

# LIOTARD'S PASTELS: TECHNIQUES OF AN 18TH-CENTURY PASTELLIST

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**ABSTRACT** In 2007 the Rijksmuseum, Amsterdam initiated a conservation and research project on framed pastels by the Swiss artist Jean-Etienne Liotard. For the first time, 21 pastels were unframed and available for documentation, examination and technological analysis. In order to reconstruct both his workshop practice and his palette, materials used by the artist were examined as well as his production process. The first results of this project are presented here with a preliminary palette of colours. Liotard's working methods were studied – from the supports to the application of colours – and then compared to various sources. The 1762 treatise on parchment making by Jérôme De La Lande, *L'art de faire le parchemin*, provided very interesting information on vellum support for pastel painting. Apart from the *Traité des principes et règles de la peinture* (1781) written by Liotard himself, the archives of his only pupil in pastel painting, Princess Karoline Luise von Hessen-Darmstadt, can be considered a unique and direct record of Liotard's practice.

## Introduction

Jean-Etienne Liotard (1702–1789) is considered one of the major artists of the 18th century. He painted in oil, painted miniatures, made enamels and engraved, but pastel, his favourite medium, established his reputation. The Rijksmuseum, Amsterdam, houses the second largest collection of his pastels with 23 works, while the Musée d'Art et d'Histoire de Genève, with 37, has the largest. Many others are held in private collections all over the world. In 2007, the paper conservation studio of the Rijksmuseum initiated a conservation project in which the Liotard pastels were all unframed and documented. In preparation for the reopening of the Rijksmuseum in 2013, it was decided to conserve 13 of his pastels. This was a unique opportunity to investigate the artist's techniques allowing analytical data to be compared with written sources for the first time. The early results of this ongoing research project are presented in this paper.

## Corpus and methodology

The research project was based on two types of primary sources: material evidence (pastel paintings) and written sources (archival material and treatises) from the 18th century. Secondary sources addressed some of the technological aspects of pastel painting<sup>1</sup> and of Liotard's work, and enabled

the identification of primary sources.<sup>2</sup> They also provided information on Liotard and his pupil.<sup>3</sup> Specific studies on the city of Geneva<sup>4</sup> and fixatives<sup>5</sup> provided the necessary information to put this research in a broader context.

Apart from his pastels, Liotard's treatise is the main primary source as it contains theoretical rules established by the artist himself. Information on the pastellist's tools and the making of pastel sticks was provided by contemporary sources, such as Chaperon's *Traité de la peinture au pastel* (1788). The notes taken in 1746 by Liotard's unique pupil in pastel painting, Princess Karoline Luise von Hessen-Darmstadt (1723–1783), during a series of lessons, complemented the treatises' corpus with a direct record. They are now contained in volume XVI of her correspondence and notes on art.<sup>6</sup>

Regarding the material sources, a corpus of 13 pastels, representing a good sample of Liotard's production over his career (from 1735 until 1789), were unframed for technical research. The surface, the sides and the versos of pastels were studied (SK-A-1197 and SK-A-232) as well as two unfinished pastels (SK-A-1196 and RP-T-2010-58). They revealed valuable information on Liotard's preliminary colour tests, wet or dry, on the backs of pastels (SK-A-232) (Fig. 1). These findings provided vital information on his palette, which was then compared with the notes taken during Liotard's lessons in 1746.

The same methodology was applied to the study of all the available material sources. Visual examination was carried out with high-resolution photography using direct,

**Table 1** A summary of the pigments identified by elemental analysis on Liotard's pastels. The question marks indicate an incomplete identification and a need for further research.

Pigments identified		Pastel (Inventory number, Title, date, support)				
Colour	Pigment/colorant	SK-A-228 <i>La Liseuse</i> , 1746, parchment	SK-A-231 <i>M. Coignard</i> , parchment	SK-A-232 <i>M. Boère</i> , 1746, parchment	SK-A-233 <i>Mme Boère</i> , 1746, parchment	SK-A-234 <i>F. Algarotti</i> , parchment
Whites	Calcite	x	x	x	x	x
	Lead white	x	x	x	x	x
	Tin white		x	x		
	Bismuth white					
	Ba or Ti white?		x	x	?	
	Zinc white			x		x
Flesh tones	Cinnabar/ vermilion	x	x	x	x	
	Ochre	x	x	x	x	
	Cu-based green-blue	x			x	
	Lead and bismuth whites					
Yellows, oranges, browns	Various ochres		x	x	x	
	Umber		x	x	x	
	Orpiment					
	Cr-based yellow					
Reds	Cinnabar/ vermilion	x				
	Red ochre					
Greens	Green verditer			?		
	Other Cu-based pigment					
	Mixture of Prussian blue and ochre			?		
	Mixture of Cu-based pigment and ochre			?		
	Mixture of indigo and ochre					
Blues	Prussian blue	x		x	x	x
	Azurite					
	Other Cu-based pigment		x			
	Indigo					
	Mixture of Prussian blue and Cu-based pigment	x		x	x	x
Blacks	Bone black		x	x	x	x
	Black ochre	x	x	x	x	x

Pastel (Inventory number, Title, date, support)						
SK-A-238 <i>MJ. of Saxony</i> , 1750, parchment	SK-A-240 <i>Young Woman in Turkish Interior</i> , parchment+canvas	SK-A-242 <i>Three Graces</i> , parchment	SK-A-1195 <i>Apollo and Daphne</i> , paper+canvas	SK-A-1197 <i>View from Geneva</i> , 1765, parchment	RP-T-2010-57 <i>C. Calkoen</i> , parchment	RP-T-2010-58 <i>Unknown lady</i> , parchment
x	x	x	x	x	x	x
x	x	x	x	x	x	
	x			x		?
x	x				x	
?	?			?	?	
	x				?	
x	x	x				
x	x	x			x	
x						
x					x	
x	x	x	x	x	x	x
x	x	x	x	x	x	x
	x	x	x	x	x	
					x	
x	x	x		x	x	x
x	x	x				x
	?	?		?		
	?	?		?	x	
		?				
				?		
x	x	?	x	x		x
?				x		
?			x			
x	x	?	x	x		
	x	x		x		
x		x	x	x	x	



**Fig. 1** Jean-Etienne Liotard, *Portrait of Monsieur Boère*, 1746, pastel on parchment, SK-A-232: verso. (© Rijksmuseum, Amsterdam.)

raking and transmitted light, ultraviolet and infrared radiation, and with digital microscopy (Hirox). Non-destructive elementary analyses (micro X-ray fluorescence ( $\mu$ XRF) and scanning macro X-ray fluorescence (MA-XRF)) were carried out on some of Liotard's pastels.<sup>7</sup> MA-XRF revealed

the location of one chemical element on the pastel, and also provided a visual indication of the way it was applied on the support. On the MA-XRF maps shown below (Figs 8–10), the higher concentration of an element is shown as a whiter area; dark areas indicate that the element was not detected. When

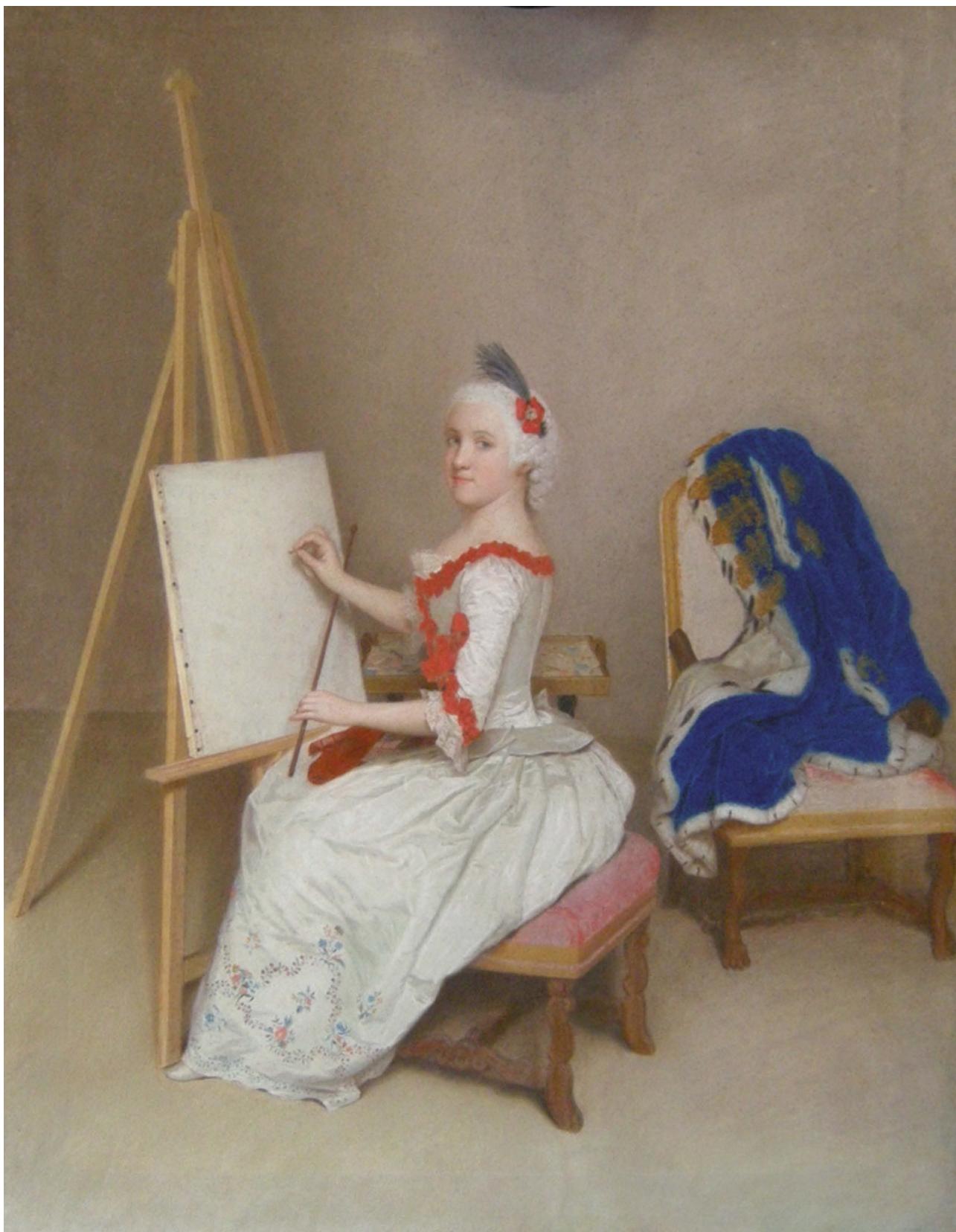


Fig. 2 Jean-Etienne Liotard, *Portrait of the Princess von Hessen-Darmstadt*, 1745, pastel on parchment, inv. 2962. (© Staatliche Kunsthalle, Karlsruhe.)

micro sampling was possible, Raman spectroscopy and polarised light microscopy (PLM) were used to complete pigment identification (Table 1). The pastel, *Portrait of the Princess von Hessen-Darmstadt* (1745, Staatliche Kunsthalle, Karlsruhe, inv. 2962) is a very good illustration of a pastellist at work (Fig. 2).

### Liotard's pastel supports

Liotard painted pastels on various supports, some quite unusual such as prepared canvas, silk and wood. The Rijksmuseum houses some of these, for example, the *Portrait*



**Fig. 3** Jean-Etienne Liotard, *Portrait of Madame Boère*, 1746, pastel on parchment, SK-A-233: detail showing the parchment's texture in raking light. (© Rijksmuseum, Amsterdam.)

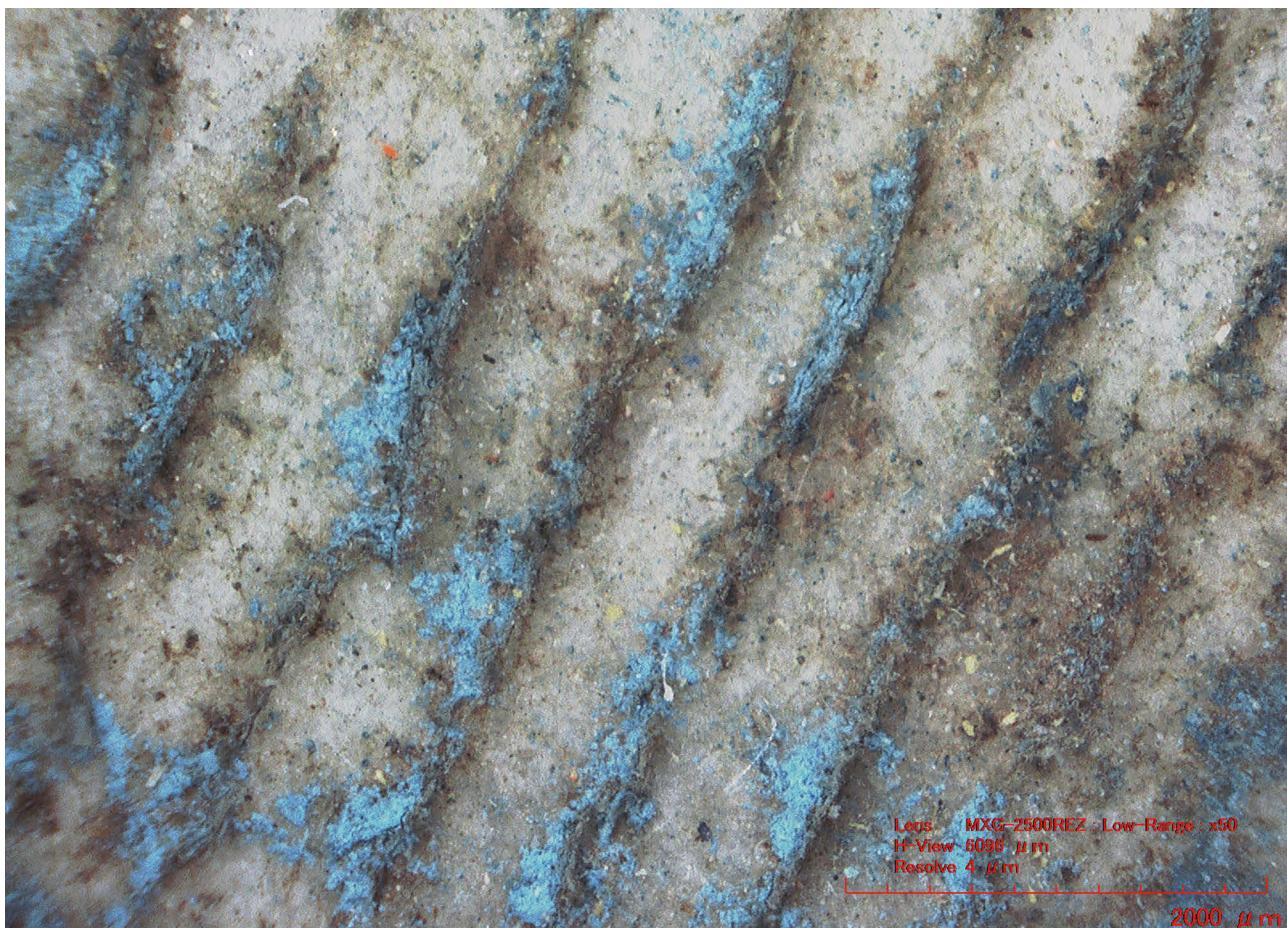
of William Ponsonby (SK-A-237), which is executed on a prepared canvas. A thick layer of blue gouache has been applied to the canvas and shows through the canvas on the back. The *Sleeping Nymph* (SK-A-1194) was painted on a wood panel. Further investigation is needed to determine how it was prepared.

At this time, when painting in pastel, it was common practice to paste paper onto a stretched canvas. There are five pastels painted on this type of support in the Rijksmuseum. The portraits of *Archduke Franz Maximilian* (SK-A-1199) and his brother *Archduke Karl Ferdinand* (SK-A-1198) are unfinished. Executed in Vienna in 1778, these two pastel sketches on blue paper were mounted at a later date. The three other pastels were originally mounted on strainers. *Apollo and Daphne* (SK-A-1195) was drawn on three pieces of paper pasted together. In addition to the main sheet, a paper strip was added along the left edge and another at the bottom. Infrared reflectography (IRR) shows continuity of the underdrawing, proving that the additional strips were added by Liotard. It was common practice among pastellists to paste several pieces of paper together, either to match the size of a strainer, as in this example, or to attach pre-drawn parts of the composition. Maurice-Quentin de La Tour (1704–1788) often used this technique to include the faces in his portraits. Two portraits – *Portrait of Louis de Bourbon* (SK-A-235) and *Portrait of a Young Boy* (SK-A-243) – were drawn on a single

sheet of paper but the original colour is difficult to determine without further investigation.

However, Liotard painted most of his pastels on parchment, in particular vellum, his favourite support. Vellum was frequently used by 18th-century pastel painters. In 1762, De La Lande (1732–1807) wrote in his treatise on parchment making: 'Rosalba and de La Tour have always used paper, whereas Mr Boucher and Mr Liotard prefer vellum. M. Boucher whose authority probably equals in that regard, the celebrity of the painter of the Graces, finds that on vellum colours look fresher, lights are brighter, that there is more velvety and finesse'.<sup>8</sup>

There are 16 pastels on vellum in the Rijksmuseum collection. In the *Portrait of Madame Boère* (SK-A-233), one can easily appreciate in raking light the fibrous, velvety texture of vellum. It grabs pastel pigments and perfectly imitates the texture of skin in portraits (Fig. 3). But texture was not the only advantage Liotard found in vellum. For three years (1723–26), Liotard was apprenticed to the Parisian master, Jean-Baptiste Massé (1687–1767), who taught him miniature painting on ivory and particularly on vellum, his speciality. Trained as a miniaturist, Liotard might indeed have appreciated the very smooth, white and translucent surface of calfskin<sup>9</sup> aged between eight days and six weeks.<sup>10</sup> It enabled him to work small-scale details while its property of absorbing colours allowed more layering than on paper or ivory.<sup>11</sup>



**Fig. 4** Jean-Etienne Liotard, *The Three Graces*, 1737, pastel on parchment, SK-A-242: microphotograph of the dents in the parchment. (© Rijksmuseum, Amsterdam.)

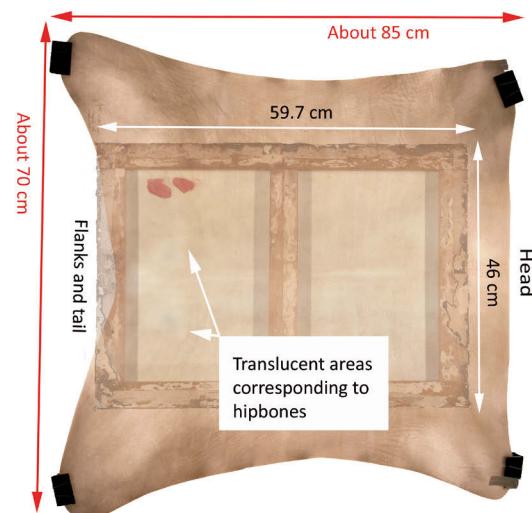
## Vellum for pastel painting

De La Lande's treatise provides an in-depth description of the production and uses of vellum during the 18th century:

To stretch vellum on a strainer, it has to be humidified on the flesh side; but one has to be careful that water doesn't reach the back because the velvety texture would sink and the vellum would become too smooth; in that case, one would have to work in a similar way as with a pumice stone, with a knife rubbed on a soft file; the uneven marks or thin dents left by the file, render vellum fluffy [fibrous], as it was when it came out of the workshop.<sup>12</sup>

This refers to the parallel dents left by the soft file that are sometimes visible on Liotard's vellum supports. Figure 4 is a microphotograph of a detail from *The Three Graces* (SK-A-242): the fibrous texture had probably been damaged due to an excess of humidity during the stretching process. In these areas, pastel adhered specifically on top of the ridges whereas undamaged vellum would be able to hold onto the pastel powder to facilitate drawing and layering.

Liotard's vellum supports were always stretched on rather thick wooden strainers, and were usually folded and secured at the sides with iron nails. A crossbar sometimes reinforced



**Fig. 5** Jean-Etienne Liotard, *View from the Artist's Studio in Geneva*, 1765–1770, pastel on parchment, SK-A-1197: the back superimposed on a picture in transmitted light of a modern calf parchment (H. de Groot, Rotterdam). (© Rijksmuseum, Amsterdam.)

the strainer. The back of *View from the Artist's Studio in Geneva* (SK-A-1197) when superimposed on a photograph in transmitted light on a piece of modern calf parchment, shows which part of the skin was used (Fig. 5). The spine area

is particularly thin in calfskin, while the sides are thicker.<sup>13</sup> The hipbone area is visible where the vellum is more translucent. According to De La Lande: 'The skin side is chosen to paint in pastel, whereas the flesh side is required for miniature; however some vellums are prepared to be used on both sides which allows both choices.'<sup>14</sup> The standard size of a half-figure pastel portrait by Liotard (65/60 × 45/40 cm) corresponds to the useful part of a vellum hide.<sup>15</sup>

The *Young Woman in a Turkish interior* (SK-A-240), more than 1 m high, is a rare case of two vellum sheets pasted onto a stretched canvas with a parchment strip concealing the seal. This mounting technique is very unusual and interesting as De La Lande describes sewing, rather than gluing, to attach together vellum pieces to paint in pastel.<sup>16</sup> Looking at a microphotograph of a vellum sample from this large pastel, the identification of the animal type and of the vellum side used is impossible. The structure has been altered due to the skin preparation during the vellum's production process. It is very difficult to characterise precisely Liotard's vellum supports and therefore to deduce from where they originate. They could have been bought locally wherever the artist was staying or possibly brought from Liotard's hometown of Geneva.

## Pastel medium

A pastel stick is traditionally made of a ground colour (mineral pigment or dried colorant) mixed with a binder, gum arabic being the most common. The quantity of binder added is just enough to hold the pigments together, as the particles should be easily transferred to the drawing support. The amount is usually too small to be identified with the techniques mentioned earlier, which explains why most of the studies in this field focus on pigment and colorant identification. A white filler, usually calcium carbonate and/or a white clay (kaolin), is added to the pure pigment to create a range of lighter hues.

Mixing pastel colours directly on the support is more difficult than in oil painting. The pastellist needed a large set of individual pastels, containing different hues (including mixtures), but also a range of intensities for each hue. Pastel sticks were usually stored in a wooden box.<sup>17</sup> The fabrication of a complete set of pastel sticks required substantial knowledge of the different physical and chemical properties, such as shape, size, texture, hardness, binding property and chemical compatibility of each pastel ingredient. Most of the recipes do not give the precise proportion of each ingredient so artists needed to gain experience to be able to produce a homogeneous set of pastel sticks. They had to know, for example, that some pigments had very strong binding properties, requiring very little binder in order to make a stick. In his treatise, Chaperon listed the properties of each ingredient and advised the reader on incompatibilities or specific sensitivities.<sup>18</sup> The emergence of the pastel maker as a new kind of artists' supplier was thus a solution to the lack of technological knowledge of some pastellists, as well as an efficient response to the new demand for ready-made pastel sticks in Europe during the golden age of pastel painting.

## Liotard's pastels and practice

Discussing Liotard's workshop practice and palette is challenging as the artist never described tools or gave precise technical recipes. The treatise he published in 1781 remains highly theoretical with 12 principles and 20 rules. His aesthetic theories were combined with advice on the proper artist's attitude, based on patience, reason, choice of subjects and the acceptance of criticism regardless of who provided it.<sup>19</sup> Even had Liotard known of and tried ready-made pastels by the likes of Stoupan, the famous Swiss pastel maker,<sup>20</sup> he would probably have made most of his pastel crayons himself as he possessed the relevant technical knowledge.

Liotard defined more precisely his use of colours in rules V and XV, recommending the use of nine tones: four light, four dark and one medium. In rule XV of his treatise he urged the reader to 'Spend as much as necessary to obtain the brightest, the most beautiful, the most solid, the deepest and the best ground colours'.<sup>21</sup> He further elaborated: '[such colours] are useful in any kind of paint'.<sup>22</sup> The artist also advised against the use of green earth, blue ashes and orpiment in oil painting unless the salts they contain were washed off. This corroborates the suggestion that Liotard possessed the technical skills and knowledge to make his own pastels. Liotard's son also referred to this knowledge in a 1779 letter sent to his mother in which he urged her to have his father gather 'all the writings regarding the secrets he found on the way to make pastels of solid colours'.<sup>23</sup> The same year, Liotard answered via his wife that he did not have any writings on his techniques.<sup>24</sup>

Looking at unfinished pastels and at the backs of pastels is fundamental to understanding of the production process. As previously mentioned, in some cases Liotard used the side or the back of the parchment support as a palette to try out pastel sticks (see Fig. 1).

## Underdrawing: composition and shadows

In the *Portrait of the Princess von Hessen-Darmstadt* (see Fig. 2), Liotard depicted his pupil drawing on a stretched vellum nailed to a wooden strainer with the tools used by a pastellist, including a box of pastel sticks to organise colours, a painter's mahl stick and an easel. The princess is outlining her composition with a dark pastel or chalk before applying colours. In her general rules, the princess included the advice given to her by her master regarding drawing: a drawing should be made 'for each part of a painting that appears very difficult to me,' 'finely drawn with a sketching charcoal,' 'traced again with red chalk and wiped away with flour'.<sup>25</sup> Here, she might have mistaken flour for bread, used to remove the excess of charcoal once a drawing had been secured with red chalk. Drawing is very important in Liotard's process as it is the title given to one of his 12 principles.<sup>26</sup>

Marcel Roethlisberger and Renée Loche explain in their monograph on Liotard that there are only a few preliminary 1:1 scale sketches of Liotard's finished pastels, which makes underdrawing all the more important to Liotard as



Fig. 6 Jean-Etienne Liotard, *Portrait of Monsieur Boère*: photograph in direct light and infrared reflectograph. (© Rijksmuseum, Amsterdam.)

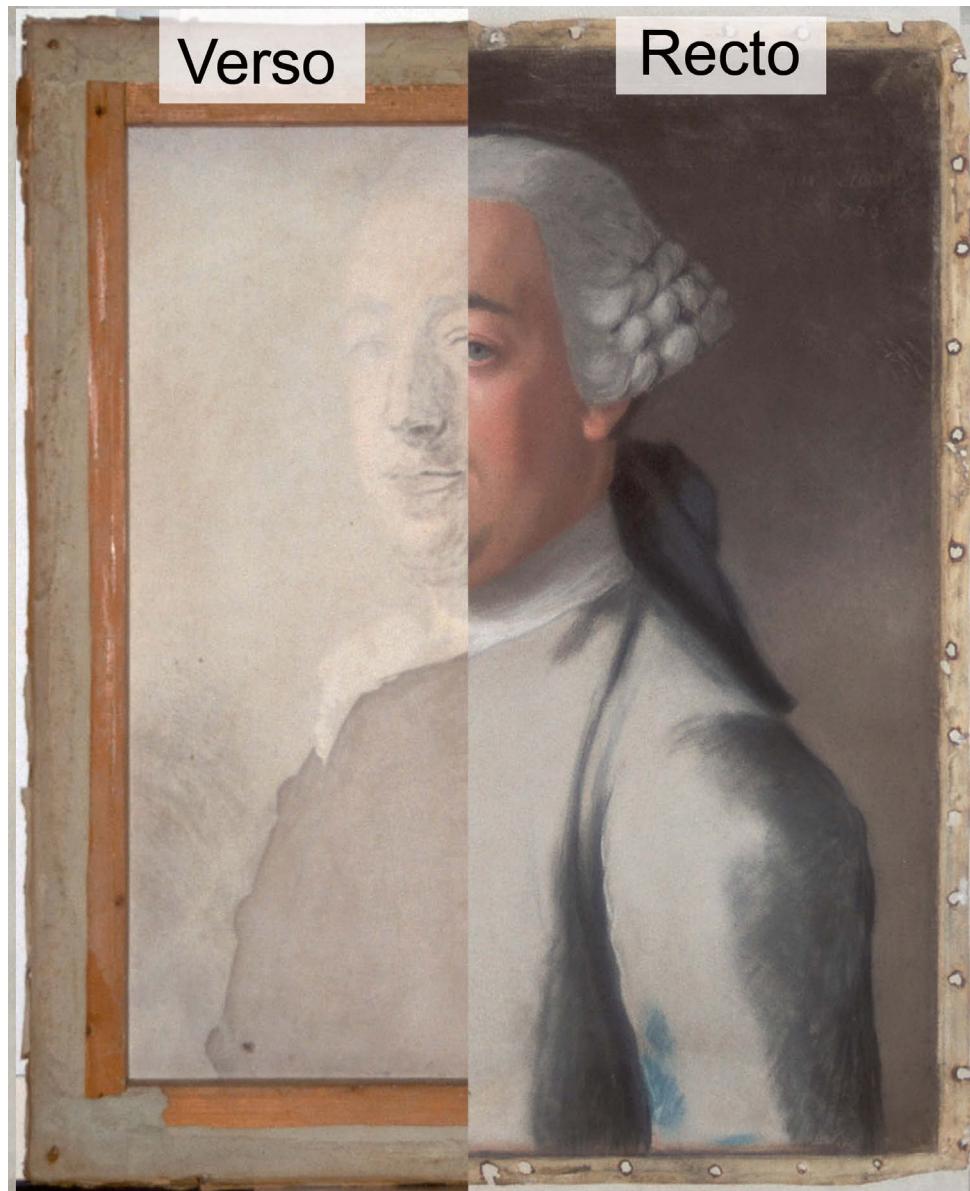
the composition is directly invented and drawn on the support.<sup>27</sup> IRR has confirmed that the artist used a carbon-based chalk or pastel in order to outline his composition. Hatches were also used as an underdrawing technique. In the *Portrait of Monsieur Boère*, the darker side of the sleeve is a layering of dark hatches applied in a coarse and quick manner with the pastel stick (Fig. 6). Despite the layer of blue pastel applied on top, the dark area shows through, building up shades in the garment. As in oil painting's glacis technique, Liotard used the translucency of coloured layers applied on top of dark drawn areas. Following the same pattern, light shades on the right side of the face were created by underlayers of what seem to be carbon-based washes applied with a brush.

Trained as an engraver at an early stage of his career, Liotard knew that building up hatches was essential to create shadows and convey the illusion of three-dimensional effects. In rules I, II, III and IX of his treatise, he develops his theories on shadows and their imitation, stating that shadows should be gradually built up both in the lightest and in the darkest

areas. One of his principles is chiaroscuro, which he characterised as follows: 'It also consists in organising, in a painting, lights and shadows, to group them in order to emphasise the painting's effect and brightness, or subject one is depicting.'<sup>28</sup> However, translucency of the media was not the only way to create the illusion of depth – translucency of the vellum support was also used by the artist.

### Building up coloured layers

In rules VII, VIII, X, XIV, XVI and XIX, Liotard developed his theories on the application of colours. Completing his writing, the notes taken by Princess Karoline Luise are a practical list of steps to be followed in order to draw with pastels. According to the princess, Liotard began his portraits with umber, cinnabar and white to create shadows, adding that, 'all the background colours should be applied evenly without



**Fig. 7** Jean-Etienne Liotard, *Portrait of Cornelis Deutz van Assendelft*, 1756, pastel on parchment, inv. BR0541, Collectie Rijksmuseum, Twenthe, Enschede. Bruikleen particuliere collectie, Zwolle: verso and recto. (© Rijksmuseum, Twenthe, Enschede and Nico Lingbeek.).

smudging them.<sup>29</sup> Liotard used this technique both on the verso and on the recto of his works.

#### Silhouettes on the back of pastels

Behind many drawings the artist did indeed use this technique of drawn silhouettes – they contribute to building up shadows on the recto, using the translucency of the support. This technique can be related to Liotard's work in miniature and transparencies on glass.<sup>30</sup>

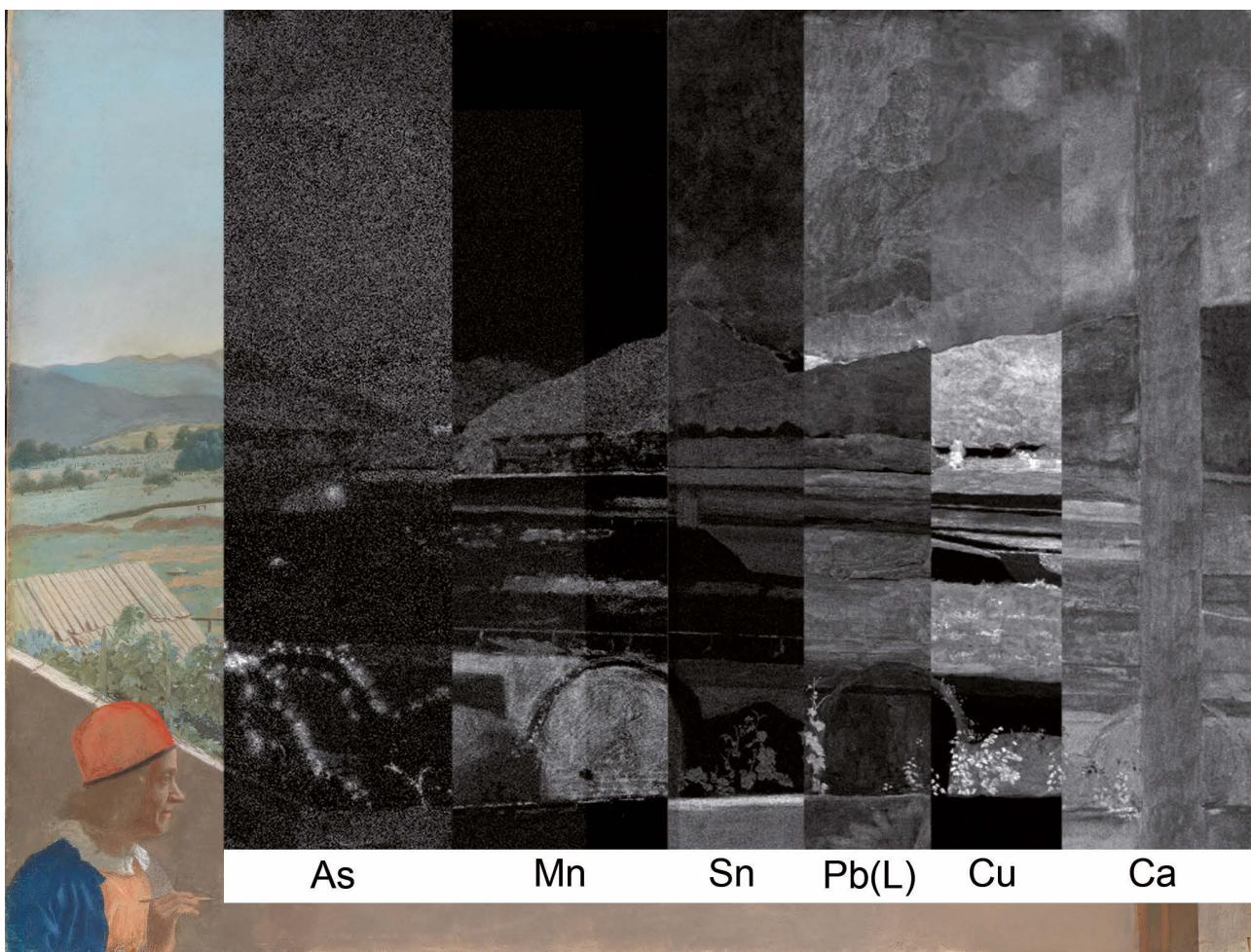
Access to the back of pastels is very difficult as they are rarely unframed. The silhouette technique is not evident on the backs of the Rijksmuseum pastels that are accessible. Due to infestation, some pastels have recently been removed from their strainers and mounted on supports such as plywood or pressed wood, preventing any access to the vellum's verso. Some pastels

on vellum have been mounted on strainers with stretched canvas, again blocking access to the back of the parchment. These original mountings appear to be a reuse of stretched canvas. It is difficult to say if this was an act of preventive conservation (to protect the back) or an artistic gesture (to block the light). Reuse, however, remains the main hypothesis at a time when materials were not always easily available.

Very rare cases of silhouettes on the backs of pastels are known. The *Portrait of the Marquise Wilhelmine de Brandenburg-Bayreuth* (inv. BayNS.G89, Bayerische Verwaltung der staatlichen Schlosser, Gärten und Seen, Neues Schloss) painted in 1745/46, is one example while the *Portrait of Cornelis Deutz van Assendelft* (1730–1788) housed in the Rijksmuseum Twenthe, Enschede (BR0541) is another. The conservation treatment performed by the paper conservator Nico Lingbeek in 1998 provided access to the backs of the pastels. In both cases wet and dry techniques were used. In the



**Fig. 8** Jean-Etienne Liotard, *Portrait of Madame Boère*, detail (from left to right): photograph in direct light, in transmitted light, MA-XRF maps of Mn, Fe, Pb and Hg elements. (© M. Alfeld, Universiteit Antwerpen; TU Delft; Rijksmuseum, Amsterdam.)



**Fig. 9** Jean-Etienne Liotard, *View from the Artist's Studio in Geneva*: (from left to right) photograph in direct light, MA-XRF maps of As, Mn, Sn, Pb(L), Cu and Ca elements. (© M. Alfeld, Universiteit Antwerpen; TU Delft; Rijksmuseum, Amsterdam.)

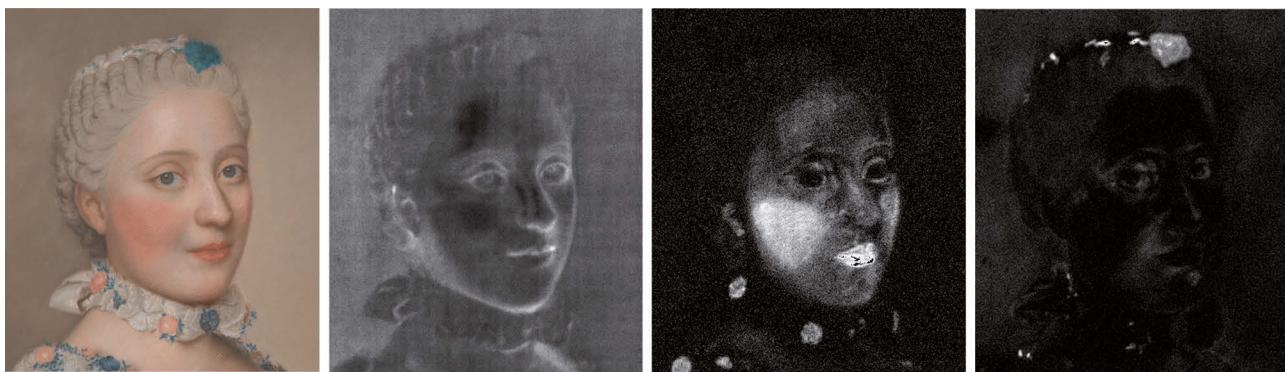
first example, ochre, umber and blue were applied with pastel sticks. In the second example, a large red and black wash was applied wet with a brush in the garment area (Fig. 7), referring to the princess's note number 14: 'The garments are applied in thin and even layer, and then the folds are drawn.'<sup>31</sup> Black, red, yellow and blue washed pastel also seem to have been applied on the face. The white collar is also indicated.

#### Underlayering on the recto

The cases of the *Portrait of Madame Boère* and *Portrait of Marie-Josèphe of Saxony* (SK-A-238) are very good examples of MA-XRF maps matching the princess's notes. As in his

silhouette work, Liotard used the same set of colours to start his portraits. These underlayers contributed to building up shades and depth. In rules IV and VI, the artist described the treatment of colours in relation to shadows. This preliminary step of dark underlayering was carried out in preparation for the application of lighter colours and can be related to Liotard's treatise: 'it is very difficult for a colorist to make believe in shadows where there are only colours.'<sup>32</sup>

In the *Portrait of Madame Boère*, MA-XRF revealed both the location of one element on the pastel and offered a visual idea of the way it was applied on the surface. The umber layer builds shadows in the dark area of the face whereas the cinnabar layer builds modulations in the lightest areas. In transmitted light, both the dense-coloured areas are highly



**Fig. 10** Jean-Etienne Liotard, *Portrait of Marie-Josèphe of Saxony*, 1749, pastel on parchment, detail: (from left to right) photograph in direct light, MA-XRF maps of Fe, Hg and Cu elements. (© M. Alfeld, Universiteit Antwerpen; TU Delft; Rijksmuseum, Amsterdam.)

visible. Once the portrait was completed, the underlayer was no longer visible (Fig. 8).

Underlayers are sometimes difficult to characterise, but MA-XRF again proves useful. The *View from the Artist's Studio in Geneva* is an excellent illustration of this (Fig. 9). A wet underlayer has been broadly applied below the sky and the fields, complying with Liotard's rules: 'Light and brown backgrounds have to be uniformly applied without any colour thicknesses, because if colour is coarsely applied, it makes the background stand out, whereas it seems more distant when it is evenly applied.'<sup>33</sup> The calcium layer, visible with MA-XRF, could be part of the production process of parchment, however, analysis revealed that calcite was probably the filler used in most of Liotard's pastel sticks.

Lead and copper, used mixed together, show the same washed application pattern on the MA-XRF maps. The copper wash is visible on the side of the pastel and was identified as azurite with Raman spectroscopy analysis. Tin is also present in the underlayers, possibly mixed with lead and copper. All these layers contribute to depicting the atmospheric perspective above the mountains. Calcium carbonate, lead and tin white seem to have been used at an early stage of the composition.

### Intermediate layers

This first coloured layer was then completed with 'the mid-tones with burnt ochre, broken with blue or purple; the lights with shade of minium,' described by Princess Karoline Luise (note number 16). The use of blue to render the bluish tone of veins under the translucent skin is clearly visible in the copper scan obtained by MA-XRF from the *Portrait of Marie-Josèphe of Saxony* (Fig. 10). This green-blue pigment is visible in the eyelids, the chin and next to the mouth, slightly showing through the translucent skin. It is used either alone as a layer or could have been blended with another pigment as described by the princess: 'all the flesh is perfectly applied and later blended with a very tight blue and white stick, light and shadow together.'<sup>34</sup>

The use of intermediate layers was also identified in *View of the Artist's Studio in Geneva*. On top of the wet underlayer described earlier, Liotard applied dry pastel broadly to

indicate the main areas of his composition, before painting the details in the foreground (see Fig. 9). In underlayers as well as intermediate layers, no hatches or strokes are visible, following Liotard's rule number VI, to get 'an even background layer'. Again, the princess's notes provide technical details on the mode of application. To create large areas of colour with dry pastels, the layers can be 'worked with a large [pastel] stick'.<sup>35</sup> This probably refers to the use of the long side of the stick for a broader application.

### Top layers

The princess specified that one should keep 'the nice colours and lights for the end.' The *Portrait of Madame Boère* and *Portrait of Marie-Josèphe of Saxony* are clear examples of the application of this rule. Analysis revealed that Liotard used cinnabar and umber sticks containing more lead white as his layers progressed, blending each one into the other (see Fig. 8). The colours could be blended with the fingers, a brush, or a stump made from rolled leather, felt or paper.<sup>36</sup> Princess Karoline Luise insisted many times, probably following Liotard's guidelines, on colour blending in order to obtain very subtle and smooth transitions at each step of the layering process.<sup>37</sup>

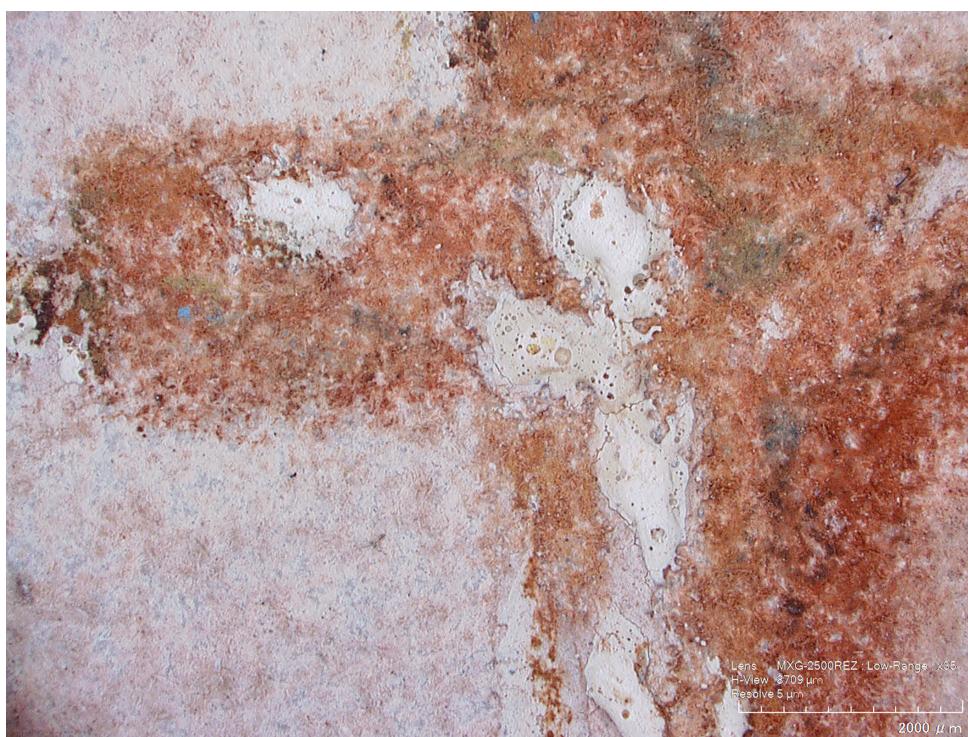
In the last layer of these portraits, the artist sometimes used bismuth white for its pearlescent properties, imitating perfectly the cosmetic powders of the time.<sup>38</sup> Liotard left here an illustration of his rule VII, because the lights come from the superimposed layers, not from light lines.<sup>39</sup> In this instance the technique is based on an optical mixture of primary colours, not on the use of many different colours.

### Highlights

The last step of this layering process is the detail, particularly important for the foreground according to Liotard's rule VIII. Close examination of the upper pastel layers of his pastels led to the identification of two techniques. First, employing the drawing technique of highlighting, the pastelist could use the sharpened tip of a pastel stick to draw the details. This technique was widely used by Liotard, who insisted in his rule VII,



**Fig. 11** Jean-Etienne Liotard, *View from the Artist's Studio in Geneva*: detail in raking light. The upper part shows two horses finely detailed with a sharp dry pastel stick (a few millimetres in height). The relief of the wet pastel, applied with a brush, is visible in the plants in the foreground.



**Fig. 12** Jean-Etienne Liotard, *La Liseuse*, 1746, pastel on parchment, SK-A-228: microphotograph. (© Rijksmuseum, Amsterdam.)

titled 'No stroke' that 'highlights [should be] blended with other colours'. The trees and animals in the background of *View from the Artist's Studio in Geneva* were created using this technique (Fig. 11).

Digital microscopy and raking light revealed a second technique, inspired by the miniaturist and enamel painting

techniques: *La Liseuse* (SK-A-228) and *View from the Artist's Studio in Geneva* are two examples of the use of a miniaturist technique for pastel painting. To depict the crucifix on the *Liseuse's* necklace (2 cm long), Liotard applied pastel as a 'wet paste' on top of a layer of dry pastel (Fig. 12). In the same way, the little white plants in the foreground of the landscape were

delicately painted over an even, dry background (see Fig. 11). Liotard probably mixed pastel powder with water and applied the wash obtained with a very fine brush to achieve this effect.

Generally, Liotard elaborated his pastels carefully respecting his principle of 'No strokes' (rule VII) to create the shadows. Colours were applied as evenly as possible. However the artist contradicted his own theory in a few details, such as the face of *Marie-Josèphe of Saxony* (1749), where the cheeks show a series of parallel dark pink hatches (see Fig. 10). This more vibrant mode of application reveals a free practice of pastel painting in direct opposition to instructions in his 1781 treatise.

## Fixatives

Liotard mentioned fixatives in a letter he sent to the Earl of Bessborough in 1763.<sup>40</sup> He warmly advised the earl to have his pastels fixed by Monsieur Jurine (1722–1779) in Geneva: 'He fixed nine of my works, and three for an English man Sir Chaloner whom I painted not long ago and over sixty works here.'<sup>41</sup> It is unclear whether the 60 works referred to were his or works by other artists from the area of Geneva, from where the letter was sent. In his *Dictionary of Pastellists before 1800*, Neil Jeffares mentions Sébastien Jurine in the 'Inventors, writers and suppliers' section<sup>42</sup> as well as Jurine's advertisement in the *Gazeteer & New Daily Advertiser* published in 1765, which confirms that the earl followed Liotard's advice since he is listed with other British clients of Jurine. There is no information on the content of Jurine's recipe. In the same letter to his client and patron, Liotard also declared that Jurine could fix pastels as well as Loriot in Paris.

Antoine-Joseph Loriot (1716–1782) invented a fixative recipe in 1753 that was officially disclosed at the Académie Royale de Peinture et de Sculpture, Paris, in 1780. It consisted of a solution of fish glue in water and alcohol – two volumes of alcohol should be mixed with one volume of dilution.<sup>43</sup> Jurine's recipe is probably comparable to Loriot's as fish glue is used in several contemporaneous recipes to fix pastels. Moreover, Jurine stated in his advertisement: 'His Method not only prevents the colours from falling or fading, or being easily rubbed off, but likewise takes out every Spot of Mouldiness, and hinders the forming of others.'<sup>44</sup> Loriot claimed the same antifungal properties for his own fixative and Jurine's recipe may also have contained alcohol as an antifungal preventive treatment.

In order to characterise the presence of a fixative on Liotard's pastels, the conservation scientist Julia Schultz analysed three samples from Rijksmuseum pastels in 2009. The antibody-based technique ELISA gave negative results for sturgeon glue or any protein-based substance. The concentration of the protein may have been too low or the protein might have degraded, either by the addition of ethanol in the production process or by ageing.<sup>45</sup>

## Conclusions

The Rijksmuseum pastel conservation project provides a unique opportunity to access unframed pastels during their treatment. This research project on Liotard's techniques is rare in the field of research in pastel painting as it combines examination and analysis of unframed pastel paintings with direct and indirect sources and technical treatises. Princess Karoline Luise von Hessen-Darmstadt's notes contribute to understanding of his working process. She also represents the development of pastel painting among women of high rank by the middle of the 18th century. The princess's connection to Liotard also illustrates the itinerant career of the artist, which can be related not only to the materials to which he had access, but also to his practice. Our understanding of Liotard's palette needs to be completed with analysis of its organic compounds. His knowledge and use of Stoupan's and other pastel makers' pastels are verified and relate to the problems of making his own pastels due to his frequent travels. However, Liotard's procedures for painting or drawing in pastel primarily originate in a very solid, multidisciplinary technological background gained as an apprentice and developed throughout long years of practice. It had a strong impact on his practice and on the colours he used to paint in pastel, some of which were unknown in oil painting such as bismuth and tin white.

## Acknowledgements

We would like to thank P. Poldervaart and I. van Leeuwen, head of paper conservation at the Rijksmuseum, who initiated and supported this project since 2007, as well as D. Christoforou and M. Jürgens for their help. Thanks also to the Rijksmuseum conservation scientists J. Pedroso, A. Wallert, and J. van Iperen, who performed part of the analysis. The development of a MA-XRF device by M. Alfeld (University of Antwerpen), in collaboration with TU Delft and Brüker, brought a very useful tool in our research, and we are very grateful for the time devoted to the analysis of Liotard's pastels and the processing of the scans. We would like to thank D. Bull, curator of international painting at the Rijksmuseum, for sharing his knowledge and passion on Liotard. The part of our research dedicated to Princess Karoline Luise and Stoupan owes a lot to W. Zimmermann, head of Landesarchiv GLAK, and H. Jacob-Friesen, curator at the Staatliche Kunsthalle in Karlsruhe, who provided direct access to archival materials and generously shared their knowledge. We would like to express our gratitude to Nico Lingbeek, paper conservator in the Netherlands, for sharing with us his technical knowledge on Liotard's pastel paintings. We are also very grateful to T. Gough, freelance paper conservator and bookbinder, Sweden, for the proofreading and contribution to the translation of Liotard and Chaperon's treatises and to Dr H. Evans, paper conservator at the Nationalmuseum Sweden, for proofreading. Finally, we would like to thank R. ter Beeke, Rijksmuseum Twenthe (Enschede) for allowing us to reproduce an illustration of a unique pastel painting (Fig. 7).

## Notes

1. T. Burns, *The Invention of Pastel Painting*, London, Archetype Publications, 2007.
2. M.G. Roethlisberger and R. Loche, *Jean-Etienne Liotard: catalogue, sources et correspondances*, 2 vols, Dornspijk, The Netherlands, Davaco, 2008.
3. J. Lauts, 'Jean-Etienne Liotard und seine Schülerin Markgräfin Karoline Luise von Baden', *Jahrbuch der Staatlichen Kunstsammlungen in Baden-Württemberg* 14, 1977, pp. 43–70.
4. G.A. Bridel, 'Les pastels de Lausanne', *Revue historique vaudoise*, Lausanne, Société Vaudoise d'Histoire et d'Archéologie, 1944, pp. 10–21.
5. N. Jeffares, *Dictionary of Pastellists before 1800*, London, Unicorn Press, 2006. Available at: [www.pastellists.com](http://www.pastellists.com) (accessed May 2015).
6. Corr. 5a, Bd.96, Landesarchiv GLAK, Großherzogliches Familienarchiv, Karlsruhe, Germany.
7. For the µXRF analysis, the µXRF ARTAX (Bruker Nano GmbH, Berlin, Germany) was used with the following parameters: molybdenum tube with polycapillary lens (lens 0.060), voltage 50 kV, current 598 µA, detector XFLASH 3001. For the MA-XRF analysis, the MA-XRF scanner M6 Jetstream (Bruker Nano GmbH, Berlin, Germany) was used, with the following parameters: Rh anode, voltage 50 kV, current 500 µA. The technique was developed by M. Alfeld (University of Antwerpen) and Technische Universiteit Delft. For more information on this last technique, see M. Alfeld, J. Vaz Pedroso, M. van Eikema Hommes, G. Van der Snickt, G. Tauber, J. Blaas, M. Haschke, K. Erler, J. Dik and K. Janssens., 'A mobile instrument for in situ scanning macro-XRF investigation of historical paintings', *Journal of Analytical Atomic Spectrometry* 28, 2013, pp. 760–767.
8. 'La Rosalba et M. de la Tour se sont toujours servi du papier ; tandis que M. Boucher & M. Liotard préfèrent le vélin. M. Boucher dont l'autorité doit égaler dans cette parti, la célébrité de ce fameux Peintre des Grâces, trouve que sur le vélin, les couleurs sont plus fraîches, les clairs plus brillants, qu'il y a plus de velouté & même plus de finesse.' J. De La Lande, *Art de faire le parchemin*, Paris, H.L. Guerin et L.F. Delatour, 1762, p. 33, §61.
9. Ibid., p.5, §4.
10. Ibid., p. 24, §44.
11. Ibid., p. 31, §58.
12. Ibid., p. 34, §61: 'Pour tendre le vélin sur le châssis, il faut le mouiller du côté de la chair; mais on doit prendre garde que l'eau ne pénètre pas le côté du dos: car le velouté s'abattoit, & et le vélin seroit trop lisse; dans ce cas on seroit réduit à faire un travail semblable à celui de la pierre-ponce, avec un couteau passé sur une lime douce; les petites inégalités, ou dentelures fines, que la lime y a laissées, rendent ce vélin pelucheux comme il l'étoit au sortir de l'atelier.'
13. Ibid., p. 24, §44.
14. Ibid., p. 34, §61: 'C'est le côté du dos que l'on choisit, pour peindre en pastel, au contraire de la miniature qui exige le côté chair; cependant il y a des vélin qui sont préparés des deux côtés, & dans lesquels on peut choisir.'
15. Roethlisberger and Loche 2008 (cited in note 2), vol. 1, p. 106.
16. De La Lande 1762 (cited in note 8), p. 33, §61.
17. For an illustration of a pastel box, see D. Diderot and J. d'Alembert, *Encyclopédie*, Paris, 1751–1772, Peinture-Planche VI.
18. P.R. de Chaperon, *Traité de la peinture au pastel*, Paris, Defer de Maisonneuve, 1788, chs II, III, IV.
19. J.E. Liotard, *Traité des principes et règles de la peinture*, Genève, 1781, rules XI, XII, XIII and XX.
20. Roethlisberger and Loche 2008 (cited in note 2), vol. 2, p. 809: (Genève, 13 octobre 1778): 'J'y joins ... des pastels la grande boîte
- est pour toi, & la petite des pastels de Stoupass parce qu'on ne les trouve plus, mais d'un autre qui valent encore mieux a se que dit ton Papa.'
21. Liotard 1781 (cited in note 19), p. 119: 'N'épargnez rien pour avoir les couleurs les plus claires, les plus belles, les plus solides, les plus foncées et les mieux broyées.'
22. Ibid., p. 121: 'elles sont utiles pour toute espèce de genre de peindre'.
23. Roethlisberger and Loche 2008 (cited in note 2), vol. 2, p. 817, Lettre de Jean-Etienne Liotard fils à sa mère (Amsterdam, 6 septembre 1779): 'tous les écrits qui intéressent les secrets qu'il a trouvés sur la manière de faire les Pastels de couleur solide'.
24. Ibid., p. 820.
25. Ibid., vol. 1, p. 111: 'pour chacune des parties d'un tableau qui me paraissent les plus difficiles'; 'finement dessiné au charbon à ébauche'; 'repassé à la sanguine et essuyé avec de la farine'.
26. Liotard 1781 (cited in note 19), p. 48.
27. Roethlisberger and Loche 2008 (cited in note 2), vol. 1, p. 108.
28. Liotard 1781 (cited in note 19), p. 56: 'il consiste aussi à distribuer, dans un tableau, les clairs et les ombres, en les groupant d'une manière capable d'augmenter l'effet et l'éclat de la peinture, ou du sujet que l'on traite'.
29. Roethlisberger and Loche 2008 (cited in note 2), vol. 1, p. 110: 'Toutes les couleurs de fond doivent être appliquées lisses, en évitant de les frotter.'
30. Ibid., vol. 2, p. 606.
31. Ibid., vol. 1, p. 111: 'Les vêtements sont appliqués en couche mince et à plat, ensuite on y dessine les plis.'
32. Liotard 1781 (cited in note 19), p. 49, §Du Coloris.
33. Ibid., p. 80: 'Il faut que dans la peinture les fonds clairs ou bruns soient peints unis, et sans aucune épaisseur de couleur; car si elle est grossièrement appliquée, elle fait avancer le fond, qui paraît d'autant plus éloigné, qu'il est couché uni.'
34. Roethlisberger and Loche 2008 (cited in note 2), vol. 1, p. 111, note 26.
35. Ibid., note 22.
36. Burns 2007 (cited in note 1), pp. 31, 121.
37. Roethlisberger and Loche 2008 (cited in note 2), vol. 1, p. 111, notes 3, 23, 24 and 26.
38. Burns 2007 (cited in note 1), pp. 89–94.
39. Liotard 1781 (cited in note 19), rule VII: 'No strokes: there are coloured layers, no strokes.'
40. J. Anderson, 'Fixing pastels: a letter from Liotard to the 2nd Earl of Bessborough in 1763', *The Burlington Magazine* CXXXVI, 1994, pp. 23–25.
41. Ibid., p. 25: 'il m'a fixé 9 de mes ouvrages et 3 pour un Anglais M Chaloner que j'ay peint il y a peu de tems, et plus de 60 autres portraits icy'.
42. Jeffares 2006 (cited in note 5), 'Suppliers/Jurine'.
43. A. Renou, *Secret de fixer le pastel*, s.l., 1780.
44. Jeffares 2006 (cited in note 5), 'Suppliers/Jurine'.
45. J. Schultz and K. Petersen, 'Immunology and art: using antibody-based techniques to identify proteins and gums in binding media and adhesives', in *Symposium on Adhesives and Consolidants for Conservation: Research and Applications*, Ottawa, ICC, 2011.

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