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Exploring intentional distortions in Cold War era tourist maps

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Summary: Cartography of the Cold War period may be a very interesting area of research because it became a common practice in socialist countries to distort maps published for the general public between the 1950s and 1980s. However, this activity has never been mentioned or documented publicly. In the Soviet Union, the distortion of maps began in the 1920s, but as maps had not been made for a broader public before, the Soviet map users had no basis for comparison. However, accurate, high-quality tourist and city maps were published in most socialist countries (e.g., Poland, Hungary, and East Germany) even between the two world wars, so the map users easily recognized the distortions, and it was difficult for them to accept the situation at least. Since maps made available to the general public were produced only by state map publishers at this time, only they knew the technique of distortions. This technique, originally initiated by the Soviet experts, was developed in the early 1960s in East Germany and introduced in all socialist countries. Prior to the digital age, it was not an easy task to implement these geometric distortions. This study examines the geometric distortions of tourist maps of the Mátra Mountains in Hungary. This area did not have too many military objects (therefore it was not a subject of specially targeted distortions during the Cold War). However, the accuracy of maps for the general public is questionable and can be numerically verified and determined.

Introduction

There are two (partly) historical commissions in the ICA: the traditional Commission on the History of Cartography and the relatively newly founded Commission on Cartographic Heritage into the Digital. The focus of the two commissions is different, with the cartographic history commission essentially concentrating on maps of earlier periods, while the Cartoheritage Commission focuses on the methodology (digital technologies) of cartographic heritage preservation. Since these commissions usually deal with maps for a given period, research on maps for the past 50 to 100 years is largely omitted by both ICA commissions.

The Cold War periods

According to historians, the Cold War era started soon after World War II, when (about 75 years ago) Winston Churchill, the former Prime Minister of the United Kingdom delivered his famous speech in Fulton (USA) declaring that the former alliance with the Soviet Union against the Axis powers (Germany, Italy, Japan and few others) was over and “From Stettin in the Baltic to Trieste in the Adriatic, an iron curtain has descended across the continent.”

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The term ‘Eastern Bloc’ or ‘Soviet Bloc’ was used in the Western countries, but these Eastern and Central European countries named themselves communist countries or people’s democratic countries (mainly in the 1950s) and later as socialist countries. From now on, the paper is using this latter term. The term ‘Eastern Bloc’ went into use as a shorthand for Yugoslavia, however, was never a member of the Warsaw Pact, which was the military alliance of socialist countries established in 1955. Thus, in military-political terms, Yugoslavia was not an Eastern Bloc country, while Albania left the Soviet military alliance in 1961 all these countries, as it conveys the general Western sense of a non-Western socialist sphere in the period (Matless et al, 2008).

**Early tourist maps**

Some of the socialist countries published their first tourist maps before the Second World War, and some of them even in the late 19th century. These early experiences certainly influenced both the usage and the publication of tourist maps of socialist countries during the Cold War period. Due to the lack of specific research on tourist maps, it is not easy to find information on the early tourist maps of socialist countries, but the countries with German-Austrian relations (German Democratic Republic, Poland, Czechoslovakia, Hungary, to use the names of the Cold War period) published their first tourist maps, mainly of the Alps, before the First World War. These countries had already become tourist destinations in the late 19th and early 20th centuries, although of course tourism at that time cannot be compared with the form and scale of international tourism today.

The first Hungarian map for tourism purposes was published in 1848, in a Balaton album. The Hungarian Carpathian Association and the Hungarian Tourist Association published a few similar maps (High Tatras, 1876; Budapest and surroundings, 1899; Mátra Mountains, 1897). The first map of Hungary with detailed hiking trails of the Pilis was published in 1890.

In 1922 the Royal Hungarian State Cartographic Institute published a new series of public maps. This series of maps was called the “Hikers’ Map”, but because of the angels decorating the front cover they were mostly called “angel” maps. The first such tourist map of the Buda Hills was published in 1928, followed by maps of several Hungarian mountains and hills. The tourist map of the Mátra Mountains was published in 1929 (Figure 1). Although the visualization was simplified compared to the topographic maps (which were not classified between the two world wars), these publications were accurate and represented a flourishing period of Hungarian hiking tourism between the two world wars. Thanks to the experience of the first topographic maps (e.g. the former Austria-Hungary and Germany), these early tourist maps are comparable in accuracy and quality to today’s tourist maps. The tourist maps published before the Second World War were quite widely used and known (at least in Hungary) and were widely used, well-known maps (although the prices of maps at that time were certainly higher than today’s incomes). This relatively widespread familiarity proved to be a problem in these countries because, as Soviet influence grew stronger in the late 1940s, the Soviet Union pressed the countries in its sphere of interest to ban the use of the earlier maps. These high-quality maps were thus collected, and the population was threatened with severe sanctions if they did not hand in their maps of home. From then on, the content of any (previously publicly available) map issued for open use was strictly regulated and carefully controlled by the military authorities, whose staff were trained by Soviet advisers (Papp-Váry, 2005).
The chronology of the Cold War period and international tourism cannot be understood without considering long-term socio-economic developments. For example, the introduction of paid leave for workers in the period between the two world wars and the shift to a five-day working week in the 1950s and 1960s years changed patterns and notions of consumption and leisure (Noack, 2018). Socialist tourism was purposeful and set a model for the socialist citizen by emphasizing the physically and mentally invigorating function of tourism. However, tourist maps were not only for domestic tourists, but also for travelers from foreign countries. Foreign tourists at that time were mostly (at first exclusively) from neighboring socialist countries. However, visitors from Western countries were much more valuable to the host countries, as local currencies were not convertible. For this reason, the national tourist offices of the socialist countries really valued Western currencies. As travel to Western countries was quite limited or even forbidden in most socialist countries during the Cold War, the tourist offices in socialist countries had only limited opportunities to gain experience of the tourist infrastructure in Western countries. In any case, the main attraction of Eastern tourism for Western tourists was the cheapness and exoticism (including some danger) of the mystery beyond the Iron Curtain. Western interest in visiting Eastern Europe gave socialist countries the opportunity to showcase their societies while earning ‘hard’ currency. However, Western tourists also posed the risk of espionage and could have a negative impact on the local population if they were exposed to foreign ideologies. In other words, tourism in the Cold War period was an area of competing cultural, economic, ideological and security concerns (Collier et al, 1996).
From secrecy to distortions

The secrecy of topographic maps in the early days of regular large-scale surveys was, in fact, a matter of course since maps played a major strategic role. Most of the maps of the military surveys of the Habsburg Empire (later the Austro-Hungarian Monarchy) were classified. This was obvious if only because these maps were manuscripts, surveyed and drawn by military cartographers. An additional copy of the maps of our military surveys (manuscript copy) was also produced, mainly for security reasons. As the Emperor financed the military surveys, the emperor and the military staff decided how these maps could be used.

These military maps were the most detailed and up-to-date maps of the time. Indeed, they played a strategic role in helping the military to map their own territory. Sometimes, in emergency (war) situations, topographic maps were reproduced on a smaller scale, but most of these derived maps were also classified.

The first open-use city maps of the socialist countries in the second half of the 20th century were usually published at scales between 1:20,000 and 1:30,000, but there was no reference to scale on the map itself (nor was there a scale of proportions). A similar content reduction was applied to essentially all public maps, including other official civilian maps.

An examination of the maps of the 1950s shows that, although they (especially the city maps) were (often severely) lacking in content, the maps did not show significant geometric distortions. In the Soviet Union, all maps with a scale of more than 1:1 million were classified, but in 1966 this limit was changed to 1:2.5 million. Even geographic maps at this scale were distorted in Soviet atlases, but Western publishers and map users also became aware of the distortions and, accordingly, confidence in maps published in socialist countries (especially the Soviet Union) was severely reduced.

After the creation of the Warsaw Pact in 1955, a new organization was set up under the Joint Command, which directly coordinated and harmonized the activities of the military cartographic services of the socialist countries.

The 7th International Conference of Geodesic Services of the Socialist Countries was held in Moscow in 1965. One of the most important decisions of this meeting was that topographic maps could no longer be used for civilian purposes. In fact, essentially all civil topographic maps were classified, and this decision had an impact on other publicly available maps, such as tourist maps or city maps. Since the functioning of the state, the economy (as the people’s economy was called at the time), was impossible without such detailed civilian maps, the only solution was to introduce map distortions (Unverhau, 2009).

In 1966, the Soviet Union, at the Conference of Cartography of the Socialist Countries, provided for the complete separation of civil and military map publishing and map use. The socialist countries tried various solutions to meet the Soviets' dictates: certain map objects and the geographical grid were abandoned. This affected the publication of larger scale civilian maps in all socialist countries.

East Germany (GDR) was the first socialist country to produce a series of open-use civilian maps at a scale of 1:200,000 to meet Soviet requirements as early as 1966. The 1968 conference of the civil cartographic offices of the socialist countries invited East Germany to share its experience in this field with other countries. When Hungary reproduced the distortion methods and tried to publish a similar series of maps, the Hungarian military authorities were not satisfied with the result. They only gave permission for publication after further distortions.
It should also be recalled that the Hungarian civil cartographic office at the time was headed by the Hungarian Sándor Radó (who was allowed to leave the Soviet Union in 1955 after a decade in prison). Radó regularly referred to Lenin, the main ideologist of communism, and also stated that he and Lenin met in Moscow during the 3rd Congress of the Communist International in 1921, when Lenin explained that the struggle against imperialism involved special forms of cartographic representation, including distortions. Distortions on state topographic maps were created by photographic methods. Films of the dissected topographic maps were compiled at a scale of 1:100,000 by optically transforming the images. This method distorted both the angles and the distances, making these maps no longer suitable for accurate field navigation. This method was also used for tourist maps (in all socialist countries), which had to be based on distorted topographic maps. As a result, tourist maps became even less accurate than topographic maps.

In terms of cartographic representation, the areas bordering the western countries were the most sensitive parts of Hungary. In most cases, the countries concerned opted for the simplest solution: they left these areas (and even a strip of the required size along the border) blank on tourist maps.

**Cartographia maps**

The Kartográfiai Vállalat (Cartographia) was founded at the end of 1954 to meet the needs of users with tourist maps, city maps and all kinds of educational maps. The first tourist maps were published in 1956.

![Figure 2: The first Mátra Mountains map of Cartographia, (no scale indicated, only scale bar) 1956](image)

The first Mátra Mountains map of Cartographia was published in 1956 was reminiscent of the tourist maps of the Mátra between the two world wars, both in its content and in its legend and appearance, the filtered content was only noticeable (Figure 2). This first edition was presumably too weak even for tourists’ use (no contour lines, the linear features became angular (even the hiking trails)).
The second edition in 1957 looked more detailed but did not meet with the approval of military cartography, so a heavily revised edition was published the following year and formed the basis for subsequent editions. The contour lines sometimes appeared again, and the content of the map was also slightly enriched and then reduced again (Figure 3) (Hajdú, 2021).

In the later years, only hill shading was used to represent relief (for quite a long time) and most of the linear features (roads, railways) were slightly distorted and represented as polygons. These early tourist maps did not even indicate the scale, but only a proportional scale; calculated on this basis, the scale was not even a rounded value. In later editions of the map, in addition to the shading, the 50-metre contour lines were added, and in even later editions, the lines of man-made features were also drawn as curved lines. Tourists did not appreciate the small animal and plant figures and drawings of hikers on the map, which helped map editors obscure the military-like objects. The scale was only given in scale bars on maps of many later editions, although the scale itself was not put on the map’s title page until the mid-1980s (Gercsák, Zentai, 2021).

All maps were checked by the military authorities before publication, but sometimes the editors of Cartographia did not receive very clear instructions from them. The military authorities thought that these maps were too accurate for civilian users, so they were only allowed to be published if the map content was revised and further distorted.
Distortion analysis

Most tourist map distortions can be originated from the slight modification of the projection system. The quantification and visualization of this disorder helps to understand the logic and thinking behind decision making and map editing.

A tool for any old map accuracy analysis is the ‘MapAnalyst’. Its main purpose is to compute distortion grids, displacements, and scale isolines to determine how correct the analyzed maps are. These are achieved by marking control points (junctions, hilltops, bridges – similarly to georeferencing) on an accurately georeferenced (e.g. OpenStreetMap) and the examined map. The distortion grids are perfectly rectangular when a map has no distortions, while compressed and enlarged grids refer to local distortions. Displacement vectors show the accuracy of control point locations: the larger the vector, the larger the distortion value. By calculating the scale, the accuracy of maps can be given in meters. Scale isolines show various parts or areas of the analyzed map that has a different scale than the nominal (Jenny, Hurni, 2011). However, these were not generated in this study, as distortions were not as big to present significant scale differences.

The maps from the socialist period of Hungary were analyzed using this software: we analyzed and quantified distortions following the timeline of published maps. The first analyzed map was from the year 1948, while the last was from 1990.

We analyzed tourist maps almost every 5 years (1948, 1956, 1960, 1967, 1972, 1976, 1980, 1986, 1990) during the research, so we worked with 9 maps. As a first step, the collected maps were loaded into the software. In each case, 10 control points were placed in the area with almost nearly the same density (Figure 4). We also marked the position of the control points in the OpenStreetMap window, which was the default ‘Referenced Map’.

![Figure 4: Control points in the ‘Old Map’, and in the ‘Referenced Map’ (1948)](image)

In all 9 cases, we mark the same characteristic control points on the map. These were mostly railway and road crosses, churches of settlements, or mountain peaks.

After placing the control points, the program computes and displays the distortions in different ways. First, it draws a distortion grid on the map, the distortion grid (red grid), that didactically shows the
overall scale of map distortions (Figure 5). Where the lines run relatively straight and for nearly accurate grid cells the distortion is not significant. In contrast, where this regularity fails, these lines become curved to a certain extent, referring to a quantifiable distortion in the area.

![Figure 5: ‘Distortion Grid’ on some analyzed maps (1948, 1956, 1972, 1986)](image)

The curvature of the lines appears on each map differently. In addition, to reach more accurate results, the program can be used to detect additional local distortions too. We can also display the displacement of the placed control points, which shows how much the selected point on the examined map is away from its position on the reference map (Figure 6). The program marks this distortion with a blue line starting from the point on the analyzed map (pink cross) pointing to the location derived from the reference map (the other end of the blue line).

![Figure 6: Displacement vectors of the TV tower in Kékes (1948, 1967, 1980)](image)
Results

As can be seen in the figures, the examination of a given point over a relatively long period of time gives surprising results. We examined the position of the TV tower at the highest point in Hungary (Mount Kékes), which showed different distortion/displacement values in all 3 cases. The largest displacement can be seen on the 1980 map, where a 235 m slip can be read from the map. The same process was repeated at the intersection of a railway and a road on the border of the city of Pásztó. In this case, the largest numerical distortion was presented on the 1990 map, ~240 m (Figure 7). The quantified results of a few additional control points can be seen in Table 1.

![Figure 7: Displacements of a railway and road crossing (1956, 1972, 1990)](image)

Another spectacular difference that is hard to quantify is that all line features (except for hydrography) were represented by straight lines: both the railway and the road network consist of straight, angular lines. Another interesting fact is that in the 1957 tourist map (issued the following year), they are already depicted with curved lines supplemented with contours (Figure 8).

![Figure 8: Differences between the representation of roads, railways, and relief (1956 and 1957 maps)](image)

We also found differences in the visual presentation of objects in the different years. The church of village Markaz is omitted on the 1956 map. The same church is marked on the 1948 and 1957 tourist maps too in the same place (Figure 9).
Concluding remarks

Most tourist maps can be characterized by a certain extent of distortion of the examined era. By using a suitable software, these inaccuracies can be visualized and also quantified in some cases. This paper determined that the largest numerical distortions were about a few hundred meters (200-500 m on average). However, a clear pattern and system of these modifications could not be determined, just local issues.

Current tourist and hiking maps are not affected by these types of errors: they are usually based on accurate field measurements and sometimes produced in a georeferenced GIS environment. Additionally, tourists of our age like to use online map providers that visualize up-to-date data with good positioning. Although distortion practices revealed in this and preceding studies affected every map of that age, they usually meant to hide important state and military objects from the public and the cold war enemy.

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