Birutė Giedraitienė, Medeina Steponavičiūtė

ANALYSIS OF WORKS ON TRACING PAPER FROM A COLLECTION OF DRAWINGS BY LITHUANIAN ARTISTS

Résumé

Les fonds de la bibliothèque "Vrublevskiai" de l'Académie des sciences de Lituanie disposent de dossiers documentaires de valeur, partie du patrimoine culturel, parmi lesquels se trouve une collection de tableaux et d'esquisses des peintres lituaniens (signature LMAVB RS F320) conservée au Fonds des manuscrits. Cette collection s'étend de 1748 a 1970 et comprend 2386 œuvres conservées. Elle contient 24 œuvres de peintres du 19 siècle, effectuées sur papier calque. Les œuvres ont été analysées en appliquant les méthodes de microscopie optique, de ATR-FTIR et de SEM-EDX. Le pH du papier calque a été mesuré, les matières composantes, non organiques et celles qui ont été utilisées pour réaliser une copie ont été identifiées.

Keywords: tracing paper, ATR-FTIR, SEM-EDX

Analysis of works on tracing paper from a collection of drawings by Lithuanian artists

The Wroblewski Library of the Lithuanian Academy of Sciences (hereinafter referred to as the Library) has many valuable sets of cultural heritage documents. One of them is *The collection of drawings and sketches by Lithuanian artists* (signature LMAVB RS F320). Covering the period from 1748 to 1970, it is stored in the Manuscript Fund of the Library and contains 2386 storage units. This is a collection of different genres of works by authors who have lived and worked in the territory of the former Lithuania and Poland. The collection includes works by famous artists, such as Franciszek Smuglewicz, Jan Rustem, Kanuty Rusiecki (Fig. 1), Bolesław Rusiecki, Römers, Ivan Trutnev, Lew Antokolski, and others. Recently, the collection has attracted the attention of art scientists and historians of art and culture from various Lithuanian and foreign institutions.

Tracing paper (also called transparent paper), as a support is not much investigated in Lithuania, although documents on this type of paper are stored in many cultural heritage institutions in the country.

Although tracing paper is a relatively fragile type of support, sometimes the artwork made on it remains longer than a that on painted canvas does. For example, three of the collection drawings stored in the Library, are the draft versions of the religious painting *Evening at the Gate of Dawn*,

Fig. 1. Kanuty Rusiecki (1800–1860). Head sketch for the famous painting The Reaper. The 1850s. Tracing paper, ink, graphite pencil, 39×25.5 cm. LMAVB RS 320 1605

created by the famous student of Vilnius art school: Kanuty Rusiecki.[1]

History of tracing paper

The beginning of the use of tracing paper (also called transparent paper) in art is associated with the Renaissance period. In his tract *Il libro dell'arte*, an Italian painter, Cennino d'Andrea Cennini, mentions a type of paper that, when coated with the flaxseed oil, can be used for copying works of art. Up until the 19th century, tracing paper was not widespread and had no strictly defined requirements for its properties and was often produced by the users themselves. Only when the industrial production method of tracing paper was invented (in 1806 by Ralph Wedgwood) did its production and use increase dramatically, starting from 1820.

The production of all types of tracing paper is based on two main methods:

1) paper fibre or wet pulp is beaten to break and shrink the fibres and thus reduce the porosity and increase the transparency of paper,
2) already produced paper is coated or filled with a particular material that makes the paper transparent.

The following types of tracing paper are known:

- Parchment imitation – wood pulp is beaten for a long time, giving the end product transparency and resistance to water and dirt.
- Parchment paper (vegetable parchment) – is a type of paper, for which sulfuric acid or zinc chloride is used during its production.
- Oiled paper – paper is soaked in flaxseed or other oil.
- Resin paper – paper is soaked in resins.
- Onion skin – thin, slightly polished / glazed translucent paper, called this due to its resemblance to the thin outer shell of an onion.
- Manifold paper – the surface of the paper is coated with a layer of pigments (usually carbon fibre); the paper is soaked in oil to make it resistant and transparent.
- Waxed paper – the paper is soaked in a molten wax or paraffin bath.

Results and discussion

The object of this research is twenty-four works from the Collection LMAVB RS F320 by 19th-century artists, created on tracing paper. The works were investigated using ATR-FTIR, SEM-EDX, and optical microscopy techniques. Different parts of the artworks (paper used, materials used for its production, as well as tools for drawing on it) were examined and their composition determined.

1 I. Pajedaitė, 'Lietuvos dailininkų piešinių ir eskizų kolekcija', in: *Bibliografija: mokslo darbai. 2008/09*, (2011), 82-94.

Table 1. Results of analysis

No.	Metric	pH	Protein	Starch	Coating/ Impregnant	Inorganic coating	Material used for copying	Paper base
1.	LMAVB RS F320-1571	6,8	-	+	-	-	Charcoal pencil	Cellulose
2.	LMAVB RS F320-1597	6,7	-	+	Vegetable oil	-	Charcoal pencil	Cellulose
3.	LMAVB RS F320-1607	5,7	-	+	Venetian turpentine, Damara?,Oil (linseed?)	-	Charcoal pencil, graphite	Cellulose
4.	LMAVB RS F320-1614	6,1 (5,5)	-	+	Oil (linseed?)	-	Graphite pencil, HgS	Cellulose
5.	LMAVB RS F320-1685	6,8	-	+	Damara, Venetian turpentine?	-	Charcoal pencil	Cellulose
6.	LMAVB RS F320-1726	6,8	-	+	Wax?	$PbCrO_4$	Charcoal pencil	Cellulose
7.	LMAVB RS F320-1728	6,2	-	+	-	-	Graphite, charcoal pencil?	Cellulose
8.	LMAVB RS F320-1761	7,3	-	+	-	-	Graphite pencil , sanguine	Cellulose
9.	LMAVB RS F320-1762	6,4	-	+	Oil	Carbon	Graphite pencil	Cellulose
10.	LMAVB RS F320-1765	6,6	-	+	Oil	-	Graphite, charcoal pencil?	Cellulose
11.	LMAVB RS F320-1944	5,3	-	+	Oil (linseed?)	-	Graphite pencil, ink (Fe)	Cellulose
12.	LMAVB RS F320-1184	6,6	-	+	Oil (linseed?)	-	Graphite pencil, ink (Fe)	Cellulose
13.	LMAVB RS F320-1678	6,5	-	+	Oil	-	Graphite pencil	Cellulose
14.	LMAVB RS F320-1679	6,9	-	+	Damara, Venetian turpentine?	-	Charcoal pencil, ink	Cellulose
15.	LMAVB RS F320-1733	6,1	-	+	Damara, Venetian turpentine?	-	Charcoal pencil, sanguine	Cellulose
16.	LMAVB RS F320-1632	7,1	-	+	-	-	Charcoal pencil, ink	Cellulose
17.	LMAVB RS F320-742	7,0	-	+	Oil (linseed?)	-	Graphite, charcoal pencil	Cellulose
18.	LMAVB RS F320-1555	6,9	-	+	-	-	Pencil, sanguine	Cellulose
19.	LMAVB RS F320-1681	6,8	-	+	-	-	Charcoal pencil, sanguine	Cellulose
20.	LMAVB RS F320-1603	6,2	-	+	Oil (linseed?)	Fe_2O_3/FeO(OH)/ $PbCrO_4$	Graphite pencil	Cellulose
21.	LMAVB RS F320-1605	6,6	-	+	-	-	Graphite pencil, ink	Cellulose
22.	LMAVB RS F320-1560	6,6	-	+	-	-	Graphite pencil, sanguine	Cellulose
23.	LMAVB RS F320-1613	6,9	-	+	-	-	Graphite pencil, ink	Cellulose
24.	LMAVB RS F320-1570	6,3	-	+	Damara, Venetian turpentine	-	Pencil, ink	Cellulose

Following analysis of the paper of the drawings, it was defined that in most cases, irrespective of the original production method, the papers' pH is neutral or close to neutral. More significant changes of pH are noticeable in cases of documents LMAVB RS F320-1614, LMAVB RS F320-1944, and LMAVB RS F320-1607. A lower pH value of paper in document LMAVB RS F320-1614 can be linked with the HgS pigment used in drawing process; in document LMAVB RS F320-1944 with ink destruction; LMAVB RS F320-1607 with the destruction of paper impregnation material (oil).

Inorganic coatings ($PbCrO_4$ (document LMAVB RS F320-1726), carbon (document LMAVB RS F320-1762) and Fe_2O_3/FeO(OH)/ $PbCrO_4$ (document LMAVB RS F320-1603)) have no significant influence on papers' pH. Prevailing pH values in tracing paper are close to neutral. This shows that in many cases, from the chemical point of view, paper is rather stable. Mechanical damage is the main problem.

It is defined that in the production process of tracing paper, starch was used as a sizing material. For impregnation coating, various oils, turpentine, and damara resin were used; in the case of document LMAVB RS F320-1726, wax might have been used.

Information achieved in the course of the investigation about the composition of tracing paper documents and materials for copying aids the restorers in learning more about the objects, and in choosing suitable methods and materials for conservation and restoration.

The results of the analysis are presented in the table 1.

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Birutė GIEDRAITIENĖ

The Wroblewski Library of the Lithuanian Academy of Sciences, Žygimantų g. 1, LT-01102 Vilnius, Lithuania

birute.giedraitiene@mab.lt

Medeina STEPONAVIČIŪTĖ

National Museum – Palace of the Grand Dukes of Lithuania, Katedros a. 4, LT – 01143 Vilnius, Lithuania

steponaviciute.medeina@gmail.com