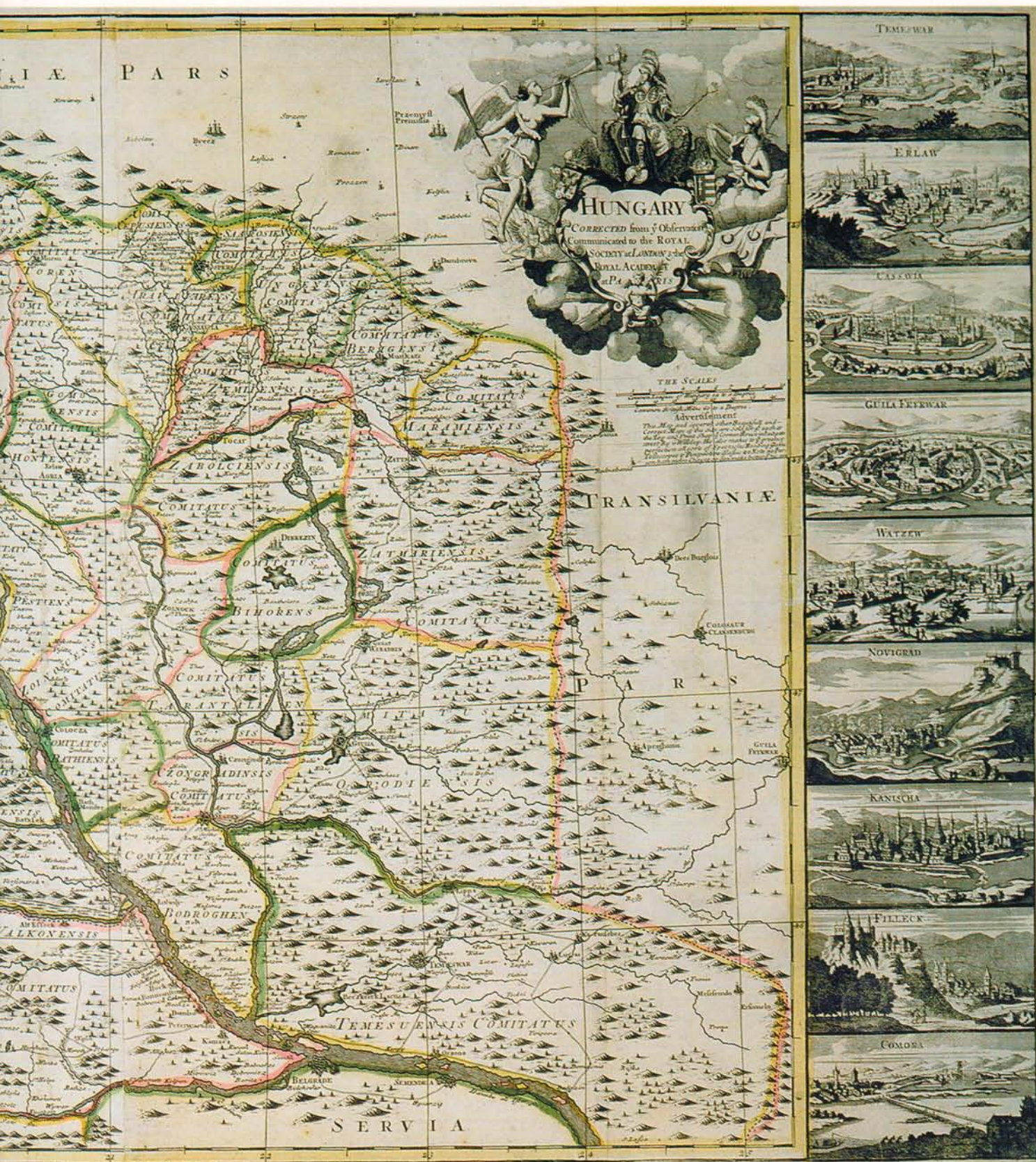


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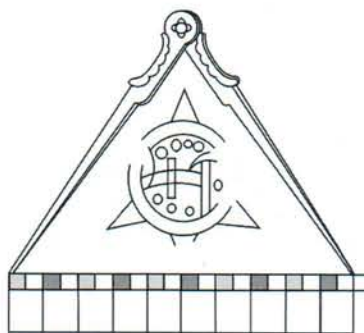
MAGAZINE FOR MAP HISTORY

„Ha egy nemzetnek nincs múltja, nincsen jövője sem.”

‘A nation without history is a nation without future.’

CONTENTS - TARTALOM

Tibor Szathmáry - <i>Szathmáry Tibor</i>	2
To the Reader - <i>Köszöntő</i>	
Zsolt Török - <i>Török Zsolt</i>	
The summaries of the articles published in Cartographica Hungarica (1992 – 2004)	5
<i>Cartographica Hungarica (1992 – 2004), a tanulmányok összefoglalói</i>	
Zsombor Nemerkenyi - <i>Nemerkenyi Zsombor</i>	20
Indexes - <i>Név-, és Tárgymutató</i>	
Zsolt Török - <i>Török Zsolt</i>	
A short history of Hungarian Cartography	22
<i>A magyar térképészet rövid története (angol nyelven)</i>	



Welcome
to the

21st International Conference on the History of Cartography!

Zsolt TÖRÖK:

A short history of Hungarian Cartography

The specific conditions of spatial orientation in the Carpathian Basin derive from the basin-like geographical environment. Mountains surround the plains; the network of valleys helps transport and orientation. The streams and rivers always flow towards the bottom of the basin serving as natural guides. The hills provide a look over large areas, but as we arrive at the plains finding our way becomes more difficult in a land full of marshes, flood plains, and capriciously meandering rivers. It took a long time after centuries of collecting and organising spatial knowledge in the far past to create the first map sketches.

The beginnings

The Carpathian Basin was first represented on the Ptolemaic maps. The detailed regional maps, belonging to the antique geography book, could be plotted later on the basis of the co-ordinate register. The later Hungary appeared on its *tabulae* as the territory of *Pannonia* and the neighbouring colonies of the Roman Empire, the Danube represented as a natural as well as a military-administrative border, the *limes*. Among the sparse relics of ancient cartography we find the *Tabula Peutingeriana*, on the long parchment scroll the area is a stretched, narrow band between the Danube and Sava rivers.

In the 10th century, shortly after the Carpathian conquest (895) the Hungarians appeared first on the famous *Anglo-Saxon map* as descendants of the Huns (*hunorum gens*). The large-sized circular medieval map of Ebstorf (late 13th century) also describes Hungary as the former land of Huns. The portolan of *Angelino Dulcert* from ca. 1330 represents the Danube and inland hydrography, but in addition some Hungarian settlements are also depicted. The detail on *Abraham Cresques'* famous Catalan atlas (1375) is very similar. These maps reflect the knowledge of contemporaries about the medieval Kingdom of Hungary, which became one of the major Christian powers in Europe by that time.

Cardinal *Nicolaus Cusanus* (1401-1464) made his map of Central Europe in the early 15th century, reflecting the contemporary view on the Carpathian basin with the winding Danube river that crosses the basin diagonally. The early 15th century brought modernisation to European cartography: new geographical co-ordinate list were not, however, the results of astronomical determination. The register compiled near Vienna in the monastery of Klosterneuburg contains data of Hungarian cities such as Buda, Pécs, Pozsony (today Bratislava), Nagyvárad (Oradea), Kassa (Košice) and Brassó (Braşov).

Although famous scholars were working as astronomers and astrologers in the splendid Renaissance court of the King Matthias Corvinus, we have no reliable information about map making. The Italian *Francesco Rosselli* (1447-1513?) worked in the royal court as illuminator of codices, and after returning to Florence he became a cosmographer. Rosselli's enigmatic 'ungeria dopia' could not be interpreted as a lost chorographical map of Hungary. Rosselli published Henricus Martellus Germanus manuscript of Central Europe and the Balkans in 1491. The country description of Italian historian, Petrus Ransanus (1428-1492) and the work of Sebastiano Compagni (1489, 1509) give more detailed geography. The oldest property sketch we know about dates back to 1488, but there are references to earlier ones. The existence of medieval route descriptions is demonstrated by the itinerary, made shortly after the pilgrimage to Jerusalem in 1031, which tells us about the road crossing Hungary. In 1522, after adjusting a border near Beszterce a sketch was drawn, which proves that educated clerks in the 15th century could draw maps. *Petrus Lossai's* notes on the use of the astrolabe (1498) were written in Bologna. Another early work on measuring is the book of *Christoph Pühler*, born in Hungary, was printed in 1563.

The first modern maps of Hungary

The first map of Hungary we know was printed in Ingolstadt, in 1528. The dedicatory texts on the map as well as reliable contemporary sources prove that its author was Lazarus. In the map legend he is mentioned as the secretary of the powerful archbishop of Esztergom, *Thomas Bakócz*. Still, we were not able to identify the "secretarius" authentically. Most probably he was neither a noble nor a graduated person, but a notary working at the chancellery. Lazarus could work on his map with the assistance of *Jacob Ziegler* during the peasant revolt (1514), after the defeat at Mohács (1526) a manuscript map was found in the castle of Buda by *Johannes Cuspinianus*, the diplomat and humanist of Vienna, who published it. Lazarus, the author of the work was not present when the material was edited with the assistance of the professor of mathematics and astronomy, *Georg Tanstetter* in Vienna. Their manuscript was cut into wood by *Martin and Michael Ostendorfer*. The four wood blocks, with inserted stereotypes for the names, were printed in workshop of *Petrus Apianus* in Ingolstadt in 1528. The only known copy of this first edition, the "*Tabula Hungarie*" was found in the late 19th century.

This publication from 1528 is an upright, poster-sized map, when the four parts are put together. It is an excellent

representation, but at first sight hardly recognizable. The main reason for this is the direction of the Danube river that flows diagonally, diverging from the customary course. This unusual turn also affects the other contents of the map. Despite the four cardinal directions marked on the margins, the map is actually disoriented; moreover the original structure had been modified. Complications occurred because of the chosen format and the use of coat of arms and accompanying texts. While preparing the print the original content was moved away to give place to these "important" additions, at that time this was a common procedure. The duplicated settlement names on the map suggest structural lines, how the manuscript was compiled. The printed map's scale is about 1: 1 200 000 and it is very rich in orographical and hydrographical details, containing names of about 300 geographical features and 1300 settlements. This amount of factual knowledge refers to a direct information collection, apparently along the roads, that is itineraries, and not astronomical measurements. Cuspinianus added some antique relics (e.g. bridge of Traianus), the miniature scene at Mohács refers to the lost battle, and a cross shows the place where the Hungarian King Louis II had fallen. The area, which was occupied by the Ottomans as a consequence of the defeat, is represented with dotted line and areal colouring: this is a borderline.

About the same time Lazarus's map was published, *Johann Honter* (1503? -1549) made his chorographic map of Transylvania in Basle. The majority of names are written in German, we can find a few Hungarian names and Romanians are only referred to. This map dates back to 1532, but the unique copy preserved was a proof (dated after 1539). Two recently found fragments, which were edited, completed and printed some years later prove this. Honterus work, similarly to Lazarus's, was used as a source during the centuries of the Turkish occupation. Honterus's short cosmographic introduction, the *Rudimenta Cosmographica*, became very popular in Europe and was published in subsequent editions until the 17th century. The world's first geographical schoolbook with an atlas was printed in the author's workshop in Braşov (Brassó) in 1542.

Military maps of the Turkish Wars

After these pioneer works civil cartography was pushed into the background for two centuries. The war against the Turkish rapidly transformed Hungary into a huge battlefield. The woodcut of the Venetian *Giovanni Andrea Vavassore* was made in the late 15th century (?), as a typical commercial print demonstrating military activities. Jacopo Gastaldi, who depicted the Danubian countries in 1546, might have used an earlier map, which has been lost or remained unknown.

The demand for maps showing the occupied territories of Hungary increased in the 16th century. *Wolfgang Lazius* (1514-1565) working in the imperial court as a doctor published his large woodcut map in 1552-56 in Vienna. The map listed 24 Hungarian men who contributed to the work, even added a pronunciation guide to help foreign readers and used pictorial economical symbols. Lazius tried to correct the errors of the Lazarus map, but he didn't realise the false orientation, and made more mistakes instead of amendments. (We should emphasize Lazarus and Lazius were different persons.)

A reduced version of Lazius's map was published in 1570 Ortelius's atlas, which also included the map of Transylvania by Johannes Sambucus, a Hungarian humanist, who worked as a physician and a historian in the Viennese court. In the same year Sambucus copied the map of Lazarus as well and published it. Vavassore in Venice produced another edition of this important map in 1553, and then it was printed twice in Rome (1559) from copper plates; the last Italian edition dated 1602. However, Sambucus published a completely new map of Hungary in 1571, which were also published in Ortelius' work. The maps of Lazius and Sambucus were present in the atlases of significant publishers, from where the citizens of Europe acquired their knowledge of our country languishing under the depression of 'two pagan forces', the Turks and the Habsburgs.

During the Turkish wars of border castles there were no possibilities to survey the whole country, but maps, sketches and fortification plans were made. At this time many foreign, mostly Italian and German master builders and engineers were working in Hungary. The Aulich War Council in Vienna directed the construction of border fortresses, which formed a system, a huge defense line from the Adriatic sea to Transylvania. The castle builders constructed plans and drew views and maps of the fortresses and the border zone. The manuscript atlases of the Italian *Nicolo Angielini* include chorographical maps and a remarkable map of Hungary (1570s). *Giovanni Gacopo Gasparini* c.1580 map represents the defence system in Hungary. *Martin Stier*'s manuscript atlases were to accompany his report on the condition of the fortresses in the mid-17th century. Stier received special permission to print his map of Hungary in 1664 in Vienna. Except for this remarkable exception, the cartographic works of military engineers were kept secret and could not influence commercial cartography.

In 1689, some three years after the reoccupation of Buda, a pocket atlas was published, the *Parvus Atlas Hungariae* (meaning Small Atlas of Hungary). This publication was the thesis work of count Fabius Anton Colloredo, supervised by a Hungarian Jesuit working in Vienna, professor Gábor Hevenesi. The map was based on Coronelli's work, not surveys. The work sets forth the principles of editing, gives an overview of the country and lists 2665 settlements names in the index. The different coordinates on the map and in the list suggest a systematic collection of information about Hungary by Hevenesi and his Jesuit colleagues.

Mapping in the 17th century

The liberation wars against the Turks gave opportunity to new surveys. Commissioned by the Imperial Court of Vienna, the Italian *Luigi Ferdinando Marsigli* (1658-1730) played an important role in this work. With his assistant, *Johann Christoph Müller* he surveyed and mapped the course of the Danube. After two centuries the river finally appeared on its accurate place. Marsigli published his detailed map of the Danube in his six-volume monograph (Amsterdam, 1726). After the Peace of Karlovac (1699) Marsigli was commissioned to survey and mark the southern border. From the material Müller created the border maps. In 1709 the Hungarian Chamber financed the printing of 2500 copies of Müller four-sheet map of Hungary. This first official map made for the general public corrected the false views of the past two centuries. Another remarkable work, Stephan Welzer's large map of Transylvania, was printed in Sibiu (Nagyszeben) in 1699. In order to be able to make more accurate representations new scientific methods based on systematic survey were inevitable.

The beginning of the next historical period of Hungarian cartography is represented by the works of *Samuel Mikoviny* (1700-1750). Mikoviny (1700-1750) was educated at the universities of Nuremberg, Altdorf and Jena. After learning the art of copperplate engraving he studied modern European surveying and mapping methods. In his 1732 "*Epistola*" (epistle) he described the fundamental principles scientific map-making principles: astronomical, geometrical, compass-using and hydrological surveying methods, raising up the level of Hungarian cartography to the European standard. He determined the latitudes of some Hungarian cities astronomically, measured from the Prime Meridian of Bratislava (Pozsony). For the historical-geographical description of Hungary written by *Matthias Belius* (1684-1749) he constructed county maps based on topographic survey. His maps were published in the *Notitia* from 1735; at the same time as a professor of geometry at the mining school in Banská Štiavnica (Selmechánya, Chemnitz) he started the full-scale survey of the whole country. Empress *Maria Theresia* was in favour of his proposal in which he suggested to survey the country's natural and economical resources, but in the end he did not have the time to complete his plan. After Mikoviny's death, his colleagues, pupils and other county engineers continued the vast work of county mapping, while the military survey was also in progress. Ignaz Müller created the twelve-sheet depiction of Hungary, which used data collected since Johann Christoph Müller's work half a century ago, in 1769.

The first military survey

After the Seven Years' War Empress Maria Theresia ordered the military survey of the Habsburg Empire. The first military survey started during the reign of Emperor Joseph II in 1764. The 1:28 800 (1 Viennese inch: 400 Viennese fathom) scale map of the whole country was completed in 1785, after 21 years of work. The officers were working with compasses, plane tables, and astrolabes and measuring chains. They neither used projection or graticule in geodesy, nor had they a levelling network as a base of altimetry. The maps did not indicate height values; mountain regions were inspected visually ('la vue'), relief was represented planimetrically by form-hachures. The original manuscript sheets were strictly confidential and had had precious amplifications: the country descriptions, providing useful information for the Higher Command.

Following military mapping, European states started cadastral surveys. Joseph I ordered the survey of land properties in 1786 and the collection of gains of land proceeds in the Hapsburg Empire, thus in Hungary as well. Hungarian nobles tried to impede the execution whenever they could, because they thought their right to tax exemption was restricted. The resistance was so strong that the emperor withdrew his order on his deathbed.

In the second half of the 18th century sworn surveyors and engineers were employed because of the secrecy of the detailed military maps. They were educated at the *Institutum Geometricum et Hydrotechnicum*, founded in 1782 at the university in Buda, as the world's first civil engineers. Numerous civil surveys and mappings were used for road and later for railroad construction, river regulation, draining and other technical tasks. We have to mention some outstanding civil surveyors, whose works were of very high standard: *Antal Balla* (1739-1815) and *Lőrinc Bedekovich* (1751-1839). The major hydrographic projects, the regulation of rivers started in the beginning of the 19th century. In order to do this, rivers had to be surveyed precisely and heights above sea level had to be measured; the engineers involved included *Pál Vásárhelyi* (Tisza river), *Mátyás Huszár* (Körös river) and *József Beszédes* (Rába and Kapos rivers).

Civil mapping in the 19th century

The geographical view of our country has been reformed in the beginning of the 19th century thanks to the activity of Hungarian cartography. The significant increase in quality was the result of new procedures used in surveying and reproduction, changes in content and form, and modern methods of publishing and distribution.

Johannes Matthias Korabinsky (1740-1811) from Bratislava (Pozsony) announced the absence of good maps in his encyclopaedia of geography, history and economics (1786). He published his economic map of Hungary in 1791, and his

pocket atlas (*Atlas Regni Hungariae Portatilis*) published in 1804. At the same time a new, modern series of county maps was also on its way, under the guidance of *Demeter Görög* (1760-1833). Görög undertook the publication of these maps in order to promote public education. In his periodicals written in Hungarian he used maps to demonstrate events and to show general information. He published 127 maps during a 15-year period, of which the series of county maps, printed between 1796 and 1811 were the most important. With the collaboration of the linguist *Sámuel Kerekes* (? -1800) the sheets of this "*Magyar Atlas*" (Hungarian Atlas) were amplified with an index called *Repertorium*, listing the variations of 15 000 names in Hungarian, Latin, German, Slavic and Romanian. County engineers and the data collected by military survey were contributing to this map, but without the grant provided by noblemen the publishing could not have been managed. The first civil Hungarian map publisher ceased to exist because of financial reasons, therefore the demand for maps was supplied by foreign publishers only.

Between 1804-1808, while the Görög-Kerekes atlas was published, the military officer *Johannes Lipszky* (1766-1826) presented his *Mappa Generalis*, the modern map of the country on nine sheets. Versions of his high-standard work were printed by the Austrian map publisher Zuccheri and later Artaria & Co.. In after years it had a significant effect on the authors of country maps, *József Aszalay*, *Lajos János Schedius* and *Sámuel Blaschnek* (1836).

The second military survey

In 1806 a new survey started in the Hapsburg Empire, based on ten separate provincial trigonometrical networks. The map scale of this second military survey (1819-1866) was also 1:28 800, but the work itself was of much higher standard. The origin of the co-ordinate system was the tower of Stephansdom cathedral in Vienna and the Cassini-Soldner projection Trigonometrical heighting, still without a levelling network was done to represent relief, and after 1860 aneroid (barometric) altimetry was also present. They had a special instrument for measuring angles of slopes, but "la vue" mapping was still used frequently in mountain regions. The maps were drawn with Lehmann's geometrical lining system showing steeper slopes by wider lines.

Mapping was done on plane tables, with the help of compasses. Densely populated areas were surveyed with the scale of 1:14 400 and they derived the 1:144 000 scale "*Spezialkarte*" and the 1:288 000 scale "*Generalkarte*" also. These last two were printed from copper-engravings, then after 1818 they changed to lithography. Field sheets were multiplied after 1864. During the second military survey the Viennese mapping, trigonometric and map reproducing divisions were united with the military mapping institute of Milan founded by Napoleon; in 1839 they established the *Military Geographical Institute* in Vienna.

Maps for schools and the public

At the end of the 18th century, a pioneering attempt started to supply Hungarian school education with maps, under the guidance of professor *Ézsaiás Budai* (1766-1841) working in the Reformed College of Debrecen, educated in Oxford and Göttingen. His students learned the basics of map plotting and copperplate engraving. They finished their first work called "*Oskolai Új Átlás az alsó classisok számára*" (New school atlas for primary schools) in 1800, which was shortly followed by a historic map collection (1801), and later an edition for upper schools (1804). They also produced important visual aids, hand-written globes. The astronomer *Károly Nagy* edited the first printed globes with Hungarian geographical names, the terrestrial globe was engraved by *Biller* in Vienna, while the celestial was made by *Charles Dien* in Paris, in 1840.

The most talented engraver of the Debrecen College's students was *Ferenc Karacs* (1770-1838), who contributed to many of the maps, but later he himself also published maps for educational purposes in his workshop in Pest. His most significant work, the map series of "*Európa Magyar Atlasa*" (Hungarian Atlas of Europe, 1834-38) could not be completed because of his death. Subsequent Hungarian educational atlases — edited by *Antal Vállas*, *Alajos Bucsánszky* and *Elek Fényes* — were translated versions of foreign, mainly German works.

The third military survey

The second survey was not yet completed when modernised surveying equipment and a new, uniform trigonometrical network in 1862 made it possible to start a 1:25 000 scale survey, which was also demanded by the industrial and military growth following the *Compromise* (*Ausgleich*) and the creation of the Austro-Hungarian Monarchy in 1867. The Military Geographical Institute's mapping was based on highly accurate astronomical determination, triangulation points determined by theodolites and commencing levelling also. Cadastral maps were used as planimetric base, amplified with plane-table surveys, aneroid, compass and vertical angle measurements. From 1871 on, the metric system was adopted. Liechtenstern's polyhedral projection was used on the maps, with the prime meridian of Ferro. The topographic map sheets, *Spezialkarte der Österreichisch-ungarischen Monarchie*, were printed from heliogravure-plates after reduction to 1:75 000 scale.

Cadastral mapping

The 1:2880 scale detailed cadastral maps which were first surveyed in 1856, did not use any projections, but later the area of parishes were shown in planar projection. The angles and lengths of property boundaries were measured by protractors and measuring chains inside the boundaries of the parishes. The maps represented agricultural land-use, buildings, and roads between land possessions. Registers, which were made simultaneously with maps, listed the owners, areas of land and nature of culture. The parcel number of sites connected maps and registers.

The cadastral survey of 1856-1864 used a projectionless system. Later they adopted the stereographic conformal projection system, which was already in use in higher triangulation since 1860. Cadastral mapping was finished before World War II, but maps were highly different in projection, sheet division, scale and accuracy. 2/3 of the maps were stereographic, 1/4 were in oblique conformal cylindrical projection, while the rest were in the projectionless system. From 1885 on, all maps were recorded.

Maps for Hungarians

After the Compromise (Ausgleich) of 1867 *Ágoston Tóth* (1813-1889), who was a military cartographer, proposed the foundation of an independent Hungarian Topographic Institute, which could provide the country with both military and civil maps. He wrote his cartographic handbook in 1869 in Hungarian, therefore the international reaction to his excellent work was missing. In his book he urged on using contour lines to represent altitude, which were first used in on civil maps. His institute based on European models failed to materialise; the mapping department of the Ministry of Public Works and Transport became the part of the State Printing Office. *Imre Péchy*, the director, was an expert of relief models, while *József Homolka* was the most prolific mapmaker of that era. We also have to mention *Ignác Hátsek*, the Hungarian royal cartographer who worked in the Statistical Office.

Pál Gönczy (1817-1892) was an under-secretary at the Ministry of Education, who urged on publishing school maps which help geographical education; he entered into contract with German publishers to produce maps in Hungarian. Besides translating wall- and hand-maps, he ordered school globes from the *Felkl* company near Prague.

Manó Kogutowitz (1851-1908), the talented, discharged army officer was commissioned later to be the editor of Hungarian maps: the atlas was printed in 1890, in the lithographic institute of Posner in Budapest. Thanks to the success of this excellent work, in 1895 Kogutowitz founded (with *Eduard Hölzel*, Vienna) a map publishing company called *Magyar Földrajzi Intézet* (Hungarian Geographical Institute). Apart from modern geographical and historical wall-maps many school atlases were published. Despite its name being "Teljes földrajzi atlasz" (Complete geographical atlas), the first Hungarian geographical atlas was continuously supplemented following its first publication in 1902. The world atlases of the following years worth mentioning: the *Nagy Magyar Atlasz* (Great Hungarian Atlas, 1908) edited under the aegis of the 1872 founded *Magyar Földrajzi Társaság* (Hungarian Geographical Society), the booklets of the World atlas (1912-18) edited by *Pál Teleki* and *Károly Kogutowitz*, the geographical and statistical atlas of geographer *Jenő Cholnoky* (1927). Famous scientists were also contributing during their creation.

Covername: State Mapping Institute

The Peace Treaty of Versailles ordained the reduction of military force under the continuous control of the Triple Entente powers. Eluding this ordain the State Mapping Institute started to employ "civilian" people apparently under the guidance of the Ministry of Finance. Army officers returning from the Military Geographic Institute in Vienna and workers of the State Printing Office's department of cartography were among the members. The primary aim of the Institute was to supply the country's needs for military maps.

After the establishment of the Institute (1922), trained, young experts started the revision of old 1:75 000 scale maps. The revision of planimetry and lettering was completed in seven years. After 1923, aerial photographic procedures also helped their work. Simultaneously with the revision, a new 1:25 000 scale survey started in 1927. In order to use cadastral maps and to unify the system of co-ordinates, the stereographic projection was adopted. Before World War II the 1:75 000 scale sheets were replaced by 1:50 000 scale uniform troop maps. These public map sheets were among the best of the era, considering technical accuracy and the quality of drawing and painting. Besides the words of acknowledgement let us mention that the pace of mapping was rather slow. During World War II the originally planned work had to be interrupted in order to be able to survey the newly reannexed territories. They planned to complete the 1:50 000 scale map series by 1945, but the war made it impossible. As soon as *Állami Térképészeti Intézet* (State Mapping Institute) was founded it became a centre of civil map publishing, despite being a military establishment. The institute published several types of maps, including atlases for elementary schools, administration, transport, geology, city and bathing resort maps and wall-maps, too. Their most significant publication was the *ÁTI Kisatlasz* (Small Atlas) from 1937.

After World War I Hungary lost about 60 percent of her territory and half of the population. While analysing nationality questions, ethnographic maps were plotted with the help of statistical data. Teleki's famous ethnographic map called "*carte rouge*" (showing the Hungarian nationality with red colouring) was among the maps neglected in the Peace Negotiations of Versailles in 1920. At about the same time, the thematic atlas 'Hungary on economic maps' (1919) by *Illés Edvi* and *Albert Halász* indicated the animation of economic mapping. The huge number of statistical data collected in the Institute of Political Science was summarised in *András Rónai's Közép-Európa Atlasz* (Atlas of Central Europe, 1945), but because of World War II only a few copies were printed; the digital version of this atlas has been available for public use since 1993.

Beginnings of map history in Hungary

After the interest in early maps of 18th century polymath *Matthias Belius*, the first summary of Hungarian map history was given in his geographical-statistical work by *Korabinsky* (1786), in his journal *Karl Gottlieb Windisch* described the map collection of *Bernat Moll* (today in Brno). In the 19th century there was a growing interest in old maps, the book collection of noble bibliophiles included maps of Hungary as well. The rediscovery of the first map of Hungary by *Apponyi* was an important factor in the end of the century; however, by this time research was strongly influenced by ideology of nationalism. Scholarly and systematic research began in the 20th century with the activity of count *Pál Teleki*, who started his academic career as a historian of cartography and geographical explorations. For his book on the map history of Japan, published in 1909 he was awarded the Jomard prize. Teleki's colleague, *Ferenc Fodor* wrote the first history of Hungarian map making (1952-54). Teleki sent his student, *Lajos Glaser* to Karlsruhe to catalog the Hungary related material preserved there (1933). *Károly Kogutowicz* encouraged *Kálmán Eperjesy* to study the manuscript maps in the Military Archives in Vienna (1929).

Cartography after World War II

After 1945 the reorganised Mapping Institute began boundary marking, replacement of control points, expropriation of railways and in 1950 they started the revision of maps. This map series had the same legend as the Soviet and neighbouring socialist countries' maps, as well as the Bessel ellipsoid datum and the Gauss-Krüger projection. The base of the division of sheets was the international system of 1:1 000 000 scale maps. Despite the use of aerial photographs, the technical value of this map series was still not satisfying. In order to supply the demand for increased accuracy and detail, a new survey of the country was done between 1953 and 1959, based on instrumental plotting of aerial photographs. The reference datum was the Krasovsky ellipsoid; the Baltic reference benchmark was adopted, in harmony with the Soviet Union. Parallel to the *Mapping Institute of the Hungarian People's Army*, the State Survey and Mapping Bureau also started to produce its civil topographic map series in the early 1950's. This series was finished in 1979, after more than 20 years of work.

Following World War II none of the former private cartographic contractors could work further in the socialist system; they all closed down, similarly to *István Turner's* (1899-1975) workshop, where he produced globes and relief maps. The once famous Hungarian Geographical Institute also pined away in its successor by 1949. In 1951 the *Állami Földmérési és Térképészeti Hivatal* (State Surveying and Mapping Bureau) became the central authority of civil mapping; the *Kartográfiai Vállalat* was founded in 1954, which became the only centre of civil map publishing in the following decades.

The democratic change of the political system in 1989 gave stimulus to enterprise, and in the past ten years several Hungarian enterprises and foreign publishers appeared on the map market. Along with the traditional printed products the electronic atlases and other digital and multimedia products, databases and web maps mark the new epoch of global cartography.