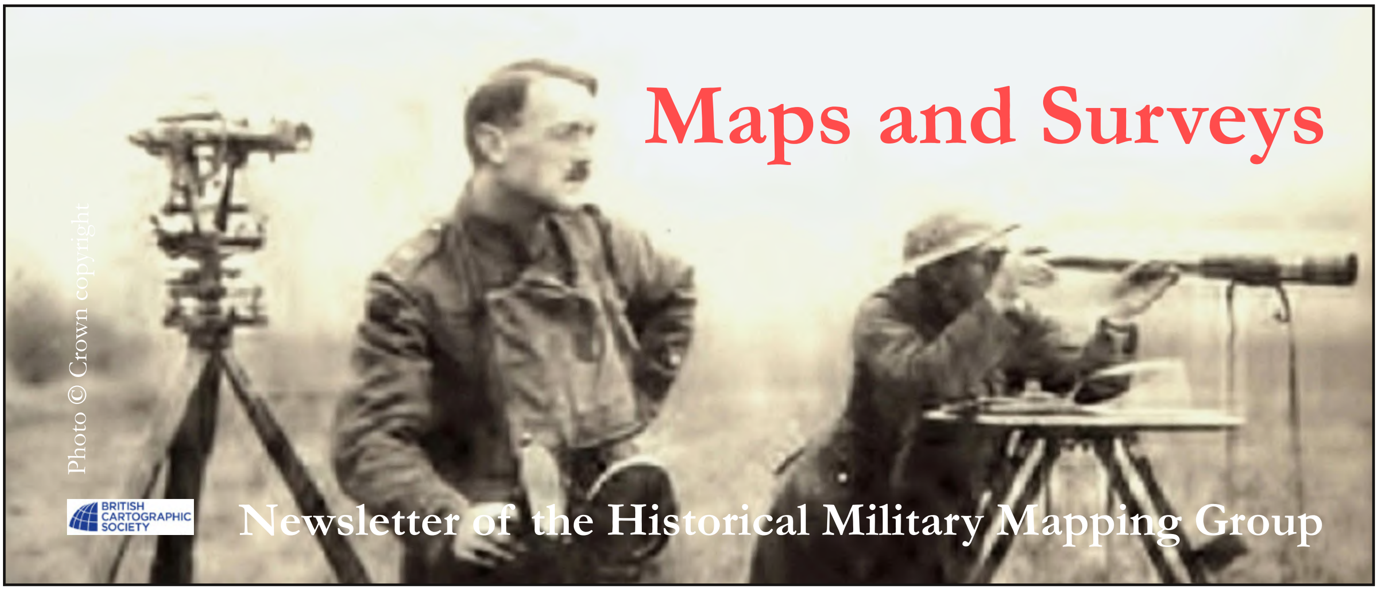


Maps and Surveys

Newsletter of the Historical Military Mapping Group

Maps and Surveys appears in spring, summer and autumn. The Newsletter welcomes contributions - please contact Ros Derby, BCS Administration (*admin@cartography.org.uk*) for information. Editor: Paul Hesp (*Paul.Hesp@drei.at*).

Summer 2023

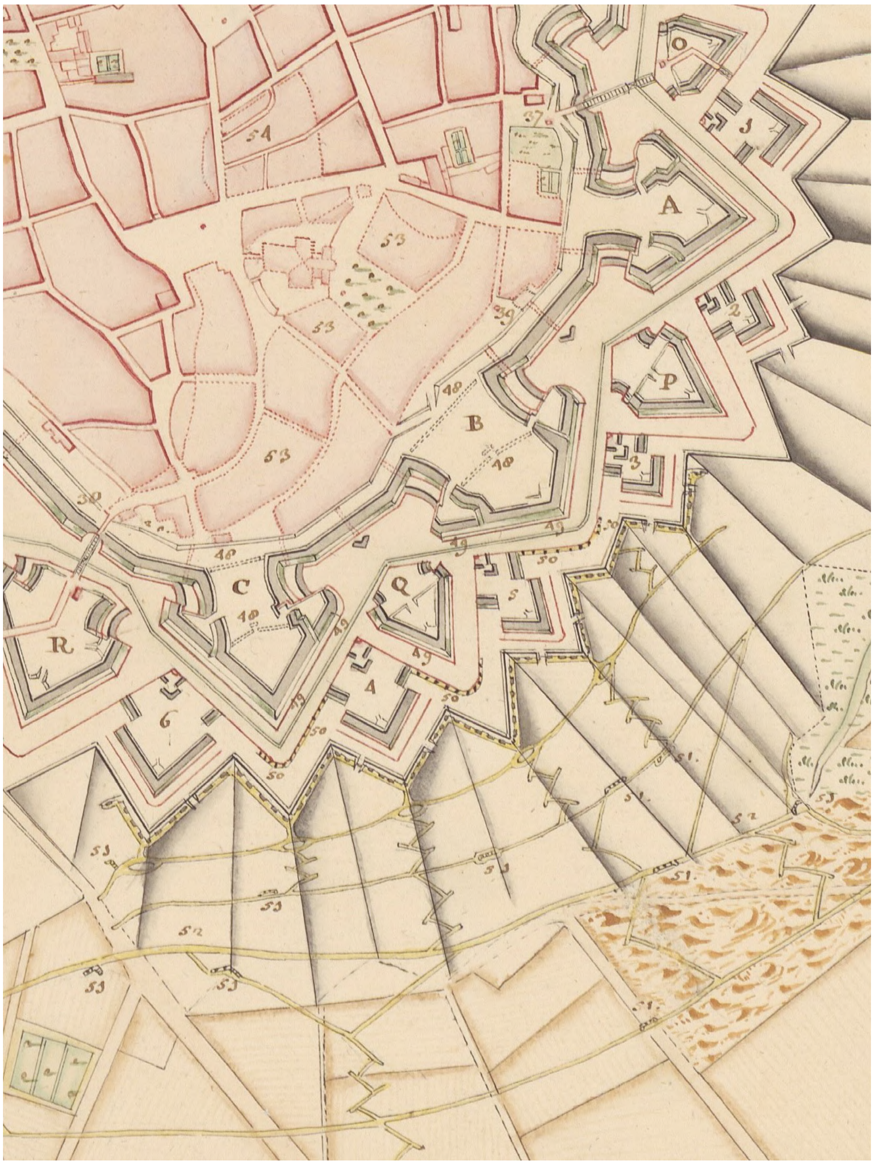
Contents

From the Editor

We start with a look behind the Iron Curtain: what was the Soviet impact on Hungarian military mapping? After which I'm taking you on a visit to the 1900 Paris World Exhibition.

The BCS, represented by Dr Seppe Cassettari and HMMG Convener Dr John Peaty, and the Defence Surveyors Association have held a meeting to discuss future co-operation and collaboration. *Maps and Surveys* will keep you posted on developments.

Paul Hesp



Fragment of a 1: 6 850 map of the Dutch garrison town of Bergen op Zoom, near the border with the Austrian Netherlands, made in 1749 by D.W.C. Hattinga. It shows the French approach trenches of the 1747 siege and the damage to the built-up area (dotted street blocks) Source: Brabants Historisch Informatie Centrum. See the Notice Board for more information on the Hattingas.

László Zentai and Gábor Gercsák - HUNGARY'S TRANSITION TO THE GAUSS–KRÜGER PROJECTION SYSTEM: THE 1950–1952 QUICK REVISION

Historical background

Independent Hungarian topographic mapping could not develop before the Great War, as the production of topographic maps was then the right of the emperor. Although the Compromise of 1867 established the Austro–Hungarian dual monarchy, the control of foreign and military affairs remained in the hands of Vienna. Cadastral maps were produced under Hungarian supervision using a stereographic projection. After the Great War, Hungary established its own topographic mapping institute inspired by the Vienna model. Being a losing power, Hungary had to limit its armed forces after the Treaty of Trianon (1920), so the cartographic institute was – at least in name – a non-military institution until 1938.

Introduction of the Gauss–Krüger projection

In the period between the two world wars, Hungarian topographic maps – breaking with the polyhedron projection of the Third and Fourth Military Surveys – switched to the stereographic projection used by cadastral mapping. In 1917, the countries of the Central Powers had agreed on harmonizing the geodetic base. They adopted the conformal Gauss–Krüger projection and the 3° meridian zone system, but could not introduce it. The Gauss–Krüger projection system was first described in Hungarian in a 1926 article, "The survey organisation and topographic maps of Germany after the war" in the Hungarian journal *Geodéziai Közlöny (Geodetic Bulletin)*.

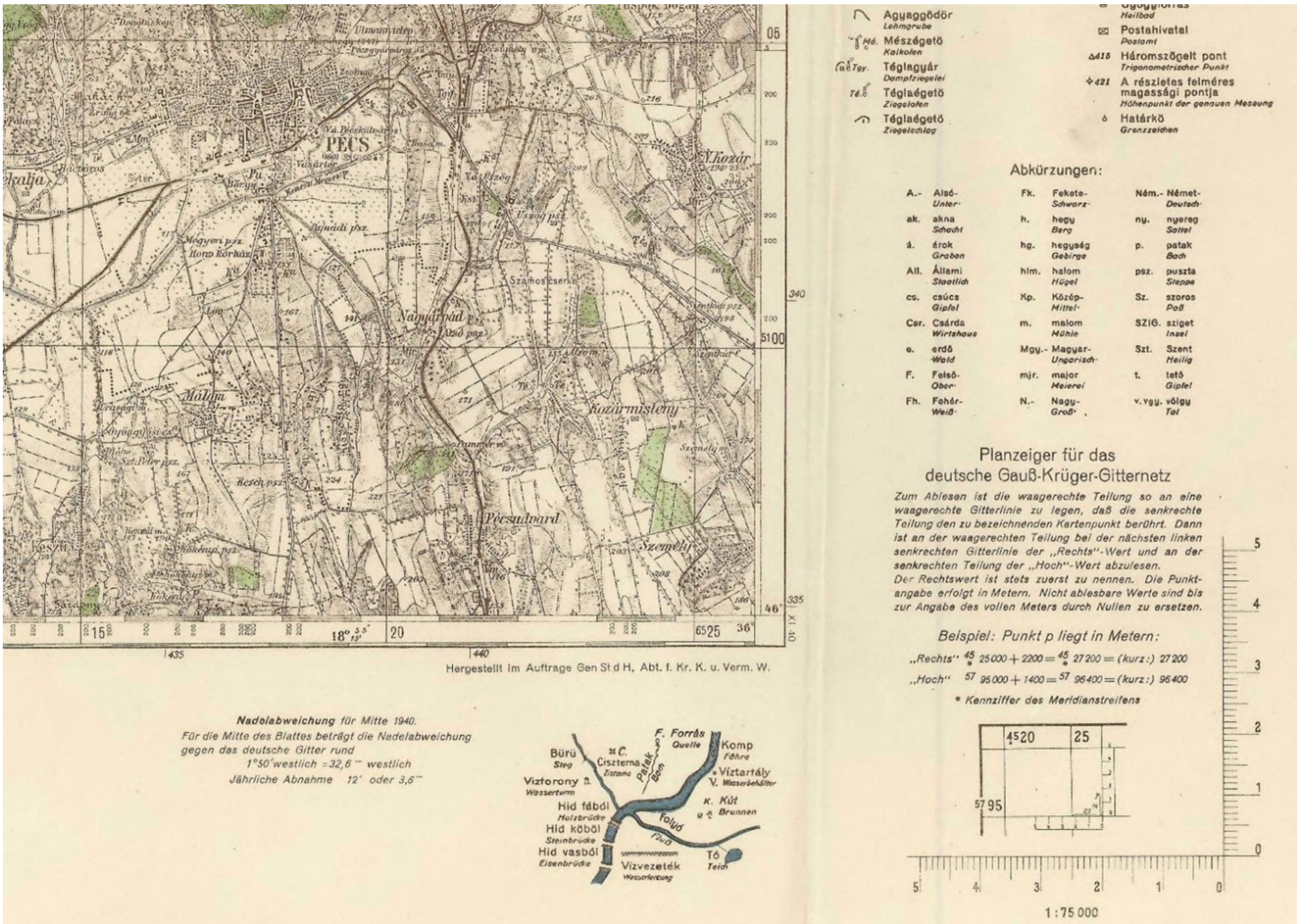
At the outbreak of World War II, and before Hungary entered the war, several Hungarian topographic maps were published which were overprinted with the Gauss–Krüger system's coordinate network used by the Germans. The base points used by Germans were derived from the unified Central European network proposed in 1917 (which Hungary ultimately did not join), where horizontal coordinates were calculated on the basis of the Gauss–Krüger projection. The 1:25 000 and 1:75 000 scale sheets were simply overprinted with the German network, ensuring that the maps fit. In 1939–1940, 1:75 000 scale sheets were prepared in Vienna with German text; in addition to the Hungarian stereographic network, the kilometre network of the Gauss–Krüger projection was also shown, to fit the maps used by the Germans. German edition maps (almost 140 sheets) were prepared for almost all of Hungary, and also for most of the neighbouring northern and eastern areas. For examples, see the next page.

After World War II

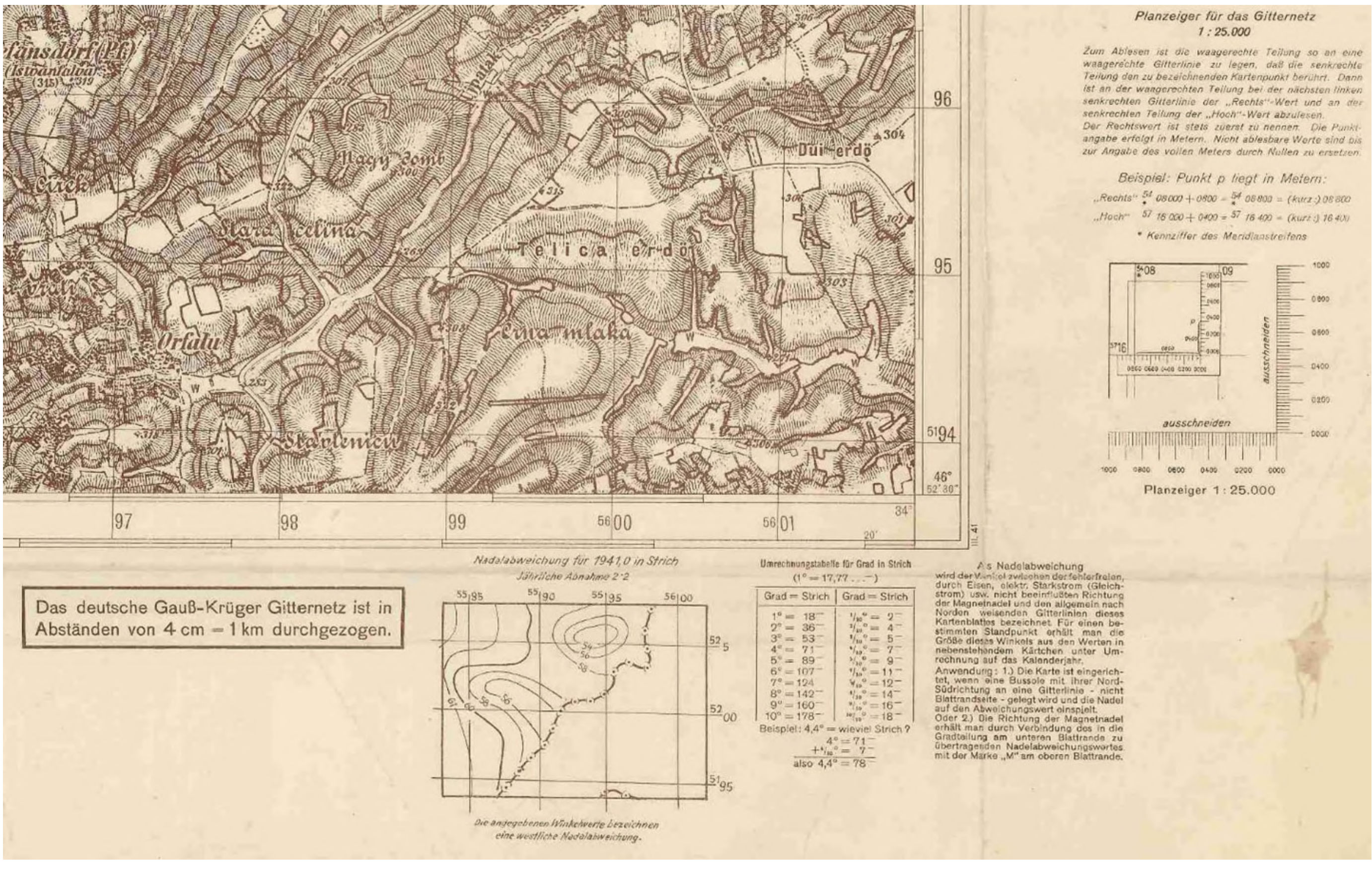
The reformed Science Department of the Military Mapping Institute continued its research work in the late 1940s. Its main task was to develop a method of transitioning to a new map system and to harmonise projection, sheet system and content with the Soviet system. The responsibilities included translating Soviet map making regulations into Hungarian as well as a flood of Soviet books and research notes on geodesy, topography and cartography. In parallel, it also organized a three-year course for new personnel. To increase the staff required for the work, young people were recruited for mapping training from factories. These participated in shorter, 6- to 12-month courses on map drawing and surveying.

Between 1950 and 1952, a so-called quick revision of the 1:25 000 scale maps was completed using the Gauss–Krüger projection system. As this was a military survey largely supported by photogrammetry, virtually no articles or news about military topographic maps were published in the professional press of the time. The authors can only assume that the Soviet Union forced all socialist countries to produce topographic maps of the whole country at 1:25 000. To produce more than a thousand topographic map sheets in such a short time was an impossible task for Hungary. However, in the Stalinist years the task had to be completed somehow - with heavy compromises.

Hungarian military officers knew that the Soviet maps were based on the Gauss–Krüger projection system. But Hungarian cartographers were familiar with the German Gauss–Krüger projection only, the coordinates of which referred to the Potsdam Datum (Bessel ellipsoid). They were not familiar with the details of Soviet Gauss–Krüger projection, the reference datum of which was at Pulkovo and which used the Krasovskiy ellipsoid. In order to convert the old projection system into the new one, the editors compiled a list of reference points with coordinates in both systems. They took the corner point coordinates of the sheets from the German Gauss–Krüger table and



Map 1. Detail of 1:75 000 scale map sheet Nr. 5560 (1940) near the town of Pécs with Gauss–Krüger coordinates.
Map 2. Detail of 1:25 000 scale map sheet Nr. 5256/2 (German edition, 1941) near the town of Szentgotthárd, with Gauss–Krüger coordinates.
(Source: Map Library, Institute of Cartography and Geoinformatics, ELTE Eötvös Loránd University, Budapest)



edited the kilometre-network lines. This is how the maps were made in the initial years of the revision.

The map revision was determined by the available cartographic materials. These presented a mixed picture, because the sheets originated in surveys made at different times:

• Maps from the Third Military Survey in the 1880s (these sheets covered about 70% of the country);
• Re-ambulated sheets from the 1920s;
• Resurveyed maps from 1928–1940 (the most reliable sources); and
• Photomaps prepared from cadastral maps as well as transformed photographic maps.

Because of the diversity of material and its uneven quality, revision and producing fairly uniform sheets were difficult. Different combinations of bases were used. For instance, the original 100- and 50-metre contour lines of the 1:75 000 maps used were transformed into 20-metre contour intervals. This was verified and corrected by interpolation of 10-metre and 5-metre contour lines based on field work.

In the third year of the revision, when the Soviet mapping counsellor placed the Soviet maps depicting the area adjacent to the Hungarian sheets just finalized, it turned out that the maps did not connect to each other: there was a 600-metre difference in the X coordinate, and there was also some twisting of the kilometre network. There were several reasons for the deviation. The axes of the Bessel ellipsoid are nearly 1 km shorter than those of the Krasovskiy ellipsoid, which immediately caused a difference of 70 to 80 metres in the Y coordinate. Because of the different orientation of the two ellipsoids, the networks were twisted relative to each other. Furthermore, the Hungarian network of control points was not homogeneous.

To solve this problem, the Science Department was instructed to clarify the reasons for the discrepancies and to calculate network data that corresponded to the Soviet system. After long research, the coordinates in the Soviet Gauss–Krüger system were calculated using Soviet source materials. The sheets corrected on this basis in 1952 already connected to the Soviet sheets (example: Map 3 next page); the sheets at 1:50 000 then under design were re-edited just in time. However, the sheets revised in 1950 and 1951 had already been printed, so the connection is broken along the 20° meridian and along the 46° 40' latitude (see Map 4 next page).

Results and shortcomings of the quick revision

The quick revision had two major achievements:

• First, a modern topographic map series of 1157 sheets (sheet size 38 x 37 cm) with a new symbol system covering the whole country at a scale of 1:25 000 was produced in three years – though in the case of most sheets this was only achieved by converting the hachured relief into contour lines without field work;
• Second, the geographical names were all translated into Hungarian – on the sheets made under the Third Military Survey a significant part of the names were in German.

The shortcomings of the quick revision programme were caused by the variety of bases and the technical-technological methods used. It was therefore necessary to launch a new survey in Hungary based on a more complete and uniform technology. The survey was ordered by the Council of Ministers on the initiative of the Geodetic Services of the Socialist Countries. Good equipment, well-trained surveyors in adequate numbers and educated in-house staff were available. Right after the completion of the quick revision, Hungary started a new systematic survey on the same scale, but using the Soviet Gauss–Krüger projection system correctly. This survey was completed by 1959.

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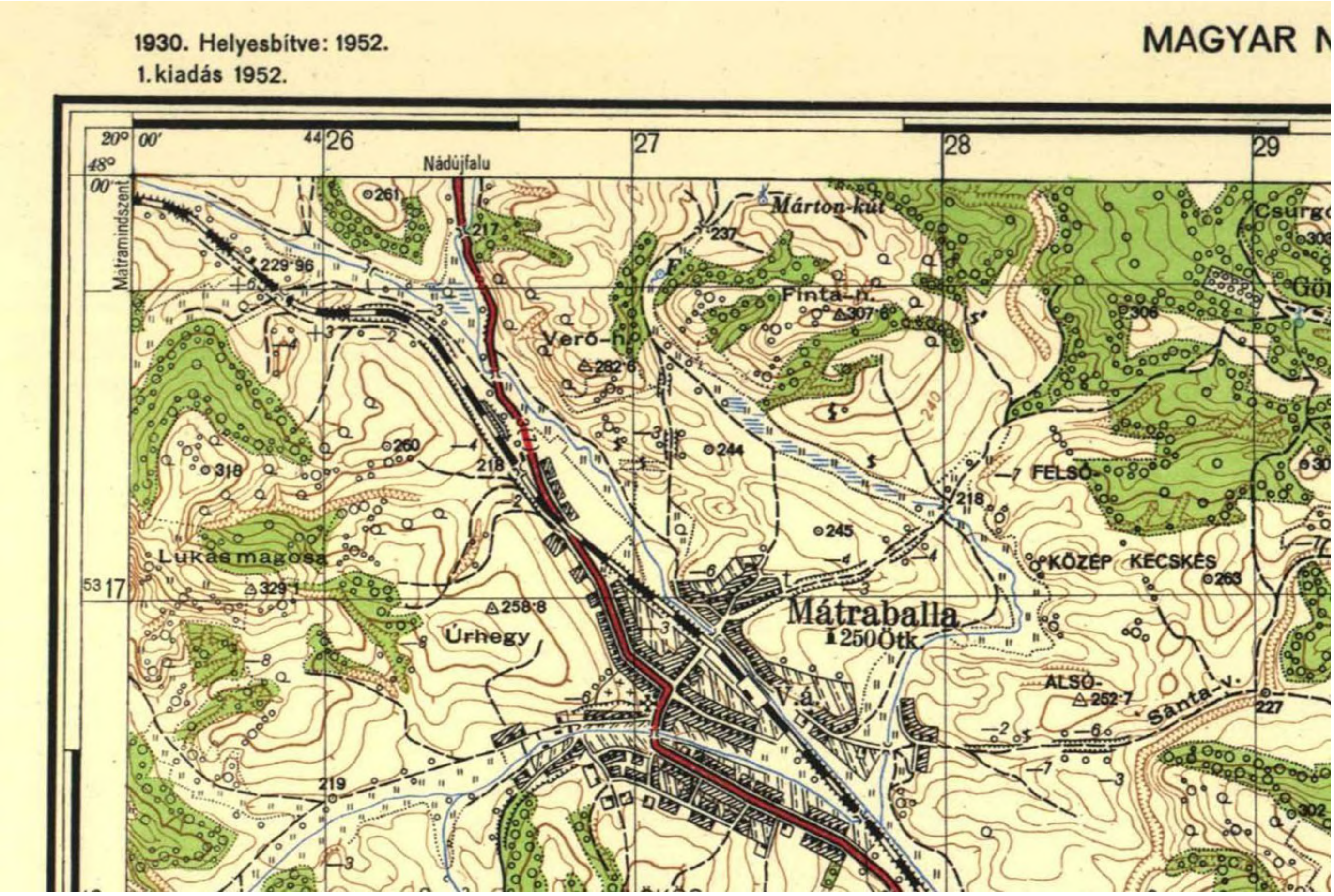
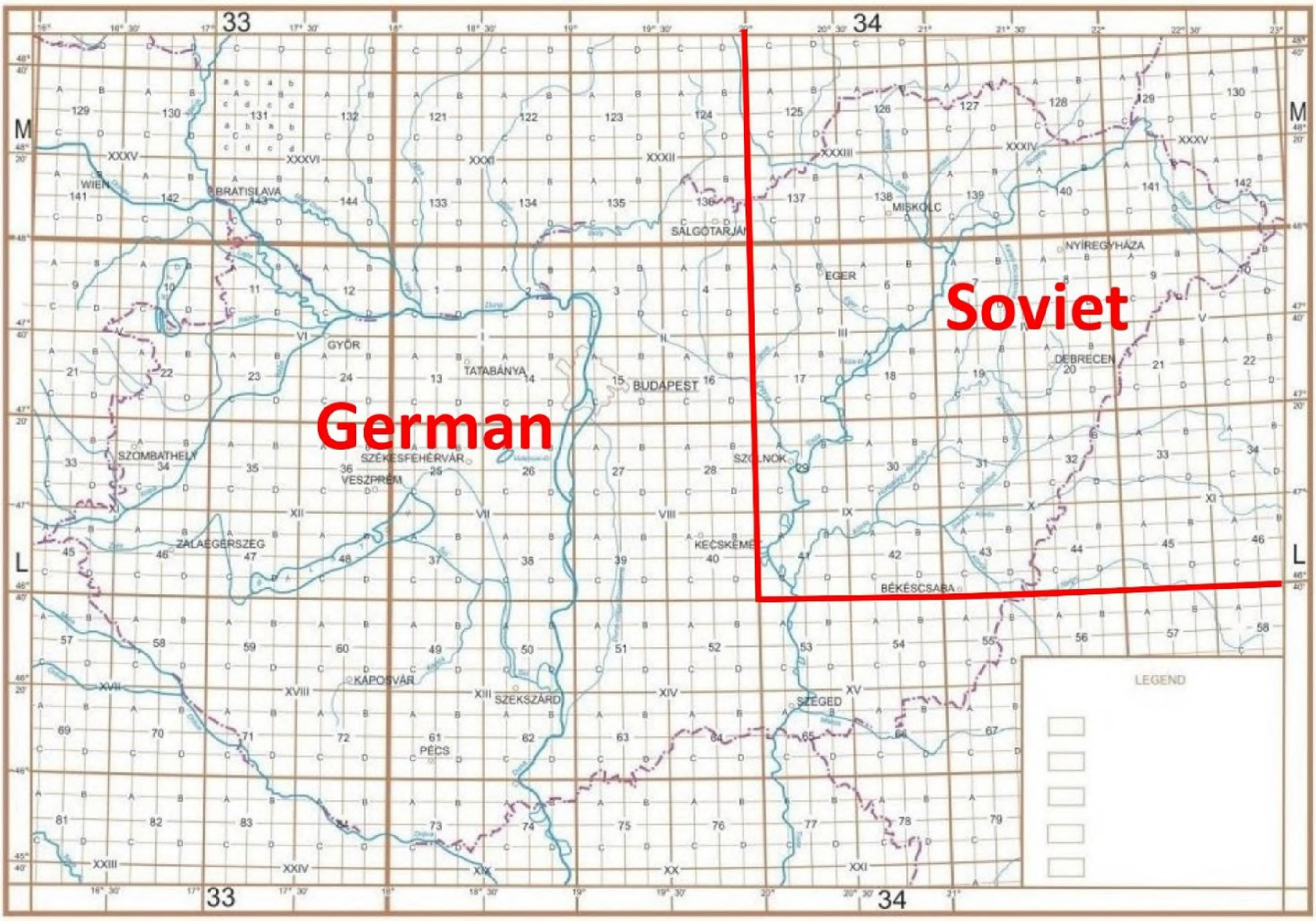
Gábor Gercsák is a retired Associate Professor of the Institute of Cartography and Geoinformatics at Eötvös Loránd University, Budapest. He also served as Vice-Dean for International Relations of the Faculty of Informatics. His publications deal with cartography, geography and languages.

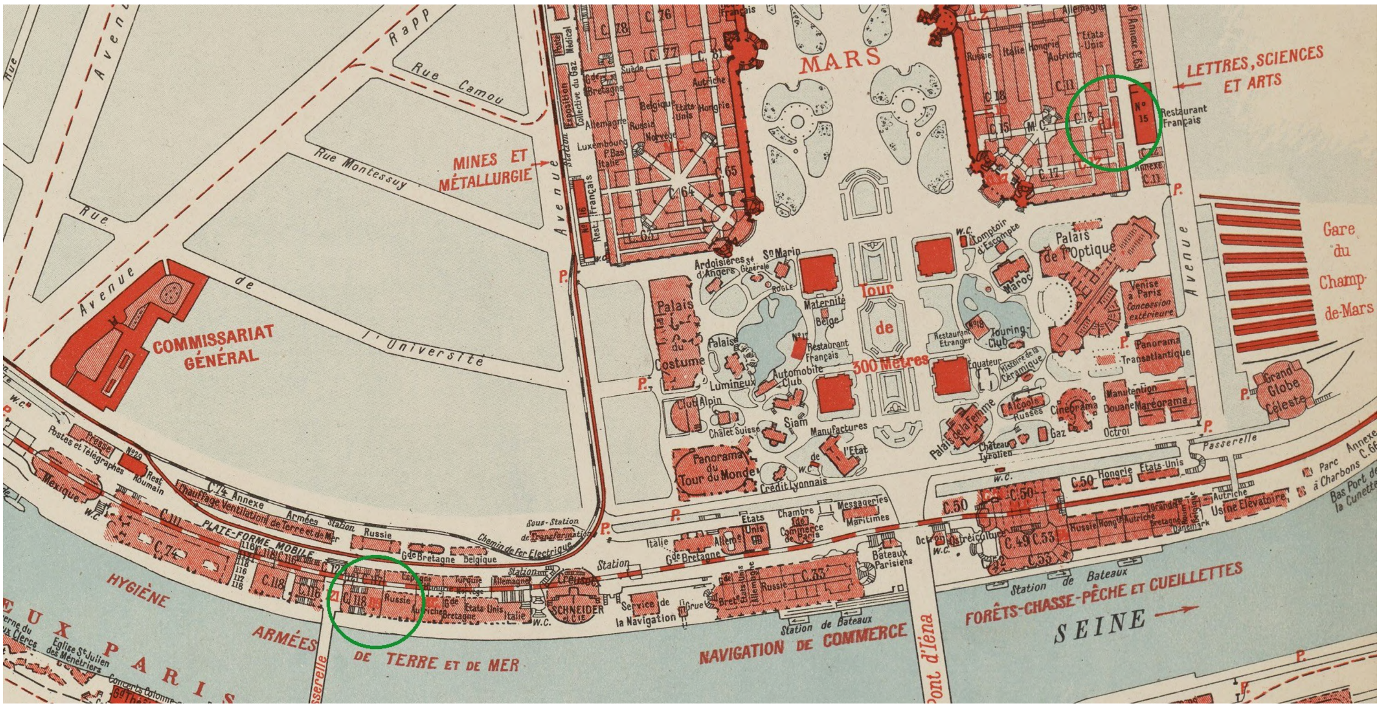


Map 3. Detail of a 1:25 000 Soviet Gauss-Krüger sheet east of the 20° meridian.
Map 4. The "border" of the Soviet and German Gauss–Krüger system at the quick revision.
(Source: Map Library, Institute of Cartography and Geoinformatics, ELTE Eötvös Loránd University, Budapest)



Paul Hesp - "PROGRESS IN THE CONCRETE EXPRESSION OF GEOGRAPHIC FACTS"

Military mapping at the 1900 Paris Exhibition



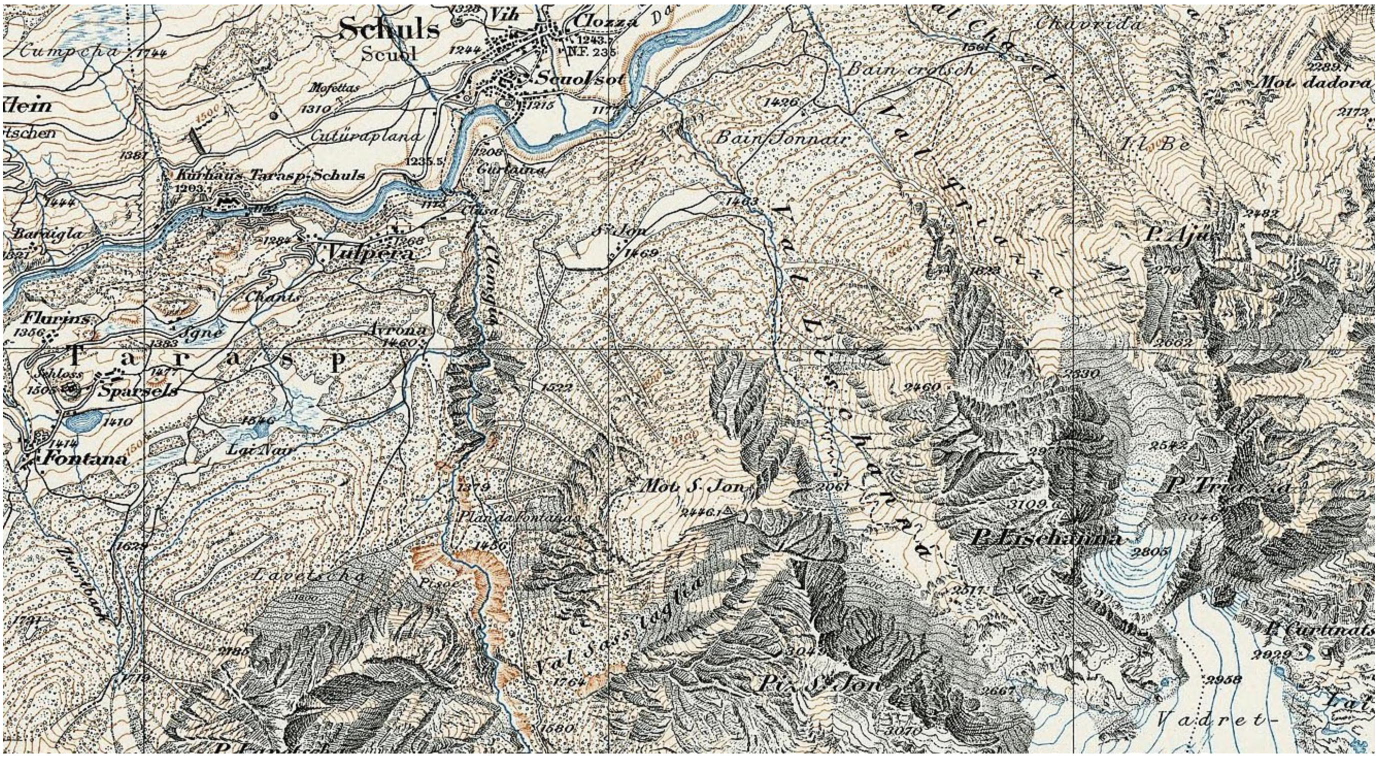
Map 1. Exposition Universelle de 1900 – Plan Général. *Figures in red, often hard to read, show first floor exhibition spaces; classes 14 and 119 (see text), with maps prepared by the military, are circled in green. The Eiffel tower (only the foundations are shown) is still called 'Tour de 300 Mètres'. The map fragment shows only a small part of the vast exhibition area. (Source: Musée Carnavalet, Paris)*

In the eyes of Emmanuel de Margerie, one of France's most prominent geographers and a Foreign Member of the Royal Society, cartography was one of the highlights of the vast 1900 Paris Exhibition. He co-authored two lengthy articles on the subject in the *Annales de Géographie*. The driving force behind the "progress … in the concrete expression of geographic facts" that excited de Margerie was the late 19th-century interplay of industrialisation, colonisation and infrastructure development. Not surprisingly, resource mapping – hydropower and mining potential, soils, forestry, etc. – accounted for a high proportion of the maps exhibited, but Charles Booth's Social Map of London and a 1:400.000 map of France for cyclists and tourists were also representative of the time. Terrain models, some of spectacular size, were exhibited as well.

Apart from the USA and Japan, almost all maps exhibited were produced by European countries. The maps were partly exhibited in national pavilions, partly in thematic pavilions, depending on subject of the maps. The countries exhibiting maps prepared by military cartographic offices, according to the Austrian periodical *Mittheilungen des kaiserlichen und königlichen Militär-geographischen Institutes*, were Bulgaria, France, the Netherlands, Norway, Russia, Romania, Serbia, Switzerland and the United Kingdom. The more detailed articles in the *Annales de Géographie* don't mention maps produced by the military in Serbia.

Exhibition space was divided among thematic groups, and these were divided in classes. In most cases, the articles in the *Annales de Géographie* mention the groups and classes where the maps were exhibited. The *Plan Général* of the exhibition area (Map 1) shows these groups and classes, mapping the map locations. Only France (with some exceptions) and Russia exhibited their military maps in group XVIII, 'Armées de terre et de mer', class 119; the military maps of other countries were exhibited in national pavilions and in group III, 'Instruments et procédés géneraux des Lettres, des Sciences et des Arts', class 14. Mapping and printing technologies were also exhibited and are discussed extensively in the reviews mentioned above, the main production issue being quantity/speed versus quality.

Some fragments of the maps exhibited by military cartographic offices follow. The text quotes in the captions are from the exhibition reviews mentioned under References.

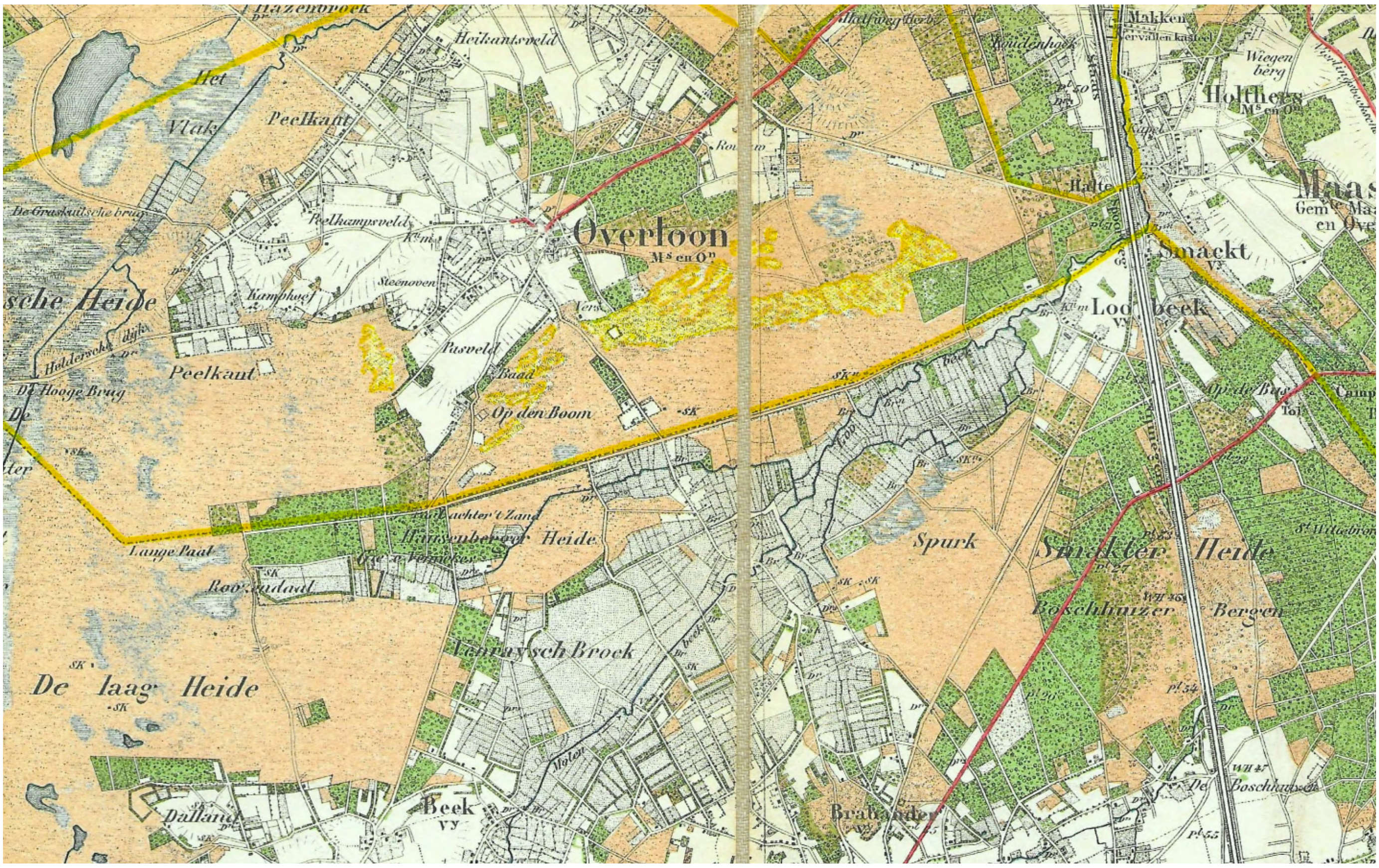


Map 2. Topographischer Atlas der Schweiz (Siegfriedatlas) 1:50 000 Blatt nr. 421 Tarasp, 1891, revised in 1898. (Source: Siegfriedkarte TA_398_425_Biblio (admin.ch))

"The Swiss exhibition, as we might have expected, is very rich and varied. In Group III, class 14 we find the complete collection of maps of the Federal Topographic Office (Siegfried Atlas) at 1: 50 000 and 1: 25 000." (de Margerie and Raveneau [b], p. 385)

Map 3. Madagascar 1:100.000, Feuille No. 250 Analabe, 1899. Triangulation des R.P. Colin et Roblet. (Source: Université de Bordeaux Montaigne)

"The most important document [exhibited by the Topographic Office of the Madagascar occupation corps] is the collection of surveys completed so far at 1:100 000, prepared by Captain V. Mérienne Lucas and Bibault, heads of the Topographic Office of Madagascar, on the basis of work by the geodetic and topographic brigades and the Reverend Fathers Roblet and Colin… engraved and printed at the workshops of the general staff of the occupation corps, 1898-1899." (de Margerie and Raveneau [a], p. 309-310)



Map 4. Topographische Kaart van Nederland 1:50 000, 1895, blad 52 Venlo. (Source: collection author)

"The Dutch map exhibition was one of the most beautiful and instructive… It included the topographic maps of the Kingdom at 1:25 000 and 1:50 000… All technical work of the topographic bureau in the Hague shows great mastery… [but] the methods… have not been adopted elsewhere because they are less suitable for maps printed in large numbers." (Heimbach and Hödlmoser, p. 204-205)

References

Heimbach, Wilhelm, and Carl Hödlmoser: 'Die Militär-Kartographie auf der Weltausstellung in Paris 1900', *Mittheilungen des kaiserl. und königl. Militär-geographischen Institutes*, XX. Band 1900, p. 194-212.
de Margerie, Emmanuel, and Louis Raveneau (a): 'La cartographie à l'exposition universelle de 1900', *Annales de Géographie*, t. 9, no 46, 1900, p. 291-312.
de Margerie, Emmanuel, and Louis Raveneau (b): 'La cartographie à l'exposition universelle de 1900', *Annales de Géographie*, t. 9, no 48, 1900, p. 385-412.

NOTICE BOARD

BCS 60th anniversary conference

Annual Conference | BCS (cartography.org.uk)
Read all about it on the website!

19th ICA General Assembly/31st International Cartographic Conference

The 19th ICA General Assembly and the 31st International Cartographic Conference, organised by the South African National Committee for ICA, will be held in Cape Town, South Africa from 13-18 August.

The Conference theme is " Smart Cartography for Sustainable Development". Military cartography - just think of the physical impact of armed conflict on the natural environment - is one of the topics.

D-Day logistics maps

Chris Barrington Brown runs a fascinating D-Day logistics project: 'The Build-Up to D-Day'. See storymaps.com and Geomob Podcast - 158: Chris Barrington Brown: D-Day Buildup, thegeomob.com. He will talk about it at GeoMob in London on 28th September. You can attend by signing up at: https://lnkd.in/eYEU9yt6.

The Austrian War of Succession and Dutch map making

Willem Hattinga and his sons David and Anthony were prominent 18th century Dutch map makers. During and in the aftermath of the 1740-1748 Austrian War of Succession, they provided the States General and the Prince of Orange with detailed maps of fortified towns and inundations protecting the southern approaches to the Republic.

Free high-res downloads of these and other maps of the region on the website of the Brabants Historisch Informatie Centrum (BHIC).