Preserving a unique chest of drawers decorated with grease crayon drawings: Alessandro Mendini’s Nigritella Nigra, a unique chest of drawers decorated with grease crayon drawings

Mol, T.; Stigter, S.; Cattersel, V.; De Vis, K.; van Halem, L.; van Duin, P.

Published in:
Future Talks 017

Link to publication

Creative Commons License (see https://creativecommons.org/use-remix/cc-licenses):
CC BY-NC-SA

Citation for published version (APA):

General rights
It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

Disclaimer/Complaints regulations
If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: https://uba.uva.nl/en/contact, or a letter to: Library of the University of Amsterdam, Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.
FUTURE TALKS
017
THE SILVER EDITION.
VISIONS.
INNOVATIONS IN TECHNOLOGY
AND CONSERVATION OF THE MODERN

CONTRIBUTIONS BY
SILVIA ANNICCHIARICO MILAN
LYDIA BEERKENS AMSTERDAM
GIULIA CAPPELLONI ROMA
SILVIA CAPPELLINA MILAN
SILVIA CASONATO MILAN
VINCENT CATTERSEL ANTWERP
JULIAN CECI VIENNA
LOUISE CONE COPENHAGEN
HELENA CUOCO PARIS
MARTA GARCIACELMA
COLOGNE
GRAZIA DE CESARE ROMA
SUZAN DE GOOIJER AMSTERDAM
KRIESTEL DE VILLE ANTWERP
RUSSELL DRODDICH NEW YORK
REINER DÜXMANN HAMBURG
CHRISTINA ELSAESSER MUNICH
BARBARA FERRIANI MILAN
MARTINA HAIDVOGL SAN FRANCISCO
EMILY HAMILTON SAN FRANCISCO
DANIEL HAUSSER NEW YORK
PAOLA IAZURLO ROMA
DANIELA JACEK KOPENHAGEN
JONAS JÜCKSTOCK MUNICH
BRENDA KENEGHAN LONDON
ROBERT KEET SAN FRANCISCO
SHU-WEN LIN NEW YORK
YNGVE MAGNUSSON BERGEN
BRUNO MAZZONE ROMA
TIZA MOL ANTWERP
LAURA MONTAINA ROMA
GIULIANA MORETTO NEW YORK
DELLA MÜLLER-WÜSTEN NEW YORK
MARISA PAMPLONA MUNICH
MONICA PIGNATTI MORANO ROMA
LUCA REDUZZI MILAN
KENDRA ROTH NEW YORK
JULIA SANZIENI MUNICH
LEONIE SCABOLA ROMA
YVONNE SHASHOUA COPENHAGEN
MARTA SINGER NEW YORK
MARTA SORRENTINO ROMA
SANNEKE STIOTER AMSTERDAM
LEANNE TONKIN NOTTINGHAM
RAFAELA TREVISAN MILAN
CARIEN VAN AUBEL AMSTERDAM
PAUL VAN DUIN AMSTERDAM
LUIO VAN HAL AMSTERDAM
HEND VAN DEULEN AMSTERDAM
OLIVIA VAN ROOIJEN AMSTERDAM
MARTINA VENTO ROMA
EVA WENTLAND BERLIN
KATE WIGHT TYLER NEW YORK
ELENA ZACCAGNINI ROMA
ISBN 978-3-9018165-3-5

FUTURE TALKS 017
11/13 2017
DIE NEUE SAMMLUNG THE DESIGN MUSEUM

OCTOBER
I HAVE TROUBLE KEEPING
PLANTS ALIVE.
EVEN PLASTIC ONES.
ANE KRAKOWSKI
ACTRESS
This is the FUTURE TALKS Silver Edition!

We are gratified to be presenting the book covering the fifth edition of the FUTURE TALKS at Die Neue Sammlung – The Design Museum in the Pinakothek der Moderne.

The FUTURE TALKS were initiated and conceptualized by Tim Bechthold, head of our conservation department, to address current issues relating to technologies and materials in contemporary design and to develop strategies for its conservation and restoration. Held for the first time in 2009, the biennial FUTURE TALKS conference and the accompanying books have long since become a strong tradition and a renowned platform for the exchange and production of knowledge.

In 2009, the former director of Die Neue Sammlung rightly stated: “...the huge success of FUTURE TALKS 009 is the initial point and a mission for our museum to feature further events related to the technology and conservation of modern materials.” (1)

The mission has come true: We can now look back on five conferences and – with this present book - on five postprints. And if you take a closer look at the huge workload our museum’s activities involve, then forecasting such a success might have appeared fairly unrealistic; most of all if you take into account that our conservation department consists of only two full-time staff members and one person working part-time. It is therefore, particularly pleasant and exceptional that you are now actually reading the preface of the fifth (!) publication, this one covering the FUTURE TALKS 017 conference.

This Silver Edition deals with the topic Visions. Innovations in Technology and Conservation of the Modern. In the course of three days, conservators and conservation scientists presented among other things: New methods to identify and monitor plastics in collections, clever conservation materials such as parylene coatings or Intercept®, innovative treatment methods for high-gloss surfaces, grP objects and soft and hard foams, research into cool temperature storage, management of digital heritage and many more... With keynotes on innovative materials by material scout Efrat Friedland, one by John Hamilton, Global Design Director at Coalesse on the development of a low-weight carbon fiber chair, and finally a lecture by Dutch design wizard Maarten Baas the conference highlighted other key features in the field.

Since the launch of the FUTURE TALKS we have seen growing public interest in the conservation of the modern. This is reflected in an increasing number of conferences, panels and media reporting.

With the initiation of the FUTURE TALKS series ten years ago our conservation department recognized at a very early stage the need for frank and interdisciplinary discussions on the challenge of conserving modern heritage and the need to debate pragmatic solutions. That said, to be honest none of us would have expected that the FUTURE TALKS would ever become a synonym for such topics!

Nevertheless, this success would not have been possible without the support of a small community of experts who willing to contribute with selfless effort and conviction to editorial processes, to hosting workshops and panel discussions, and last but not least with inspiring lectures and critique. We like to mention the fully booked evening receptions in hip places, counteracting the Munich cliché and highlighting the need of professional networking in an inspiring atmosphere.

I would like to thank Felix Kempf from Munich for designing his strong and creative cooperate identity. I am grateful to Tim Bechthold, our head of conservation, and his team Julia Demeter, Helena Ernst, Christian Huber, Franziska Schittler for their profound initiative, unwavering commitment and the undiminished pleasure of creative networking.

A big thank you goes to all the contributors and authors for their texts.

I am happy to thank our main sponsors for their generous support without which the FUTURE TALKS would not be possible, let alone such a great success.

After the FUTURE TALKS is always before the FUTURE TALKS. While writing this, the preparations for the 6th FUTURE TALKS conference have almost reached completion.

The foundations have thus been laid for the next edition of the conference with 27 inspiring lectures, three interdisciplinary keynotes and more than 30 relevant workshops and exciting excursions on conference-related topics.

The registration of nearly 300 professionals from more than 25 nations illustrates that there is not just a sustained demand but a growing interest in this unique event.

To conclude, the increasing number of FUTURE TALKS conferences and publications are obscuring the view of our protagonists. What came first? The chicken or the egg? The book or the conference?

Anyway. We assume FUTURE TALKS speaks for itself. Listen well and enjoy reading!

Congratulations!

ABSTRACT
This paper discusses the decision-making process and the conservation treatment of Nigritella Nigra (1993), a chest of drawers designed by Alessandro Mendini (Milan, 1931-2019). The top drawer case is decorated with several colourful abstract crayon drawings, making the chest a unique work of art. The varnish on top of these drawings was peeling off, lifting the crayon with it, with loss of material as a result. This study analyses the factors that may have contributed to the degradation process and describes the research performed preceding treatment, including ethical, aesthetical and artistic perspectives. Information from an artist interview has enriched deliberations in decision-making. For material analysis Py-GC/MS and FTIR were used, identifying grease crayon as medium for the drawings and cellulose nitrate (CN) for the varnish. Various options for consolidation and retouching were considered and tested, and a suitable approach was found with satisfactory result.

KEYWORDS
Alessandro Mendini, artist interview, grease crayon, cellulose nitrate, Acrylkleber 498 HV (Lascaux®), Medium für Konsolidierung (Lascaux®)

INTRODUCTION
In 2016 the Rijksmuseum Amsterdam accepted the donation of a colourful piece of furniture by art historians Johan Ambaum (1931-2018) and Frans Haks (1938-2006), the latter being the former director of the Groninger Museum. The chest of drawers is entitled Nigritella Nigra and designed by the Italian architect and artist Alessandro Mendini (Milan 1931) in 1993. Mendini’s work is often associated with postmodernism. His designs are characterised by the use of contrasting materials and vivid colours in joint collaboration between artists, artisans and architects. Decoration and craft play a key role. As such, Nigritella Nigra is exemplary, as art historian Peter Weiss explained, considering it an important piece in Mendini’s oeuvre, “a strong postmodern statement of his design-cosmos.”

The chest is handmade and composed of five different encaised drawers stacked onto a low base, decreasing in size towards the top. The boxes are centred and aligned at the back, designed to place the object against a wall. Various types of manufactured board are used, some decorated with paint, others with wood, metal leaf, high-pressure laminate (HPL), and glass mosaic. The top drawer case is covered with colourful crayon drawings on all visible sides and finished with a transparent varnish (Figure 1). Whereas most of the object was still in fairly good condition, the top drawer case was not. The pictorial layer of the drawings showed severe cracks, cupping and flaking. The cupping varnish had locally pulled away the crayon, resulting in numerous losses all over the surface (Figure 2).

This study discusses object’s history, its material composition, and degradation phenomena, as well as the concept of the artwork, the artist’s opinion on its condition and the technical possibilities for conservation, to finally arrive at decision-making, testing, and treatment. The main challenge was to consolidate the brittle varnish that was peeling off, taking the crayon with it. Different products and methods were tested to consolidate the flaking varnish, while different approaches for retouching were considered, taking aesthetical, historical, and ethical perspectives into account.

FURNITURE FOR THE MUSEUM MARKET
Nigritella Nigra is part of the Museum Market, Mendini’s furniture collection produced by the Design Gallery Milan in a limited edition meant for the museum market. With a nod to agricultural produce and the market, all pieces of furniture were named after a different flower. Nigritella Nigra is a type of orchid. A special feature that sets this piece apart from the rest
of the series, are the handmade drawings on the top drawer case. As they all differ, each version of *Nigritella Nigra* is unique.

The drawings are not made by Mendini himself, but by Lucio Giudici, a young man with Down syndrome. Mendini recalls that he first saw the drawings during a visit to the psychiatric hospital where the boy lived, near Trieste, Italy. “This young guy was drawing a lot of drawings with beautiful colours. I asked whether I could use them and paid him some money.” It was only years later that he used them to decorate the top drawer cases of each piece in the *Nigritella Nigra* series.

Although the *Museum Market* catalogue states that *Nigritella Nigra* has been produced in one series of twelve pieces, comparative research indicates that there are two series. In addition, a prototype is known, now part of Die Neue Sammlung - The Design Museum in Munich, purchased from a private collector in 2011.

The Rijksmuseum’s piece is marked 1/12. The Montreal Museum of Fine Arts, Canada, owns number 5/12 from the same series since 1994, as part of a gift from the Liliane and David M. Stewart collection. Gallery Collet Park, Paris, had number 9/12 for sale, a piece which was formerly owned by a private collector from Torino, and was sold to a private collector in 2017. An additional number 5/12 was located with Peter Weiβ, acquired from a gallery in Münster in 1993. According to Weiβ, Mario Godani of the Design Gallery Milano mentioned two series of 12 pieces, which had both sold out. Comparing the pieces that could be traced, reveals that the two series can be distinguished by the different decoration patterns on most drawer cases (Figure 3).

**CONDITION OF THE TOP-DRAWER CASE**

Except for the prototype, the top-drawer cases from all of the *Nigritella Nigra* chests that could be located have similar degradation phenomena. On chest nr. 5/12 the drawings have „local retouching of losses that also seem to have involved local lifting of the resin layer.” Nr. 9/12 has „a flaking surface finish on the paper drawing.” Nr. 5/12 from the other series shows similar degradation phenomena: “the wax crayon lost contact with the paper and the wax application frees itself of the paper.” From these observations it could be suggested that this problem could be the result of incompatible use of materials. To support this assumption, the first phase of the investigation was the identification of the drawing materials.

Fourier Transform Infrared Spectroscopy (FTIR) revealed that the varnish on the top drawer case of *Nigritella Nigra* nr. 1/12 is a cellulose nitrate (CN) lacquer. CN is notorious for its instability and has a tendency to disintegrate over time, which is strongly affected by exposure to UV, heat, and humidity. Decomposition can become autocatalytic by the initial breakdown products, resulting in shrinkage and distortion. Other causes of structural deterioration are the loss of plasticisers and stress cracking as a result of shrinkage (Selwitz, 1998: 7), phenomena that are clearly visible on the top drawer case.

Pyrolysis gas chromatography/mass spectrometry (Py-GC/MS) of a sample of the drawing material indicated that grease crayon was used. Grease crayon is predominantly composed of paraffin wax, pigments and tallow (Ellis and Yeh 1998: 50). Wax is usually considered a chemically stable material, but it is known to become problematic in laminated structures (Mills and White 1994: 49). Another well-known phenomenon is the migration of free fatty acids, causing a deposition of hazy irregular crystalline particles onto the surface of wax containing artefacts (Ordonez and Twilley 1997: 416A). Yet, none of the examples found in the conservation literature considers the combination of grease crayon with a varnish layer, which makes the case of *Nigritella Nigra* rather exceptional.

Mendini claimed that the varnish was applied with a brush. However, reconstruction tests showed that applying a CN varnish with a brush or roller smeared the crayon as the CN varnish dissolves it. (Mol 2017: 26). This explains the merging of layers observed underneath the flakes that were lifted off the paper substrate. Since the crayon on the drawings of *Nigritella*...
Nigra is partly dissolved into the varnish, but not smeared over the surface, it can be assumed that the CN has been sprayed onto the surface. The absence of brushstrokes or roller marks supports this assumption. In order to determine what factors may have additionally contributed to the deterioration of the drawings on the top case, the work’s history is assessed.

**NIGRITELLA NIGRA NO. 1/12**

Little is known about the first years of the life of Nigritella Nigra no. 1/12, now in the Rijksmuseum collection. However, since 2001 the chest has had a prominent position in the apartment of former owner Frans Haks and Johan Ambaum in Amsterdam for 15 years. Haks had appointed Mendini as the designer for the new building of the Groninger Museum in 1994. When he and his partner moved to Amsterdam, Atelier Mendini designed the ground floor of their new apartment. A remarkable detail was a sunken bathtub right in the middle. Nigritella Nigra was positioned at a distance of less than two meters from the bathtub, facing it as the centrepiece of the room (Figure 4). Ambaum confided that Haks took a bath daily, a routine that must have caused the relative humidity in the room to fluctuate, as there was little buffering material in the apartment. The walls and the floor are made up of glass terrazzo and granite (Casciani 2011: 124). The hygroscopic organic materials of the chest itself must have reacted instead, swelling and shrinking at different rates in response to the fluctuations in relative humidity. With CN becoming more brittle over time, it ceases to be able to adapt to such changes in volume, which leads to cracks. Craquelures facilitate moisture and oxygen to penetrate the structure, inducing an autocatalytic degradation process, ultimately disrupting the entire CN film.

**ARTIST INTERVIEW**

It was important to know whether the object’s condition had affected the artwork’s meaning. Apart from art historical research and consultation with curators and conservators at the museum, it was considered necessary to consult the artist. A semi-structured interview was prepared to enquire about Nigritella Nigra,
Alessandro Mendini (AM):
In my opinion it could remain like this. I find it interesting to see the passage of time in the drawing.

Tirza Mol (TM):
Yes. So, no inpainting or retouching?

AM:
It depends on the politics of the museum. …
I like it when an object becomes old, with storia.[…]

TM:
If we don’t do anything it may continue to flake.

AM:
Of course.

TM:
and eh…

AM:
Bene. [Looks at the camera, smiling].

TM:
How far could it go for you before you say it is enough?

AM:
Maybe in one hundred years it has become white.

Benissimo! (Laughter) [19]

Although Mendini suggests that decisions about conservation are theoretical problems as well, mitigating his personal voice, both he and his brother like the idea of the top drawer case becoming white over time, comparing it – once more – to a temple and the way these too have become white over time.

However, upon presenting a more detailed photograph of the drawing in raking light, showing the severe cupping, these initial thoughts are left aside and the conversation leads to the desire for active intervention. Notwithstanding the artist’s general thoughts about material degradation, it became clear that he would not object to consolidation of the pictorial layer. On the contrary, he was in favour of retouching the drawing as well. [20]

DECISION-MAKING

In consultation with the museum staff and in accordance with the artist, it was decided that the conservation treatment should include consolidation to avoid further damage, and retouching to serve its aesthetic appearance. The interview made clear that Mendini had designed Nigritella Nigra as a temple for artistic freedom. The top is meant to be the most sacred place of the zigur, shaped drawer chest and this idea is no longer expressed with damaged drawings and flaking varnish.

Therefore, the option not to retouch the lacunas to leave the object’s history visible was left aside. It was considered to use a monochrome colour matching its surroundings as a seemingly neutral way of retouching, leaving the intervention visible. However, a digital impression of such an intervention made clear the meaning of the design, the materials used, and the artist’s opinion on its condition.

Alessandro and his brother Francesco Mendini welcomed us in their studio in Milan on 2 February 2017 (Figure 5). At a long table in their office space, on a split level overlooking the studio, we started the interview addressing the design. Mendini explained how he had aimed at the shape of a zigur. This is a massive structure built in ancient Mesopotamia in the form of a terraced step pyramid with a temple on top. Knowing this, the top drawer case could be considered the most important part of Nigritella Nigra. Indeed, in Mendini’s words, the lower drawers are the base for the top, which he conceived as “a monument for an artist.” [15] He purposely applied a glossy varnish “to transform the separate drawings into an object. … a box with decoration – a shiny box.” [6] The fact that Nigritella Nigra is a showpiece is underlined by Mendini’s suggestion to use “dramatic lighting” from below. [17] At the same time the chest must remain accessible to suggest its use as a drawer chest. He does not allow a display case, nor a plinth, which is already included in the design itself. [18]
that the effect would be rather disturbing to the overall image (Mol 2017: 62). The nuances in colour and texture of the crayon turned out to be so significant for the visual appearance of the drawings that ignoring this texture seemed worse than not intervening at all. Finally, the choice was made for integral retouching to visually enhance the top drawer box.

This choice may seem to neglect the object’s inherent material properties, as the degradation phenomena seem to be intrinsic to the original materials used. Climate fluctuations in the room where the chest had been in use for fifteen years have adversely affected its condition. However, this part of the object’s history does not add to the meaning of the artwork itself and can be disclosed by other means.

It can be concluded that the object’s functional, aesthetic, and conceptual characteristics will be greatly improved by a conservation treatment that includes consolidation and retouching of grease crayon drawings on the top drawer case.

**ASSESSING CONSOLIDANTS**

Adhering the brittle cupped CN flakes with grease crayon back to the paper substrate was a challenge. Paraffin wax is an extremely hydrophobic material (Feist, Little, and Wennesheimer, 1985). In theory the grease crayon film will protect both the paper substrate and CN from the adverse influence of humidity. However, this combination of materials complicates consolidation options. No heat could be applied to use the thermoplastic properties of CN, as the glass transition temperature (Tg) of paraffin wax (40-65 °C) is far lower than the Tg of CN (145-152°C) (Horie 2010: 127; Shashoua 2008: 237). The use of a solvent that plasticises the CN temporarily to facilitate pushing the flakes back in place was no option either, as CN is only soluble in solvents that dissolve the grease crayon adhered to it. Therefore, the solubility parameters of grease crayon limited the range of possible adhesives to water-based types.

The consolidant required demonstrating good adherence to grease crayon, excess material to be easily removable, and minimal shrinkage upon curing. In addition, low viscosity was important to allow for penetration into the network of cracks by capillary action. Finally, the consolidant had to have good ageing properties. Based on the literature, the following adhesives were selected as performing well on fatty surfaces: Aquazol 200 (Arslanoglu 2003: 12); Mowilith DMC2 (Lascaux) and Mowiol 4-88 (Lang 2011: 4); sturgeon glue and fish glue (Lang 2011: 4). In addition, the acrylic dispersion glues Medium für Konsolidierung (MfK) (Lascaux), Acrykleber 498 HV (Lascaux), and Acrykleber 303 HV (Lascaux) were selected as being suitable to consolidate CN (Shashoua 2008: 216). These products were tested on sample CN flakes and then clamped onto a grease crayon covered piece of cardboard.[21] The adhesives were not diluted too much, as high tack is necessary on the greasy surface, while the water percentage was kept to a minimum. Only Acrykleber 498 HV and Acrykleber 303 HV were diluted with demineralised water at 50% v/v because of their viscosity.

MfK and Acrykleber 498 HV showed good adherence already after 5 minutes. Sturgeon glue (8%) and Mowilith DMC2 needed approximately an hour to dry and performed well. Both Aquazol 200 (10%) Mowiol 4-88 (8%) did not adhere the flakes at all. Acrykleber 303 HV remained tacky for days due to its low Tg and was not tested further. Ready-made fish glue turned yellow after drying and was also left aside. Acrykleber 498 HV, MfK, Mowilith DMC2, and sturgeon glue performed well and were further tested on their workability, reversibility, shrinkage, and ageing properties.

The ease of removal of excess material was tested with a cotton swab moistened with demineralised water both immediately and 24 hours. All consolidants were removable with water immediately. This was still the case after 24 hours, except for MfK, but that could still be removed with ethanol.

Shrinkage was evaluated by applying the adhesives onto two strips of Melinex, of which one was artificially aged to evaluate transparency upon ageing. The translucent Melinex substrate demonstrated that Mowilith DMC2 turned milky after curing.
Sturgeon glue showed significant shrinkage after solvent evaporation, distorting the Melinex substrate. Acrylkleber 498 HV and MfK retained their transparency and did not shrink.

These two acrylic dispersion glues were finally tested on each of the grease crayon colours on the actual object. A tiny droplet of the adhesive was left on the surface and visually examined with a Hirox 3D microscope for possible physical alterations, such as selective leaching and formation of tidelines. Both adhesives did not alter the grease crayon. Finally, long-term adherence was tested. Two CN sample flakes were adhered to a grease crayon covered paper strip, one with Acrylkleber 498 HV and one with MfK. The two strips were artificially aged in a Xenon lamp test chamber. After ageing both samples performed well and still showed good adherence.

The overall test results led to the choice for Acrylkleber 498 HV 50% v/v in demineralised water to be applied with a fine brush, while the small cracks were filled with the less viscous undiluted MfK by use of a syringe. The flakes were carefully pushed down with the tip of a finger, allowing for the body temperature to help plasticise the cupped CN particles. This method proved successful for consolidation of the entire pictorial layer.

**RETOUCHING**

The next step was retouching, which would also stabilize the consolidated areas. To protect the grease crayon remains on the paper surface, an isolation layer was required to ensure reversibility of the retouching. Several water-based glues were tested and sturgeon glue (8%) performed best. It adhered well, dried in a clear transparent film, and remained easily removable with water (Mol, 2017: 138-141).

The retouching medium had to be compatible with the isolation layer and to remain soluble in solvents that do not dissolve the isolation layer, nor the CN varnish. Furthermore, it had to have excellent ageing properties and allow for variation in opacity and imitation of the crayon texture. Based on these requirements the following products were selected, tested, and evaluated on their visual performance, adherence, and reversibility: pigments in Paraloid B72, QoR Watercolors, Golden Fluid Acrylics and Gamblin Conservation Colors.

All products adhered well to the sturgeon glue isolation layer. QoR Watercolors and Gamblin Conservation Colors dried even and matte, making it hard to imitate colour nuances, and impossible to create a structured surface. Pigments in Paraloid B72 dried rather translucent, while Golden Fluid Acrylics allowed for variation in opacity and structure, providing the closest match to the original, except for the gloss.

An additional layer on the retouched areas to match the gloss was deemed undesirable, as it may increase strain caused by different shrinking and swelling coefficients of the various layers. Moreover, it would complicate reversibility and compatibility, as all products had to remain soluble in different solvents. The main reason to renounce the use of a local varnish is the concept of water vapour permeability. The premixed acrylic emulsion has a long-term water vapour permeability of 84%, which is very close to CN: 81%, creating a nearly tension free film (Hoadly, 2000: 208). Instead, the gloss of the acrylic emulsion paint was enhanced by adding Golden Regular Gel Gloss to the Golden Fluid Acrylics in a percentage varying from 5-20% based on the different inherent gloss level of the colour. This colourless acrylic emulsion is a modifying gel composed of the same acrylic polymer as the Golden Fluid Acrylics, allowing for a stable blend. Close by the retouched areas can be distinguished, while form a distance they become invisible. The final result satisfied both the artist and the curator of the Rijksmuseum (Figure 6).

**CONCLUSION**

Comparative research showed that Alessandro Mendini’s drawer chest *Nigritella Nigra* was produced in two different series and at least one prototype. Examples from both series show similar degradation patterns on the grease crayon drawings on the top drawer case. The intrinsic instability of the cellulose...
nitrate (CN) varnish layer on top can be considered the main cause for flaking, eventually disrupting the pictorial layer.

The artist interview with Mendini has significantly enriched decision-making preceding treatment. Mendini compares his ziggurat shaped *Nigritella Nigra* as a monument for an artist, with the top-drawer case decorated with handmade drawings, by a young boy with Down syndrome, as the most important feature. Therefore, treatment aimed to rehabilitate the visual appearance such that it would support this idea, improving the aesthetic value of the object.

The degraded CN varnish on the grease crayon drawing could be successfully consolidated with Acrylkleber 498 HV (Lascaux), 50% diluted in demineralised water, and MfK (Lascaux) depending on the capillary action needed. The lacunae were retouched with Golden Fluid Acrylics, adjusted with Golden Regular Gel Gloss.

As a fragile but prestigious object with a meaningful design, Mendini’s *Nigritella Nigra* called for an interdisciplinary approach because of the complex combination of materials and degradation phenomena. Joint input from the artist’s studio, paper conservators, paintings conservators, contemporary art conservators, art historians, and scientists was crucial for a successful conservation treatment.

**ACKNOWLEDGEMENTS**

The authors would like to thank: Johan Ambaum, Francesco and Alessandro Mendini and Beatrice Felis from Atelier Mendini for their kind collaboration; Barbara Ferriani for her insight and hospitality; Henk van Keulen, Suzan de Groot, Luc Megens, and Ineke Joosten of the Cultural Heritage Agency of the Netherlands for technical analysis; Peter Weiß, Tim Bechtold of Die Neue Sammlung - The Design Museum and Richard Gagnier of the Montreal Museum of Fine Arts for sharing information; Jan Dorscheidt, Iskander Breebaart, Davina Kuh Jacobi, Dionysia Christoforou, Alexandra Nederlof, and Lisette Vos from the Rijksmuseum Amsterdam, and Steven van Kolsteren from the Groninger Museum for their valuable insights.
ENDNOTES

(1) In the time between submission and publication of this article, Alessandro Mendini passed away. He deceased the 18th of February 2019.

(2) Peter Weiß, personal email to Tirza Mol, 6 February 2017.

(3) This paper is based on the first author’s MA thesis (Mol 2017).


(5) Another version with a pattern similar to Peter Weiß’ object was found in Rotterdam, the Netherlands, in a private collection. In the email correspondence (January 2019) the owners stated it concerns Nr. 1/12 and the top drawer case is in bad condition. At the time of publication there were no photo’s available of this object.

(6) Peter Weiß, personal email to Tirza Mol, 6 February 2017. The fact that we found two different objects numbered ‘5/12’ and ‘1/12’ proves Godani’s statement. Mendini does not know whether all objects have been produced and is only aware of an intended edition of nine and two prototypes (personal interview, see note 3).

(7) As Die Neue Sammlung’s Nigritella Nigra is a prototype, the materials used may differ from the other pieces. Tim Bechthold, personal email to Tirza Mol, November 2016.

(8) Richard Gagnier, personal email to Sanneke Stigter, 7 November 2016.

(9) Dennis Collet, personal email to Tirza Mol, 16 November 2016.

(10) Peter Weiß, personal email to Tirza Mol, 1 March 2017. Weiß’ chest shows similar degradation phenomena on the grease crayon drawings of the top case. Microscopic cross-section analysis of a sample of Weiß’ chest showed the same stratigraphic build-up as the samples of the Rijksmuseum chest. However, py GC/MS analysis indicated that the CN on the drawings differs slightly in composition. This may be indicative of a different batch or brand, and maybe different production dates (Mol 2017: 138-141).

(11) Material analysis was kindly carried out by Henk van Keulen and Suzan de Groot of the Cultural Heritage Agency of the Netherlands (RCE).

(12) For example, the beeswax that painter Brice Marden added to his oil paint was found to have migrated through the interfaces between individual paint layers, causing them to separate. Flaking occurred in reaction to a difference in tension (Wijnberg 2014: 23-24). Other studies indicate that gouache and crayon in adjacent layers in some of Karel Appel’s gouaches failed in adhesion (van Dalen and Beentjes, 2002: 155; van Dalen et al, 2000: 22-27). In historical wax-resin lined paintings disintegration of the wax-resin mixture has been observed, the wax migrating through the painting’s structure, darkening its surface (Boon, Rainford and Pureveen 1994: 14).

(13) Personal interview, see note 3.


(15) Personal interview, see note 3.

(16) Ibid.

(17) Mendini does not remember the type of varnish. Nigritella Nigra was produced by Design Gallery Milano. Although their website is still online, we were unable to get in touch. Mendini explained they are no longer active (personal interview, see note 3).

(18) Personal interview, see note 3.

(19) Ibid.

(20) Ibid.

(21) Hundreds of displaced CN flakes with grease crayon attached to them were found on the object. The smallest that could not be traced back to their original position have been used as samples for testing.

(22) Artificial ageing was performed in a Xenon test chamber for 20 hours at a constant 40 % RH and 50°C, simulating five years under museum conditions, 3200 hours at 200 lux. An Atlas Xenotest Alpha High Energy with a Xenon arc-lamp was used. The air ventilated Xenon arc lamp radiates 105.087 lux and a 320 nm filter simulates daylight entering through glass.


Photo: Rijksmuseum Amsterdam

Console horizontal panel, before (above) and after (below), case study no. 1. mWe knew exactly the original appearance of every key: integrations are made with mute and symbol keys.
Lecture 014
Investigating the Colourful World of Alessandro Mendini: Preserving Nigritella Nigra, a Unique Chest of Drawers Decorated with Grease Crayon Drawings

Suppliers

Aquazol® 200. Fa. Kremer Pigmente:
http://www.kremer-pigmente.de.

Fish glue. Fa. Kremer Pigmente:
http://www.kremer-pigmente.de.

Gamblin® Conservation Colors
(Gamblin™. Kremer Pigmente:
http://www.kremer-pigmente.de.

Golden® Fluid Acrylics (Golden™).
Kremer Pigmente: http://www.kremer-pigmente.de

Golden® Regular Gel Gloss (Golden™).
Kremer Pigmente: http://www.kremer-pigmente.de

Acrylkleber 303 HV
(Lascaux and Acrylkleber 498 HV (Lascaux).

Medium für Konsolidierung (Lascaux).

Mowilith® DMC 2. Poly(vinyl acetate).

Mowiol® 4-88. Poly(vinyl alcohol).
Sigma-Aldrich: http://www.sigmaaldo.com

Paraloid® B72. Deffner & Johann:

Sturgeon glue. Fa. Kremer Pigmente:
http://www.kremer-pigmente.de.

QoR® Watercolors.
Golden® http://www.qorcolors.com

References

Arslanoglu, J. 2003


Casciani, S. 2011

Dalen, P. van, et al. 2000

Dalen, P. van, Beentjes, G. 2002

Ellis, M.H., Yeh, M.B. 1998
The history, use and characteristics of wax-based drawing media. The paper conservator 22: 48-55.

Feist, W.C., Little, J.K., Wennesheimer, J.L. 1985
The moisture excluding effectiveness of finishes on wood surfaces. Wisconsin: Forest Products Laboratory.

Hoadly, B.R. 2000

Horie, C.V. 2010

Lang, J. 2011

Mendini, A. 1993

Mills, J.S., White, R. 1994

Mol, T. 2017
De kleurrijke wereld van Alessandro Mendini. De behandeling van Nigritella Nigra, een moderne ladenkast. MA thesis.
Conservation Studies, University of Antwerp.

Ordonez, E., Twilley, J. 1997
Clarifying the haze: Efflorescence on works of art, Analytical Chemistry 69 (13): 416A-422A.

Selwitz, C. 1988

Shashoua, Y. 2008

Wijnberg, L. 2014
Do we see what we know or do we know what we see? In: van den Berg et al. (eds.), Issues in Contemporary Oil Paint. Switzerland: Springer International Publishing: 21-32.

LECTURE 015
CONSERVATION OF THE OPERATOR CONSOLE OF THE OLIVETTI ELEA 9003 COMPUTER (1959) AT THE MUSEO NAZIONALE SCIENZA E TECNOLOGIA LEONARDO DA VINCI OF MILAN

SUPPLIERS
1:100 - Architectural models, mock-ups and rapid prototyping,
Milano, http://1a100.it/

REFERENCES
Brandi, C., Basile, G. (ed.) 2005

Bellisario, M. 1987
Donna e top manager. La mia storia. Milano: Rizzoli.

Bolognani, M., Logrippo, L. 2009

Bonfanti, C. 2012

Ceruzzi, P. 2003

De Marco, G., Mainetto G. et al. 1999

Daudin-Schotte, M., van Keulen E.H. 2013

Ensmenger, N. 2012

Filippazzi, F. 2008

Gallino, L. 2003
La scomparsa dell’Italia industriale. Torino: Einaudi.

Gemelli, G. 2013

Hénin, S. 2017
Il racconto del computer. Giugliano: Edizioni Manna.

Linguaggi Nella Società e Nella Tecnica, 1970.
Milano: Edizioni di Comunità.

Logrippo, L. 2007

Mengozzo, M. 2012

Mori, E. 2014

Morando, S. 1962 (ed.)

Mullaney, T. S. 2018

Parolini, G. 2015

Piol, E. 2004
Il sogno di in’impresa. Milano: Il Sole 24 Ore SPA.

Pivato, M. 2011
Il miracolo scippato. Le quattro occasioni sprecate della sc-
The FUTURE TALKS workshop: Soft Particle Blasting has been made possible by the generous support of: Deffner & Johann

The editor also likes to thank the following people for supporting the idea and the realization of the FUTURE TALKS:

DIE NEUE SAMMLUNG
Daniela Augstein, Andrea Czermak, Michel Daume, Julia Demeter, Helena Ernst, Michaela Kreuter, Alexander Laurenzo, Angelika Nollert, Rainer Schmitzberger, Monika Schubert, Cornelius von Heyking, Waltraud Wiedenbauer

MODERATION CONFERENCE
Tim Bechthold, Helena Ernst, Roger Griffith, Claartje van Haafren, Brenda Keneghan, Friederike Waentig

EDITORIAL TEAM
J. Luca Ackerman, Tim Bechthold, Helena Ernst, Delia Müller-Wuesten, Kendra Roth, Nanke Schellmann, Claartje van Haafren

DESIGN
Felix Kempf / Karin Klemm

DESIGNERS / ARTISTS IN DIALOGUE
Maarten Baas, Efrat Friedland, John Hamilton

ASSISTANCE ON SITE
Andrea Czermak, Michaela Kreuter, Anna Reichelt, Julia Sawitzki, Franziska Schittler, Felix Wilhelm, Waltraud Wiedenbauer

PAPER BAGS
Franziska Schittler

DJS @ BLITZ
Ayzit Bostan / Tanja Seiner

The publisher and authors would like to thank the following photographers and copyright holders for the use of their material (page numbers are given in parentheses):

[12, Fig. 1] (13, Fig. 2) (14, Fig. 3) [15 Fig. 4] (17, Fig. 5) © Kendra Roth [22, Fig. 1, 2, 23, Fig. 3) (24, Fig. 4) (25, Fig. 5) (26, Fig. 6) © Carien van Aubel (30, Fig. 1) © Roel Siebrand (31, Fig. 2) © Olivia van Rooijen (32, Fig. 3) © Carien van Aubel (32, Fig. 4) © Olivia van Rooijen (33, Fig. 5) © Ron Kavits (34, Fig. 6) © Peter Cox (34, Fig. 6) © Paulien Hoens (40, Fig. 1) (41, Fig. 2, 3) © Christine Ehsser (50, Fig. 1, 2) © Ico Parisi (51, Fig. 3) © Triennale Design Museum (52, Fig. 4) © Ico Parisi (58, Fig. 1) (59, Fig. 2) © Felix Kempf / Karin Klemm (61, Fig. 3) © Contemporary Conservation (62, Fig. 4) © Seth Price, (63, Fig. 5) © Contemporary Conservation (70, Fig. 1) (71, Fig. 2) © Metropolitan Museum of Art (71, Fig. 3) (72, Fig. 4) (73, Fig. 5) (74, Fig. 6) © Leanne Tonkin, (82, Fig. 4, 5, 6) © Jonas Jückstock (94, Fig. 1) © Marta C. Singer, (102, Fig. 1) (103, Fig. 2) (104, Fig. 3, 4) © Roel Siebrand, (105, Fig. 5) (106, Fig. 6) © SMK/CATS, (110, Fig. 1) (111, Fig. 2) (113, Fig. 3) (114, Fig. 4) © Sasha Drossick, (115, Fig. 5) © Camacho 2011, (116, Fig. 6) © Sasha Drossick, (124, Fig. 4), (125, Fig. 5), (126, Fig. 6) © Grazia De Cesare, (130, Fig. 1) © Rijksmuseum Amsterdam, (131, Fig. 2) © Tinio Mol, (132, Fig. 3) © Peter Weiß (133, Fig. 4) © Tinio Mol, (134, Fig. 5) Photo: Beatrice Fells (135, Fig. 6) © Rijksmuseum Amsterdam, (140, Fig. 1) © Associazione Archivio Storico Olivetti, (150, Fig. 1), (151, Fig. 2) (153, Fig. 4), (155, Fig. 6) © SFMOMA, (173, Fig. 2) © Neri Oxman, Photo: Katherine Du Tiel, (178, Fig. 1) © Kendra Roth, (179, Fig. 3) © Carien van Aubel, (180, Fig. 1) © Roel Siebrand (181, Fig. 3) © Triennale Design Museum, (182, Fig. 2) © Contemporary Conservation, (182, Fig. 7) © Leanne Tonkin, (183, Fig. 5) © Jonas Jückstock, (184, Fig. 1) © Marta C. Singer, (184, Fig. 2) © SFMOMA, (185, Fig. 1, 2) © Sasha Drossick, (185, Fig. 1) © Grazia De Cesare, (186, Fig. 1) © Rijksmuseum Amsterdam, (186, Fig. 2) © SFMOMA, (188, Fig. 2) © Neri Oxman, Photo: Katherine Du Tiel (189, Fig. 1) © Die Neue Sammlung – The Design Museum, Photo: Julian Cech, (189, Fig. 3) © Isabelle Cuoco, (190, Fig. 1) © Paolo Iazurlo, (190, Fig. 1) © Julie Sawitzki, (190, Fig. 1) © Marta Sorrentino, (191, Fig. 2) © Eva Wentland, (191, Fig. 2, 3) © Maren Dümler, (196, Fig. 1) © Die Neue Sammlung – The Design Museum, Photo: Julian Cech, (197, Fig. 2a, 2b) © Die Neue Sammlung – The Design Museum, Photo: Julian Cech, (198, Fig. 3a, 3b) © Die Neue Sammlung – The Design Museum, Photo: Julian Cech, (199, Fig. 4a, 4b) © Die Neue Sammlung – The Design Museum, Photo: Julian Cech, (215, Fig. 3) © Isabelle Cuoco, (220, Fig. 1) © Paolo Iazurlo, (221, Fig. 2) © Paolo Iazurlo, (222, Fig. 3, 4, 5) © Paolo Iazurlo, (224, Fig. 6) © Paolo Iazurlo, (230, Fig. 1) © Julia Sawitzki, (231, Fig. 3) © Julia Sawitzki, (232, Fig. 4, 5) © Julia Sawitzki, (233, Fig. 6) © Julia Sawitzki, (238, Fig. 1) © Marta Sorrentino, (239, Fig. 2) © Marta Sorrentino, (240, Fig. 3, 4) © Marta Sorrentino, (241, Fig. 5) © Marta Sorrentino, (243, Fig. 6) © Marta Sorrentino, (248, Fig. 1) © Eva Wentland, (249, Fig. 2) © Eva Wentland, (252, Fig. 4) © Eva Wentland, (253, Fig. 5) © Eva Wentland, (255, Fig. 6) © Eva Wentland, (260, Fig. 1) © Maren Dümler, (261, Fig. 2) © Maren Dümler, (262, Fig. 3) © Maren Dümler, (264, Fig. 4) © Maren Dümler, (265, Fig. 5) © Maren Dümler, (19, 27, 37, 47, 55, 67, 73, 91, 97, 102, 117, 127, 137, 147, 157, 169, 175, 176, 177, 192, 193, 201, 217, 227, 235, 257, 299, 300, 302) Photo: Alexander Laurenzo © Die Neue Sammlung – The Design Museum

Not all owners of rights relating to illustrations could have been traced. Claimants to such rights are invited to contact: Die Neue Sammlung – The Design Museum.

FRONTISPIECE
Felix Kempf, FX68 München