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NIGHTRIDER, 1972, VICTOR LIND: CHALLENGES OF DATA GATHERING

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ABSTRACT The painting *Nightrider*, 1972, by Norwegian artist Victor Lind consists of household acrylic emulsion paint on canvas with two thick layers of clear lacquer applied on top to produce a smooth, glossy surface. The coating has deteriorated and now exhibits significant scratches, scuffs and areas of delamination across the surface. To facilitate a re-saturation treatment of the coating, optical and instrumental analysis of the painting was undertaken using stereomicroscopy, XRF, micro-FTIR, Raman spectroscopy and STA to help identify the pigments and characterise the composition of the lacquer. This was supplemented with information from the artist, who recalled that the coating was industrial grade 'floor lacquer from 1972', and research into lacquers available in Norway at that time thought to be primarily nitrocellulose-based or polyurethane-modified alkyd resin. However, scientific analysis identified the coating as a styrene-modified acrylic resin. These findings outline the challenges of aligning technical examination with anecdotal and historical evidence.

Introduction

The painting *Nightrider* (in Norwegian, *Nattrytter*, Figure 1), painted in 1972 by Norwegian artist Victor Lind (born 15 December 1940) is part of the permanent collection exhibition of the Norwegian National Museum (Nasjonalmuseet). As part of the preparations for moving to a new building, recently opened to the public, the painting – the only one by the artist in the collection – was assessed for display suitability and the materials and techniques were investigated.

The appearance of the work, as well as the condition of the surface layers, are described in this paper. The painting's context and history, its important position within Norwegian art history and reasons for the shifting interpretations of it are presented. The discussion focuses on the materials and techniques employed by the artist, and on the challenges of data interpretation when faced with contradictory information. The reliability of certain types of data, such as that gathered directly from the artist, and the limitations of some analytical methods are also factors.

The painting depicts a uniformed policeman on horseback, dramatically silhouetted against a full moon. The work measures 116 × 140 cm and according to the artist was made using household acrylic paint with a glossy coating of clear floor lacquer.[1] This layer is not a varnish in the usual sense of the word, to saturate and protect the paint layers; rather, it should be seen as part of the artistic expression and intended aesthetic of the artwork. As it is the uppermost layer, for this reason it is referred to as a coating throughout this paper. The canvas support of the painting is structurally stable, and the acrylic paint layers are well adhered to the ground and canvas. However, there are visible air pockets of delamination in localised areas (Figure 2a); it is unclear whether these are between the clear glossy coating and underlying paint layers or between the two layers of the lacquer coating. Furthermore, the coating exhibits significant wear and abrasion across the surface in the form of scratches, scuffs and rubbed areas (Figure 2b). Additionally, the coating has yellowed significantly, resulting in a colour shift of the dominant blue paint and a reduction of contrast between different parts of the composition, specifically the white areas which now appear yellow (Figure 2a). Therefore, the visual appearance of the work has changed dramatically, and it is vital that the surface regains its flawless high gloss level; however, such a

Figure 1 Victor Lind, *Nattrytter / Nightrider*, 1972, acrylic and lacquer on canvas, 116 × 139.5 cm, The National Museum, Oslo, MS-02238-1991. The inscriptions in red refer to the locations of pXRF analysis, while the yellow marks represent physical samples taken for FTIR (PR001), Raman (PR002), and STA (PR003).

Figure 2 Details showing the condition of the coating: (a) delamination of the coating, visible as pale grey spots over the black, and yellowing of the coating, causing a change in tonal balance of the picture; (b) mechanical degradation visible as scratches and abrasion in the coating (photos: Laura Homer).

Figure 3 (a) The GRAS workshop with the silkscreen printing table (photo © Per Helge Berrefjord/scamclip.com). (b) Members of GRAS at one of their meetings. Lind can be seen on the telephone in the background. The figure in the centre is the meeting's leader, Per Kleiva. Other members present include Morten Krogh, Olav Orød, Bjørn Krogstad and Eva Lange (photo © Per Helge Berrefjord/scamclip.com). (c) Victor Lind, *Also in Son My Will the Flowers Bloom*, 1972. A political silkscreen about the Vietnam War (photo © Victor Lind).

treatment could only be done with full knowledge of the material to be treated.

The research into this artist and his paintings aims to provide the conservator with the knowledge required to undertake an appropriate conservation treatment to improve the appearance of the painting and reduce the disturbing damages for the viewer.

Victor Lind

Victor Lind trained at the National College of Art and Design in Oslo from 1965 to 1966 and at the National Academy of Art from 1966 until 1969. He very soon departed from the established modernist-formalist tradition of the academy at that time, carrying out experiments, especially in the field of graphics. He worked in a wide range of materials and with a variety of techniques, exploring different means of expression. In the 1960s he worked primarily with linoleum and woodcuts, while between 1965 and 1970 he moved over to metal prints. For some years, he worked experimentally with the printing plate following in the footsteps of artists such as the German born, Norwegian expressionist artist Rolf Nesch. In the late 1960s, he became more politically engaged and took on controversial themes of the day; from 1970, he used serigraphy (silkscreen printing). He was a member of the Marxist Workers' Communist Party (AKP) and became part of a milieu influenced by the emerging pop and op art of the time. Some of them, including Lind, established an artist community, the GRAS group, at the turn of the year 1969/70, working seriously with graphic art and often with a left wing, politically engaged subject matter (Figure 3). The late 1960s and early 1970s were marked worldwide by political student uprisings in response to, but not exclusively, the Korean War, nuclear armament programmes, the Cuba crisis and the Vietnam War, which became a decisive issue.

Within Norway, there was also increasing resistance against the authorities and established art institutions.[2] The GRAS workshop in Oslo served as a gathering place for 15–20 artists and a meeting point between politics and art, ethics and aesthetics, where new ideas and strategies were discussed; the artists rebelled against the established artistic methods and systems such as jury-led exhibitions and questioned the role and function of art within society, seeing art as a collective movement that should mirror the collective consciousness.[3] They experimented with new techniques using silkscreen as their main creative medium; by producing art in large editions that could be sold cheaply they were able to present their political art to the masses, not just the elite.[4] A leading member of the group, Anders

Kjær, characterised the role of GRAS as an advertising agency for the AKP.[5]

Lind used not only silkscreen and photographic techniques, but also experimented with modern painting materials such as acrylic paint, only available as household paint at the time,[6] and different types of industrial lacquers employed as clear coatings rather than traditional resin varnishes. The intention was to remove any trace of painting, of the hand and brushstrokes.[7] From an aesthetic point of view Lind was very much in touch with the new, contemporary art of the time. Most of what we know today as pop art, minimalism and conceptual art has a similar turning away from traditional art materials, mark-making and the handmade towards non-gestural brushstrokes and extensive use of high-gloss surfaces through industrial and/or synthetic painting materials, or even paring art down to a set of instructions to be followed by a draughtsman.

The painting's context and history

From 1968, Lind was a member of the Young Artists' Society (Unge Kunstneres Samfunn) and, in 1969, he was involved in a house occupation project called 'A place to be', in which left-wing youths joined forces and moved into a disused school in Grønland, an area in the inner east of Oslo. During a street demonstration in support of this action, Lind was whipped in the face by a policeman on horseback.[8] A currently unavailable press photo of this event, showing the policeman on horseback, was used as the basis for several editions of *Nightrider* that Lind produced between 1972 and 1997.

The 1972 version, the focus of this paper, has for a long time been considered of great importance both within Lind's art and more generally within Norwegian art of the period. However, the painting gained a new kind of interest in recent years due to Lind's study of atrocities during World War II in Norway and his remaking of the image of a night rider in a new context. This has created a need for a better understanding of the 1972 version.

Modern viewers of the painting often mistake the policeman for Knut Rød (1900–1986), a Norwegian police inspector during World War II and member of the Norwegian National Assembly (Nasjonal Samling), a far-right political party led by Vidkun Quisling (1887–1945) that governed Norway during occupation by Nazi Germany. Rød was instrumental in the mass deportation of Norwegian Jews between November 1942 and February 1943, during which 771 Jews were arrested and deported to Stettin and thereafter to Auschwitz,[9] but he was twice acquitted on charges of treason after the war.

Lind, the son of a Norwegian father and an American-Jewish mother, was born in 1940 during the German occupation of Norway. He spent the first few years of his life in hiding with his parents in Lunner, in the Norwegian countryside, not far from the capital Oslo, to avoid deportation. The appalling treatment of Norwegian Jews during the war, the subsequent acquittal of authoritarian figures, and his own personal experiences, unsurprisingly led to Lind making this the focus of his art for several decades.

When Lind painted *Nightrider* in 1972, his awareness and knowledge of Rød was limited and he had not yet begun his extensive explorations of this man. By the late 1990s, Lind was fixated on Rød and had carried out systematic research in the National Archives, leading to his condemnation of Rød and his role in the deportation of Jews. The painting *26 November 1942* (also known as *Nightrider* 5) from 1999 (Figure 4) is executed in acrylic paint with a clear acrylic coating and has a strikingly similar appearance to his 1972 *Nightrider*. However, in the 1999 painting, the unidentified policeman is replaced with a recognisable depiction of Knut Rød, standing on the quay in Oslo silhouetted before a group of people. This image is based on a photograph taken in secret by Georg Fossum on the night of 26 November 1942, when 529 Jews were arrested in Oslo and taken on board the German ship *Donau*.

That the two paintings are very similar in technique and appearance is no coincidence. They combine the negative associations of both authoritarian figures that have impacted Lind's life and career, with the artist stating himself that the policeman in *Nightrider* became Knut Rød.[10] It is Lind's intention that the modern viewer should read the painting with knowledge and hindsight of Rød and his importance in Lind's oeuvre.

Research objectives

The objectives of the investigations into the painting were to document as thoroughly as possible the materials and technique of the painting and describe the condition of the clear lacquer coating. Identification of the polymeric composition of the coating was required to predict the compatibility of certain conservation materials with the lacquer and to help in deciding on an appropriate course of treatment.

Using optical examination and instrumental analysis, the aim was to gather information about the composition and structure of the paint and coating layers. This would be supplemented with information gathered through personal communication with the artist, as well as research into floor lacquers available in Norway at the time the painting was made.

Methodology and data gathering

Imaging techniques

Close examination of the coating, its surface finish, relationship to the underlying paint layers and condition was carried out using a Leica Wild M80 stereomicroscope (5× to 50× magnification range) (Ortomedic AS, Lysaker, Norway). Further examination of the surface coating was undertaken with UVA-induced fluorescence both overall and under the microscope to characterise the distribution, evenness, thickness and condition of the resin.

Figure 4 Victor Lind, *26 November 1942*, 1999 (photo © Victor Lind).

Documentary information

Direct communication with the artist, Victor Lind, was established early in the project. Unless otherwise stated, all anecdotal information is taken from this correspondence, which occurred between August 2020 and November 2021.

Research was carried out into the types of industrial lacquers available in Oslo in the 1970s, primarily through direct communication with Jotun, the largest industrial paint and varnish manufacturer in Norway that bought out many of the smaller paint companies in 1972, the year this painting was made. In addition, the main author consulted with a specialist industrial lacquer shop close to the artist's home and studio that has a significant physical archive of historic paints and varnishes, as well as the primary fine art supply store in Oslo in 1972, Christ Engebretsen; Lind is known to have frequented this shop and tended to buy all his art materials from there at that time.

Methods of investigation

Microsampling

In total, three microscopic scrapings of the clear coating were collected from different locations along the upper and lower turnover edges of the painting, where there were drips of the coating of reasonable thickness to successfully take a scraping. All scrapings consisted of clear material, with no pickup of underlying paint.

Handheld portable X-ray fluorescence (XRF)

XRF was employed for the identification of elements associated with pigments and other inorganic components within the paint films. Measurements were taken with a handheld Thermo Niton XL3t 900 Gold energy-dispersive X-ray fluorescence analyser (Thermo Scientific, Holger Hartmann, Oslo, Norway) with a Si-drift detector (geometrically optimised large drift detector (GOLDD)). The proprietary 'Mining Cu/Zn Testing Mode' was used, which enabled detection of the largest range of elements. Total measurement time was *c.*120 seconds for each sampled area and the instrument switched automatically between main (Al/Fe filter, potential: 50 kV, maximum current: 40 μA), low (Cu filter, potential: 20 kV, maximum current 100 μA), high (Mo filter, potential: 50 kV, maximum current: 40 μA), and light range filters.[11]

Micro-Fourier transform infrared (micro-FTIR)

Two of the sampled coating scrapings were compressed using a diamond compression cell and analysed with a Thermo Fisher iS50 Nicolet Continuum FTIR microscope

equipped with a liquid N_2 cooled MCT-A detector. The spectra have been registered in transmission mode between 4000 and 700 cm^{-1}, with 50 scans and a spectral resolution of 8 cm^{-1}.

Raman spectroscopy

The coating scrapings were subjected to further analysis using Raman spectroscopy. Raman analysis was performed using a Renishaw inVia confocal microscope Raman spectrometer equipped with a 50× microscope objective and Renishaw charge-coupled device (CCD) camera detector. A laser emitting light at 633 nm was used as the excitation source. Spectra were collected in continuous scan, 10 second exposure time, 20 accumulations, with 100% laser power (11.4 mW) and in the spectral range 134–3257 cm^{-1}.

Simultaneous thermal analysis coupled with infrared gas chromatography-mass spectrometry (STA–IR–GCMS)

A final coating scraping was analysed with a STA 449 F1 Jupiter (Netzsch Gerätebau GmBH, Germany) connected via heated transfer lines to GC-MS (Agilent 7820A gas chromatograph, Agilent Technologies, USA) and FTIR gas cell (Tensor 27 FTIR spectrometer, Bruker Optik GmbH, Germany). The material was placed in an alumina crucible and heated under nitrogen atmosphere from 40 to 500 °C, at a heating rate of 10 °C min^{-1}. TG and DTG curves were recorded simultaneously. The IR spectra of the gases evolved from the heated sample were recorded between 4000 and 600 cm^{-1}, with 16 scans and a spectral resolution of 4 cm^{-1}.

Results and discussion

The painting is executed on commercially primed plain weave, medium weight canvas, bought from Christ Engebretsen. The canvas was pre-prepared, but the artist stretched it over a narrow, five-member wooden, expandable stretcher with one vertical cross bar, also purchased at Christ Engebretsen; the double attachment with tacks and staples is original since both are covered with paint. The artist recalled that he wanted a flat, even surface without brushmarks so chose acrylic paint over oil. However, artist grade acrylic paints were not readily available in Norway at that time, so he was obliged to use interior household acrylic emulsion paints.[12] The palette is limited to blue, black and yellow; the white passages of the composition are areas of unpainted ground.

According to Lind, the canvas was prepared with a commercially applied white ground layer; the typical preparation at this time for Christ Engebretsen was rabbit skin glue size layer and an oil-based primer.[13] XRF analysis (spot locations shown in Figure 1) indicated that the ground (WG04) consisted of zinc as a major component with lead as a minor component (Figure 5a).[14] In addition, signals for titanium, barium and possibly sulphur were present (Figure 5b). This could point towards a mixture of two white pigments, zinc oxide and lead carbonate, with either barium sulphate or titanated lithopone as a filler.[15]

The XRF spectra of the blue background (Bl01) exhibited weak signals for both copper and iron, along with titanium and calcium, in addition to signals from the ground elements (Figure 5c). This, in combination with visual examination of the hue, suggests the use of either copper phthalocyanine blue (CuPc) or blue verditer, which was often used in house paints.[16] However, neither of these pigments can be identified conclusively by the detection of copper alone, since many other pigments contain this element. Moreover, nitrogen, which could point towards the presence of the phthalocyanine molecule, cannot be detected by the XRF technique. Titanium could come from titanium dioxide, which was occasionally mixed with CuPc in commercial paint formulations to increase the opacity of the paint, supporting the theory of CuPc.[17]

The XRF spectrum of the black silhouetted horse (Bk03) showed signals for iron and calcium (Figure 5d). This could be explained by the artist using (either knowingly or not), a combination of bone black and the iron-based Mars black.[18] Although no phosphorus was detected, it is possible that the amount present was below the detection limit of the XRF. Alternatively, only Mars black was used, with calcium as a filler.

The identification of the yellow paint (Y02) was difficult to ascertain and the XRF spectrum is dominated by elements also found in the ground layer, such as lead, zinc and titanium (Figure 5e). Along with calcium, iron and chromium, the XRF spectrum suggested the presence of titanium in the same layer/mixture. While the blue and black paints were used directly from the can, the artist spent a long time mixing the right colour of the yellow moon, with many false attempts. The complexity of the XRF spectrum could be explained by the intentional use of several pigments to create the desired hue: titanium dioxide, yellow ochre and chrome yellow, possibly with calcium carbonate as a filler. It is also possible that an organic pigment such as Hansa yellow was used, but this cannot be identified conclusively with XRF.

According to Lind, the clear coating layer was normal floor lacquer that he purchased in 1972. He recalls it as being very solid, clear industrial lacquer, made for floors and not for art. It was a cheap solution to his desire to distance himself from oil paintings that typically featured brushmarks and signs of application. He stated that 'It no longer has any trace of painting. There is no stroke there, there is no trace of the hand. It's just the expression that's there, it's quite alienated, far away'.[19] Lind applied the coating directly from the can in two layers using a large flat brush about 10 cm wide, with the painting lying on the ground, which resulted in a flat, even, highly glossy surface. The artist's description of

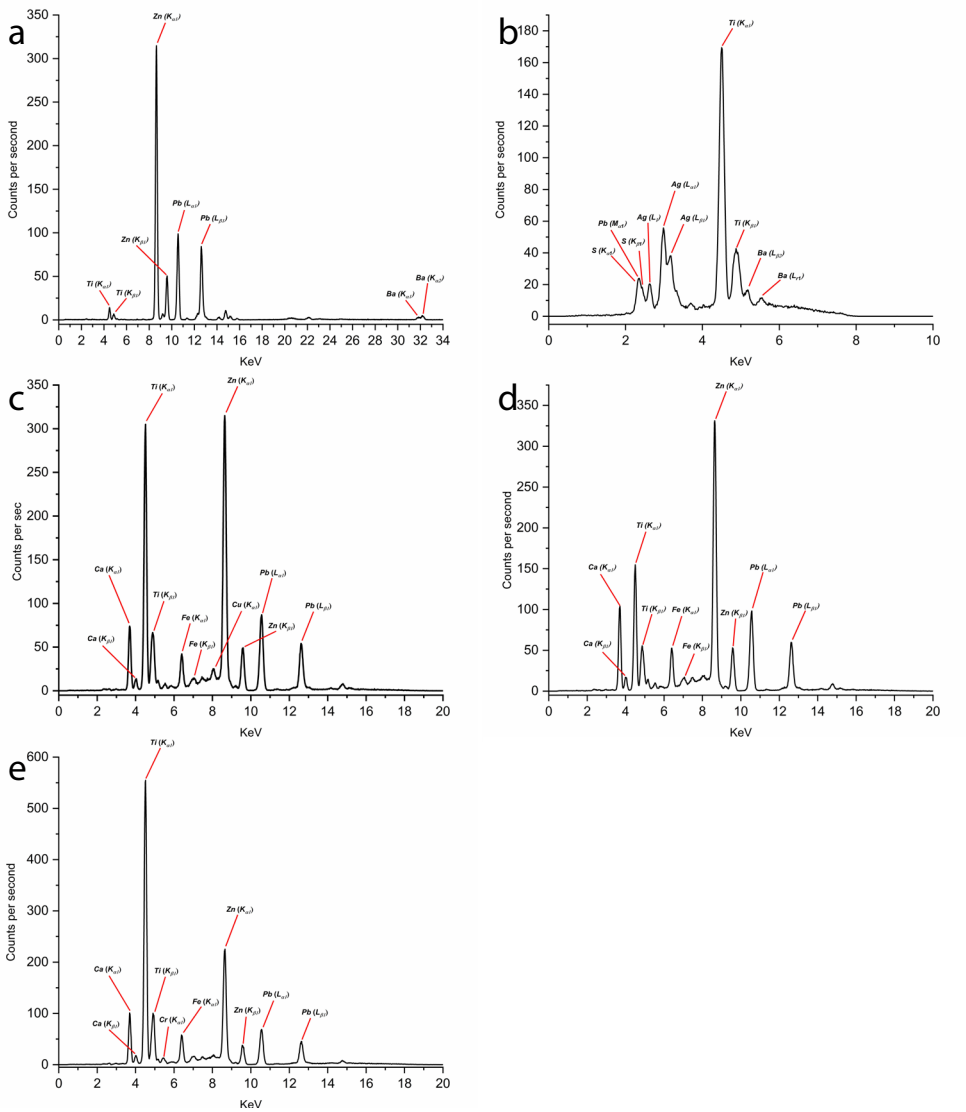

Figure 5 (a) and (b) XRF spectra of the exposed, unpainted ground layer (WG04), in (a) main range and (b) light range, showing zinc and lead, as well as titanium, barium and sulphur. (c) XRF spectrum of the blue background (Bl01) in low range, showing copper and iron, as well as titanium and elements from the ground layer. (d) XRF spectrum of the black horse (Bk03) in low range, showing iron and calcium, as well as elements from the ground layer. (e) XRF spectrum of the yellow moon (Y02) in low range, showing calcium, iron and chromium, along with elements from the ground layer.

the material, its handling and odour, and the need to wash his brushes in a strong thinner called Lynol, based on toluene, indicates the polymer was solvent-based as opposed to aqueous. Research into typical solvent-based varnishes and floor lacquers in Norway in the early 1970s suggested that the polymer was likely to be either nitrocellulose-based or alkyd resin. Alf Bjercke, one of the largest varnish manufacturers in Norway at the time, produced several household lacquers, including Hurtig-lakk, Ultralys and Golac. Both Hurtig-lakk and Ultralys were branded as 'synthetic lacquers' designed for floors, while Golac, a cellulose-based resin, required Lynol as a solvent, but was more commonly used for cars and occasionally furniture.

Contrary to expectation, spectra collected by micro–FTIR spectroscopy and Raman spectroscopy (sampling locations shown in Figure 1) indicated the presence of an acrylic resin modified with styrene. Figure 6a shows the Raman spectrum of the clear coating sample (PR002) that exhibits clear signals due to the strong resonance of the styrene moieties: rocking of the benzene ring (1000 cm^{-1}), stretching of the benzene ring (1446 cm^{-1}), symmetric stretching of CH_2 (2856 cm^{-1}), along with the stretching of tertiary CH (2911 cm^{-1}).[20] In addition, the spectrum of poly(styrene-co-butyl methacrylate) from the Renishaw reference database (Figure 6b) presented a high match, both in terms of position and intensities of the peaks. The differences in intensities (especially in the aliphatic region) could be explained by the different ratio of styrene/butyl methacrylate.

The FTIR spectra from sample PR001 also exhibited clear features belonging to both copolymers: styrene and an alkyl-methacrylate (Figure 7). According to the literature, the peaks from the aliphatic region at 2932 and 2859 cm^{-1} could be assigned to the C–H (CH_2 or CH_3) asymmetric and symmetric stretching vibrations of the alkyl moiety, while the peaks at 1732 cm^{-1} and 1173 cm^{-1} could be attributed

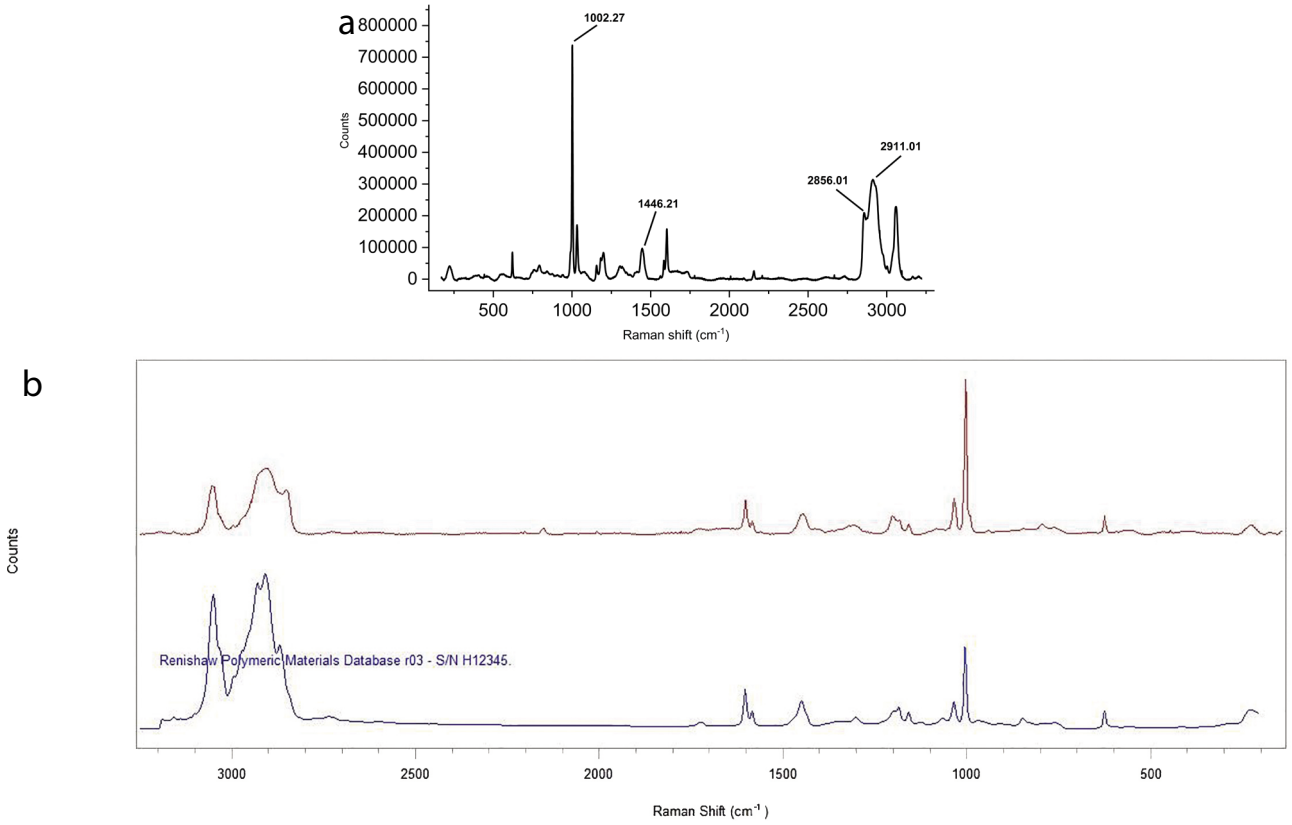

Figure 6 Sample PR002: (a) Raman spectrum and (b) Raman spectrum (red line) stacked over a poly(styrene-co-butyl methacrylate) standard spectrum from the Renishaw database (blue line).

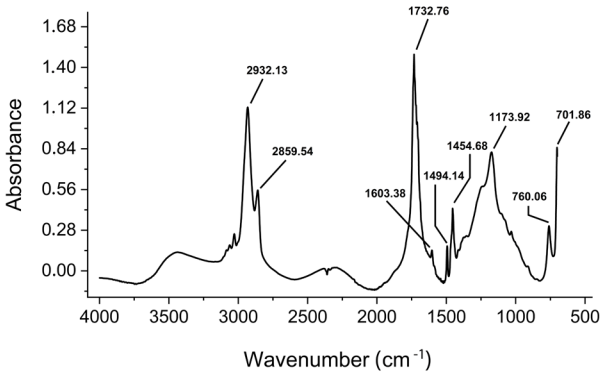

Figure 7 Sample PR001: FTIR spectra.

to the stretching vibrations of C=O and C–O, respectively, typical for ester moieties from methacrylate structure. Additionally, the absorption bands at 1603 cm^{-1} (C=C), 1494 cm^{-1} (C-H), 1454 cm^{-1} (C–C), 760 cm^{-1} (C–H), and 701 cm^{-1} (C=C) are characteristic for the aromatic ring from the styrene structure.[21]

These results were unexpected; to increase the degree of certainty, a new coating sample was collected (PR003) and submitted for STA-IR-GCMS analysis. Due to the small amount of sample (commonly 5–10 mg material is needed, while in our case, only 0.56 mg was finally available), the quality of analysis suffered, but important information has been acquired.

According to STA-IR-GCMS analysis, the maximum-rate decomposition temperatures (Tmax) was 416.9 °C (Figure 8a), while the reported Tmax values for pure methyl methacrylate and pure polystyrene are 400 °C and 408 °C, respectively.[22] The IR spectrum (data not shown) of the evolved gas at decomposition temperature (Tmax) suggested the presence of styrene. Moreover, the recorded mass spectrum of the evolved gas at the same temperature showed the main fragments specific for styrene: 51, 78, 104 (Figure 8b).[23]

Explorations carried out to date reveal there were very few acrylic resin varnishes available at that time; indeed, Jotun has no record of such varnish in its archives.[24] However, Alf Bjercke had a product called Bengacryl, an incra varnish made with solvent-based acrylic resin. Further study into this particular varnish is required, as there are no records of this product held by contemporary art supply stores and the gathered information does not suggest styrene is a component. Parallel research is needed into other types of varnishes and floor lacquers available in Norway in 1972, which might match the interpreted data, as well as comprehensive documentation of recipes and varnish compositions from the Jotun archives.

Styrene-modified acrylic resins are promoted for gloss, chemical resistance and dirt pickup resistance, desirable properties for floor lacquers.[25] However, these resins seem to be used more often for inks and printing, and the majority appear to be water-borne dispersions, rather than clear solvent-based solutions (e.g. Acronal S 360d). This does

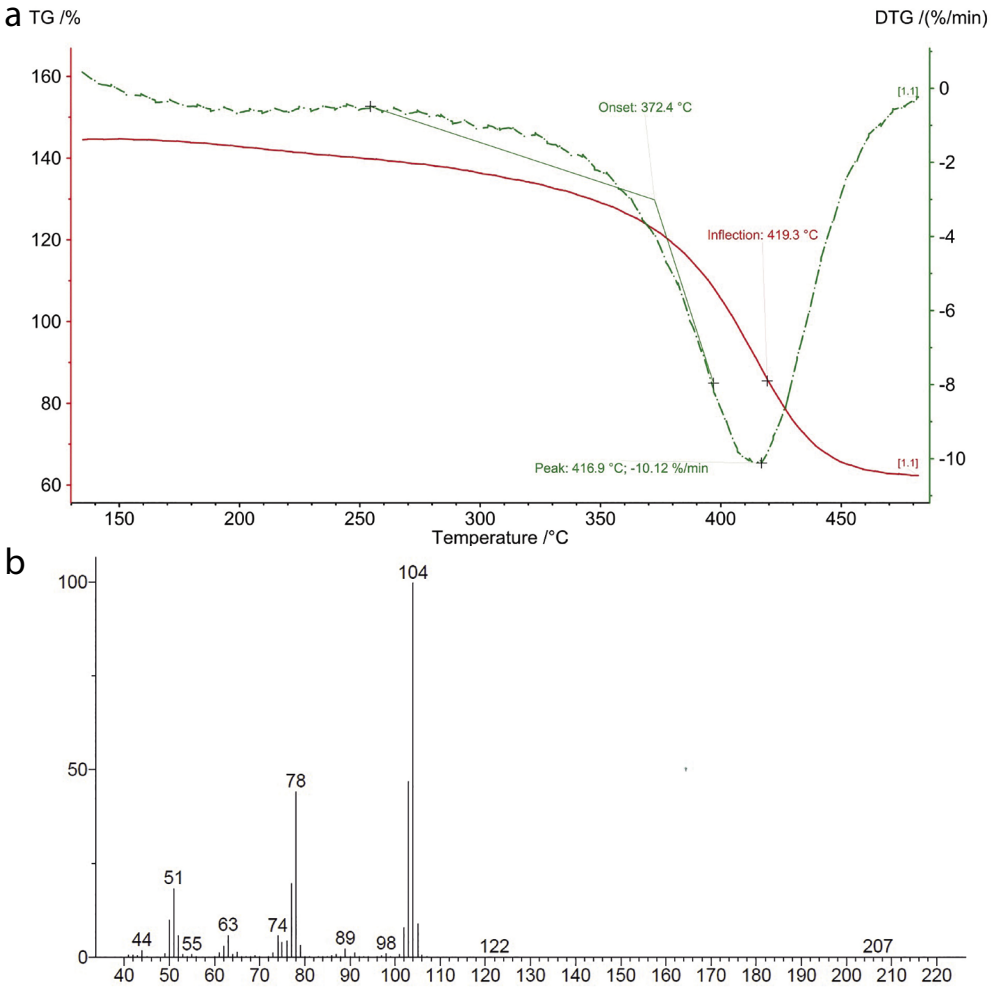

Figure 8 Sample PR003: (a) TG and DTG curves and (b) mass spectrum.

not accord with the artist's recollection about the strong odour and requirement for strong solvents needed to wash his brushes. The degree of yellowing of the coating could be attributed to the presence of the styrene component, which is not as inherently resistant to UV radiation as the acrylic monomer.[26] A fast-moving industry, with materials regularly going out of production and limited access to contemporary manufacturer employees, add to the challenges of empirical data collection.

Conclusion

The complementary analyses of micro-FTIR and Raman spectroscopy provided clear results regarding the composition of the coating as styrene-acrylic resin, yet these results are in stark contrast to proprietary and anecdotal information obtained on contemporary varnishes and floor lacquers. This highlights the challenges of data gathering and potential contradictions of information acquired through scientific methods, oral history and historic sources. In support of the scientific evidence, however, recent FTIR analysis of the surface of a painting by Per Kleiva (also a member of GRAS), painted in 1972, the same year as *Nightrider*, demonstrated the use of a styrene-acrylic resin.[27] This strongly suggests that a styrene-acrylic lacquer was available in Oslo in 1972.

The identification of the clear coating is important for the conservator to be able to make an informed decision about potentially compatible materials and appropriate treatment options. However, before treatment can be undertaken, a thorough assessment of the degree and cause of the delamination (between coating layers or between paint and coating) is necessary. Since UV light and stereomicroscopy provided only limited information, it would be beneficial to examine the surface using high-resolution 3D digital microscopy and optical coherence tomography (OCT), together with non-invasive, portable FTIR and Raman spectroscopy. These techniques would facilitate non-destructive examination of the layer structure to provide topographical information, document and categorise the degree and localisation of the delaminations, as well as ascertain if the coating had in any way affected the underlying acrylic paint film when it was applied.[28]

A greater in-depth assessment of the condition of the coating, as well as continuing research into the floor lacquers and varnishes available in Norway in 1972, will provide the conservator with comprehensive knowledge of the painting for an appropriate and informed decision to then be taken regarding possible treatment options.

Acknowledgements

The authors would like to thank the artist, Victor Lind, for his willingness to share information about his materials and techniques. Thanks are also extended to Elisabeth Elgvin Berg, previously at Jotun A/S, for delving into the archives, as well as colleagues at Nasjonalmuseet who encouraged this project. (NB Translations from Norwegian publications by Laura Homer.)

Notes

1. Conservation report for painting MS-02238-1991 (*Nightrider*); personal correspondence between conservator Thierry Ford and the artist, 2009.
2. Visnes 2009.
3. Bugge 2010.
4. Store norske leksikon 2022.
5. Krogvig 2012.
6. Although artist-grade acrylic paints were widely available in countries such as United States and United Kingdom from the 1950s, they arrived much later to Norway (*c*.1980s). Personal discussions with several Oslo-based Norwegian artists revealed they were unable to buy artist-grade acrylic paints in the 1970s but no written or published records are available.
7. Boym and van der Hagen 2000.
8. 'A place to be' was a house occupation project in which a number of young people – writers, artists, lawyers and medics – gathered together and moved into abandoned buildings in and around Oslo, and welcomed outcasts in the city: Boym and van der Hagen 2000: 128. See also Bugge 2010.
9. Lenz 2008.
10. Victor Lind, personal communication, 29 November 2021.
11. The spectra were examined in each range. Interpretation was based on the supplier's recommendations regarding the optimal range for each element (e.g. Cr is best identified in the low range).
12. See note 6 regarding the late arrival of artist-grade acrylic paints to Norway.
13. Thomas Kalmer, Managing Director, Christ Engebretsen & Søn AS, personal communication, 28 November 2021.
14. The sensitivity of the portable XRF instrument used is not the same as that of a benchtop instrument and therefore the spectra obtained, and their interpretation, will reflect this.
15. Gettens and Stout 1966: 125.
16. ColourLex: https://colourlex.com/project/blue-verditer/ (accessed 18 June 2022).
17. Defeyt and Strivay 2014.
18. Merkaj and Civici 2020.
19. Boym and van der Hagen 2000: 129.
20. Brun et al. 2013.
21. Cafiero et al. 2015; Rajangam et al. 2015.
22. Gałka et al. 2014; Cafiero et al. 2015; Rajangam et al. 2015.
23. Fan et al. 2013
24. Elisabeth Elgvin Berg, Jotun AS, personal communication, 6 November 2020.
25. Crane 2004.
26. Crane 2004.
27. National Museum internal analysis report. The findings will be published at a later date as part of a current PhD project.
28. Targowski et al. 2020; Ford et al. 2021.

References

Boym, P.B., van der Hagen, A. (eds) 2000. *Hjerte og forstand: Festskrift til Victor Lind*. Oslo: Julius Johansen Bokbinderi A/S.

Brakstad, I.V. 2006. *Jødeforfølgelsene i Norge – Omtale i årene 1942–1948: Framstilling og erindring av jødeforfølgelsene i Norge under andre verdenskrig, i et utvalg aviser og illegal presse*. Master's thesis, Department of Archaeology, Conservation and History, University of Oslo.

Brun, N., Youssef, I., Chevrel, M.-C., Chapron, D., Schrauwen, C., Hoppe, S., Bourson P. and Durand, A. 2013. 'In situ monitoring of styrene polymerization using Raman spectroscopy: multi-scale approach of homogeneous and heterogeneous polymerization processes', *Journal of Raman Spectroscopy* 44(6): 909–15. Available at: https://doi.org/10.1002/jrs.4279 (accessed 2 May 2022).

Bugge, E.M. 2010. *Karavane: Victor Linds Monument*. Oslo: Torpedo Press & Ctrl+Z Publishing.

Cafiero, L., Fabbri, D., Trinca, E., Tuffi R. and Vecchio Ciprioti, S. 2015. 'Thermal and spectroscopic (TG/DSC–FTIR) characterization of mixed plastics for materials and energy recovery under pyrolytic conditions', *Journal of Thermal Analysis and Calorimetry*, 121: 1111–19. Available at: https://doi.org/10.1007/s10973-015-4799-2 (accessed 2 May 2022).

Crane A. 2004. 'Acrylic latex paints: still the gold standard for exterior performance', *Paint & Coatings Industry E-Magazine*. Available at: https://www.pcimag.com/articles/83903-acrylic-latex-paints-still-the-gold-standard-for-exterior-performance (accessed 2 June 2021).

Defeyt, C. and Strivay, D. 2014. 'PB15 as 20th and 21st artists' pigments: conservation concerns', *e-Preservation Science* 11(x-y).

Fan, F., Xia, Z., Li, Q., Li Z. and Chen, H. 2013. 'Thermal stability of phosphorus-containing styrene–acrylic copolymer and its fire retardant performance in waterborne intumescent coatings', *Journal of Thermal Analysis and Calorimetry* 114: 937–46. Available at: https://doi.org/10.1007/s10973-013-3099-y (accessed 2 May 2022).

Ford, T., Iwanicka, M., Platania, E., Targowski P. and Hendriks, E. 2021 'Munch and optical coherence tomography: unravelling historical and artist applied varnish layers in painting collections', *European Physical Journal Plus* 136: art. no. 899. Available at: https://link.springer.com/article/10.1140/epjp/s13360-021-01758-5 (accessed 27 September 2021).

Gałka, P., Kowalonek J. and Kaczmarek, H. 2014. 'Thermogravimetric analysis of thermal stability of poly(methyl methacrylate) films modified with photoinitiators', *Journal of Thermal Analysis and Calorimetry* 115: 1387–94. Available at: https://doi.org/10.1007/s10973-013-3446-z (accessed 2 May 2022).

Gettens, R.J. and Stout, G.L. 1966. *Painting Materials: A Short Encyclopaedia*. New York: Dover Publications, Inc.

GRAS: http://grasgruppa.no/index.html (accessed 27 September 2021).

Krogvig, I. 2012. 'Blindpunktet i Victor Linds Kunstnerskap', *Kunstkritikk*. Available at: https://kunstkritikk.no/blindpunktet-i-victor-linds-kunstnerskap/(accessed 15 September 2021).

Kunstverket Galleri AS. 2022. *Victor Lind*. Available at: https://www.kunstverket.no/Kunstnere/Kunstnere-H-L/Victor-Lind/Nyheter/januar/Nattrytter-1972-2019.aspx (accessed 15 September 2021).

Lenz, C. 2008. *Adgang til riket: Victor Linds kunst som erindringspolitisk intervensjon*. Oslo: HL-Senteret.

Merkaj, E., Civici, N. 2020. 'Application of a portable XRF spectrometer for in-situ and nondestructive investigation of pigments in two 15th century icons', *Open Journal of Applied Sciences* 10: 305–17. Available at: https://doi.org/10.4236/ojapps.2020.106023 (accessed 2 May 2022).

Rajangam, V., Abidov, A., Peng, M.M., Babu, C.M., Palanichamy, M., Cha, W. and Jang, H. 2015. 'A new strategy to synthesize hypercross-linked conjugated polystyrene and its application towards CO2 sorption', *Fibers and Polymers* 16(7): 1458–67. Available at: DOI.10.1007/s12221-015-5151-y (accessed 2 May 2022).

Store norske leksikon 2022. *Knut Rød*. Available at: https://snl.no/Knut_R%C3%B8d (accessed 15 September 2021); *GRAS*. Available at: https://snl.no/GRAS (accessed 15 September 2021).

Targowski, P., Kowalska, M., Sylwestrzak, M. and Iwanicka, M. 2020. 'OCT for examination of cultural heritage objects', in *Optical Coherence Tomography and its Non-medical Applications*, M. Wang (ed.). London: IntechOpen. Available at: DOI.10.5772/intechopen.88215. Also at: https://www.intechopen.com/chapters/68201 (accessed 30 May 2021).

Visnes, G.B. 2009. 'Kunstnerkollektivet GRAS: Et svar på spørsmålet om kunstens funksjon?'. GRAS exhibition, Steinkjer Art Association, exh. cat. (foreword). Available at: http://grasgruppa.no/tekster.html#gbv (accessed 14 October 2021).

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