UDK: 912.43:7

CARTOGRAPHIC ART

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ABSTRACT

Cartography as a science studies the ways of making and use of maps, so due to the convenience of different, linear and surface objects, presented in different colors and tones, it is distinguished by a special artistic side of the study. The article is dedicated to the artistic aspects of cartography in order to classify and systematize more precisely the cartographic and graphic and artistic aspects, thus emphasizing the possibilities for special creativity in cartographic art.

Keywords: cartography, cartographic art, map in filigree, Republic of Macedonia

GOAL

The goal of the article is to emphasize the artistic side of cartography through the composition of graphic representation of mathematical and geographic elements of maps and to encourage cartographic artistic creativity through examples of a cartographic relief model, a mosaic, a filigree, and a painting (Markoski, 2003).

METHODS

The article basically covers both theoretical and applicative aspects. Therefore, several methods have been used, i.e. cartographic, geographic, technical and philosophical methods.

Cartographic methods are used for systematization and classification of card elements and ways of displaying them.

Geographic methods have been used to systematise the causal consequence and causal connection of the geographical content in space (on the land) and their associated displaying on the map.

Philosophical methods are used to perceive the logical connection and the psychic understanding of cartographic products depending on their purpose.

RESULTS

Through the realization of the entire procedure for mapping, globe or relief model, two aspects are systematized:

• typical technical cartographic and
• a specific artistic aspect.

Technical cartographic aspects

The technical and cartographic aspects include:

- procedures for transfer of real mapping of the physical surface of the Earth on a map through transfer of the spherical surface of the Earth on a flat surface, i.e. a map (cartographic projection, size, cartographic signs);
- the ways of showing the contours of the land on a map corresponding to the natural characteristics in terms of retaining the natural sizes, shapes, routes of stretching, height and size, i.e. the overall appearance of the geographic elements of the maps (with associated colors).

All actions are done or can be done with a cartographic graphic representation of mathematical elements in one color, so that all pointy, linear and surface objects have an accurate geographical location and cartographic construction, but with very difficult identification of the individual elements. Therefore, the graphic artistic design of maps is used.

CARTOGRAPHIC ARTISTIC ASPECTS

The specific artistic aspect is a procedure that allows overcoming of the problem of achromatic or monochromatic mapping by applying associatively selected colors and tones and elegantly shaped signs and lines (the size of the sign, the thickness of the lines, the color clarity) according to the readability threshold. In this sense, a cartographic image is obtained in a composition of purpose-built and associatively selected colors.

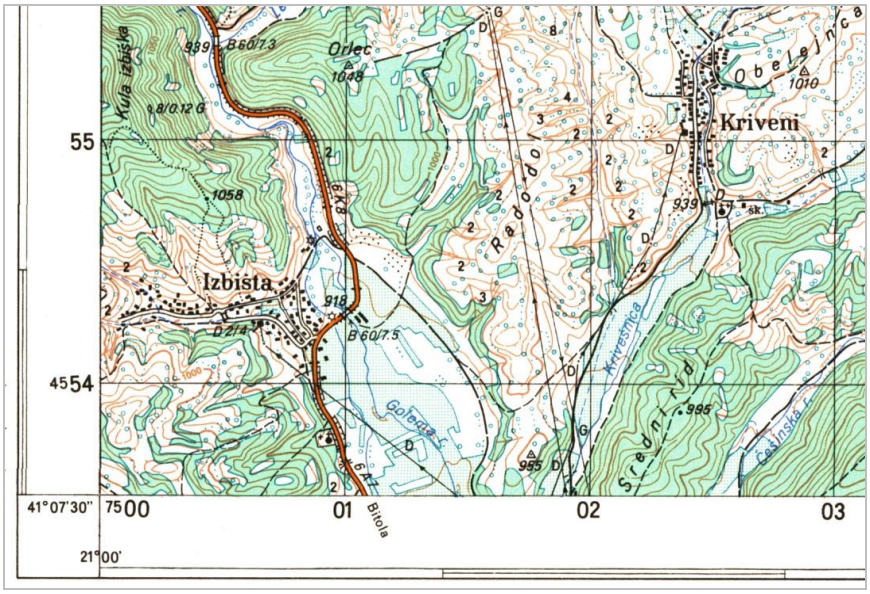


Figure 1: Part of a topographic map; scale 1: 25000.
Color composition for different elements of the map (VGI, 1975-1980)

Usually the color composition in principle assumes the application of:

- black or black-colored tones for displaying the mathematical elements of the maps;
- brown color for display of the relief;
- blue for displaying hydrographic objects;
- green for displaying plant life;
- yellow, red, black and other colors to display line infrastructure;
- black, blue, red (or others) to display geographical names and inscriptions;
- different colors and compositions depending on the purpose, the scale and the method of cartographic display of the contents of the maps.

The cartographic and artistic expression also includes a series of methods and ways of mapping the objective reality of the land, so that on specially established technical-cartographic situations (also according to certain rules) compositions of colors and tones that through psychological perception of the person the geographical content of a certain space is more objectively captured (Zivković, D. 1986). Typical examples are the methods of displaying the relief with screws, shadows, isohipses, hypsometric layers and other creations of colors and tones used in the content and composition of various thematic maps.

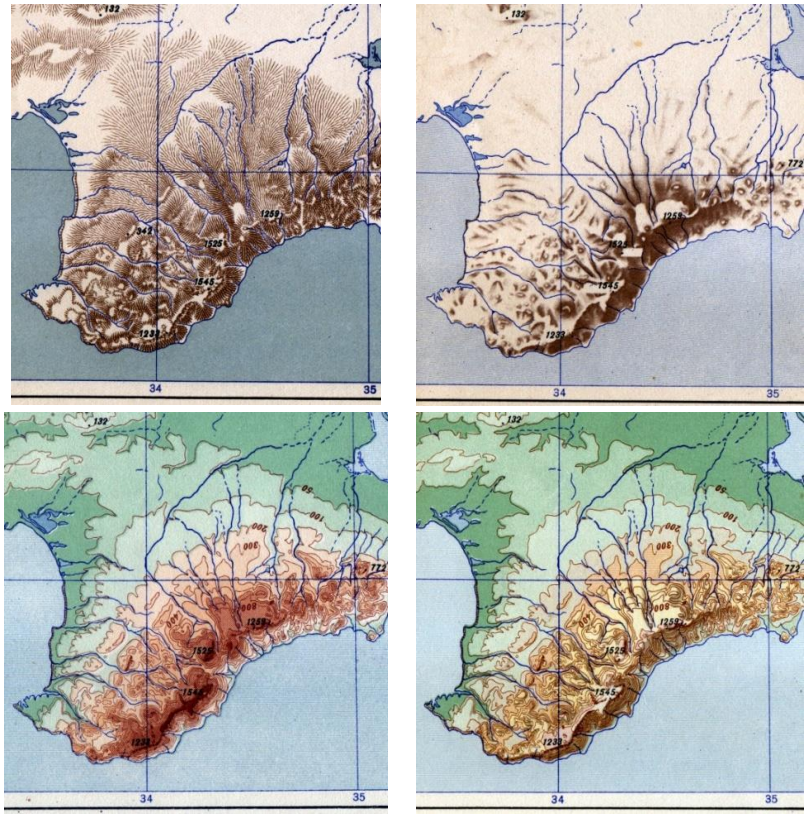


Figure 2: Cartographic and artistic expression in the process of representing the map relief with the method of hatches, shadows, hypsometric layers and combined (Gedimin 1946)

However, in the cartographical expression, in addition to the artistic aspects of map design through specific and precise technical cartographic rules (such as maps in official cartographic production), there are also several free artistic expressions where the map is taken as the main subject matter. In addition, several specific free cartographic artistic expressions are presented, for example: relief models on a specific territory, mosaic maps, filigree maps, souvenir maps, fantasy maps and tattoo maps.

MAPS IN A MOSAIC

The map, as a specific universal document and instrument with large spatial and temporal informative power, is a motive for typical artistic expression. Such is the example of the Palestine map in Madaba from the 6th century, made in a mosaic on an area of 100 m2, of which about 25 m2 are preserved (the scale is about 1: 40000) with a display of various geographical elements in different colors.

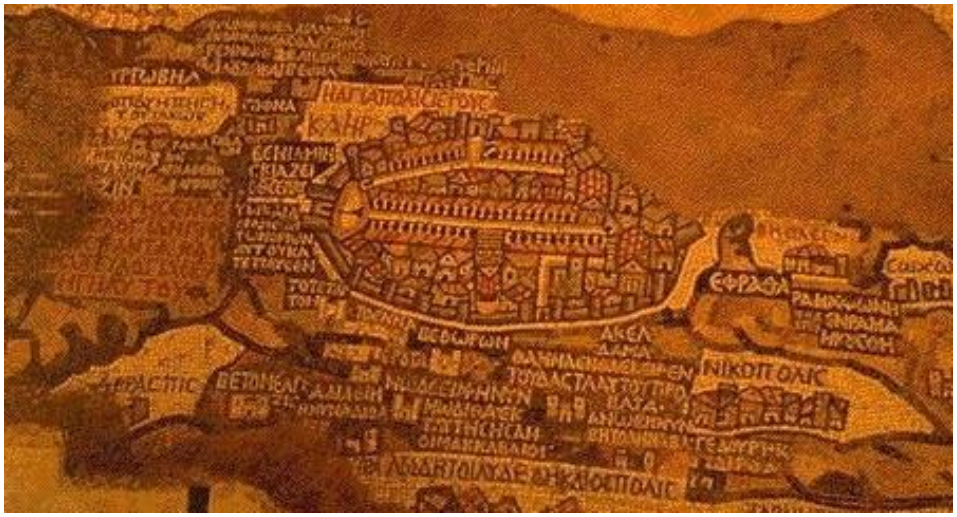


Figure 3: Part of the map of Palestine in Madaba made in a mosaic in the 6th century, scale 1: 40,000 (Michael Avi-Yonah, 1954)

RELIEF MODELS AND RELIEF MAPS

The specific cartographic artistic aspect is also evident in the construction of relief models on the terrain (Peterca M. at all, 1974), so that, although it is handled according to specially established rules (for making relief models and relief maps), the definitive fine formation of the relief models and maps presupposes a special artistic engagement. This is especially reflected in the shaping of relief plastics on the ground and the emphasis on specific geographic elements with concrete colors. The purpose is to present the actual shape of the relief of a particular territory, as well as the creation of a three-dimensional artistic work, in the process of which in addition to the technical-cartographic aspects, artistic and sculptural abilities are emphasized.



Figure 4: 3D Model of the Relief Rila Mountain branches in Bulgaria
(Photo: B. Markoski, 2015)

SOUVENIR MAP

The borders, as one of the geographic elements of the maps, are closely related to the cult of ownership and identity, so they are often used to show the natural and created values, tradition and culture of states, regions or places. It is precisely for this purpose that they are used as a basis on which the pictorial or relief displays separate national and regional characteristics. In this case it is shown through the example of maps of Portugal and Bulgaria, tourist souvenirs connected with both cartographic and tourist attractions that emotionally connect you with a specific journey and memories of it. Such cartographic products have some informative power and are especially used in tourism propaganda.



Figure 5: Maps of Portugal and Bulgaria - Tourist souvenirs with natural and anthropogenic values (photo: B. Markoski 2017)

MAP OF THE REPUBLIC OF MACEDONIA MADE IN FILIGREE

There are countless examples where certain elements of the maps are based on various signs and logos. But human creativity is so great that artistic cartographic works are made out of various materials. Some of them are of practical value, some of them purely artistic. Such is the example of a map of the Republic of Macedonia prepared in the so-called cartographic filigree of silver under the copyright of our respected colleague Temjana Melovska - Mitrevska, graduated geographer from the Institute of Geography at the Faculty of Natural Sciences in Skopje in 2014.

Technologically speaking, as a cartographer I have had the chance to work (draw) directly with a nib, a raypitograph and the latest computer technology (new generations of technology have appeared and therefore I consider myself extremely lucky). However, from the field of crafting jewelry and filigree, to my great joy, a map of the Republic of Macedonia was made in filigree and was dedicated to me (the author of this article). The map has the following characteristics:

Table 1: Overview of the data of the map of Republic of Macedonia, made in filigree

Author:	Temjana Melovska Mitrevska
Work:	Map fo Republic of Macedonia, made in filigree
Scale:	About 1:2000000
Time:	2014
Place:	Skopje, University “St. Cyril and Methodius”, Faculty of Natural and Mathematics, Institute of Geography
Content:	Border of Republic of Macedonia, Vardar river, Ohridsko and Prespansko Lake, boundaries of statistical regions in the Republic of Macedonia according to NUTS classification
Material:	Silver
Purpose:	Artistic painting in filigree
Dedicated to:	Prof. Blagoja Markoski, PhD

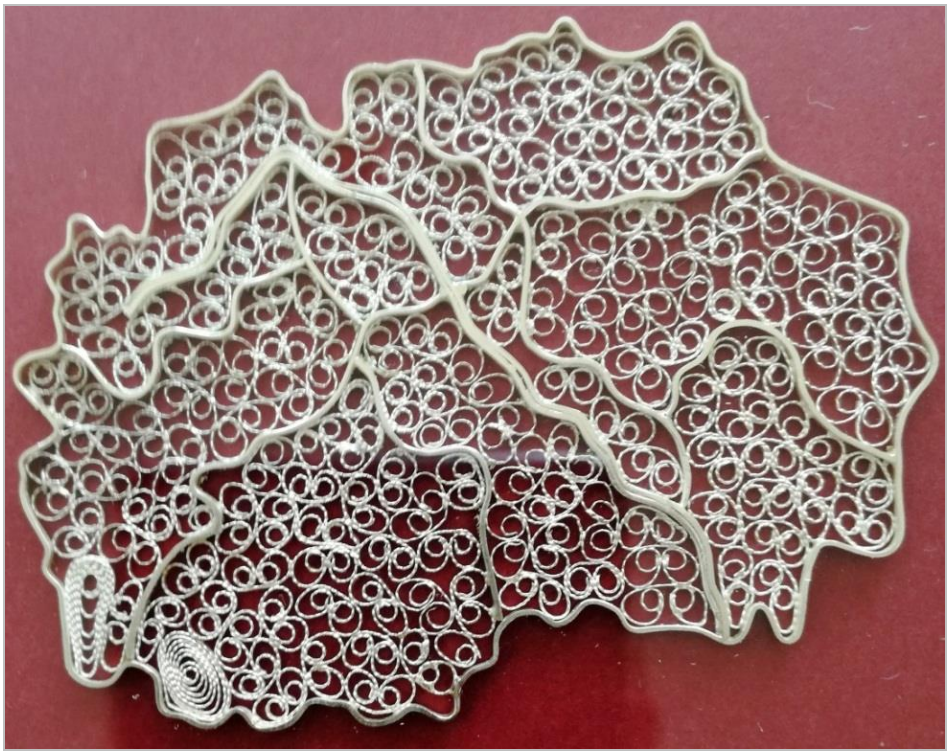


Figure 6: Map of the Republic of Macedonia made in filigree (Melovska-Mitrevska T. 2014)

MAPS WITH PERSPECTIVE DISPLAY

The perspective method of displaying map relief is one of the first cartographic methods. Due to the difficulty of the production process and the demands of great artistic gift by the authors, and in the absence of opportunities for quantitative and qualitative analyzes and measurements, this method has long been almost abandoned in the mass cartographic expression and production (Markoski B., 2003; Ćurčić S., Ristanović B., 2010). This is also as a result of the use of new far more practical cartographic methods (method of isohipses, shadows, layers and combinations thereof). On the other hand, the new aeronautical and satellite images and their computer processing made it possible for the perspective display maps to be used again. However, this method is limited to displaying smaller territories where observation is carried out under a certain azimuth and vertical angle (elevation).

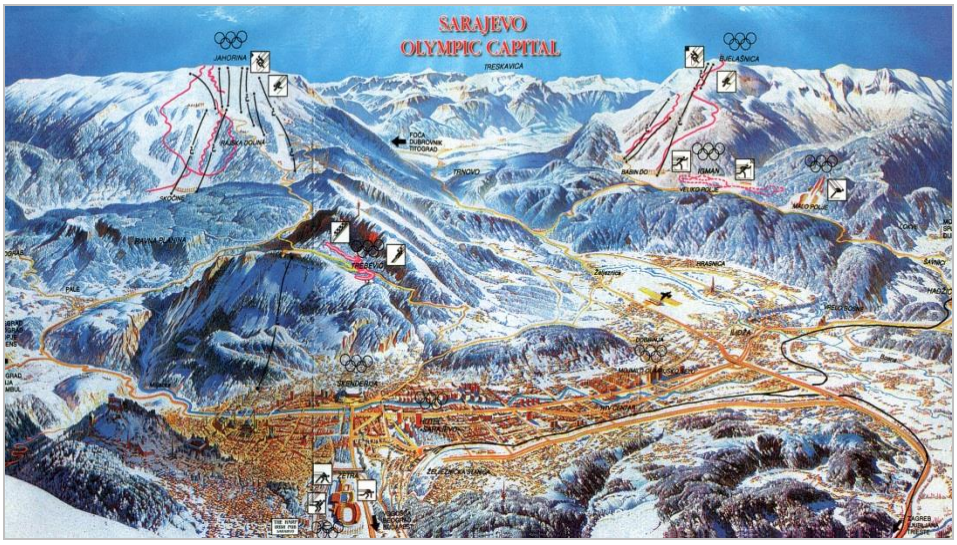


Figure 7: Perspective display of Sarajevo with the environment during the Winter Olympics 1984 (http://www.okbih.ba/new/text.php?id=4)

In the present case, as a typical example, the map of Sarajevo was taken as Winter Olympic Center in 1984 with the immediate environment for winter sports activities. The map represents a 3D view of the territory shaped by the shadow method with an overview of the infrastructure elements of the city of Sarajevo and its surroundings.

FANTASY MAPS

The group of thematic maps also includes tourist maps. Some of them are with classical general geographical and tailor-made thematic touristic content where all the cartographic laws and principles show the necessary information related to tourism activity and movement. On these maps, various associated signs of natural and anthropogenic values and type of tourist activities are displayed. However, there are tourist maps with much more freely expressed content, where the mathematical elements are absent or insignificant, and the geographical elements are incomplete, i.e. shown schematically, and the thematic content is specifically designed mainly with associated signs. Such a characteristic example is the map of South Bohemia (Czech Republic) - the Kingdom of the Messiah presented with associative symbols and characters from stories for children with a lot of imagination, where the drawings are created by the cartoonist Jaroslav Kekles, and the project of Marcel Gotzem from the Informational Cartographic Center in the Czech Republic Budjilovice made in 2014. The map is in size around B0 format.



Figure 8: Map of South Bohemia (Czech Republic) - The Kingdom of the Messiah with fairytales for children and fantasy, drawings by Jaroslav Kekles, a project by Marcel Gotzem. (mapcentrum d.o.o. 2014; photo: B. Markoski 2016)

FINE ART MAPS

The map as a basis is taken for the creation of various artistic expressions related to folklore, tradition, working processes of people and other topics that are artfully represented. Such an example is the map of folk costumes in the Republic of Macedonia (Malahova M., 1950), which shows the folklore specificities of the population in different regions of the country and the characteristics of their traditional working preoccupation.

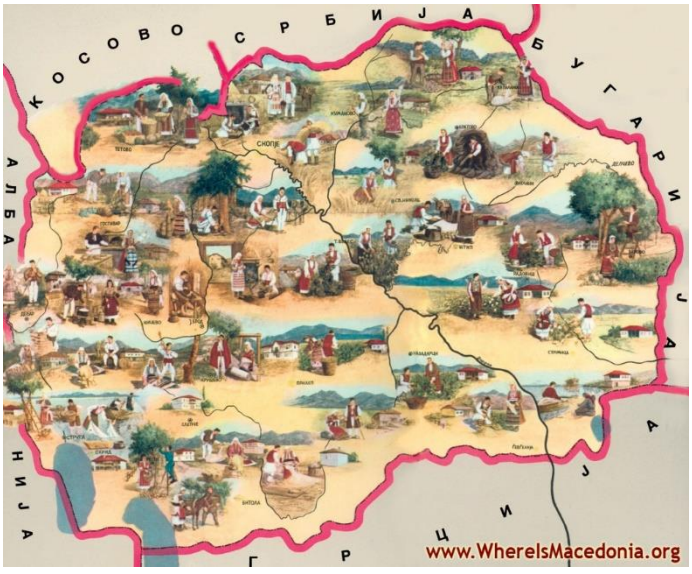


Figure 9: Map of Fine Art - folk costumes in Republic of Macedonia (Malahova M., 1950)

Another example of this type of maps is the map of Europe (as well as other similar maps), where the author used the borders of Europe and the political borders of the states, and in them (in his view) put the most famous national art works. Thus, an interesting geographical cartographic and artistic composition has been obtained which speaks about the cultural peculiarities of European civilization and culture.



Figure 10: Map of famous artwork in Europe
(https://www.reddit.com/r/MapPorn/comments/652cjw/famous_artwork_in_europe_oc_20001982/)

TATTOO MAPS

The map as a universal document showing a specific territory besides the practical application also has emotional aspects of attachment to a particular territory such as a map of one's own country, continent, world map, region, sea, lake or similar. Due to this emotional connection or fashion trend among people, maps are an inspiration as tattoos on the human body. There are many examples, but in this case, only one pattern with a map of the world and

one modified template with additional elements is displayed. Such creations are purely artistic achievements in which the fantasy and the artist's creation are boundless.

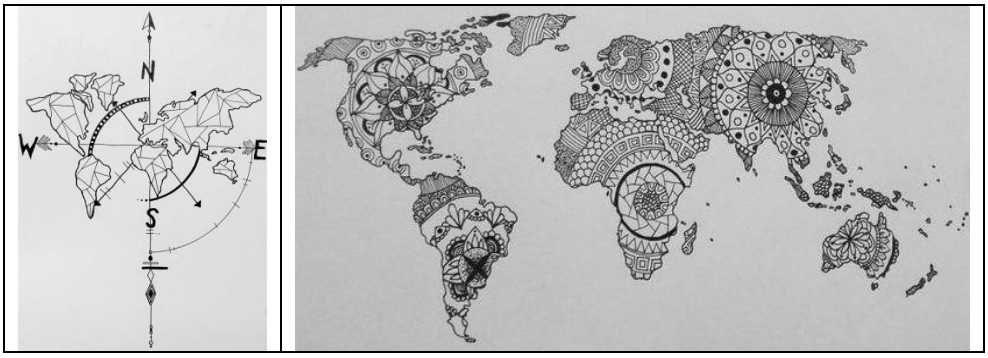


Figure 11: Map - tattoo, artistic tattoo designs with maps of the world (https://www.pinterest.com/pin/292874782002609243/ https://es.pinterest.com/pin/180636635033083063/)

DISCUSSION

Cartography as a science basically belongs to the natural (most closely related to geography) and the technical sciences (related to geodesy). However, due to graphic shaping of the maps there are expressive artistic elements (Ljesević M, Zivkovic D., 2001; Srbinoski Z. 2012).

The basis of this article is to emphasize the artistic side of cartography. For this purpose (in addition to the standard methods and procedures for mapping, where the technical contents are designed according to specific cartographic principles), several aspects have been recorded, where the artists embody a concrete map as a motive and display it through various artistic creations. Namely, the following examples were elaborated:

- a relief model and a relief map (this is a technical construction of the relief model based on specific technical methods, but in the further design it requires a special artistic sculptural ability)
- map with perspective display (it is about an almost abandoned method of displaying map relief, but with the application of airborne aerial shooting, satellite recording and computer processing of footage this method has become very attractive for presenting smaller territories. This is a result of the artistic abilities of the artist.)
- a mosaic map (for instance, the map of Palestine in Madaba was made in a mosaic in the 6th century, on which a mosaic is used to show the territory - a problem that requires a special gift for creation and performance)
- a filigree map (it is a work where the map as a motif is made into a filigree, a method of shaping contents with metal wires that are usually precious metals or maps embedded in filigree objects),
- souvenir map (a very commonly used method where the map is taken as a motif, it is shaped sculpturally and decorated artily. There is a huge range of variety of souvenirs of this type)

- a map with fantasies and stories (not typical of the true practical cartography, but in practice the map is also used for cartographic creations where stories and fantasies are displayed, something like the nuns' maps. This method emphasizes, the graphic and artistic abilities of the artist to bring the story and fantasy from the text onto a drawing and a map).
- maps with fine arts (it is about cartographic creations where one or a series of art creations are placed on the map. These are most often associated with civilization achievements, tradition and culture of individual countries, regions and places).
- tattoo maps (emotional or fashion trends that also take a map as a motif and through artistic expression with tattoo methods create diverse artistic cartographic creations).

Characteristic of all listed cartographic-artistic creations (except for maps that are made according to precisely determined cartographic principles, methods and standards) is that such maps do not possess the correct mathematical (projection, scale, frame, etc.) and geographical elements (relief, hydrography, vegetation, infrastructure objects, settlements, geographical names and inscriptions), but rely on some approximate accuracy derived from the source map. Therefore, they can not be measured. But they have wide distribution, great diversity, a high degree of popularization of cartographic activity and significant advertising aspects.

CONCLUSION

The artistic side of cartography is emphasized in the basics of cartographic design (among other things) through the application of colors as a cartographic expression, in order to display a larger number of geographical elements on a map and to be clear and transparent enough on one side, but also appropriately psychologically associative on the other hand. However, in this article the artistic side of cartography as a science (through concrete examples) is perceived from the aspect of making cartographic creations by applying different purely artistic directions such as sculpture, painting, mosaic, filigree, etc.

A characteristic of such works of art (where the map is taken as a basic motive) is that they are freer in expression and representation, so unlike official cartographic products, these do not necessarily respect the cartographic principles and standards that apply in the official cartographic production (for example, having mathematical and geographic elements with the appropriate composition of colors, character dimensions, orientation, etc.). This means they do not necessarily have size, meridians, collations, coordinates or other mathematical and geographical elements. In such artistic cartographic creations, some of the usual elements of the maps should not be represented, but rather only what is in the imagination of the artist is present.

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