

M. K. Radvila map in Middle Europe mapping context of the XVII century

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The aim of this study is to evaluate the assumption and situation which determined the creation of M. K. Radvila map. The map was created in the XVII century, which includes early cartography period in Lithuania, i. e. the XVI–XVIII centuries. The map satisfied the requirements of detailed cartographic works for administrative and military purpose. M. K. Radvila map was based on abundant terrain measurements made during Valack reform, data of citizen inventory and early cartographic works.

M. K. Radvila made map distinguished with its high level of precision. The average quarter fault of the coordinated points position to geographical latitude has reached only $m_{\varphi} = \pm 13.5'$, and in geographical longitude it was only $m_{\lambda} = \pm 13.8'$. The comparison of cartometrical data shows that M. K. Radvila map was more detailed and precise than units made later in the XVII century or even in XVIII century, consisting of Middle and Eastern Europe.

In the middle and second half of the XVII century M. K. Radvila map was widely used for cartography of Eastern Europe: Johann Pleitner “Smolenscum urbus...” (1634), Guillaume le Vasseur de Beauplan “Nova totius Regni Poloniae Magnigne Ducatus Lithuaniae” (1651), Nicolas Sanson d’Abbeville “Les Estates de la Couronne de Pologne...” (1655) and “Theatre de la guerre des Courones...” (1705), Hessel Gerritsz “Tabula Russia” (1614), Cornelis Visscher “Europa” (1685), Carel Allard “Regni Poloniae, Magni Ducatus Lithuaniae...” (1697), Jan Neprecki “Magni Ducatus Lithuaniae...” (1749), Johan Kanter “Regni Poloniae, Magni Ducatus Lithuaniae...” (1770), Giovanni Antonio Bartolomeo Rizzi Zannoni “Carte de la Plogne divisee...” (1772).

For a while M. K. Radvila map was forgotten, nevertheless, its significance to evolution of the Middle and Eastern Europe cartography is unquestionable.

Key words: cartography, Middle Europe mapping, M. K. Radvila map

INTRODUCTION

Geography is a universal science that consists of the analysis of natural and humanity development problems. Its roots go back to the beginning of civilizations germ, as during the predawn of science the knowledge of practical and later on theoretical knowledge was necessary about the surrounding world and universal laws. The laws and rules are a basis–dimensional interaction of phenomenon

and processes. The demand of this phenomenon recognition delivered geography.

Systematic geographical ideas in Lithuania started being disseminated quite recently compared to other countries – the second half of the XVIII century. However, even by that time the educated part of society was “enlightened by the beam of natural philosophy, in between of which the light of geography was shining brightly...” (Holowka, 1743). Therefore, in the middle of the XVIII century there

were attempts to review and to evaluate the condition of geography science; it might be that the evolution as well. Over 250 years the geography science ideas together with conception have changed incredibly in Lithuania. At the beginning, it was understood as a science defining the position of objects, later on it passed to concept of phenomenon and processes dimensional spread analysis.

One of the most important aspects or branches in early Lithuanian geography's first steps was cartography. It was education and practical activity range that aimed to create graphical, space reflecting creations that help people to orient. This science has very deep roots reaching old Mesopotamia and Egypt civilizations and maybe even prehistoric times.

Cartography of Lithuania is significantly younger, however, maps of the territory of our country (the previous and present territory) started to be made already in the ancient world (Fig. 1). Therefore, Lithuanian mapping has quite old traditions. In all the development of Lithuanian cartography there is a possibility to distinguish four evolution

stages that were determined by geographical surroundings perception knowledge, methodology of cartography and precision of used instruments and level of geographical knowledge (Česnulevičius, Beconytė, 2006):

1. Early (the XVI–XVIII centuries)
2. Professional topographical (the XIX century)
3. Modern topographical (the first half of XX c.)
4. Modern (the second half of the XX c. – the beginning of the XXI c.).

In early stage of Lithuanian mapping evolution the producers of leading ideas were talented personalities, who were able not only to create but also to implement wide-scale projects. One of these personalities was Great Marshal of the Great Duchy of Lithuania, Trakai and Vilnius governor.

The author of the map and the circumstances of composing the map

Mikalojus Kristupas Radvila – Našlaitėlis (Orphan) (1549–1616) was culture and science character of Lithuania's State. During 1563–1567 he studied medicine in Leipzig, Strasbourg, Rome and Paris. After the studies he came back to Lithuania and became Marshal of the Great Duke Palace and during 1578–1580 he got a title of Great Marshal. These public functions have forced Radvila to get involved in a lot of different matters that were important for administration of the state. He was educated and had gained the knowledge of the world: he has been traveling through Syria, Palestine, Egypt in 1582–1584. That helped him to realize that it is necessary to have diverse information, including the data about the State's territory and natural and human-resources. This kind of perception, apparently, was received from his father Mikalojus Radvila Juodasis (Black) who was a land marshal of the Great Duchy of Lithuania. He was implementing the reform of land use (Valack reform). As M. K. Radvila was proceeding the functions of inside State dealing manager, he organized a "team" that was responsible for performance of the tasks. The mentioned "team" included Kiev governor Konstanty Ostrogski, mathematician James Bosgrave, writer and painter Tomasz Makowski. Next to gathered "team" M. K. Radvila made a technique of tasks performance and also has defined the content of the map. The assumption was made (Gliozaitis, 2007) that the necessary information and data started being gathered and the general tasks and procedures for

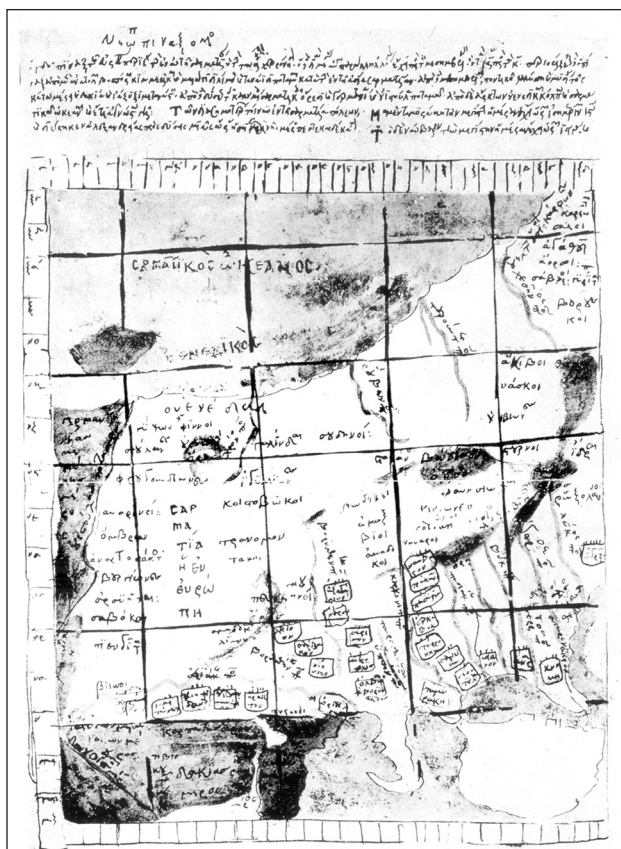


Fig. 1. Claudius Ptolemy map (a copy by Planude in the XII century)

making a map started in 1590. The data needed for composing a map was collected: the plans of Valack reform, the plans of military consolidations, parish population census data, the place-names, the measurements of geographical coordinates that were performed in some of the settlements, the descriptions of hydrographical net and forestry.

The map could be finished in about 1600. It is possible that the map image was drawn by T. Makowski. The image of the map was given to pressman Guilhemus Jansonus and the tasks of engraving were made by Hessel Gerritsz. The tasks of map's engraving were not performed very smoothly: the map was of quite a large size, it was not sufficiently good for atlases. Apparently, there were made a few additional originals of the map that were used for administration of the State. The copper form of press was found in 1613, so the first map was printed in that year (Fig. 2).

The map was made in pseudo-cylindrical projection. The selection of this kind of projection was a big drawback of the map, although it did not make a great influence on results of carto-metrical measurements. The scale of the map was 1:1 290000. The map was printed on two sheets of paper that later were agglutinated. One of map characteristics was the precision of picture as for that period. Professor Vaclovas Chomskis who had explored very deeply M. K. Radvila map's graphical picture determined

that the average square fault of coordinated points position to geographical latitude was $m_{\phi} = \pm 13.5'$, and $m_{\lambda} = \pm 13.8'$ to geographical longitude (Chomskis, 1957, 1958, 2004). At that time, technical level of corners and time measurement instruments gave a possibility to evaluate the points geographical width in accuracy of $\pm 5'$ in outside conditions, and the difference of geographical length in accuracy of $\pm 15'$. The comparison of carto-metrical data shows that M. K. Radvila map was of the same preciseness as many maps of Middle or Eastern Europe and in some cases (Mercator, 1606, 1624; Cellarius, 1659) was more precise (Table).

Chomskis' investigation shows that the precision of settlements location in M. K. Radvila map was in the same accuracy range as that of the Neprecki (1749) and Kanter (1770) maps (Chomskis, 1957).

The influence of the map on Eastern Europe cartography evolution

In the XVII century there were made a lot of maps of Lithuanian territory of that period. Part of them was a remake of M. K. Radvila map of 1613. For example, map of Lithuania in Joan Bleau's "Large Atlas", compiled in 1662. Obviously, J. Bleau did not do any cartography tasks in Lithuania. M. K. Radvila map remakes have furnished the Western Europe cartographers with information about Middle and Eastern Europe for about one hundred years.

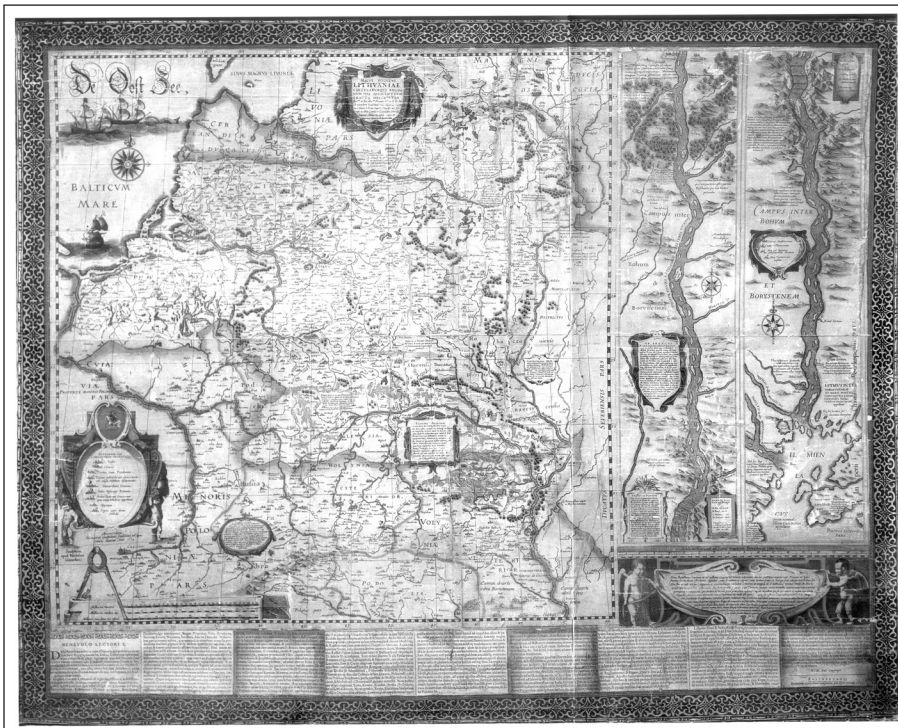


Fig. 2. M. K. Radvila map (1613)

Table. Comparison of hydrograph net accuracy in Middle Europe maps (measures by K. Peldžiūtė)

Map	River length and deviation														Curonian Lagoon area and deviation			Deviation of settlement location		
	Nemunas		Neris		Šventoji		Dubysa		Nevežis		Žeimena									
	km	%	km	%	km	%	km	%	km	%	km	%	km	%	km	%	km	%		
G. Mercator (1606)	537	57	394	79	126	51	143	103	148	71	83	104	1 539	97	21	21	21	21		
M. K. Radvila (1613)	591	63	272	53	164	67	150	108	117	56	46	58	1 563	99	19	19	19	19		
G. Mercator (1621)	513	55	364	73	119	48	160	115	118	56	104	130	1 528	96	22	22	22	22		
A. Cellarius (1659)	717	77	356	71	175	71	108	78	136	65	46	58	1 435	91	25	25	25	25		
F. de Witt (1688)	819	87	402	80	193	78	110	79	163	78	48	59	1 578	99	19	19	19	19		
N. Visser (1690)	609	65	306	61	176	72	126	91	124	59	46	58	1 362	86	24	24	24	24		
N. Sansson d'Abbeville (1692)	704	75	392	78	182	74	113	81	120	57	47	58	1 569	99	20	20	20	20		
H. Jailton (1697)	740	79	372	74	165	67	131	94	152	72	81	101	1 548	98	21	21	21	21		
B. Homman (1747)	850	91	412	82	182	74	118	85	179	86	67	84	1 562	99	3	3	3	3		
E. Bowen (1748)	917	98	473	94	212	86	122	87	192	92	71	89	1 571	99	4	4	4	4		
J. Nieprecki (1749)	906	97	482	96	217	88	116	83	183	88	74	93	1 556	98	6	6	6	6		
General map of Lithuania (1998)	937	100	501	100	246	100	139	100	209	110	80	100	1 584	100	0	0	0	100		

Different maps for the Great Duchy of Lithuania have been made until the XVI century. Since the XVII century the territory of the Great Duchy has been mapped together with the territory of Kingdom of Poland. This fact gave rise to the thought that at the end of the XVI century—the beginning of the XVII century there could be made a map of Lithuania and Poland that was used by the Western Europe cartographers of the XVII and XVIII centuries (Buczek, 1933, 1963). It is a huge possibility that this kind of map existed. This fact would be illustrated by Gerard Mercator in 1595. Atlas printed in Duisburg “*Atlas sive Cosmographicae Meditatione...*” (Fig. 3). This Atlas included Lithuanian map as well. It is assumed that the map was made



Fig. 3. Gerard Mercator Lithuanian map (1595)

in about 1570. It significantly differs from Matheus Strubicz map “*Magni Ducatus Lithuaniae, Livoniae et Moscoviae Descriptio*” of 1580 that was printed in Martin Krömer atlas dated 1589 (Fig. 4).

If a common map of Lithuania and Poland was really made and cartographers of later periods used it as a mapping material, there is a possibility to see its fragments in later made maps. Buczek (Buczek, 1933) made an assumption that a conceivable copy of this previous map could be Johann Pleitner map made in 1634 (Fig. 5). As he has been serving as a war engineer in King's Wladislaw IV soldiery, he made a big plan of 16 pages (common format of 156 × 224 cm) for Smolensk surroundings “*Smolenscium urbus ope Divina...*” (1636). On page 9 of



Fig. 4. Matheus Strubicz map (1580)

the plan there is a detailed scale map of the Great Duchy of Lithuania. However, in this map J. Pleitner's highlighted image of Lithuanian territory and Polish territory is more of orientation character. In this way, the map did not make the synthesis of these two lands images. The analysis of cartographical geographical elements shows that Lithuania's cartographical image was made according to M. K. Radvila map of 1613, while Poland was mapped according to Gerard Mercator map. Johann Pleitner map does not have any of the objects that were not included in Lithuanian map of 1613. According to its characteristics and the appearance the rivers net is identical with hydrographical network of the map of 1613. Identical features show up in the process of comparing J. Pleitner's mapped Poland's territory to Gerard Mercator map *"Poloniae et Silesiae"* of 1585. It forces to make an assumption that Johann Pleitner map is a copy of 1613 M. K. Radvila and 1589 Gerard Mercator map.

Another "copy" of M. K. Radvila map is Guillaume le Vasseur de Beauplan map *"Nova totius Regni Ploniae Magnigne Ducatus Lithuaniae..."* made in 1651 (Fig. 6). Guillaume le Vasseur de Beauplan map was made in conical projection and it is a major difference from 1613 Lithuania's map where projection was trapeze and pseudo-cylindrical. The cartographical image of Lithuania in Guillaume le Vasseur de Beauplan map seems to be quite poor. The generalization of cartographical image did not match the scale of the map. In this map, important rivers like Minija, Jūra, Nevėžis or Šventoji were not mapped. What is more, this map rarely included vil-

lages and settlements. The mapped objects showed that the cartographical image was made according to Lithuanian map of 1613. Although the author carelessly transferred a hydrographical net from Lithuanian map of 1613 into his own work, there are a lot of spots and places where in either maps images of rivers or their parts are identical: Mituva, Žeime-na, Merkys, Šešupė, Nemunas and Neris. As well as in Lithuanian map of 1613, in Guillaume le Vasseur de Beauplan map between Lithuania's villages and settlements the Radvila family's estates were distin-

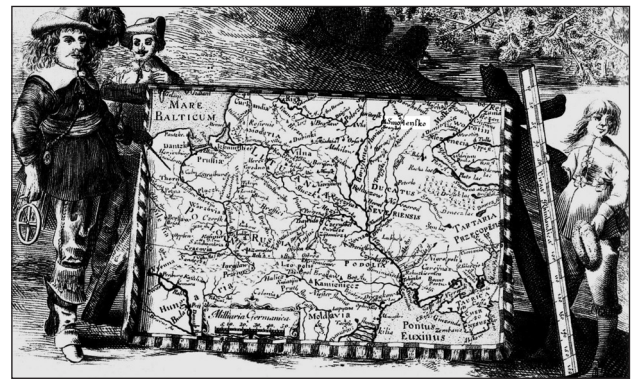


Fig. 5. Johann Pleitner map "Smolenscium urbis ope Divina..." (1636)

guished. It proves very clear connection between the map of 1613 and Guillaume le Vasseur de Beauplan map. Although it has to be stated that the map made after 40 years was less informative and detailed. Paradoxically, in Western Europe Guillaume le Vasseur de Beauplan map became very popular.



Fig. 6. Guillaume le Vasseur de Beauplan map "Nova totius Regni Ploniae Magnigne Ducatus Lithuaniae..." (1651)

It was even translated into Russian. The Russian version of the map was interesting because for the first time the Polish forms of Lithuania's geographical titles were transliterated into Russian alphabet.

In 1655 Nicolas Sanson d'Abbeville created map "*Les Estates de la Couronne de Pologne...*" which was one more example of maps the cartographical image of which was made according to M. K. Radvila (Fig. 7). It is a 56.5 × 42 cm format work that was reprinted a lot of times. Last time it was printed in Paris in 1831.

The content of Nicolas Sanson d'Abbeville map was much wider than that of Guillaume le Vasseur de Beauplan map. Very successfully generalized image helped to gradually reveal the features of the mapped territory. The analysis of hydrographical net and settlements positions shows that Nicolas Sanson d'Abbeville map is constantly supported by the data of Lithuanian map of 1613. However, to represent the Baltic Sea side line additionally to Lithuania's map the German or even Swedish maps were used. It is proved by the German titles of the settlements like Polangen (Palanga), Heiligaw (Šventoji), Garsdem (Gargždai). These localities in Lithuanian map of 1613 have been given in Polish forms. In Guillaume le Vasseur de Beauplan and Nicolas Sanson d'Abbeville maps Baltic seaside has been presented more precisely than in the map of 1613. However, the disparity of some

forms of geographical titles as well as false recording of some of the place-names (Womie, Szwole, Lubniki) were a general disadvantage of Nicolas Sanson d'Abbeville map.

In the XVII century M. K. Radvila map was a great support for cartography of Eastern Europe – Sarmatia. His map was used to make the maps of Moscow Duchy and later the map of Empires of Russia (after 1721): Hessel Gerrits "Tabula Russia" (1614), Nicolas Visscher "Nova Europa" (1652), Carrel Allard "Regni Poloniae, Magni Ducatus Lithuaniae coeterarum..." (1697) (Figs. 8–10).



Fig. 8. Hessel Gerrits map "Tabula Russia" (1614)



Fig. 7. Nicolas Sanson d'Abbeville map "Les Estates de la Couronne de Pologne..." (1655)



Fig. 9. Nicolas Visscher map "Nova Europa" (1652)

M. K. Radvila map was referred to even in the middle of the XVII century or even in the second half of the XVIII century, during the process of making the maps of Both Nations Republic. In 1749 Jan Neprecki made map "Magni Ducatus Lithuaniae in suos palatinatus et districtus divisus...": there were modified the outside of M. K. Radvila map, the orthography of some place-names. However, the map did not become more detailed. Quite similar were

the maps made in 1770 by Johann Kanter "Regni Poloniae, Magni Ducatus Lithuaniae provinciarum foedere et vassellagio illis junctum..." and in 1772 by Giovanni Antonio Rizzi-Zannoni "Carte de la Pologne divisee par provinces et palatinats et subdivisee par districts" (Fig. 11).

For some time M. K. Radvila map was forgotten, nevertheless, its significance to the evolution of Middle and Eastern Europe cartography

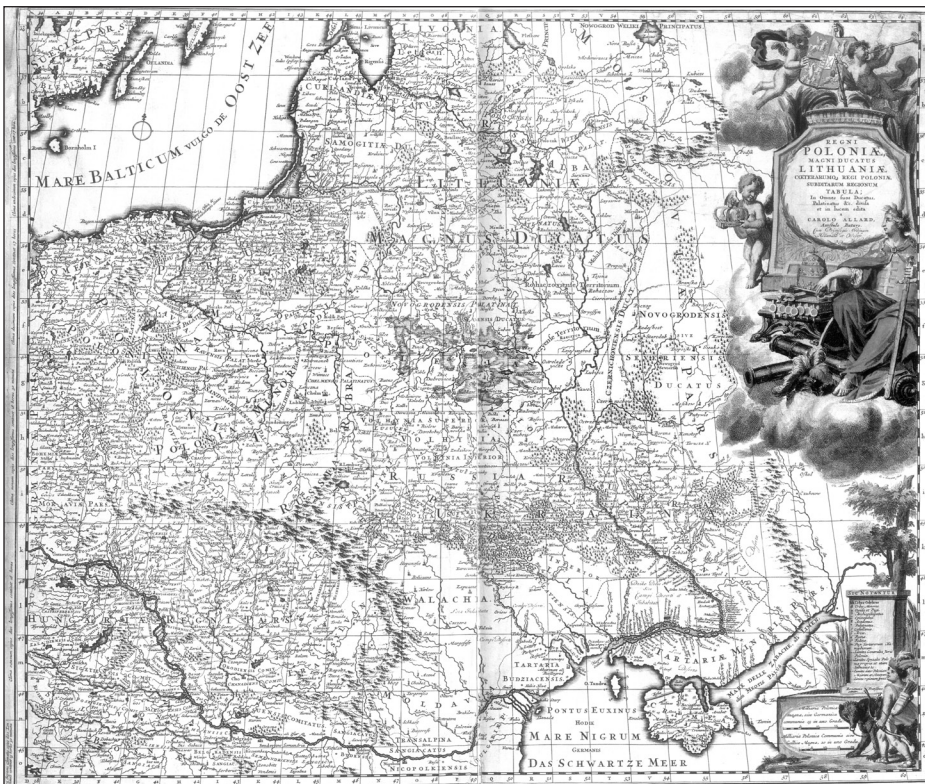


Fig. 10. Carel Allard map "Regni Poloniae, Magni Ducatus Lithuaniae coe-terarumo..." (1697)



Fig. 11. Giovanni Antonio Rizzi-Zannoni map “Carte de la Pologne divisée par provinces et palatinats et subdivisée par districts” (1772)

is unquestionable. Yet even in 1910 researcher of Russian cartography history Venjamin Kordt wrote: “The Duke’s Radvila map is one of the most famous mapping works of XVII century”.

CONCLUSIONS

1. The comparison of carto-metrical measurement data shows that M. K. Radvila map was of the same precision as many maps of Middle or Eastern Europe. Precision of settlements location in M. K. Radvila map was in the same accuracy range as the Neprecki, Kanter, Rizzi-Zannoni maps which were compiled during early and middle decade of the XVIII century.

2. In the second half of the XVII century the elements and data of M. K. Radvila map were used by many cartographers who compiled maps of Eastern and Middle Europe. The same details of rivers, settlements, forests, relief forms location, geographical place-names of M. K. Radvila map are detected in the maps of Johann Pleitner (1636), Guillaume le Vasseur de Beauplan (1651), Hessel Gerrits (1614), Nicolas Sanson d’Abbeville (1655) and other cartographers.

3. In the XVII century M. K. Radvila map was a great support for cartography of Eastern Europe – Sarmatia. His map was used to make the maps of Moscow Duchy and Empires of Russia (the western part), Ukraine, Byelorussia. Carto-

graphic images of sparsely populated territories (Polisya) in the first half of the XVIII century were transferred from M. K. Radvila map.

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Algimantas Česnulevičius

M. K. RADVILOS ŽEMĖLAPIS XVII A. VIDURIO EUROPOS KARTOGRAFAVIMO KONTEKSTE

Santrauka

Visoje Lietuvos kartografijos raidoje galima išskirti keturis vystymosi etapus, nulemtus geografinės aplinkos suvokimo žinių, kartografavimo metodikos ir naudojamų instrumentų tikslumo bei geografinių žinių lygio: neprofesionalųjį (XVI–XVIII a.), profesionalųjį topografinį (XIX a.), modernųjį topografinį (XX a. I pusė) ir modernųjį (XX a. II pusė – XXI a. pr.).

M. K. Radvilos sudarytas žemėlapis pasižymėjo aukštu tikslumu. Koordinuotų taškų padėties vidutinė kvadratinė klaida geografini plotumai siekė tik $m_{\phi} = \pm 13,5'$, o geografini ilgumai $m_{\lambda} = \pm 13,8'$. Kartometrinių duomenų palyginimas rodo, kad M. K. Radvilos žemėlapis buvo kur kas tikslesnis nei vėlesni XVII ar net XVIII a. Vidurio ir Rytų Europos žemėlapiai.

XVII a. M. K. Radvilos žemėlapiu plačiai remtasi kartografuojant Rytų Europą: Johano Pleitnerio „Smolenscium urbus ope Divina...“ (1634), Giljemo Levasero de Boplano „Nova totius Regni Ploniae Magnigne Ducatus Lithuaniae...“ (1651), Nikola Sansono de Abevilio sudarytas „Les Estates de la Couronne de Pologne...“ (1655), Heselio Gerico „Tabula Russia“ (1614), Kornelio Višerio „Europa“ (1685), Karelo Alardo „Regni Poloniae, magni ducatus Lithuaniae coeterarumo...“ (1697), Nikola Sansono „Teatre dela guerre des courones du Nord“ (1705), Jano Nepreckio „Magni Ducatus Lithuaniae in suos palatinatus et districtus divisus...“ (1749), Johano Kanterio „Regni Poloniae, Magni Ducatus Lithuaniae provinciarum foadere et vassellagio illis junctrum...“ (1770), Džiovanio Antinnio Rizzi–Dzanonio „Carte de la Pologne divisee par provinces et palatinats et subdivisee par districts“ (1772).

Raktažodžiai: kartografija, Vidurio Europos kartografavimas, M. K. Radvilos žemėlapis