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APPLICATION OF NON-INVASIVE FORENSIC METHODS OF DOCUMENT RESEARCH IN ESTABLISHING HISTORICAL TRUTH

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Abstract

The past century was not only the age of totalitarianisms and genocide, whose victims were whole nations or their overwhelmingly great proportions, but also the time of mass displacements, deportations, escape or relocations of populations, which especially affected Europe. World War II and the time of new, post-war geopolitical reality abounded in enormous human tragedies. The consequence of these unfortunate events is also the issue of compensations for the property lost by the people who were forcibly resettled from the areas where they lived. The documents confirming the ownership of a particular property lost as a result of relocation are the most important evidence constituting the basis for claiming compensation paid from the State Treasury in Poland. Unfortunately, there are cases when the documents in question are forged with the aim of obtaining excessive monetary benefits under false pretences. During a hearing of evidence concerning the payment of compensation the body conducting the proceedings concluded that there were striking discrepancies between the documents describing the property left behind. The documents deposited with the Polish Central Archives of Modern Records differed from the document presented as genuine by the party in the proceedings claiming compensation. Forensic examination proved that the examined document was not genuine and had been counterfeited. The case study of document forgery discussed in this article proves that the use of non-invasive forensic examination methods is an important element in establishing historical truth indispensable in making a correct legal decision.

Keywords: *Forensic sciences; Historical documents; World War II, Eastern Borderlands; Property left behind beyond the Bug River; Forgery; Paper; Ink; Non-invasive methods; UV-VIS-NIR*

Introduction

Forgery of documents has accompanied humanity practically from the onset of their emergence as a means of communication and transfer of thought. Despite the flow of time, disapproval of the practice by the public opinion, criminal responsibility for the offences against credibility of documents and the multitude of implemented technical countermeasures, forgery of documents is still present in many areas of social life. Unfortunately, contrary to public expectations and legal norms, the process is still on the rise, despite legal repressive measures and the development of state-of-the-art examination methods, significantly contributing to counteracting and preventing this negative phenomenon [1]. Progress in forensic examination of documents significantly hinders the development in this area of criminal activity. Forging, counterfeiting and use of non-genuine documents is a combination of complex human efforts aiming at gaining particular benefits. Development of methods and means of counteracting forgeries aims at controlling the process. Forensic examination of documents, however problematic it may sometimes be, is an invaluable analytical method applied in widely

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understood judicial sciences [2-5]. As forged historical documents may be used in all kinds of criminal offences, the potential of modern forensic science implemented in their examination should be continuously complemented with new research methods [6, 7]. For years forensic examination has been used in examination of genuineness of historical objects and works of art, while analytical methods are successfully applied in the examination of historical documents [8]. Due to diversified nature of the material from which the objects in question are made, their examination has had and should still have an interdisciplinary character. Recent years have seen considerable progress in the development of physico-chemical methods implemented in examination of genuineness of both modern and historical documents [9-13]. Forensic science has frequently been confronted with questionable documents and claims of authorship by the people who did not actually produce them either in part or in whole. Allegedly genuine documents may include the content adverse for their authors, thus putting them in a difficult situation.

Determining the genuineness of historical documents may have significant legal consequences, becoming the basis for the interpretation of actual facts and events and thus directly or indirectly affecting administrative decisions [14]. Quite significantly, examination of historical documents with the use of objective, scientific methods may bring to light completely new facts from the past, which may not necessarily be coherent with the historical truth accepted so far [15-17]. The past century was not only the age of totalitarianisms and genocide, both planned and spontaneous, whose victims were whole nations or their overwhelming great proportions, but also the time of mass displacements, deportations, escape or relocations of populations, which especially affected Europe, becoming one of the darkest episodes in the history of many countries in this part of the world. World War II and the time of new, post-war reality abounded in the multitude of human tragedies. Adolf Hitler began World War II to realise his racist vision of pan-German Reich; at the same time the Soviet leader Josef Stalin, a German ally of that time, resorted to a similar policy in the Polish territories annexed by the Soviet Union, implementing the decisions of the so-called Ribbentrop-Molotov pact of 13 August 1939. After the Allies gave their consent in Teheran in 1943 for the change of political borders in Europe – which were drawn in more detail in Yalta and ultimately endorsed in Potsdam in 1945 – millions of people were subject to "humanitarian transfer". After the war hundreds of thousands of Germans were resettled from the German territories annexed by Poland, while the populations from the pre-war Polish territories in the east of the country annexed by the Soviet Union in 1939 – which was approved by the British and American governments – were "persuaded in a humanitarian way" to leave and move westwards. As a result of the resettlement, they were forced to abandon their properties. It would not be difficult to imagine the tragedy of the people leaving behind all their possessions, frequently handed down from generation to generation, without any hope of ever regaining them. The problem which was then generated constitutes now an important legal and moral issue. Political solutions brought about by the events taking place at the end of the war decidedly differed from those expected by the Poles. On the one hand there was the government in exile in London, until July 1945 the Polish government de iure, and on the other – the Polish Committee of National Liberation functioning until 31 December 1944 and subsequently replaced by the Provisional Government – the Polish government de facto – which in terms of international law was tantamount to an adverse duality in representing Poland in the international arena [18-20].

Following the Polish-Soviet agreement of 27 July 1944, three so-called republican agreements were concluded between the Polish Committee of National Liberation and the Soviet Socialist Republics of Ukraine and Belarus on 9 September 1944, the Soviet Socialist Republic of Lithuania on 22 September 1944 as well as the agreement between the Provisional Government of National Unity of the Republic of Poland and the government of the USSR of 6 July 1945 stipulating the right of the people of Polish and Jewish nationality living in the USSR to relinquish their Soviet citizenship and be evacuated to Poland and the right of the people of Russian, Ukrainian, Belarusian, Ruthenian and Lithuanian nationality living in Poland to relinquish their Polish citizenship and be evacuated to the USSR, which were all concluded even before the new border was formally determined on 16 August 1945. The republican

agreements outlined the principles regulating the relocation of Polish citizens of Polish and Jewish nationality from the territories of the Soviet republics and the relocation of the population of Russian, Ukrainian, Belarusian, Ruthenian and Lithuanian nationality living in the territory of Poland [21, 22] (Figs. 1-3).

Fig. 1. D. Peterson, Eight Days at Yalta. How Churchill, Roosevelt, and Stalin Shaped the Post-War World, Grove Press, 2021. https://lithub.com/day-four-at-yalta-the-conference-that-shaped-the-world-the-polish-problem/

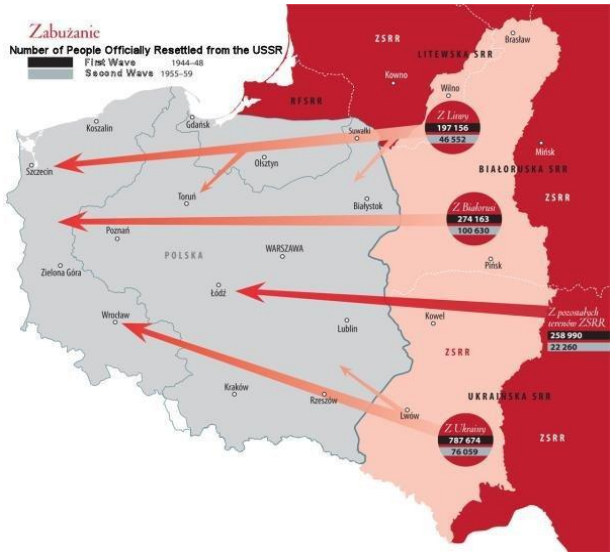


Fig. 2. Population re-resettlement from pre-WW2 Polish territories to today's western and central Poland Zabużanie map. Author M. Sobczak: https://www.polityka.pl/pomocnikhistoryczny/1674782,1,jak-odbywalo-sie-przesiedlenie-ludnosci-polskiej.read

The most important regulation, which later became the basis for the legislation allowing the Polish State to pay the compensation for the property left behind, was point 5, art. 3, stating that the signatory parties pledged that the property vacated by the relocated population would be inventoried by both the plenipotentiaries and representatives of both signatory parties, and point 6, art. 3, stating that the value of movable and real property left behind after the

evacuation would be compensated to the evacuees following their insurance assessment value in accordance with the legal acts binding in Poland (…), allowing for the exception stipulated in the text of the agreement between the Polish Committee of National Liberation and the Soviet Socialist Republic of Lithuania, which excluded landed property from the inventory (…) [23, 24].

Fig. 3. A railway carriage with displaced people from Rudka near Lviv, February 1946.
Photo: John Vachon/Archiwum Ann Vachon
https://www.polityka.pl/pomocnikhistoryczny/1674782,1,jak-odbywalo-sie-przesiedlenie-ludnosci-polskiej.read

However, the legal regulation which in practice enabled satisfaction of the claims was the act of 8 July 2005 on implementation of the right to compensation for the vacated real property situated outside today's borders of the Republic of Poland, which came into force on 7 October 2005 [25]. The act outlined the principles of implementing the right to compensation for the real property situated outside today's borders of the Republic of Poland vacated due to the deportation from the former territory of the Republic of Poland or abandoned as a direct result of World War II, which began in 1939; by stipulating the latter the act increased the number of those eligible for compensation. The people applying for the right to compensation could submit applications for confirming their right to the real property, which were considered in administrative proceedings, i.e. under the authority of province governors. Based on the act mentioned above the right to compensation is confirmed in a governor's decision. The application is accompanied by evidence which proves that a real estate was situated outside today's boundaries of the Republic of Poland, describes the type and size of the property, and confirms that the applicant was a Polish citizen on 1 September 1939. If such documents are missing, the act admits evidence in the form of testimony of two witnesses who also lived in the place where the property was situated or in a neighbouring locality and who are not related to the person entitled to the compensation [26].

Unfortunately, there have been attempts of obtaining considerable financial benefits from the State Treasury on false pretences when a party in the proceedings submitted forged or counterfeited documents – often the only available evidence. Apart from the alleged heirs, these criminal offences frequently involved their plenipotentiaries, such as lawyers or people employed in local administration. The essence of this criminal practice usually consisted in a considerable increase of the value of the property in question, thus applying for unjustifiably higher compensation paid by the State Treasury.

Object, methods, experiments and results

During a hearing of evidence, aiming at issuing a decision about the payment of compensation, the body conducting the proceedings, i.e. the Governor of the Province of Lower Silesia [27] – in the administrative structure of the Polish State a body locally representing central state authority (the government) – realised that there was a discrepancy between the documents describing the vacated property. Unquestioned entries in the document deposited in the Polish Central Archives of Modern Records in Warsaw differed from the entries in the document submitted by the interested party applying for the compensation. Therefore, the Governor's office commissioned an examination of authenticity of the document. The object of the conducted physico-chemical examination was the document confirming ownership of a house, barn, shed, fruit trees (Fig. 4). The document was entitled ОПИС МАЙНА ЩО ЗАЛИШАЄТЬСЯ (DESCRIPTION OF THE VACATED PROPERTY).

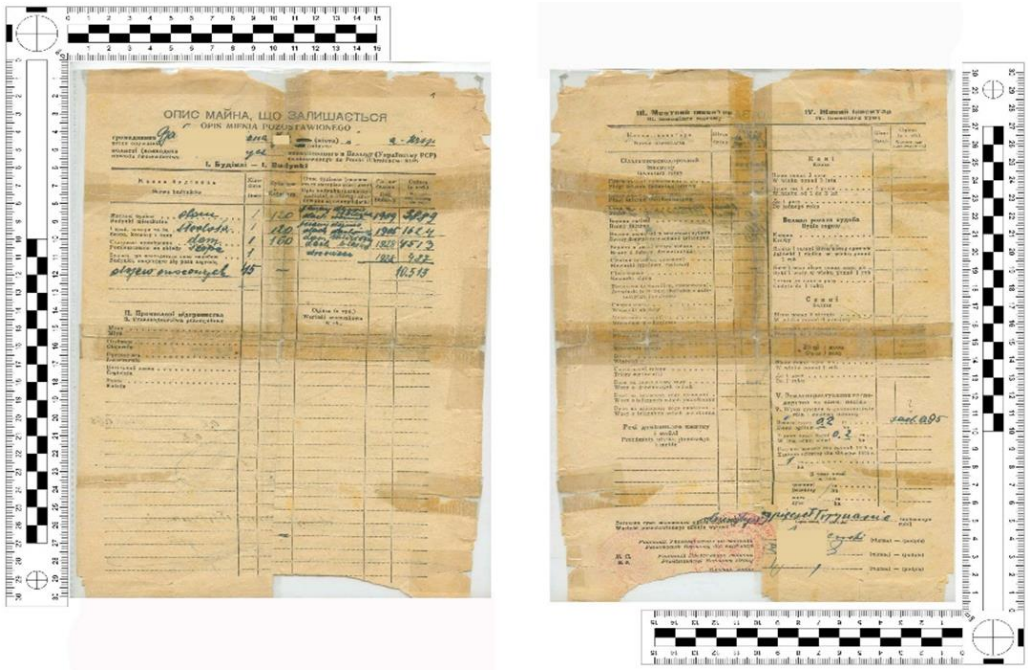


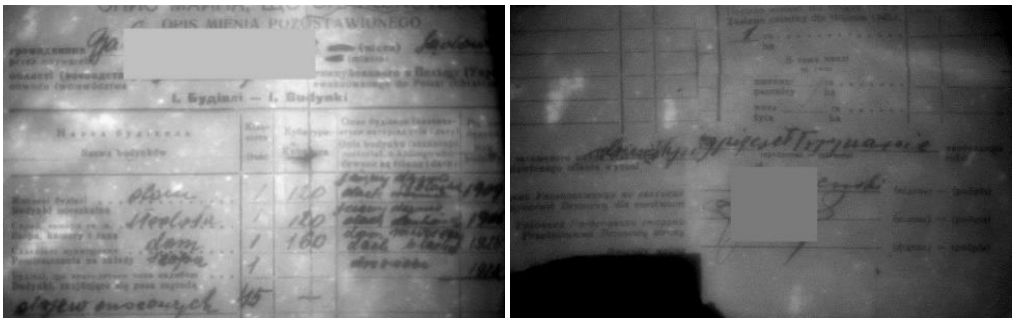
Fig. 4. Obverse and reverse of the examined document

In order to carry out the qualitative test of inks and homogeneity of the paper both sides of the document were examined with the use of a Video Spectral Comparator (VSC) [28]. It is a versatile appliance enabling examination of a document in various lighting conditions (ultraviolet UV- visual light VIS- near infrared NIR) under different magnifications and – if necessary – taking spectrometric measurements of reflection, absorption and fluorescence [29-31]. The document in question was carefully examined in various conditions: from ultraviolet to visible light to near infrared radiation and in monochromatic spotlight with the use of a filter cutting off the falling light to detect possible luminescence of the ink or it remains in the paper (Figs. 5 and 6).

As in many places on both sides of the document the spotlight caused luminescence of the ink, an attempt was made to find such lighting conditions that the differences would be best visible. For this purpose, selected fragments of the text on both sides of the document illuminated with monochromatic spotlight were examined through selected cut-off filters under the comparator's varied optical magnification (Fig. 7).

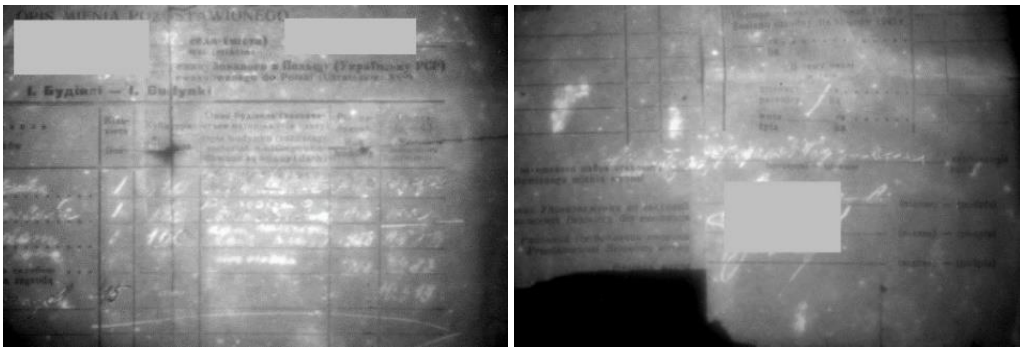
(A) (B)

Fig. 5. View of the upper part of the obverse of the examined document (A) and view of the lower part of the obverse of the examined document (B) in the light of the VIS



(A) (B)

Fig. 6. Monochromatic (400/540nm) spotlight view of the upper part of the obverse of the examined document viewed through the 590nm filter (A) and the view of the lower reverse part of the examined document in monochrome (400/480nm) point light viewed through the 570nm filter (B)



(A) (B)

Fig. 7. Monochromatic (530/660nm) spotlight view of the upper part of the obverse of the examined document viewed through the 715nm filter (A) and the view of the lower reverse part of the examined document in monochrome (530/660nm) point light viewed through the 715nm filter (B)

A detailed analysis of the images of handwritten entries revealed that they had been altered – in many places even twice or three times because as many inks were identified during the analysis. This is best visible in a fragment of the document which shows the use of three different inks. In this case it is obvious that the letter "y" and the loop of the letter "h" were written in a different colour (Fig. 8).

The examination revealed obvious interference with the document's content by the use of different inks in practically all entries on both sides of the paper. Numerous traces of altering and removing entries were found. The analysis of images taken in identical lighting conditions showed significant differences between the examined entries on the document. The entries

examined in monochromatic spotlight of different induction ranges differed substantially, which testifies to the differences between them. It should be emphasised here that the differences between the inks revealed during the examination may have resulted from differences in their colours and compositions (Figs. 9 and 10).

Fig. 8. View of a fragment of *the fruit* entry on the obverse of the examined document in the *city* field as viewed in the light of VIS

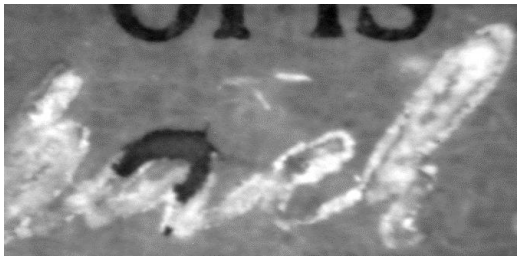


Fig. 9. View of a fragment of *…bach* entry on the obverse of the document under examination in the field *by a citizen* viewed in monochromatic (580/700nm) spotlight through the 735nm filter

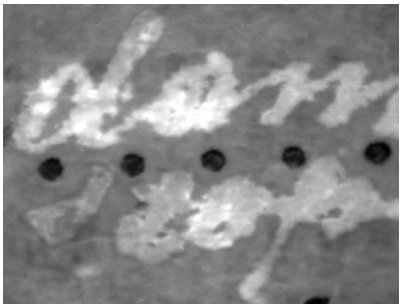


Fig. 10. View of a fragment of the entry *shed house* on the obverse in the field *Storerooms in the first column Name of the building* of the examined document as viewed in monochrome (580/700nm) spotlight through the 735nm filter

To confirm or reject the results obtained with the use of the VSC further examination of similarity of colours of selected fragments from the analysed document was carried out with the use of a specialist Polymorphic Scanner for Forensic Document Examination (PSFDE) [32]. Results of both analyses were compared. After examination of entries from both sides of the document a set of spectra was obtained, which offers a great examination potential. For example, spectral and optical images "seen" in two different wavelengths may be superimposed on each other. In these conditions, with the use of the so-called "false colours" technique, different inks (quite similar in colour to the naked eye) will produce images of clearly different hues. Any fragment of the scanned document (text) may be selected as a reference standard and compared with other scanned fragments; the obtained results may be presented in a graph. The more similar to the standard the colour is, the lighter its shade becomes. The "false colours" technique may also be implemented during this operation. At the same time a coefficient of correlation of examined colours in relation to the standard may be calculated numerically [33-37]. During the examination in a selected wavelength, after the images were superimposed and the "false colours" technique was implemented, significant differences between the colours of individual entries from both sides of the document were observed (Figs. 11 and 12). The observed colours correlated with the results of the previously implemented examination

methods, which were carried out in all available ranges of electromagnetic radiation – especially in monochromatic (580/700nm) spotlight observed through the cut-off filter 735nm.

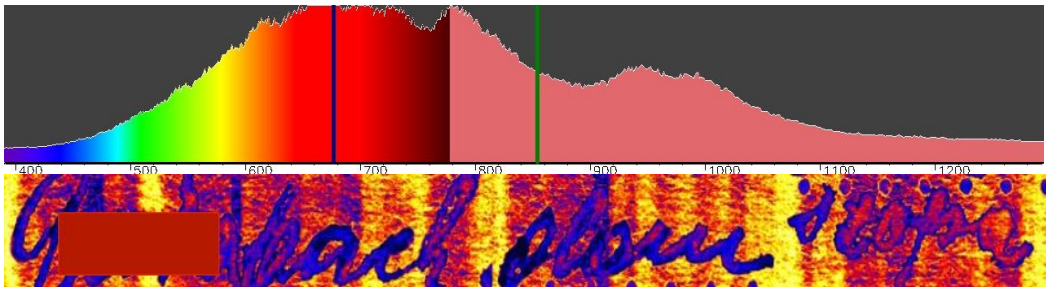


Fig. 11. Wavelengths selected from the spectrum (green and blue stripe), which were used to differentiate selected entries *…bach* (in the field by a citizen), *house* (in the "Residential buildings" item), a *shed* (in the "Shed, chambers" item) on the obverse of the examined document

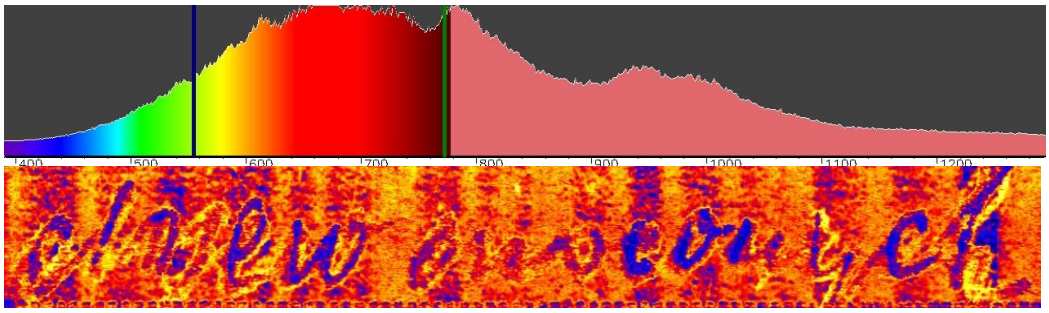


Fig. 12. Wavelengths selected from the spectrum (green and blue stripe), which were used to differentiate selected entries *fruit trees* (fifth row in the column *Name of buildings*) on the obverse of the examined document

The analysis of the level of acidity of the paper revealed that the paper of the questioned document was considerably acidic (value of pH ~ 4.0). It was considerably yellow and corroded. The paper used to produce the examined document was probably made in the so-called acidic technology, which additionally causes paper to become increasingly more acidic with time. One of the effects of this process is that the glue used in the production of the paper degrades more easily; another effect is the loss of paper's hydrophobic qualities and consequently it becomes more absorptive. As a result, an entry made in ink assumes a very characteristic appearance, i.e. the ink seeps in the paper outwards from the writing line, forming the so-called "whiskers". Allowing for this characteristic feature, it was found that the original entries were made with grey-green ink (no grey-green "whiskers"). The examination revealed that the original entries were in many places altered with blue ink. The entries made in blue did not display the characteristic seepage – "whiskers" and thus it was assumed that they were made relatively long before, when the paper was only slightly corroded. Quite significantly, modern inks from recognised and highly regarded producers contain components preventing this phenomenon. The easiest way of avoiding seepage in the form of "whiskers" is the use of ink containing a component of high viscosity, e.g. resin or a mixture of resins, as in the case of ballpoint pen ink. The examination of both sides of the document did not reveal any entry made in ballpoint pen ink. Instead, the third ink was discovered, black-blue in colour, which displayed the greatest tendency to seep, i.e. form the "whiskers". Following this specific characteristic, it was assumed that the entries made in the black-blue ink were the youngest, i.e. they were made when the paper (or – to be more precise – the glue) had considerably degraded (Figs.13 and 14).

To verify these conclusions a number of additional experiments were done; paper documents with entries drawn in ink at a more or less the same date as the examined document were retrieved from the laboratory's own collection and entries were made on their blank spaces

in modern fountain pen inks: A) HERO (Fig. 15); B) PELIKAN (Fig. 16); C) WATERMAN (Fig. 17). It was also tested whether it was possible to remove a previous entry with ink remover and then a new entry was written in its place (Figs. 17-19).

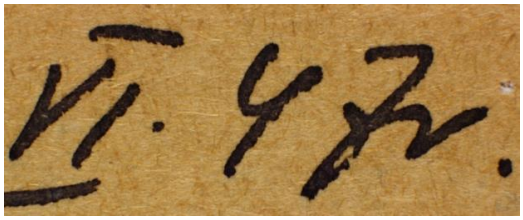


Fig. 13. Excerpt from a letter written in iron-gallic ink in 1947

Fig. 14. Another excerpt from a letter written in iron-gallic ink in 1947. Attempt to remove the so-called "Eraser" Pelikan (Super Sheriff Germany) with an ink whitening device

Fig. 15. A control entry made in contemporary ink – "HERO" on a blank fragment of 1947 letter

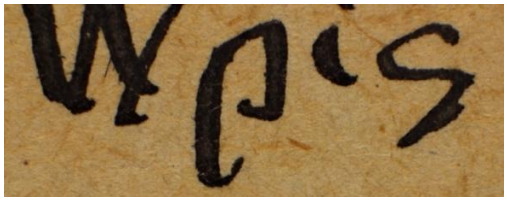


Fig. 16. A control entry made in contemporary ink – "PELIKAN" on the blank fragment of 1947 letter

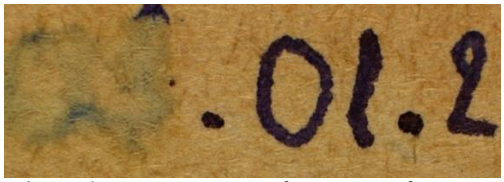


Fig. 17. An attempt to erase with an "Eraser" the writing made in contemporary ink "WATERMAN" on the paper of 1947 letter

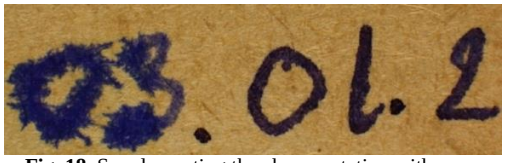
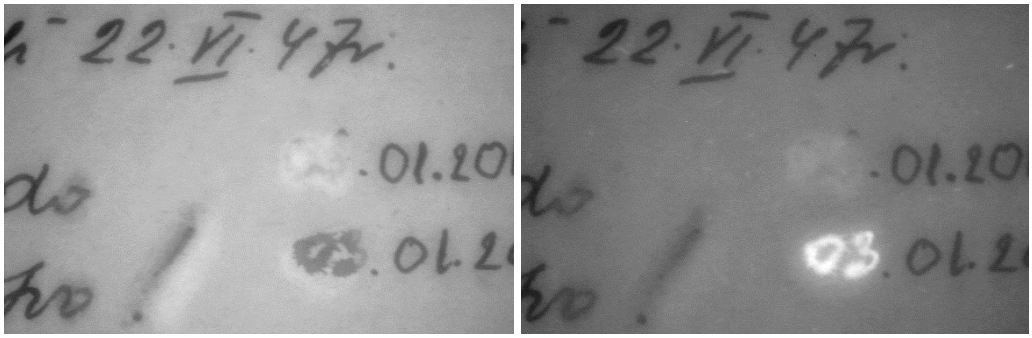


Fig. 18. Supplementing the above notation with a pen attached (integrally) to the "Eraser" at the place of its use



(A) (B)

Fig. 19. View of the above experiments viewed using a visual spectral comparator in monochrome (400/540nm) spotlight through the 590nm filter (A) and monochrome (530/660nm) spotlight through the 615nm filter (B)

Because blank paper used for handwriting usually contains more glue than the paper used for printed forms and the examined document was drawn on printed notepaper, another experiment was done – this time an entry was made in ink on a printed form (to be filled in)

from 1946 (Figs. 20 and 21). As seen in the illustrations below contemporary entries cause characteristic seepage – “whiskers”.

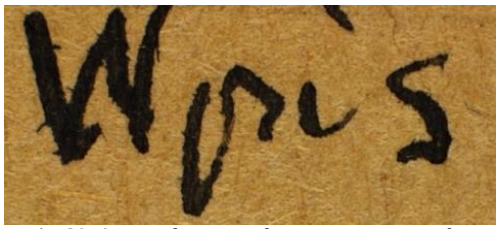


Fig. 20. A control entry made in contemporary ink – "PELIKAN" on a blank excerpt from the 1946 Protocol

Fig. 21. A control entry made in contemporary ink – "HERO" on a blank excerpt from the 1946 Protocol

Conclusions

The results of the physico-chemical examination and a number of experiments proved that numerous alterations had been made on both sides of the document entitled ОПИС МАЙНА ЩО ЗАЛИШАЄТЬСЯ (DESCRIPTION OF THE VACATED PROPERTY). The examination revealed that practically all handwritten entries on both sides of the document had been overwritten twice or even three times. Some entries consisted in simple overwriting of the altered text without interfering with its content. The fact that when the document was drawn, its copy had also to be made (writing with the document’s copy) suggests that most probably the original text was made with a copying pencil, which resulted in the grey-green colour of some entries. It is a well-known fact that copying pencil fades with time, especially on acid paper (in an acid environment); therefore, in many places the text was corrected to maintain its legibility. Independently of this, in some places on both sides of the paper alterations changing the original content of the document were found. In many places in the handwritten entries fragments inconsistent with the text overwritten on top were observed. Due to very intensive colour and a strong covering effect of the inks used for the alterations, it was very difficult to recreate precisely all original entries, especially that they were illegible under very intense overwriting used to conceal the places where the alterations of the original text were made. Yet, this fact did not prevent adopting the conclusion that the examined document was not genuine.

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