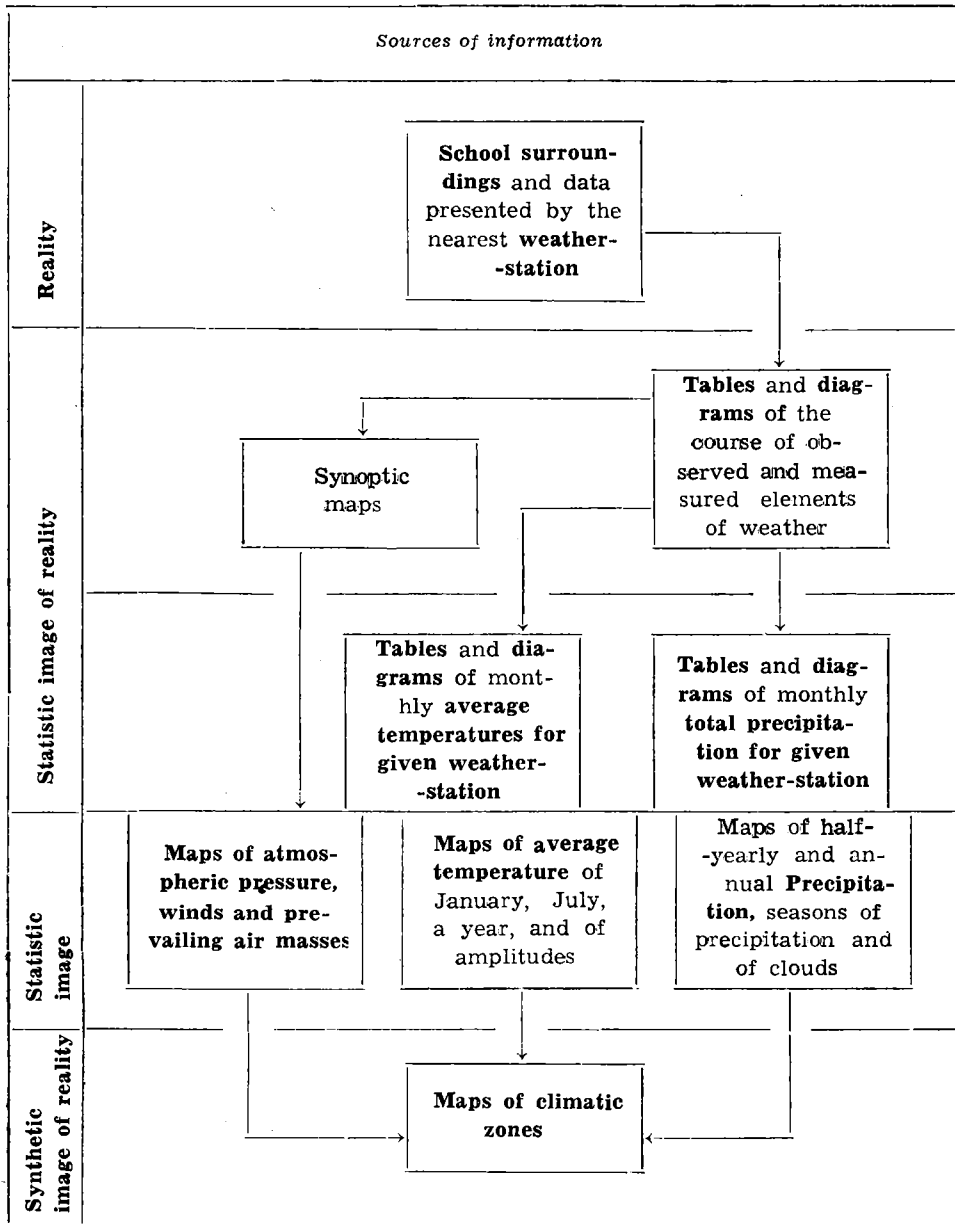


<p>Teaching of general physical and economic geography of the world regions.</p>	<p>Administrative, economic, biogeographical maps.</p>	<p>Area profiles. Tourist contour-line maps.</p> <p>Hypsometric maps of countries and continents.</p>	<p>Tables and diagrams. World maps of climate, population, transportation and economy.</p>	<p>Sections and block-diagrams. Geological, morphological and soil maps.</p>	<p>Mostly synthesis on the basis of maps with various contents.</p>
<p>Teaching of general physical and economic geography of the world regions.</p>	<p>Town plans. Tourist maps.</p> <p>General-geographical, political and economic maps.</p>	<p>Area profiles. Tourist contour-line maps.</p> <p>Hypsometric maps of countries and continents.</p>	<p>Tables and diagrams. Maps of climate, population, transportation and economy.</p>	<p>Sections and block-diagrams. Geological, morphological and soil maps.</p>	<p>Analysis and synthesis on the basis of various maps.</p>
<p>Teaching of general physical and economic geography.</p>	<p>General-geographical, political and economic maps of the world.</p>	<p>Hypsometric maps. Hypsometric line.</p>	<p>Tables and diagrams. World maps of climate, population, transportation and economy.</p>	<p>Sections and block-diagrams. Geological, morphological and soil maps.</p>	<p>Mostly synthesis on the basis of maps with various contents.</p>



Table 4

Suggestion of pupils' preparation for reading maps and weather-charts



In the case of meteorological and climatic phenomena, charts complete the time element which is presented statically on maps. The skill pupils acquire on the example of climatic maps and charts in using statistical data and maps executed by means of isorithms and motion bands may be utilized in the process of teaching with the aid of maps of population, economy transportation, etc.

The presented conception of teaching skills of using maps may be applied in various education programmes; it should be stressed that it does not involve any basic change of order of introducing the particular maps (Table 5). Moreover, one ought to remember that for a pupil a map it is not an aim in itself but a source of geographical knowledge systematizing space. The majority of maps are introduced in the course of the first years of geography teaching (form: IV—V). However, the information how to use a map does not mean that pupils acquire practical skill. At the end of primary school and also in secondary school teaching consists in permanent development of skill of reading various maps and deducing on the ground of their contents. This is carried out in connection with presenting other sources of information, mostly sections completing the third dimension and diagrams completing the time element. Thus the map usage in geography classes should contribute to active learning and later on to form the basis for individual actualization of knowledge.