

# Removing Pressure-Sensitive Tapes. A Comparison of Three Methods

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All photos by author

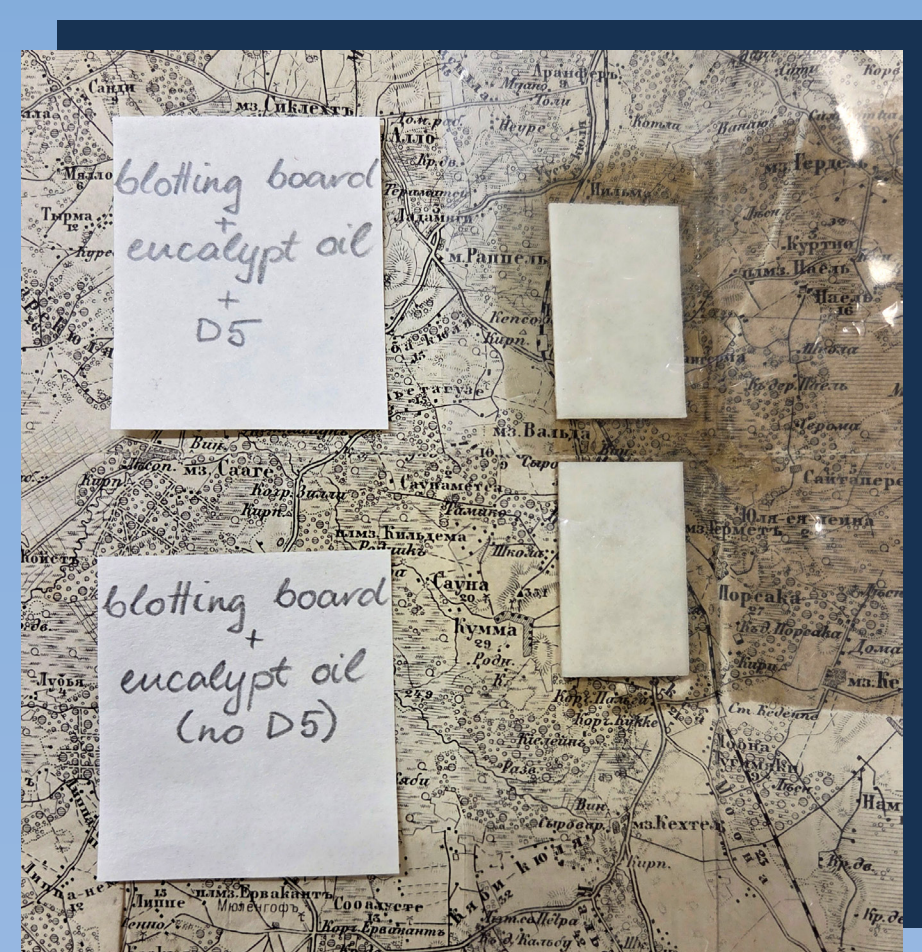
In April 2025 a web-lecture was held by François Richard (University of Amsterdam) who had developed a solvent based method for removing pressure-sensitive tapes using rigid agar-agar gel immersed with methyl ethyl ketone (MEK) or ethyl acetate (EA)<sup>1</sup>. Conservators in National Archives of Estonia tried out this method on several different paper objects with great results.

A comparison will be shown using three different carriers and solvents: agar-agar gel (Kremer Pigmente) loaded with EA (F. Richard's method), Nanorestore® MWR (Medium Water Retention) gel loaded in Nanorestore Cleaning® Polar Coating G (contains MEK and EA among other solvents)<sup>2</sup>, eucalyptus oil (Kaigert), using blotting board as a carrier.

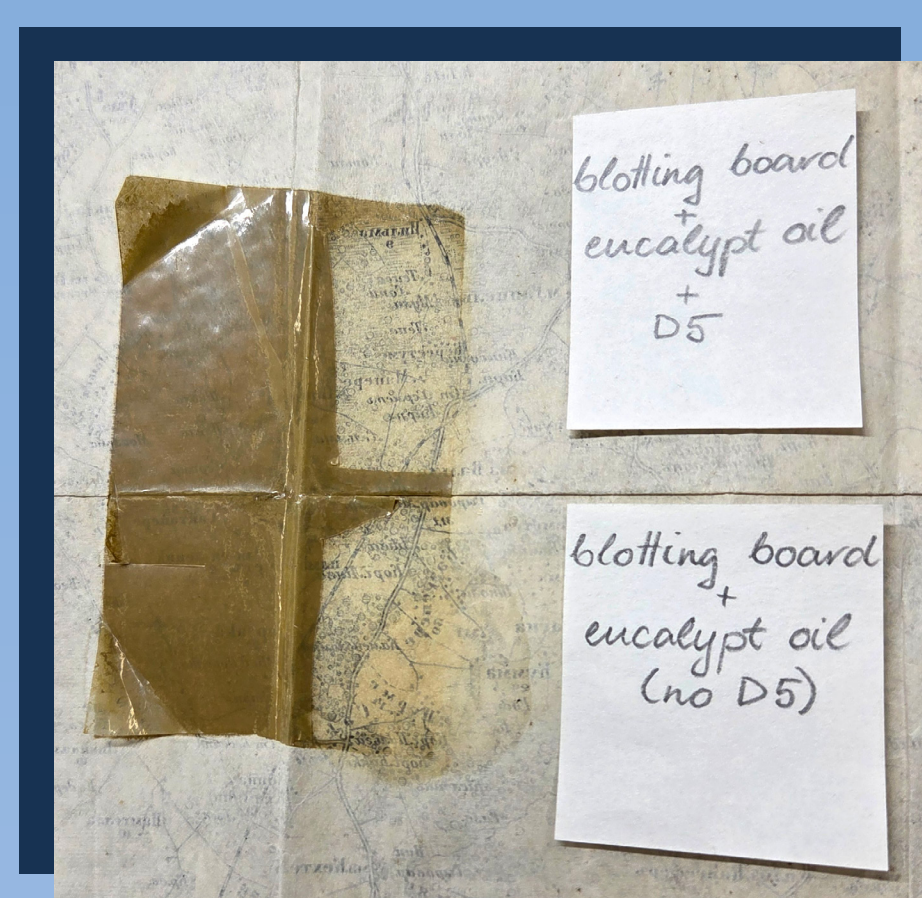
All three gels/solvents were tested with and without using Cyclomethicone D5 (Kremer Pigmente) as the possible aid to avoid tidelines. Tests were made on the recto side of the map, the carrier was covered with Melinex and put under light pressure for better contact.

## 1) Blotting board immersed with eucalyptus oil (Kaigert; ill. 3)

After 25 minutes the tape could be removed easily. Paper was sticky with adhesive, it was removed with cotton swabs immersed with eucalyptus oil. After the oil had evaporated the paper remained light yellow and a tideline has occurred where D5 was not used (ill. 4).



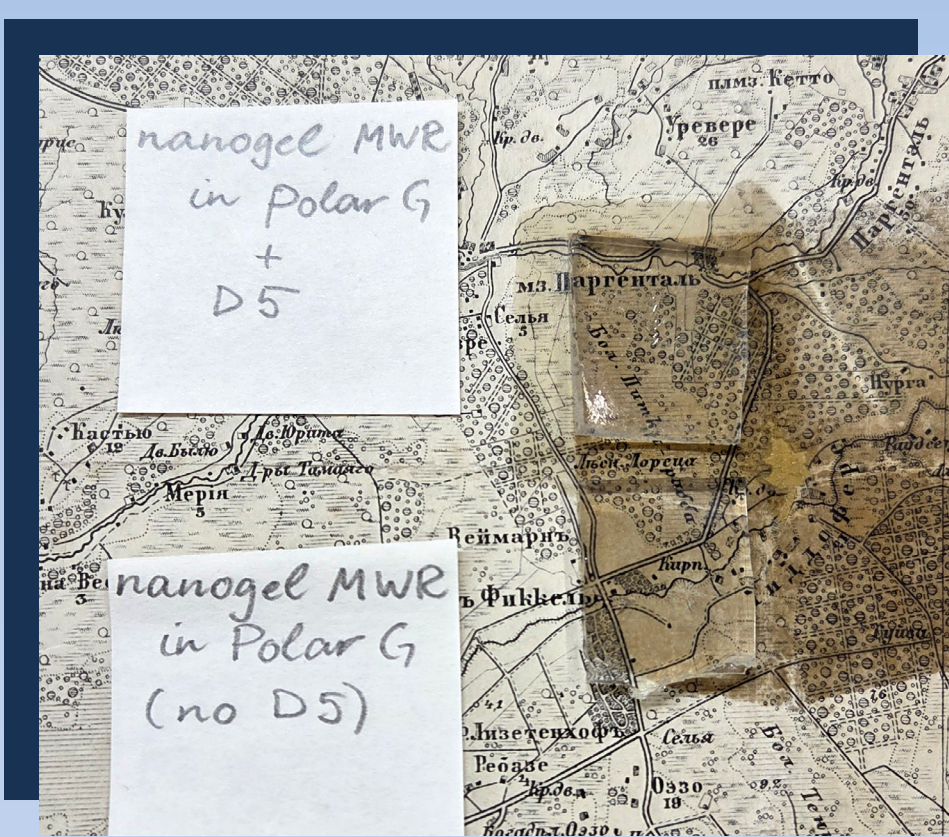
Ill. 3 Test with eucalyptus oil



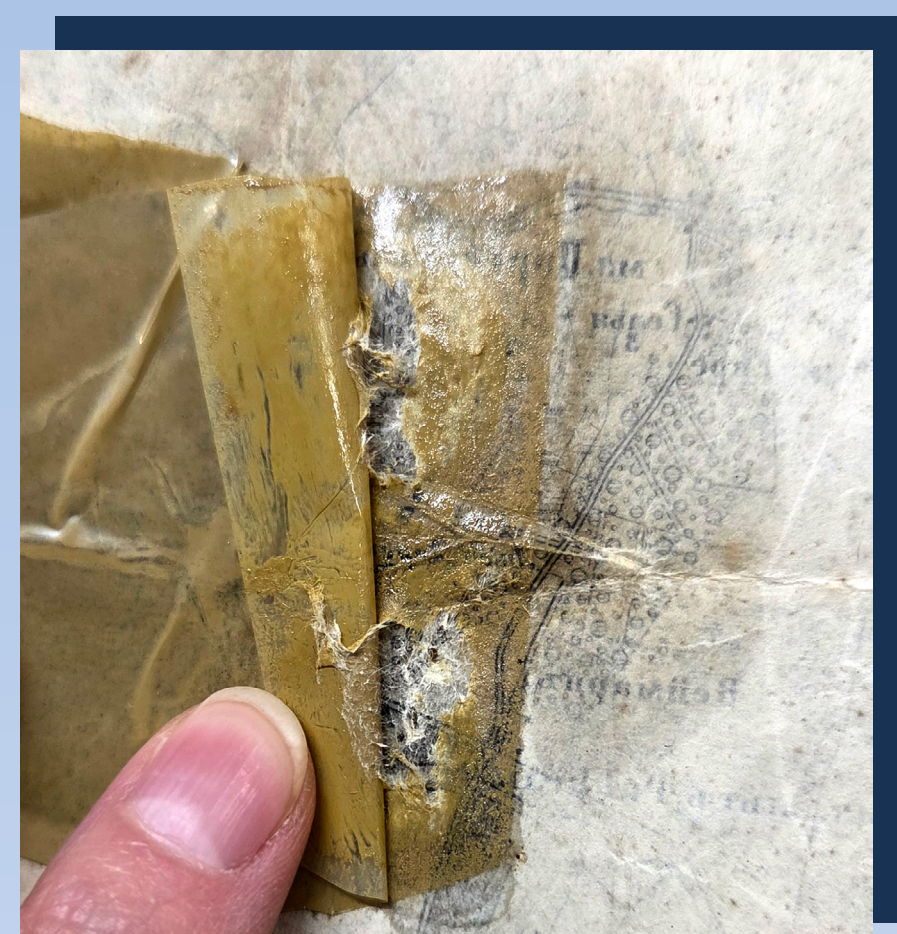
Ill. 4 Verso side of test area after treatment. Without D5 tideline has occurred

## 2) Nanorestore® MWR gel loaded in Nanorestore Cleaning® Polar Coating G (ill. 5)

Before applying the gels were lightly dried on blotting paper. After 20 minutes the test was aborted because the paper surface was damaged: although the adhesive was softened, the paper delaminated (ill. 6). The staining has lightened and the result is not that yellow as with eucalyptus oil. Tidelines can be seen on both test areas.



Ill. 5 Test with Nanorestore materials



Ill. 6 Damaged paper after treatment

### Recipe for 5% agar-agar gel:

- Mix 1 g of agar and 20 g of water.
- Warm to boil in microwave (takes about 20 seconds).
- Mix and pour on a petri dish and let it cool down. Gel will be formed.

### Loading the gel:

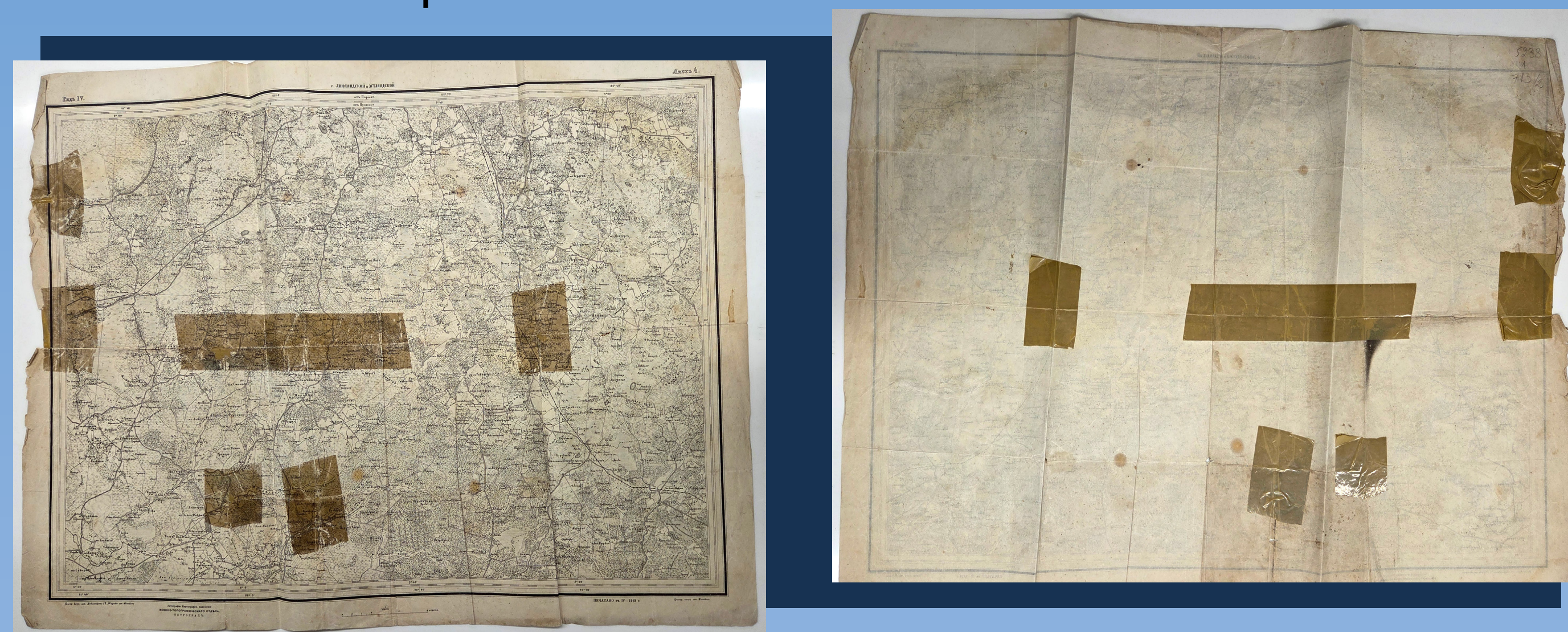
- Cut the gel to strips and load it in ethanol-water solution four times step-by-step: 25%, 50%, 75% and 100% ethanol. Each loading time minimum of 2,5 hours. This way the gel does not shrink a lot and can switch out the water in the gel.
- Then load in MEK or EA for at least 2,5 hours.

<sup>1</sup> Françoise Richard, Joen J. Hermans & Lora Angelova (2024) Rigid Solvent-Gels in Paper Conservation: A New Approach to Sticky Problems, Journal of Paper Conservation, 25:2, 86-106, <https://www.tandfonline.com/doi/full/10.1080/18680860.2024.2343671#d1e414> (viewed 05.12.2025)

<sup>2</sup> Nanorestore Cleaning®. Solutions for Conservation of Cultural Heritage. <https://www.csgi.unifi.it/products/cleaning.html> (viewed 08.12.2025)

### Object:

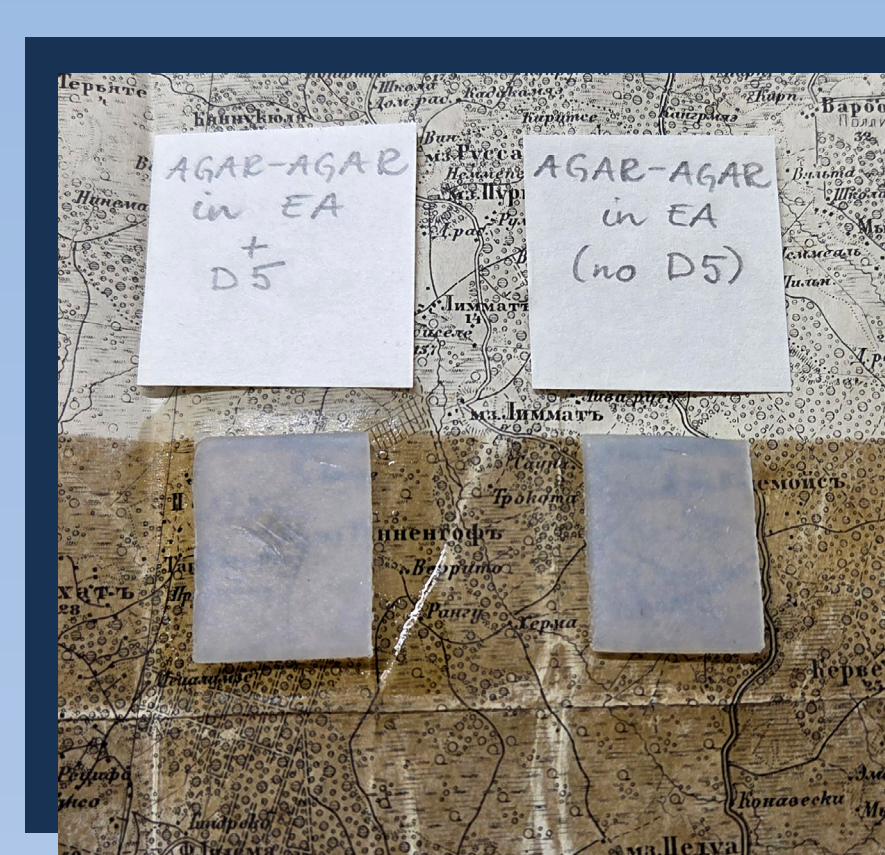
- Printed map on a fairly thin paper, dated 1918 (ill. 1-2).
- Lignin test using phloroglucinol (TAPPI Test Method T401) is negative.
- Repaired with brown pressure-sensitive tape.
- Dark stains on the recto side caused by the adhesive of the tape.



Ill. 1-2 Recto and verso side of the map

## 3) Agar-agar gel loaded in EA (ill. 7)

Before applying the gels were thoroughly dried between blotting papers. After 7 minutes the tape removed very easily. Paper surface was still a bit sticky, so the gel was put on the verso side onto the sticky area. After 10 minutes the gel had removed the sticky adhesive and turned yellow itself. The paper is not yellow like with eucalyptus oil. Both test areas left a stained circle (ill. 8).



Ill. 7 Test with agar-agar in EA



Ill. 8 Stained circles and yellowed gels after treatment

### Results and conclusions:

Eucalyptus oil and Nanorestore materials needed more time to soften the adhesive than agar in EA. Eucalyptus oil left the paper yellow (ill. 9), but it could be treated further to remove the yellowness, i.e. with sepiolite clay.

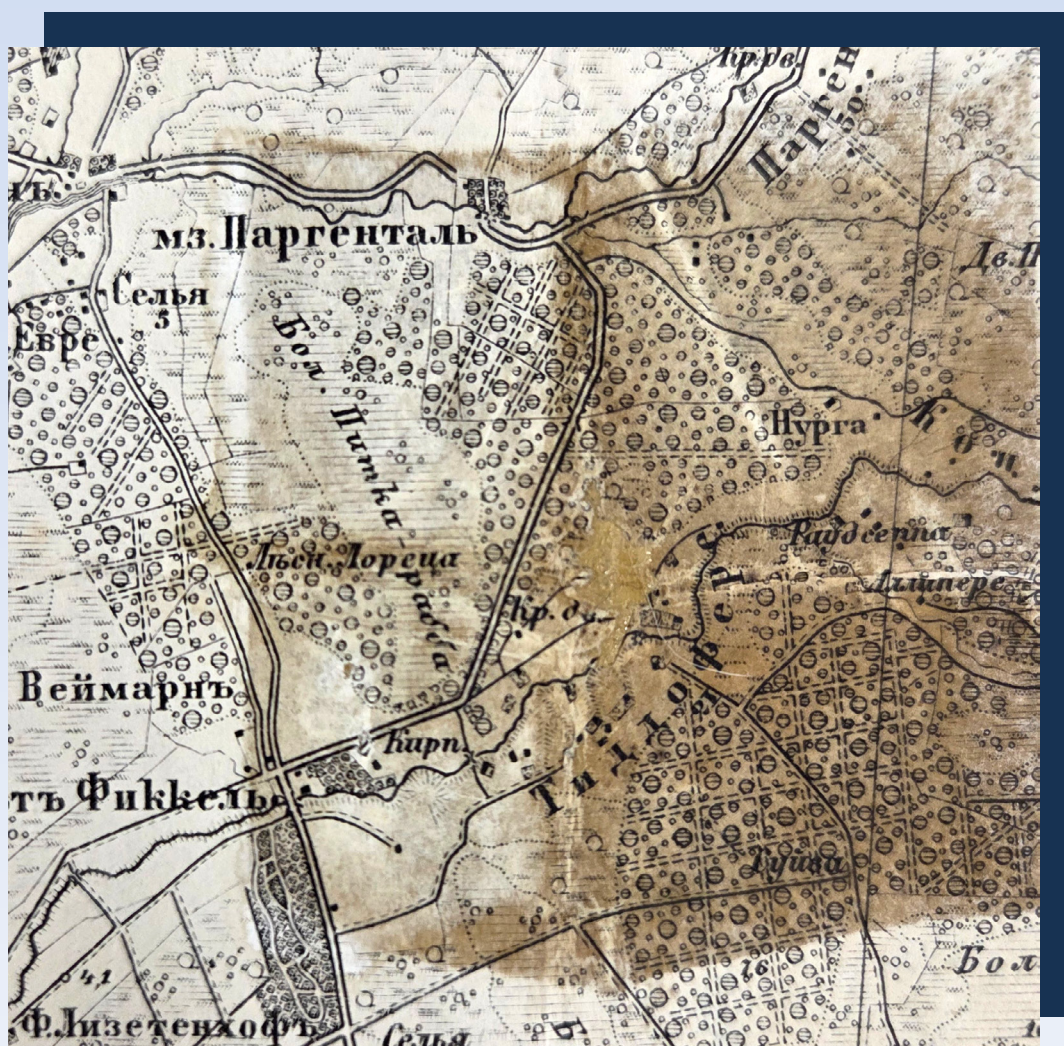
Nanorestore gel damaged the paper and tidelines occurred on both test areas (with and without D5; ill. 10) – could it be because D5 cannot impede the small nanoparticles of the Polar Coating G?

Agar gel in EA showed the best results: worked faster than others, no yellow staining of the paper. The only problem is the strange tideline that emerged on both test areas (ill. 11), which might be because the gel activates the adhesive also from the verso side. Further treatments might solve the problem (i.e. washing or treating the stains again with agar gel from both sides of the paper).

Ill. 9 Results with eucalyptus oil



Ill. 10 Results with Nanorestore materials



Ill. 11 Results with agar gel in EA

