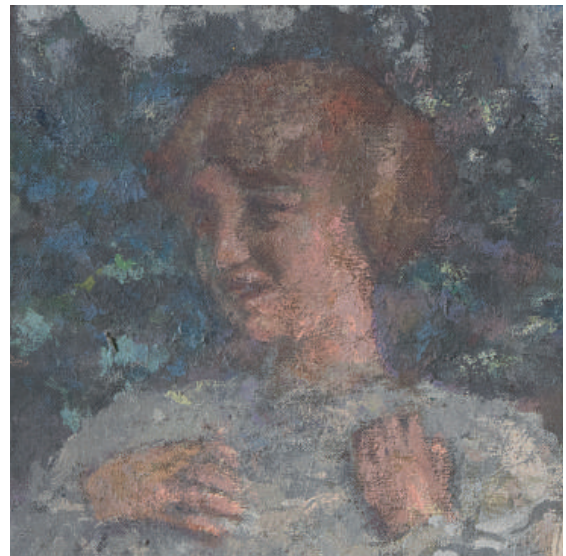


National Gallery Technical Bulletin

VOLUME 33



National Gallery Company
London

Distributed by
Yale University Press

This edition of the *Technical Bulletin* has been funded by the American Friends of the National Gallery, London with a generous donation from Mrs Charles Wrightsman

Series editor: Ashok Roy

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First published in Great Britain in 2012 by
National Gallery Company Limited
St Vincent House, 30 Orange Street
London WC2H 7HH

www.nationalgallery.co.uk

British Library Cataloguing-in-Publication Data.
A catalogue record is available from the British Library.

ISBN: 978 1 85709 549 4

ISSN: 0140 7430

1034206

Managing Editor: Jan Green
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Production: Jane Hyne and Penny Le Tissier
Repro by Alta Image
Printed in Italy by Conti Tipocolor

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FRONT COVER

Edouard Vuillard, *La Terrasse at Vasouy, The Lunch* (NG 6373), 1901, reworked 1935 (detail).

TITLE PAGE

TOP LEFT: Adolphe Monticelli, *Subject Composition* (NG 5010), reverse, probably 1870–86 (detail).

TOP RIGHT: Pierre-Auguste Renoir, *The Umbrellas* (NG 3268), c.1881–6 (detail).

BOTTOM LEFT: Niccolò di Pietro Gerini, *Saint Peter: Left Tier Main Panel* from *Baptism Altarpiece* (NG 579.2), 1387 (detail).

BOTTOM RIGHT: Edouard Vuillard, *La Terrasse at Vasouy, The Lunch* (NG 6373), 1901, reworked 1935 (detail).

Adolphe Monticelli: The Materials and Techniques of an Unfashionable Artist

KATE STONOR AND RACHEL MORRISON

'Never make fun of what seems strange to you: there perhaps lies genius, there is always effort.' (Monticelli)¹

Monticelli has long fallen from favour in art historical circles, but was, in his time, admired by Cézanne (with whom he painted in Aix), and later provided great inspiration for Van Gogh. Though we may no longer appreciate Monticelli's aesthetic, his materials and techniques are of interest because of their influence on these important figures. The National Gallery has a significant collection of late works by Monticelli from the 1870s and 80s, all of which previously formed part of

the collection of Mr Harry Wearne and were presented to the Tate in 1939, and subsequently transferred to the National Gallery Collection in 1956.² Since that time two of these pictures have been reconsidered and are now thought to be by imitators of Monticelli. The ten remaining paintings, which are the focus of this article, cover a range of Monticelli's output, depicting still life, landscape and the Rococo-inspired *fêtes galantes* for which he is best known (FIGS 1, 2 and 3).³

Study of these works was undertaken as part of the Gallery's systematic cataloguing programme. This brought to light many interesting aspects of Monticelli's



FIG. 1 Adolphe Monticelli, *Still Life: Fruit* (NG 5014), c.1878–82. Oil on wood, 45.7 x 61 cm.



FIG. 2 Adolphe Monticelli, *Sunset* (NG 5008), c.1882–4. Oil on wood, 31.8 x 44.8 cm.



FIG. 3 Adolphe Monticelli, *Subject Composition* (NG 5010), probably 1870–86. Oil on wood, 19.1 x 42.5 cm.

practice and formed the basis of this study. Subsequent surface examination, systematic sampling and analysis undertaken by the authors has given an insight into the artist's idiosyncratic working method and materials as well as indicating the influence of commercial tube paints on his production.

Adolphe-Joseph-Thomas Monticelli was born in Marseille in 1824. He studied at the local Ecole de Dessin before travelling to Paris in 1847 to attend the Ecole des Beaux-Arts and work in Delaroche's studio. His artistic education continued on his return visit to Paris in 1855, when he worked with Narcisse Diaz in Fontainebleau experimenting with Watteau-inspired figures in landscapes, and studied Delacroix's paintings with their bright colours and free brushwork.⁴ Monticelli returned once more to live in Paris between 1863 and 1870, when Rococo style was enjoying a resurgence in popularity.⁵ During this time he mingled with the Impressionist set at the Café Guerbois and met the young Cézanne,⁶ with whom he went on numerous painting trips in the countryside around Marseille in the years 1878 and 1884.⁷ The paintings examined for this study all date from the late period after 1870, when, following the outbreak of the Franco-Prussian War, the artist had settled back in Marseille.

Monticelli was highly regarded by his contemporaries: in 1869 Corot helped him to sell his work to a museum in Lille,⁸ whilst Cézanne lobbied to have one of his paintings, *Une Conspiration*, accepted at the Paris Salon in 1879.⁹ However, it is his influence on Van Gogh which is perhaps most notable. Vincent saw Monticelli's work in a Paris show in 1886, the year of the older artist's death, and purchased one of his flower pieces. Soon after, he went to Provence and, along with his brother Theo, was involved in publishing the first book on Monticelli.¹⁰ In a letter to Theo discussing the progress of his work in the autumn of 1888, Vincent states: 'The present studies actually consist of a single flow of impasto. The brushstroke isn't greatly divided, and the tones are often broken. And in the end, without intending to, I'm forced to lay the paint on thickly, à la Monticelli. Sometimes I really believe I'm continuing that man's work, only I haven't yet done figures of lovers, like him.'¹¹

Interest in Monticelli grew immediately after his death and British and American collectors started to pay large sums for his works. This gave rise to a number of imitators, and the problem of forgery is mentioned as early as 1881 in Adolphe Meyer's *La Provence Artistique et Pittoresque*.¹² Technical investigations have brought

to light several significant differences in the materials and techniques of the two signed works in the National Gallery Collection now tentatively identified as 'fakes', which further support this conclusion. The essentials of Monticelli's painting practice for this group of pictures are recorded below.

Supports

The great majority of Monticelli's works are painted on wood panel supports. Garibaldi notes that, during his mature period in Marseille, the artist used 'panels made from old beds, furniture unsold by the second-hand dealer, buffets, cabinets, often 18th century' including oak, walnut, cherry, mahogany and lemon woods. Often, he used a local cabinetmaker to break up the furniture to make suitable painting supports.¹³ This practice is also described by the collector Charles Faure, who sat for a portrait in 1874: 'Since he needed a panel on which to paint me and didn't have one, we went to a shop that sold old furniture and I bought a Louis XIII cupboard. On its door he began my portrait.'¹⁴

The works studied are all consistently painted on reused mahogany panels and it is probable that the reddish hue of the wood suited Monticelli's aesthetic.¹⁵ Where panels consist of more than one board, the joints are usually a tongue and groove construction, something more typically associated with panelling or furniture construction, for instance the back of a cupboard, than with a commercially produced painting support.¹⁶ Four of the works examined had been cradled, usually to reinforce open board joints or splits prior to painting, as paint can clearly be seen passing over gaps in the support (FIG. 4). This seems to substantiate the idea that Monticelli used a carpenter to prepare the recycled supports. Indeed, the cradles were very consistent, including decorative edges of the fixed members (FIG. 5), and would appear to have been applied by the same person or workshop. Of the remaining works all appeared to be reused pieces of furniture, with three paintings having relief carved profiles with some sort of polish applied (FIG. 6). The pendant paintings *Fountain in a Park* (NG 5011), and *Meeting Place of the Hunt* (NG 5012) are painted on matching panels that seem to be reused drawers (FIG. 7). In a letter to his brother Theo, Van Gogh discusses a chest of drawers he has just purchased for his accommodation in Arles, stating that 'I notice that this cupboard has panels just like those on which

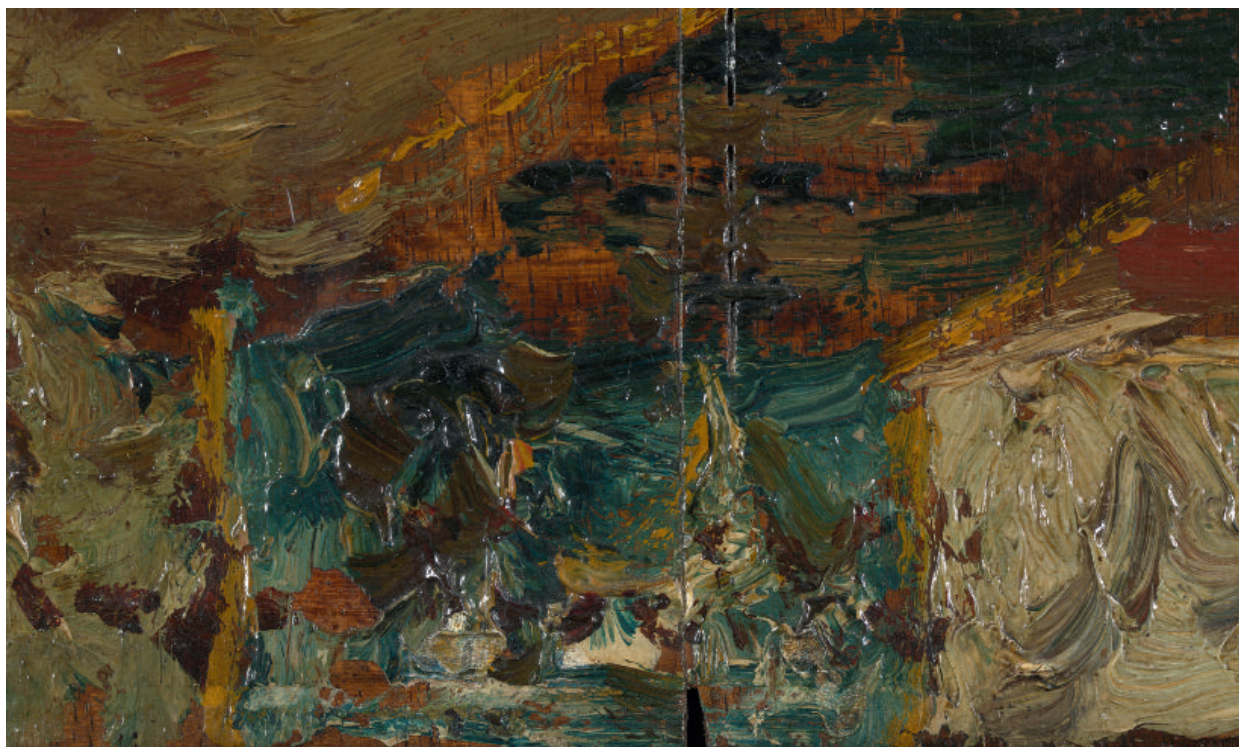


FIG. 4 NG 5015, *A Vase of Wild Flowers*, detail showing paint going over an open split in the panel support.

Monticelli painted.¹⁷ In all cases, with the exception of the double-sided composition *Subject Composition* (NG 5010), Monticelli appears to have used the ‘reverse’, more roughly finished, side for painting, and gouges and tool marks are often visible beneath the paint (FIG. 8). Insect damage was observed on some of the supports and this fits with Emile Verhaeren’s 1889 description of the artist’s use of ‘old wood, often with wormholes’.¹⁸

Panel preparation

None of the panels by Monticelli is covered with a ground layer and the wooden support is left unpainted in places to play a part in the final image. Since all the panels have been varnished with a thick, saturating layer it is difficult to distinguish any initial coating which may have been applied to the panels prior to painting. However, examination with the stereomicroscope showed that in some of the unpainted areas the exposed wood had a slightly particulate, reflective quality, suggesting that there could be a preparative layer present below the subsequent varnish. This supports Garibaldi’s description of Monticelli’s use of a hot transparent preparation on his wood supports which would have

acted to seal the panel, preventing any leaching of the paint medium and creating a smooth, warm-coloured surface for painting. This preference for a warm, dark ground seems to fit with Monticelli’s ideas about Old Master painting and his preoccupation with Titian and Veronese,¹⁹ as Faure states that Monticelli told him that ‘he lived with the Venetian Old Masters and knew all their secrets’.²⁰ Sealing an absorbent surface prior to painting was not commonly recommended in the nineteenth century, but Vibert advises in 1892, ‘if found too absorbent it will be well before painting to brush the support over with a little re-touching varnish, or painting varnish, or a mixture of both’.²¹

Some evidence for a preparatory layer of this kind has been seen in a few cross-sectional samples, where the entire layer structure was maintained intact down to the panel support. For example, a sample from the foreground of *Meeting Place of the Hunt* (NG 5012, FIG. 9) shows a semi-translucent, partially pigmented layer below the green paint which contains a little vermilion, chrome yellow, black and red earth.²² This layer is relatively fluorescent under ultraviolet light (FIG. 10) and analysis by gas chromatography–mass spectrometry (GC–MS) of a sample containing both the green paint and this lower layer identified pine resin in addition to



FIG. 5 NG 5008, *Sunset*, reverse showing typical cradle construction.



FIG. 6 NG 5007, *Sunrise*, reverse.



FIG. 7 NG 5012, *Meeting Place of the Hunt*, reverse.



FIG. 8 NG 5012, *Meeting Place of the Hunt*, raking light showing roughly finished panel with tool marks evident.

the oil paint medium.²³ Further analysis of the cross-section by attenuated total reflectance Fourier transform infrared microspectroscopic imaging (ATR–FTIR) indicated that the resinous component was located in this lower layer, suggesting that the panel was prepared with a pigmented pine resin varnish prior to painting.

In two paintings, *Still Life: Fruit* (NG 5014) and *A Vase of Wild Flowers* (NG 5015, FIG. 13), analysis by Fourier transform infrared microscopy (FTIR) identified wax, which appeared to be connected to a thin translucent layer below the paint. A corresponding cross-section from the beige paint of the tablecloth in NG 5014 shows that indeed a thin transparent layer is present directly on the wooden support (FIG. 11). Under ultraviolet light this appears to be composed of two different materials and in this case there may be two separate layers present on the panel (FIG. 12). The thin lower layer has a warmer, orange fluorescence and the upper layer contains a few fine red particles, possibly vermilion, and is similar to the preparatory layer on NG 5012. GC–MS analysis confirmed the identification of a little beeswax and indicated that a small amount of pine resin was also present in addition to the heat-bodied walnut oil of the paint medium.²⁴ It is possible that a thin wax coating was already present on some of the panels before they were acquired by Monticelli as, even though he preferred to use the backs of furniture panels rather than the polished front, items such as cupboard doors were sometimes coated with wax on the reverse.²⁵ However, it seems that Monticelli still applied a thin layer of pine resin varnish, possibly including a small amount of pigment, to seal the panel before painting.²⁶

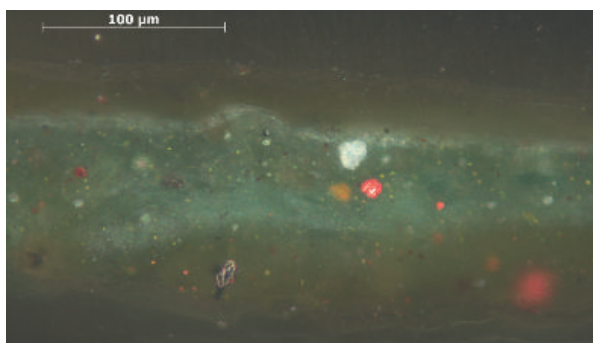


FIG. 9 NG 5012, *Meeting Place of the Hunt*, cross-section from the dull green foreground showing an initial translucent, partially pigmented layer beneath the green-earth-containing paint.

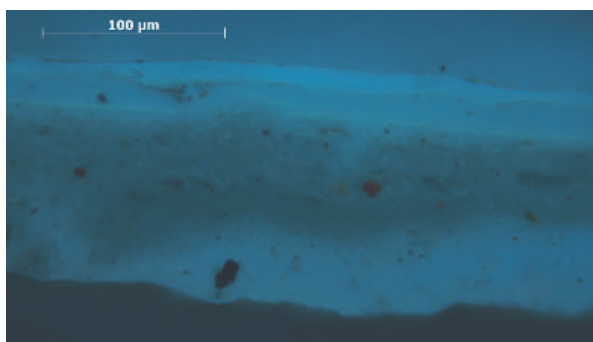


FIG. 10 NG 5012, *Meeting Place of the Hunt*, cross-section illustrated in FIG. 9 shown in ultraviolet light.

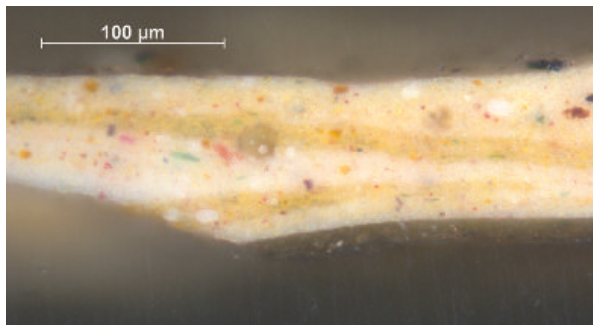


FIG. 11 NG 5014, *Still Life: Fruit*, cross-section from the beige-coloured paint of the tablecloth showing an initial translucent layer below the paint.

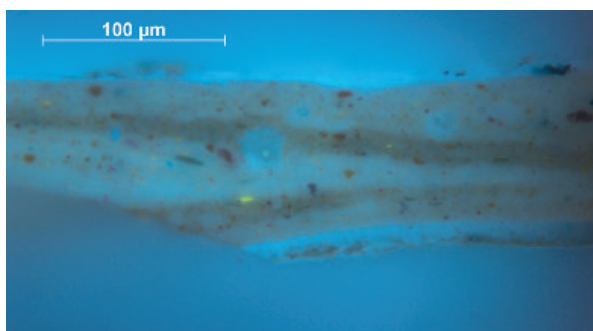


FIG. 12 NG 5014, *Still Life: Fruit*, cross-section illustrated in FIG. 11 shown in ultraviolet light indicating that the initial translucent layer may be composed of two different materials.

Painting technique

The National Gallery paintings fall into three groups according to subject matter: still life, landscape and figurative composition. Within these groups the paintings show very similar technical characteristics, possibly suggesting a chronological development of Monticelli's technique.

The group of still lifes – *A Vase of Wild Flowers* (NG 5015, FIG. 13), *Still Life: Oysters, Fish* (NG 5013, FIG. 16), and *Still Life: Fruit*²⁷ (NG 5014, FIG. 1) – which all seem to feature the same tablecloth, are very similar in terms of execution. Monticelli has set down the composition with a semi-transparent red-brown paint, which is left exposed to stand for the shadows. This has been brushed on loosely and must have been relatively fluid when it was applied (FIG. 17). It is thicker where it is used to delineate the compositional shapes, but elsewhere it is only present as a thin wash and is therefore not always easy to distinguish from the 'sealing' varnish layer already discussed. However, in cross-section the red-brown lay-in appears less fluorescent under ultraviolet light and contains a greater proportion of pigment (FIGS 14 and 15). Nevertheless, the materials are similar and analysis suggests that here, too, the medium of this layer contains a proportion of pine resin varnish.²⁸ The mixture of pigments used to create the warm red-brown colour is also similar. Some umber was identified in the darkest shadows, but fine red, yellow and black pigment particles are also present.²⁹ In the three still-life paintings much of the panel is left visible to stand as a mid-tone and the thicker, more impastoed paint is then built up in the highlights.

On the other hand, the companion landscapes *Sunrise* (NG 5007, FIG. 19) and *Sunset* (NG 5008, FIG. 2), dated to about 1882–4, appear to be painted more directly and may have been executed outdoors.³⁰ Although a similar red-brown is used to delineate the tree trunks and landscape contours, *Sunset* employs a good deal of white impasto building up the sky around the trees in silhouette, and this appears closer to the technique found on the figurative paintings.

The figurative pictures have a clearly separate lead white underpainting of the composition. Again, the extent of this varies between paintings and might have a chronological significance. *Subject Composition* (NG 5016, FIG. 18) appears the most similar to the still lifes, with a red-brown lay-in of the shadows and a more limited white underpainting of the lightest areas. The



FIG. 13 *A Vase of Wild Flowers* (NG 5015), probably 1870–80. Oil on wood, 61 × 47 cm.

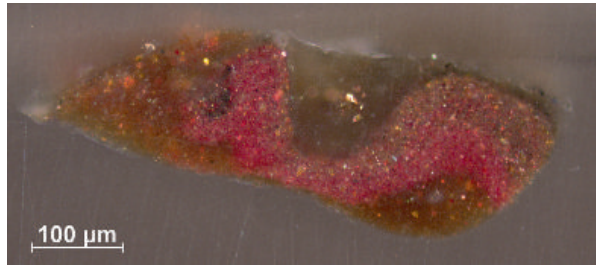


FIG. 14 NG 5015, *A Vase of Wild Flowers*, cross-section from dark brown background showing initial translucent, semi-pigmented 'lay-in' below the red-lake-containing paint.

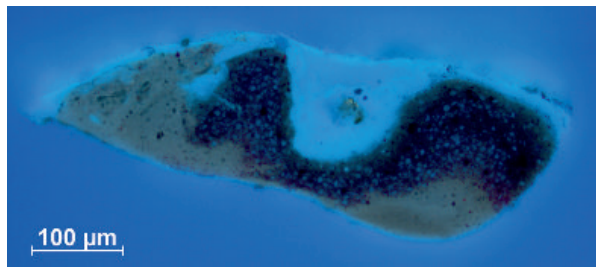


FIG. 15 NG 5015, *A Vase of Wild Flowers*, cross-section illustrated in FIG. 14 shown in ultraviolet light illustrating the different fluorescence of the 'lay-in' from the initial varnish layer seen in FIG. 10.



FIG. 16 *Still Life: Oysters, Fish* (NG 5013), c.1878–82. Oil on wood, 46.4 × 61.6 cm.



FIG. 17 NG 5013, *Still Life: Oysters, Fish*, detail showing the liquid, red-brown lay-in of the composition.



FIG. 18 *Subject Composition* (NG 5016), probably 1870–90. Oil on wood, 42 x 29.5 cm.



FIG. 19 *Sunrise* (NG 5007), c.1882–4. Oil on wood, 27.9 x 41.3 cm.

white underpainting is quite linear in some places, for example in the train of the green dress, but is also used to block in larger areas, such as the distant sky. This is subsequently glazed with blue, which suggests that the white underpaint had been allowed to dry for some time before the second phase of execution (FIG. 20).³¹

NG 5011 and NG 5012 (FIGS 21 and 22), dated 1875–80, leave less of the panel exposed and show a more wholesale use of white underpainting. However, unlike NG 5016, this underlayer is covered with more opaque paints (FIG. 23), possibly suggesting that the white underpaint is used more to create texture than for optical effect. This seems to be particularly the case for the smaller figures, where definition is achieved by superimposing red-brown, linear strokes to create shadow contours and delineate facial features (FIG. 24).

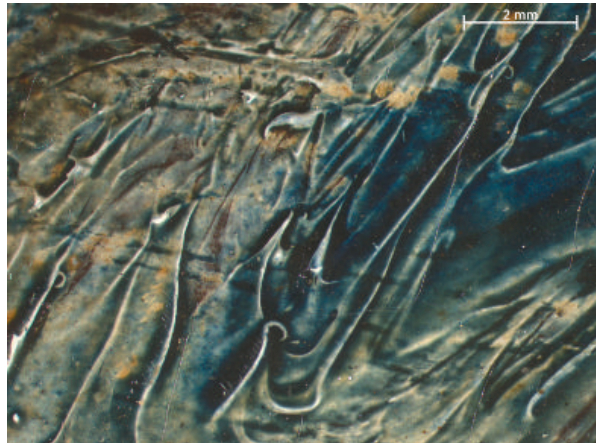


FIG. 20 NG 5016, *Subject Composition*, photomicrograph showing blue glaze over lead white underpainting.



FIG. 21 *Meeting Place of the Hunt* (NG 5012), c.1875–80. Oil on wood, 19.1 × 47 cm.



FIG. 22 *Fountain in a Park* (NG 5011), c.1875–80. Oil on wood, 19.1 × 47 cm.



FIG. 23 NG 5011, *Fountain in a Park*, photomicrograph from the sky showing the red-brown lay-in and the white underpainting with an opaque blue upper paint layer.



FIG. 24 NG 5011, *Fountain in a Park*, photomicrograph from the figure group showing linear red paint used to delineate contours and facial features.

NG 5010 and NG 5018 (FIGS 25 and 26), both entitled *Subject Composition*, are the most thickly painted works, and very little of the panel is left exposed. In fact, no area of uncovered wood was visible on the reverse composition of the double-sided panel NG 5010, although a 'wood-coloured' paint is used, and the panel may have been reworked. Due to the heavy build up of paint it is difficult to be completely sure that the red-brown lay-in is absent, but no evidence of it was found. Most of the composition on NG 5018 seemed to be underpainted with white. In this initial stage, the panel was only left showing in the deepest shadows or boldest contours. The white underpainting was more difficult to see on NG 5010, especially on the reverse, where up to five layers of differently coloured paint could be seen superimposed at the edges. Cross-sections from the reverse of NG 5010 show a complex build up of layers

FIG. 25
*Subject
Composition*
(NG 5010),
reverse, probably
1870–86.
Oil on wood,
19.1 × 42.5 cm.

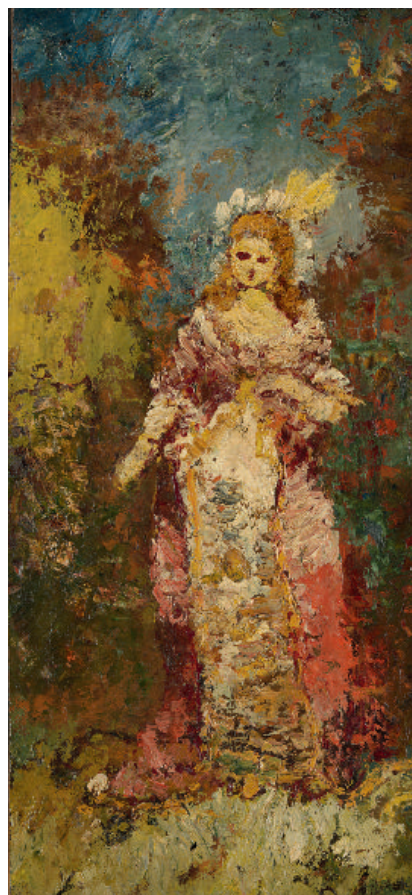


FIG. 26 *Subject Composition* (NG 5018), probably 1870–90. Oil on wood, 21 × 15.9 cm.

using both wet-in-wet and wet-over-dry techniques (FIG. 27), once more suggesting an interval of some time between painting stages. Charles Faure's diary description of his first sitting for Monticelli in 1874 says:

'He made me sit in front of a window, in full light, and he drew with his brush in black and white. He did not say a word to me during that session, which lasted more than two hours. When I saw the panel it was covered with grisaille modelling the figure, the lightest parts in pure white, the shadows warmed a bit with browns and the wood itself showing through to form the hat.'³²

Faure appears to be describing a process which includes both the white underpainting and the more liquid red-brown sketching and outlining which are visible on the paintings in this study. Monticelli's use of a *grisaille* underpainting is reminiscent of the academic *ébauche* and was probably something he had seen while in Delaroche's studio.³³ In particular, his use of a dilute reddish-brown paint to first set out the composition seems to be a variation of the 'sauce' used to work up the underdrawing into a tonal underpainting.³⁴

The idea of underpainting the composition with white was clearly understood by Monticelli's contemporaries. Van Gogh had observed a type of white underpainting in Monticelli's work and attempted to simulate it during the summer of 1889: 'I've worked their foregrounds with thick impasto of white lead which gives firmness to the ground. I believe that Monticelli's were very often prepared in this way. One then places other colours on top. But I don't know if the canvases are strong enough for this work.'³⁵ Van Gogh's worry over the strength of his canvas and whether it could

withstand such a heavy build up of paint could indicate another reason, along with factors such as cost, colour and a sense of age, why Monticelli chose to use panel supports.

When asked how he made his paintings, Monticelli is reported to have replied '*avec un allumette*'; to demonstrate he applied paint to a panel, drawing it out with a matchstick.³⁶ However, examination of the paintings at the National Gallery suggested that they were executed with brushes. Generally medium-sized flat-head brushes were used for the overall composition, such as the tablecloth in the still lifes (FIG. 28), and smaller, possibly round-head, brushes for thicker impasto and finer details. It is possible that he used a matchstick to create some of the finer textural effects, for example the skin of the fruit in NG 5014, but the indentations seem relatively large and it is perhaps more plausible that the end of a paintbrush was used. There may also have been some manipulation of the heavy impasto of the fleshtones with a stick-like implement, but when the figurative compositions are examined using raking light the strokes have a feathered quality and there is evidence of wet-in-wet paint mixing following fine brush bristles (FIG. 29).

There is considerable variation in the brushwork used among this group of paintings. Relatively broad, strongly directional strokes are used to suggest movement in the landscapes, particularly in NG 5007, which is more thinly painted (FIG. 30). There is more diversity in the still lifes, where the thin and relatively even backgrounds stand in contrast to the more dynamic, linear brushwork of the tablecloth and stippled impasto of the objects. This becomes even more extreme in the figurative works, where there is a three-dimensional

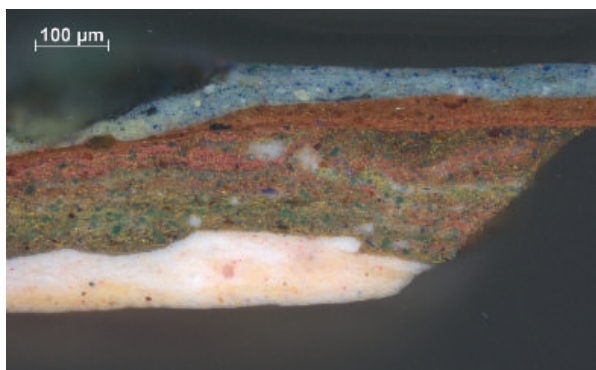


FIG. 27 NG 5010, *Subject Composition*, cross-section showing complex pigment mixtures with both wet-in-wet and wet-over-dry application.



FIG. 28 NG 5014, *Still Life: Fruit*, detail showing brushwork suggestive of the use of a flat head brush.



FIG. 29 NG 5016, *Subject Composition*, photomicrograph of woman's face showing textured brushstrokes with wet-in-wet mixing.



FIG. 30 NG 5007, *Sunrise*, detail showing directional, wet-in-wet brushwork.

quality to the painting and almost all the brushstrokes, except for the deepest shadows, are short and broken to heighten surface texture and scatter light (FIG. 31).

In a letter of 1890 to Albert Aurier, Van Gogh says 'Here you have it, as far as I know there is no colourist who comes so straight and directly from Delacroix.'³⁷ Much emphasis has been placed on Monticelli as a colourist, working along Delacroix's principles of colour theory, which had such a profound influence on the Post-Impressionists.³⁸ For example, Alauzen and Ripert state: 'He uses pure colours, picked up with his brush without mixing, using only hard brushes cut in order to be more rigid, and thus preserving the maximum brightness of each colour.'³⁹ This implies that Monticelli was interested in 'optical mixing', applying adjacent patches of 'pure'



FIG. 31 NG 5018, *Subject Composition*, raking light showing impastoed texture of the paint.

colour rather than mixing them together on the palette. Garibaldi also puts forward this idea: 'Of the ten tones that Monticelli employs, at least seven are pure ... The colours, applied with the tip of the brush without mixing on the palette, are placed next to each other in strips ... threaded but separate.'⁴⁰

Observation of the National Gallery paintings shows that some of his colours do appear to have been used 'pure' or, more accurately, straight from the tube with colour manufacturers' extenders and additions. However, there is also a good deal of evidence, both in cross-section and detailed surface examination, to show that Monticelli was mixing his colours wet-in-wet, and some quite complex mixtures containing up to eight different pigments can be identified (FIG. 32). Similarly, he seems to use non-spectral colours such as umber and black, although mixed blacks made with red, blue and sometimes green were observed on some of the figurative panels. It seems likely that Monticelli was interested in colouristic effects and he was known for his bright, almost garish colours, but there does not appear to be any evidence for 'optical mixing' in the National Gallery paintings.

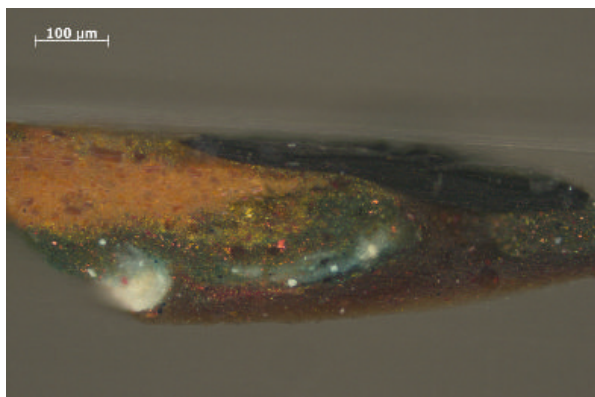


FIG. 32 NG 5013, *Still Life: Oysters, Fish*, cross-section showing complex, wet-in-wet pigment mixtures including: orange earth, chrome yellow, vermilion, Prussian blue, lead white, umber, bone or ivory black, red lake and possibly some zinc white.

Pigments and Lefranc

Alauzen and Ripert collected an invaluable archive of Monticelli's correspondence and anecdotal evidence about the artist from interviews with his friends and acquaintances. Their archive includes a letter dated 2 October 1884 from the artist's cousin Elise Richard, with whom he was staying at the time, to Marcel Guinand, asking that he buy paints for Monticelli. Alauzen and Ripert state that the letter was accompanied with a list of 27 Lefranc colours to be bought from 'Duchesne', the druggist at 68 rue de Rome, Marseille.⁴¹ Marius Duchesne appears to have been an agent for Lefranc, stocking Lefranc products, and was a friend of Monticelli's as well as his supplier.⁴² Duchesne is listed in the business directory for Marseille between 1860 and 1892 under 'drugstore, painting and articles for artists' at the rue de Rome address. Lefranc colours are not specifically mentioned in the advertisement but it is interesting to note that a Lefranc et Cie shop is listed in Marseille from 1895, after Duchesne ceased trading.⁴³ Due to Monticelli's difficult economic circumstances, he was said to have paid Duchesne with paintings and even gave him painting lessons.⁴⁴

Ripert's notebook also makes reference to a M Guesde as a dealer in articles for painting on the rue St Feréol between 1860 and 1870; indicating that he sold to Monticelli and may have received a painting in payment.⁴⁵ Unfortunately, no listing was found for Guesde but an interview with the painter Jules Monge, a close friend of Monticelli's in his final years, states that Monticelli used Lefranc paints throughout his career.⁴⁶ Certainly, Duchesne appears to have been his supplier

for the period in which the National Gallery paintings were made.

Analysis has shown a marked consistency in the artist's choice of pigments. In essence his palette reflects the general availability of pigments in nineteenth-century France, and again Monticelli's friend Jules Monge gives us information about his materials, listing the following colours favoured by Monticelli around 1882: ultramarine blue, Prussian blue, ivory black, chrome yellow and vermilion.⁴⁷ Given the consistency of the pigments used by the artist and the evidence that he was a user of Lefranc paints, comparisons can be made with contemporary colourmen's catalogues, and some inferences can be drawn regarding the possible content of the tube paints he was using.

Lead white appears to be the artist's favoured white pigment and is found pure and in pigment mixtures throughout the paintings examined. Zinc white was also identified but, apart from NG 5012, it is generally confined to pigment mixtures, possibly suggesting a manufacturer's addition to the tube paint in some instances.

Sampling indicates that Monticelli habitually employed both cobalt blue and Prussian blue. French ultramarine was identified in some of the figurative paintings, usually in addition to the other blues, and cerulean blue mixed with cobalt blue was identified on both the front and reverse paintings of NG 5010.⁴⁸ Cobalt blue was relatively expensive compared with French ultramarine and Prussian blue, but perhaps Monticelli had a preference for the paler, more delicate shade.⁴⁹ Cobalt blue was found in a homogenous mixture with zinc white on three paintings and this might suggest a colourman's addition of zinc white, possibly added to brighten the colour (FIGS 33 and 34).⁵⁰ Interestingly the French ultramarine identified on NG 5012 was found in a mixture with cobalt blue, zinc white, Naples yellow, chrome yellow and lead white. Standage in 1887 identifies a 'factitious cerulean' made from mixing ultramarine, Naples yellow and lead white.⁵¹ It may be possible that in this instance Monticelli had not realised that the colour supplier had substituted this mixture for cerulean blue.

The artist's use of greens is perhaps the most interesting, as his palette includes the traditional pigments verdigris and green earth, perhaps accounted for by his interest in emulating Old Master painting. The very strongly coloured viridian green was found on only two paintings and is present as a small component

of quite complex pigment mixtures. Emerald green, on the other hand, is widely used and was identified on all the paintings examined, used both 'pure' and in pigment mixtures.

A more unusual pigment, Rinman's or cobalt green, was identified on NG 5018, along with green earth and verdigris. *Vert de cobalt* was available for sale in the 1876 Lefranc catalogue for 45c per tube, the same price as *vert émeraude* (viridian) and a little more than *vert de gris* at 30c, *vert Véronese* (emerald green) at 25c and *terre verte* at 20c. It is interesting to note that a little emerald green was found mixed with the cobalt green, possibly a manufacturer's adulteration.⁵² A few mixed greens consisting of Prussian blue, yellow ochre and chrome yellow were observed and these might represent, in some cases, a tube mixture. Mixed greens based on Prussian blue were common throughout the nineteenth century and it is likely that the *vert anglais* (three 'nuances') listed in the Lefranc catalogue for 1876 and 1883 is based on a mixture of Prussian blue and chrome yellow.⁵³

By contrast, the reds are very straightforward, since Monticelli consistently employed vermilion, red earth and red lake. Occasionally, a transparent red earth has been identified, but the artist showed a clear preference for red lake, specifically a cochineal dyestuff on a tin substrate with a starch extender (FIGS 35 and 36).⁵⁴ This type of red lake has been identified on other French paintings from the period. In particular, this cochineal lake on a tin substrate, also with a starch extender, has been identified on two works by Cézanne at the National Gallery.⁵⁵ In a number of samples taken from apparently 'pure' red lake passages of paint there are traces of finely divided red ochre, chrome yellow and vermilion. This could be contamination from the artist's brush, but it is interesting to note that when a red lake tube paint, also on a tin substrate with a starch extender, from the French colourman Richard Aines was analysed, traces of fine ochre, chrome yellow and vermilion were identified.⁵⁶

The opaque red earth employed by Monticelli has often been found associated with minor amounts of arsenic when analysed with energy-dispersive X-ray

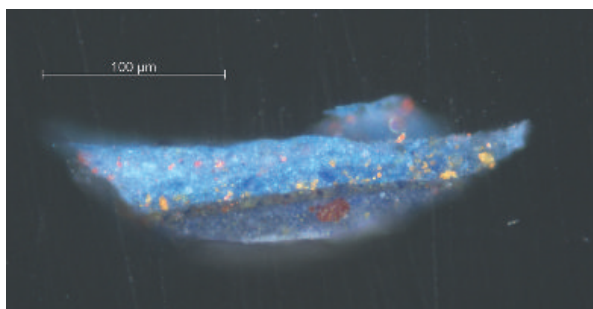


FIG. 33 NG 5011, *Fountain in a Park*, cross-section from sky showing a fairly homogenous mixture of cobalt blue and zinc white with vermilion and red earth with a lower layer of French ultramarine with lead white, vermilion, red earth, some chrome yellow and red lake.

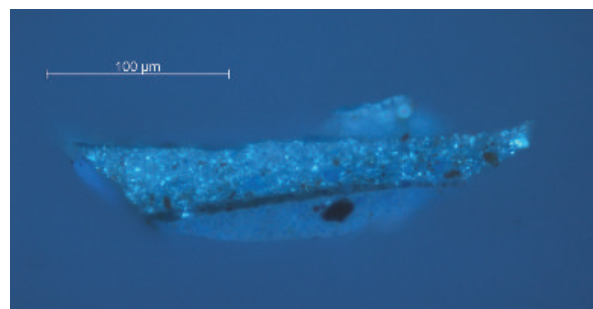


FIG. 34 NG 5011, *Fountain in a Park*, cross-section illustrated in FIG. 33 shown in ultraviolet light showing the presence of UV fluorescing zinc white in the upper cobalt-blue-containing layer.

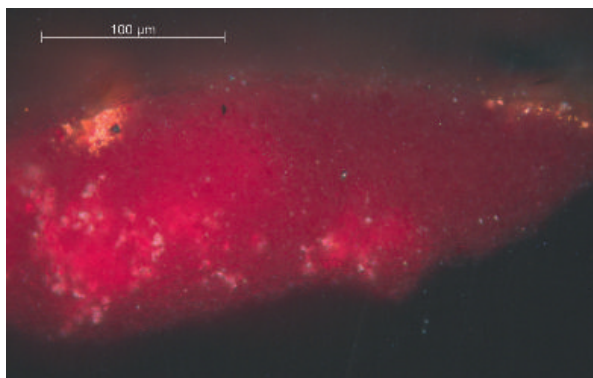


FIG. 35 NG 5015, *A Vase of Wild Flowers*, cross-section of red lake paint from flowers.

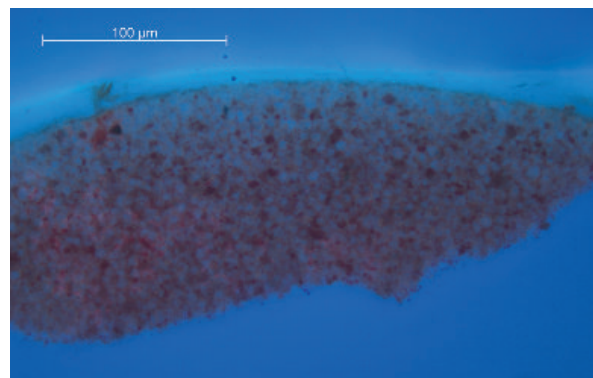


FIG. 36 NG 5015, *A Vase of Wild Flowers*, cross-section illustrated in FIG. 35 shown in ultraviolet light with distinctive starch particles visible as spheres with a milky fluorescence.

analysis in the scanning electron microscope (SEM–EDX). This might indicate a synthetic Mars colour, as arsenic was observed as a minor component in several nineteenth- and twentieth-century Mars colours offered by Winsor & Newton and by Roberson.⁵⁷ Orange earth was also identified in the majority of the paintings examined. Lefranc lists a large range of earth pigments, including *rouge de Mars* which sold for three times as much as *ocre rouge*.⁵⁸

Monticelli used chrome yellow as his primary yellow pigment. At least two shades of chrome yellow can be distinguished in samples: one cool and light; the other warmer.⁵⁹ Naples yellow has been identified on two paintings, the companion pictures NG 5011 and NG 5012, probably in addition to the light chrome yellow. Yellow ochre, transparent yellow earth, yellow lake and Indian yellow have also been observed, but these were, with the occasional exception of yellow ochre, always found in mixtures, usually with chrome yellow.⁶⁰ It is interesting that, despite their ready availability, Monticelli seems to avoid using any cadmium colours. These were more expensive than other yellow pigments, but this does not seem to have affected his choice when selecting other colours, and he may have rejected these modern pigments for more aesthetic reasons.⁶¹ Monticelli's reliance on chrome yellow pigments mirrors Van Gogh's use of various shades of chrome yellows in the National Gallery's *A Wheatfield, with Cypresses* (NG 3861).⁶²

As with cobalt blue, chrome yellow is often found associated with zinc and, although it is possible that some zinc yellow is also present, the characteristic fluorescence of zinc white is evident in cross-sections. A sample taken from the off-white foreground of NG 5018 illustrates nicely the intimate mixing of zinc white with chrome yellow and yellow ochre applied wet-in-wet with lead white and emerald green (FIGS 37 and 38). This would appear to suggest a tube mixture. The Winsor & Newton archive of nineteenth-century artist's materials includes a number of recipes that mention the addition of zinc white, again, probably added to brighten the colour. Several of these are for 'permanent yellow', a mixture of chrome yellow and zinc white.⁶³ Lefranc catalogues from the 1870s and 1880s offer a long list of yellow oil paints available to buy in tubes. Some are straightforward in their terminology, such as *jaune de chrome clair ou foncé*, which must refer to two shades of chrome yellow similar to those identified in Monticelli's work. Others are more ambiguous, for example *jaune de Rome*, and have been

interpreted variously.⁶⁴ However, analysis undertaken on a tube of Winsor & Newton paint from Corot's paint box found Roman yellow to contain a mixture of chrome yellow and yellow ochre.⁶⁵

Monticelli's palette also includes browns and black. Umber or brown earth was present in almost all the paintings examined, and black was identified on every work. The artist's preference seems to have been for the warmer bone or ivory black and this constitutes the dark backgrounds of the still-life paintings, which are often underpainted with red lake to increase the warmth and translucency of the paint.

Our results indicate that Monticelli's pigment mixtures are relatively free of extenders. Barium sulphate was found in several layers on NG 5010, but

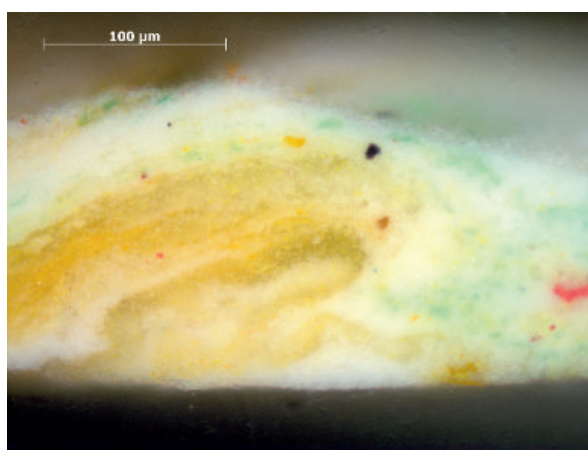


FIG. 37 NG 5018, *Subject Composition*, cross-section showing wet-in-wet mixing of yellow and white paint.

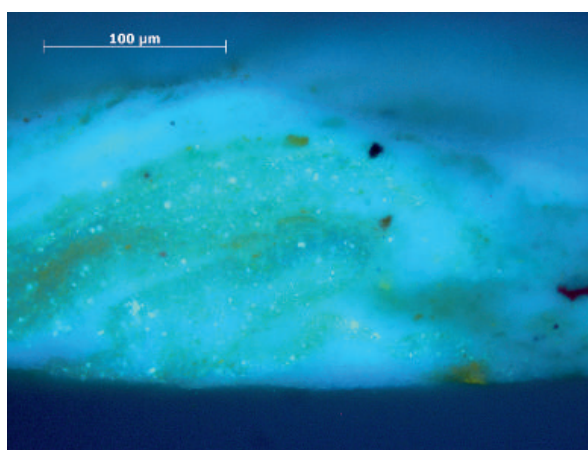


FIG. 38 NG 5018, *Subject Composition*, cross-section illustrated in FIG. 37 shown in ultraviolet light with the distinctive fluorescence of zinc white appearing to be intimately associated with the chrome yellow and yellow ochre pigment in a lead white and emerald green matrix.

since these layers were formed of quite complex pigment mixtures, it could not be associated with a specific tube paint. Silica, aluminium and calcium were also identified using SEM–EDX. In many cases these could be accounted for as a natural component of an earth pigment, but both NG 5010 and NG 5014 appeared to contain calcium sulphate associated with Prussian blue. It is interesting to note that Church writes ‘alumina was an added or extraneous substance found in Prussian blue along with plaster-of-Paris or zinc white’.⁶⁶ Prussian blues were often mixed with extenders due to the high tinting strength of the pigment. Lefranc lists two grades of Prussian blue, ‘fine’ and ‘ordinary’, in its catalogues from the 1870s and 1880s, along with *bleu de Chine* and *bleu minéral* which were probably based on Prussian blue.

As mentioned above, many writers cite Monticelli’s interest in using ‘pure colours’, that is, unmixed pigments, and have suggested that he was using a restricted palette of about ten colours, possibly reflecting contemporary ideas on colour theory.⁶⁷ The number of pigments identified (approximately twenty five) would seem immediately to discredit this theory, but it is also possible that some of these pigments may have been included by the manufacturer as an addition or even a substitution to the tube paint, as for example in the mixture sold as *jaune de Rome*. Further research into tube paints and manufacturers’ mixtures would help to gain a better understanding of the implications of tube paint formations. Nevertheless, analysis has also demonstrated that Monticelli was using more than ten colours and mixing pigments on the palette.

Medium

Organic analysis of samples from the National Gallery paintings indicates a binding medium consistently based on drying oil, which has generally been heat-bodied to some degree. This result is to be expected given Monticelli’s use of Lefranc tube paints. Interestingly, both linseed oil and walnut oil have been identified and in one sample of chrome yellow-containing paint the medium may be poppyseed oil,⁶⁸ suggesting that the manufacturer was adapting the medium. Unfortunately too few samples have been analysed to establish whether particular pigments are always linked to a specific type of oil, and Monticelli’s use of a wet-in-wet technique ensures that many of the samples contained paint mixed from several

different tubes, making it difficult to interpret the results accurately.⁶⁹ While all of the oils – linseed, walnut and poppyseed – were available for purchase, the Lefranc catalogues from this period do not specify which oil was used in their tube paints. A little beeswax was found in the cobalt blue and lead white paint from the sky of NG 5007. This probably represents a manufacturer’s additive, since in this sample the beeswax did not appear to be connected to an underlayer or preparation on the panel. Ceresine wax was also detected in various samples taken from Van Gogh’s *A Wheatfield, with Cypresses* (NG 3861) and it seems probable that wax was added to aid the dispersion of the pigment in the medium and prevent it from settling out when stored in a tube.⁷⁰

Alauzen and Ripert suggest that Monticelli added copal (*verniss à peindre ou vernis gras*) to certain of his colours, and believe that he sometimes used isolating varnishes.⁷¹ This assertion may be based to some extent on the report of Charles Faure, who describes Monticelli mixing his colours with varnish: ‘According to [Monticelli], one should never paint on parts that are partially dry; it is better to paint on still wet surfaces. The paint holds better and you avoid cracks. He uses pure colours, or [colours] mixed with varnish, which is thick, slightly yellow and I believe it is the kind used for carriages.’⁷²

While no evidence of copal was detected in any of the samples, some analyses suggested the presence of a little pine resin in addition to the oil medium. This type of result can sometimes be accounted for by the incorporation of small traces of the surface varnish layers and, as already discussed, some of the panels may have a varnish-containing sealing layer. Furthermore, the red-brown lay-in which may have been present in some material analysed also seems to contain pine resin. Even so, it is possible that Monticelli added a small amount of a pine resin varnish to his tube paint in certain passages, perhaps to achieve a higher gloss or to modify the working properties of his paints.

Despite his efforts, Monticelli did not manage to avoid his paint cracking, and numerous drying defects were noted on the panels. The dark red-brown and black backgrounds of the still lifes all display drying cracks, from minor wrinkling in NG 5014 to large aperture cracking in NG 5015 (FIG. 39). These appeared to be caused by the poor drying of the paint. However, drying defects were also noted in the thickly painted whites of these works, most notably in the tablecloth of NG 5015 (FIG. 40). Since these paints mostly contain

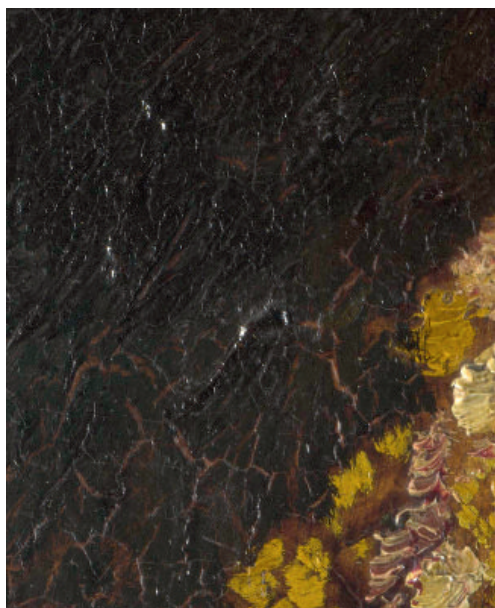


FIG. 39 NG 5015, *A Vase of Wild Flowers*, detail showing drying cracks in the dark background.

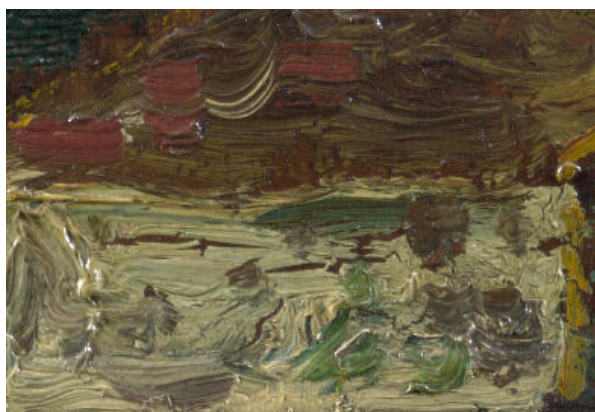


FIG. 40 NG 5015, *A Vase of Wild Flowers*, detail showing drying cracks in the white tablecloth.

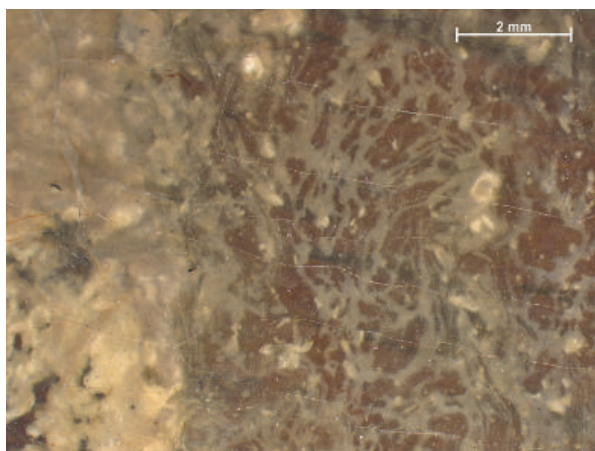


FIG. 41 NG 5012, *Meeting Place of the Hunt*, photomicrograph showing the 'resist effect' of the sky paint not wetting the coated panel support.

lead white, the cause of these defects may relate to the contraction of the initial preparation layer, which, as Faure suggests, may not have been completely dry prior to the paint application. This could have been exacerbated by a particularly thick application of paint. With one panel, NG 5012, the preparation layer seems to have caused some unintended consequences not seen on its companion piece, NG 5011. The white paint of the sky does not appear to have wet the surface properly, possibly because the preparation layer was very thick or not completely dry (FIGS 9 and 10). This has caused a pronounced 'marbling' effect (FIG. 41). Small-scale drying cracks were also noted in the red-brown passages and dark greens on many of the other works, probably due to poorly drying pigments applied quite thickly.⁷³

Varnishes

Little documented conservation history exists for these paintings, but examination suggests that only minimal treatment has been carried out. There is little evidence of any restoration, apart from some very minor 'toning' of some framing damage which probably pre-dates the transfer of the paintings to the National Gallery Collection in 1956. Minor treatments are noted in the Gallery's records for only three of the paintings: some consolidation of blisters in the paint is recorded for NG 5013 and NG 5016 in 1971, and for NG 5008 in 1969, which was also surface cleaned and revarnished in the same year. However, all of the paintings examined have thick, strongly fluorescing varnish layers, which have yellowed significantly.⁷⁴ In most cases, the varnish was evenly applied, but on NG 5008 there is a particularly uneven area in the upper left corner of the sky, where the thick varnish has pooled and the discoloration is particularly evident.⁷⁵ The varnish layers have also developed their own fine-scale crack pattern and in certain pictures this has led to a patchy loss of saturation over some of the darker passages of paint.

It is clear that these varnish layers have a pronounced effect on the appearance of the paintings. The level of discoloration masks Monticelli's use of bright, contrasting colours, and a rather more uniform surface gloss is created which reduces the difference between the thinly painted areas, with passages of exposed wood, and the more thickly built up, textured parts. Cross-sectional samples, which include the surface coatings, show that often more than one layer of varnish is present, and

generally all of these paintings have been revarnished at some point in the past. GC–MS analysis of samples from seven of the paintings indicated that the varnishes have a complicated composition, but there is a marked similarity between the different panels. In all cases the varnishes contained dammar resin in combination with a large proportion of conifer resin. Most often this was larch resin (Venice turpentine), but on two of the panels, NG 5008 and NG 5011, fir balsam was identified.⁷⁶ Varying amounts of mastic resin were also detected but, when more than one sample of varnish was obtained, the results suggested that the presence of mastic was connected to an upper layer of varnish, probably applied later. This level of consistency in the type of varnish could be explained simply as a result of the paintings all belonging to a single collection and being treated in the same way. However, it is possible that the varnishes containing the dammar and conifer resin mixture are the original varnishes which have never been removed.⁷⁷ They may have been applied while the paintings were still in Monticelli's possession, perhaps even by the painter himself. The evidence for this seems particularly strong for the seven paintings which were bought by Harry Wearne directly from the artist in 1886, the year of Monticelli's death. Subsequently, Wearne stated that the pictures had 'never been out of (his) possession nor (had) they been exhibited' until shortly before they were given to the nation.⁷⁸ Nonetheless, the now heavily saturated and glossy appearance of the National Gallery paintings may not be consistent with the aesthetic that Monticelli was searching for. The painter André Maglione (1839–1923), who also acted as a dealer of Monticelli's paintings, admitted to 'outrageously' varnishing several panels by Monticelli 'à outrance' or to excess, and it is said that 'towards the end of his life Monticelli no longer liked him', perhaps implying that the artist was unhappy with this practice.⁷⁹

Fakes

Re-examination of *Torchlight Procession* (NG 5009) and *Conversation Piece* (NG 5017) (FIGS 42 and 43), which are now considered 'fakes' on stylistic grounds, has provided some technical evidence which appears to confirm this observation. The panel supports of these two paintings are rather different from the reused furniture noted for the other paintings. NG 5017 has been painted on a mahogany panel that appears to be

cut down from a larger board, as it has a join close to the left edge. However, the narrow board on the left appears to be made from a different wood, so it seems less likely that this panel was originally used in a piece of furniture. In addition, the thickness of the boards is rather uneven and there is a pronounced warp. The panel join seems to have originally been a mortise and tenon joint but the front, painted surface of the panel has been planed or sanded down prior to painting to create a smooth surface. This is rather different from Monticelli's use of the uneven, unfinished backs of his reused panels. The reverse of NG 5017 is coated, but does not have the even finish of some of the other panels on which Monticelli painted, and several large drips are evident. In contrast, NG 5009 is the only painting in this bequest not on a mahogany support. This panel is made from two tangentially cut, horizontal grain boards of a softwood, probably pine. It has been cradled (perhaps to reinforce the split), again giving the impression of an older panel which has been reused, but the cradle is rather more crudely applied and does not share the same details as those applied to the other paintings by Monticelli.

Unlike the other Monticellis examined, the panels of both NG 5009 and NG 5017 are completely covered with paint, with no wood left exposed.⁸⁰ NG 5017 was painted on a primed panel with a grey ground containing zinc white, a little lead white and a black pigment, possibly ivory black.⁸¹ Although no ground layer was conclusively identified in samples from NG 5009, examination of the panel suggests that it too was primed with a grey layer. In both cases this layer seems to have imparted a fine gritty texture to the surface, suppressing much of the wood grain and giving these paintings a smoother overall appearance. The warm mid-tone created by the exposed wooden support in Monticelli's works is, instead, replicated with a reddish brown paint, particularly evident around the figures in NG 5009. In general, the paint on both these pictures appears to be more thinly built up, with the impasto added in the final stages of the painting process. This seems at variance with Monticelli's practice of building up the impastoed texture in his white underpaint. Furthermore, the white impasto of the figure's drapery in NG 5009 appears to have been applied with a small palette knife, a technique not observed on any of the other works examined, and there is some evidence of scratching into the wet paint on NG 5017. It would appear that the paint was applied and then manipulated to imitate the effects created by Monticelli, perhaps based on some knowledge of what



FIG. 42 Imitator of Monticelli, *Torchlight Procession* (NG 5009), probably 1870–86. Oil on wood, 30.5 × 48.9 cm.

was reported about the artist's technique but without a detailed understanding of how Monticelli worked in practice.

The palette of pigments used in these two paintings also differs from those identified on the other panels. Zinc white, identified in the ground layer of NG 5017, was also found to be the primary white pigment used on NG 5009 rather than the lead white more commonly found on the other Monticelli panels.⁸² The red lake composed of a cochineal dyestuff on a tin substrate with a starch extender, which Monticelli seems to have used habitually, is absent from both pictures. Instead, an alizarin crimson lake was used, which had a chalk substrate and no evidence of a starch extender.⁸³ The traditional greens, verdigris and green earth, favoured by Monticelli are also absent from both pictures. It has been suggested by Sheon that these 'fakes' are by the same hand and the similarities between the pigments on these two pictures tends to support this suggestion.⁸⁴ The type of Prussian blue pigment employed on these panels, which in both cases is extended with calcium carbonate, is a further example.

Conclusion

There seems to be a resurgence of interest in Monticelli's techniques, perhaps because his methods seem to have been of such particular concern to his now more famous contemporaries. As Van Gogh observed while painting in Arles: 'Under the blue sky, the orange, yellow, red patches of flowers take on an amazing brilliance, and in the limpid air there's something happier and more suggestive of love than in the north. It vibrates – like the bouquet by Monticelli that you have.'⁸⁵

With this in mind, it should be remembered that the condition of many of Monticelli's works today may have a considerable effect on our current appreciation of the artist's aesthetic. Monticelli's strong association with Lefranc products sets his materials in the context of commercial paint formulations and the influence they had on an artist's choice of pigments and medium in the second half of the nineteenth century.

In many ways Monticelli might be seen as the archetypal misunderstood genius, the 'modern painter' driven by his art rather than commercial or populist success. This seems to be yet another way in which he provided a model for Van Gogh, who stated:



FIG. 43 Imitator of Monticelli, *Conversation Piece* (NG 5017), probably 1870–90. Oil on wood, 33 × 25.4 cm.

‘I myself think about Monticelli a great deal... He was a strong man – a little, even very, cracked – dreaming of sunshine and love and gaiety, but always frustrated by poverty, a colourist’s extremely refined taste, a man of rare breeding, carrying on the best ancient traditions. He died in Marseille, rather sadly and probably after going through a real Gethsemane. Ah well, I myself am sure that I’ll carry him on here as if I were his son or his brother.’⁸⁶

Acknowledgements

The authors would like to thank Sarah Herring for sharing her thoughts on Monticelli’s technique and for her considerable help with the art-historical literature and observations on the text of this article. We would also like to acknowledge the sampling and inorganic analysis carried out by Rachel Grout, whose observations

formed the basis of this research, and thank Raymond White and Catherine Higgitt for their initial work on the paint medium and surface coatings. Jo Kirby undertook the analysis of the red lake dyestuffs and was most helpful in advising the authors on technical literature. We would also like to thank Anne Robbins for assistance with translation and guiding our archival research. We owe a great debt to Laurence Fumey of the Archives départementales des Bouches-du-Rhône (Département des documents, secteur Archives privées-documents figures), who searched through the Monticelli archives to find references to artists’ suppliers in Marseille. And finally, our thanks to Nigel Bamford, Senior Conservator of Furniture and Wood at the Victoria & Albert Museum, for his useful comments on furniture and Nancy Ireson for her helpful notes on the text.

This article is available for download at:
http://www.nationalgallery.org.uk/technical-bulletin/stonor_morrison2012

Notes

- 1 S. Stammegna, *Catalogue des Oeuvres de Monticelli*, Vol. 1, L'Imprimerie des Remparts, Vence 1981, p. 10.
- 2 Twelve paintings were presented to the Tate by Miss F.K. Hascall in 1939, ten years after Wearne's death. The National Gallery also has another painting by Monticelli, *The Hayfield* (NG 3263), acquired through the Sir Hugh Lane Bequest, 1917, which is on long-term loan to Dublin City Gallery The Hugh Lane, and was not included in this study.
- 3 It should be stated that the provenance and exhibition history of these paintings is not always known and that the titles given to the works may have changed over time.
- 4 A. Sheon, in J. Turner (ed.), *Dictionary of Art*, Oxford 1996, Vol. 22, p. 29.
- 5 A. Sheon, *Monticelli: His Contemporaries, His Influence*, exh. cat., Museum of Art, Carnegie Institute, Pittsburgh 1978, p. 24.
- 6 F. Fowle, 'Painting like a Provençal: Cézanne, Van Gogh and the secret of Monticelli's "alchemy"' in F. Fowle and R. Thomson (eds), *Soil and Stone: Impressionism, urbanism, environment*, London 2003, pp. 135–152, p. 137.
- 7 Sheon 1996 (cited in note 4), p. 29.
- 8 Sheon 1978 (cited in note 5), p. 58.
- 9 Sheon 1978 (cited in note 5), p. 70.
- 10 P. Guigou, *Adolphe Monticelli*, Paris 1890. This publication contains lithographs by August Lauzet of twenty paintings by Monticelli.
- 11 Vincent van Gogh to Theo van Gogh, Arles, Wednesday, 26 September 1888 (689) in L. Jansen, H. Luijten and N. Bakker (eds), *Vincent van Gogh – The Letters: The Complete Illustrated and Annotated Edition*, London 2009, Vol. 4, p. 290.
- 12 Sheon 1978 (cited in note 5), p. 97.
- 13 Translated from C. Garibaldi and M. Garibaldi, *Monticelli*, Geneva 1991, p. 74.
- 14 Faure translated in Sheon 1978 (cited in note 5), p. 75.
- 15 The end grain of two panels, *Subject Composition* (NG 5010) and *Fountain in a Park* (NG 5011), were sampled and mahogany tentatively confirmed. The wood of the other panels was visually identified.
- 16 None of the panel dimensions match the standard sizes offered in colourmen's catalogues of the period. Correspondence with Nigel Bamford, Senior Conservator of Furniture and Wood at the Victoria and Albert Museum, confirms that mahogany was used for furniture making from the mid-eighteenth century. Shellac furniture polish was in general use from about 1830.
- 17 Vincent van Gogh to Theo van Gogh, Arles, Wednesday 10 or Thursday 11 October 1888 (702) in Jansen et al. 2009 (cited in note 11), Vol. 4, p. 321.
- 18 Translated from French in E. Verhaeren, 'Monticelli', *Art Moderne*, 24 Novembre 1889, *Sensations*, Paris 1927, referred to in G. Ruillard, *Monticelli l'étrange*, Marseille 2008, pp. 103–6, esp. p. 103.
- 19 Translated from Garibaldi and Garibaldi 1991 (cited in note 13), p. 76.
- 20 Faure translated in Sheon 1978 (cited in note 5), p. 75.
- 21 L. Carlyle, *The Artist's Assistant*, London 2001, p. 205.
- 22 The pigments were identified by scanning electron microscopy–energy dispersive X-ray analysis (SEM–EDX).
- 23 Pine resin was identified by the detection of the following methylated, oxidised resin acids: 7-oxodehydroabietic acid and 7-oxo, 15-hydroxydehydroabietic acid. The fatty acids ratios (P/S 2.0, A/P 1.1, A/Sub, 2.5) indicate that the oil medium of the green paint was heat-bodied, although the ratio of palmitate to stearate is at the boundary between linseed and walnut oil, and in this case the type of oil cannot be positively confirmed. However, GC–MS analysis of further samples taken from the sky indicated the use of heat-bodied walnut oil.
- 24 Heat-bodied walnut oil was indicated by the ratio of fatty acids (P/S 2.1, A/P 1.0, A/Sub 3.5). The presence of beeswax was confirmed by the pattern of hydrocarbons and long chain fatty acids and, given the results obtained by FTIR microscopy, it seems likely that this is related to a thin layer below the paint. Methylated peaks for dehydroabietic acid and its oxidation products indicated the presence of pine resin. Traces of both larch resin and dammar resin were also detected but, on the basis of additional GC–MS analysis, these components can be assigned to the upper varnish layers and do not appear to be part of either the paint medium or the preparatory layers on the panel.
- 25 Correspondence with Nigel Bamford, Senior Conservator of Furniture and Wood at the Victoria and Albert Museum. It must be borne in mind that the beeswax detected could relate to consolidation carried out with a wax adhesive. However the detection of this layer on two separate panels for which no records of consolidation exist implies that this is not the case.
- 26 It is possible that the pine resin detected by GC–MS may be related to the paint medium, since the sample analysed contained both the beige paint and the preparatory layers, but the layer structure visible in the cross-section suggests that it is more likely to be connected to a sealing layer below the paint.
- 27 The composition of NG 5014 has a large pentiment underneath the carafe/wicker bottle which is very apparent in raking light, where a highly textured area shaped like a handle is apparent at the left and the area to the right appears to have been scraped down. It is possible that the original design included a jug. This relates to the composition of RF19375 *Nature morte au pichet blanc* in the Musée d'Orsay, Paris.
- 28 ATR–FTIR analysis of the cross-section illustrated in figs 14 and 15 indicated that the translucent brown underlayer contained a natural resin component. GC–MS analysis of a sample containing both this layer and the red lake-containing paint identified a small amount of pine resin in addition to the heat-bodied linseed oil paint medium. Whilst it is possible that the pine resin is a component of the paint, the information gained through the ATR–FTIR analysis suggests that it is more likely to be related to the translucent underlayer.
- 29 A little umber was identified by SEM–EDX analysis, which showed clear peaks for iron and manganese.
- 30 Sheon 1978 (cited in note 5), p. 56.
- 31 Tests done by the National Gallery Scientific Department show that an interval of at least several days must occur in order to paint over lead white oil paint without disturbing the layer. D. Bomford, J. Kirby, J. Leighton and A. Roy, *Art in the Making: Impressionism*, exh. cat. National Gallery, London 1990, p. 92.
- 32 Faure translated in Sheon 1978 (cited in note 5), p. 75.
- 33 Pigments used for the ébauche include Cassel earth, ochres, and other earth pigments with small quantities of cobalt blue, red lake and black. J. Kirby and A. Roy, 'Paul Delaroche: a case study of academic painting' in *Historical Painting Techniques, Materials and Studio Practice*, Symposium preprints, University of Leiden, The Netherlands, Getty Conservation Institute 1995, pp. 166–75, p. 171.
- 34 For a further discussion of French academic painting practice see Bomford et al. 1990 (cited in note 31), p. 12.
- 35 Vincent van Gogh to Theo van Gogh, Saint-Rémy-de-Provence, Tuesday 25 June 1889 (783) in Jansen et al. 2009 (cited in note 11), Vol. 5, p. 41.
- 36 Notes by P. Ripert from his notebook 31F 15-3, Monticelli Manuscripts, 31 F *Papiers Pierre Ripert et André Alauzen* (1802–1982), Archives Départementales des Bouches-du-Rhône, Centre de Marseille.
- 37 Vincent van Gogh to Albert Aurier, Saint-Rémy-de-Provence, Sunday 9 or Monday 10 February 1890 (853) in Jansen et al. 2009 (cited in note 11), Vol. 5, p. 198.
- 38 For a further explanation of nineteenth-century colour theory see chapter 'Seurat and Colour Theory' in J. Leighton and R. Thomson,

- Seurat and the Bathers*, exh. cat., National Gallery, London 1997, pp. 42–9.
- 39 Translated from A. Alauzen and P. Ripert, *Monticelli: Sa Vie et Son Oeuvre*, Bibliothèque des Arts, Paris 1969, p. 131.
- 40 Translated from French in M. Garibaldi, 'Monticelli' in *Van Gogh Monticelli*, exh. cat., Centre de la Vieille Charité, Marseille 2009, pp. 65–91, p. 77.
- 41 The list was supposedly destroyed by Gabrielle Guinand, another of the painter's cousins, so that it could not be used by forgers. This was also the reason given for a recipe for the famous 'black velvet' being destroyed. Presumably this was some sort of mixed black created using primary colours. Alauzen and Ripert 1969 (cited in note 39), p. 163.
- 42 'Duchesne avait le dépôt de Lefranc' – Interview with Ayasse, nephew of Marius Duchesne, September 1930, in Ripert notebook 31F 15-2, Monticelli Manuscripts (cited in note 36).
- 43 Entries from *L'Indicateur Marseillais* kindly researched by Laurence Fumey, Archives départementales des Bouches-du-Rhône, Département des documents, secteur Archives privées-documents figures. Lefranc et Cie is listed under 'couleurs et vernis' at 76 rue de la République between 1895 and 1908 and at 47 Boulevard du Muy between 1910 and 1920.
- 44 Alauzen and Ripert 1969 (cited in note 39), p. 398.
- 45 Entry from Ripert notebook 31F 15-2, Monticelli Manuscripts (cited in note 36).
- 46 Interview with Jules Monges by Ripert on 11 October 1930 from his notebook 31F 15-1, Monticelli Manuscripts (cited in note 36)
- 47 Memories of Jules Monge in Alauzen and Ripert 1969 (cited in note 39), p. 453.
- 48 Cerulean blue is an artificial compound of cobalt and tin oxides, cobalt stannate, first supplied as a watercolour in 1860 as caeruleum blue by Rowney. Bomford et al. 1990 (cited in note 31), p. 56. It is interesting to note that a peak for magnesium was found associated with the cerulean blue, indicating its method of manufacture.
- 49 The 1876 Lefranc catalogue lists 'Bleu de cobalt' and 'Bleu caeruleum' at 65c per tube whilst 'Outremer Guimet No1' is 45c, 'Outremer Guimet No2' is 30c, 'Bleu de Prusse fin' is 30c and 'Bleu de Prusse ordinaire' is 25c.
- 50 NG 5010, NG 5011 and NG 5012 all had samples with homogenous mixtures of cobalt blue and zinc white.
- 51 Carlyle 2001 (cited in note 21), p. 472.
- 52 It is possible that this is a manufacturer's adulteration, given that emerald green was cheaper and more strongly coloured than cobalt green.
- 53 Balcar and Vila analysed a Lefranc paint, *Vert Anglais No.5*, dating from 1930–4 and found it to contain a mixture of Prussian blue and chrome yellow. Nathalie Balcar (C2RMF) and Anna Vila, 'Chemical Composition of Artistic Paint: Lefranc reference samples from the first half of 20th Century', conference poster *From Can to Canvas: Early uses of house paints by Picasso and his contemporaries in the first half of the 20th century*, 25–27 May 2011, France. Interestingly, both *vert mineral* and *vert anglais* are priced at 30c per tube in the Lefranc catalogue.
- 54 See J. Kirby, M. Spring and C. Higgitt, 'The technology of eighteenth- and nineteenth-century red lake pigments', *National Gallery Technical Bulletin*, 28, 2007, pp. 69–95. Samples of red lake from four of the paintings were analysed by high performance liquid chromatography (HPLC): *Subject Composition* (NG 5010); *Still Life: Oysters, Fish* (NG 5013); *Still Life: Fruit* (NG 5014); *A Vase of Wild Flowers* (NG 5015). In each case a cochineal dyestuff was identified. SEM–EDX analysis identified a tin substrate in all of the red lake-containing samples examined, and the pigment was consistently found to be extended with starch, identified by FTIR microscopy. In red lake samples from NG 5011, NG 5012, NG 5015 and NG 5018, SEM–EDX analysis identified small quantities of calcium in addition to the tin. It is possible that some chalk is also present as an extender in these particular paints, but little evidence of this was found by FTIR analysis. Furthermore, ATR–FTIR analysis performed on a cross-section of red lake-containing paint from NG 5015 indicated the presence of small amounts of calcium oxalate, which could account for the Ca detected by SEM–EDX.
- 55 This type of red lake has been identified on the later works by Cézanne in the National Gallery: *Bathers* (NG 6359, 1894–1905) and *An Old Woman with a Rosary* (NG 6195, 1895–6). See Kirby et al. 2007 (cited in note 54), pp. 90–3.
- 56 A Kwakernaak, E. Hermens and K.J. van den Berg, 'A Travel Experience: The Corot Painting Box, Matthijs Maris and 19th Century Tube Paints', *ArtMatters: Netherlands Technical Studies in Art*, Vol. 1, Zwolle 2002, pp. 104–21, p. 116.
- 57 Table of EDS results in K. Helwig, 'Iron Oxide Pigments: Natural and Synthetic' in B. Berrie (ed.), *Artists' Pigments: A Handbook of Their History and Characteristics*, Vol. 4, London 2007, pp. 39–110, p. 64.
- 58 Lefranc catalogue 1876 and 1883.
- 59 SEM–EDX analysis indicates that the light yellow has a lower chrome content than the darker pigment. According to ASTM Standard (D211-67) chrome yellows can be classified into three types according to their PbCrO₄ content: Type I ('primrose') contains >50%; Type II ('lemon' or 'light') contains >65%; and Type III ('medium') contains >87%. N. Eastaugh, V. Walsh, T. Chaplin and R. Siddall, *Pigment Compendium: A Dictionary of Historical Pigments*, Amsterdam 2004, p. 99.
- 60 The dyestuff of the yellow lake was not analysed by HPLC, but SEM–EDX analysis indicated an aluminium substrate distinguishing it from the Indian yellow. The Indian yellow was characterised by its distinctive yellow fluorescence under ultraviolet light and the presence of calcium and magnesium detected by SEM–EDX.
- 61 Jaune de cadmium clair and foncé are priced at 1f per tube in both the 1876 and 1883 Lefranc catalogues, whereas jaune de chrome clair and foncé are listed at 25c.
- 62 See the discussion of chrome yellow pigments in J. Leighton, A. Reeve, A. Roy and R. White, 'Vincent Van Gogh's 'A Cornfield, with Cypresses'' in *National Gallery Technical Bulletin*, 11, 1987, pp. 42–59, p. 54.
- 63 Lead white is also an ingredient of one recipe. Unique recipe codes: P1P164AL08 and P1P364AL01 Winsor & Newton Archive of 19th Century Artists' materials, <http://www.hki.fitzmuseum.cam.ac.uk/archives/wn/>. 'Permanent yellow' can also refer to zinc chromate-containing paints in recipes in the archive.
- 64 Jaune de Rome is described as based on a mixture of zinc and manganese oxides in F. Perego, *Dictionnaire des matériaux du peintre*, Belin, Paris 2005, p. 423. Elsewhere, the term 'Roman' has been linked with ochre in R.D. Harley, *Artists' Pigments c.1600–1835*, London 2001, p. 90, and lead-tin-antimony oxide in A. Roy and B. Berrie, 'A new lead-based yellow in the seventeenth century', *Painting Techniques. History, Materials and Studio Practice*. Contributions to the IIC Dublin Congress, 7–11 September 1998, A. Roy and P. Smith (eds), London 1998, pp. 160–5.
- 65 Similar analysis done on a German 'Ocre Jaune' tube paint of the period (manufactured by Dr Schoenfeld) also found a mixture of zinc yellow, yellow ochre and possibly chrome yellow in Kwakernaak et al. 2002 (cited in note 56), p. 116.
- 66 Carlyle 2001 (cited in note 21) p. 476
- 67 Garibaldi 2009 (cited in note 40), p. 77.
- 68 Analysis of this sample gave a P/S ratio of 3.5, considerably higher than that obtained from all the other samples. This falls close to the boundary between walnut and poppyseed oil, but since all the other results from this group of paintings which were interpreted as walnut oil gave P/S ratios in the range 2.0–2.9, it is possible that this sample is in fact poppyseed oil.
- 69 Samples containing paint mixed from several different tubes could contain different types of oil. Mixtures of linseed and poppyseed

- oil may give an intermediary P/S ratio which could be interpreted as walnut oil.
- 70 See the discussion of medium in Leighton et al. 1987 (cited in note 62), p. 59.
- 71 Alauzen and Ripert 1969 (cited in note 39), pp. 131–2.
- 72 Faure translated in Sheon 1978 (cited in note 5), p. 76. Copal varnish was typically used for coating carriages.
- 73 Drying defects in red-brown passages were noted particularly in NG 5012 and NG 5016. Drying defects in green and brown passages were also seen on NG 5010 (front).
- 74 All paintings fluoresced strongly green in ultraviolet light. Those with a more degraded surface coating had a more milky appearance.
- 75 NG 5010 *Subject Composition* (front) also has some pooling of the varnish.
- 76 In some of the varnishes, particularly those from NG 5011 and NG 5015, there may be some pine resin in addition; the relative amounts of methyl dehydroabietic acid and its oxidation products being rather high in comparison to the characteristic markers for fir balsam and larch resin respectively. Very little, if any, oil was detected in the varnishes, which were most likely made by simply dissolving the resins in turpentine spirits.
- 77 Several nineteenth-century varnish recipes mention the inclusion of oleoresins such as fir balsam or Venice turpentine, and it is likely that these varnishes were applied to the paintings early in their lifetime. See R. White and J. Kirby, 'A survey of nineteenth- and early twentieth-century varnish compositions', *National Gallery Technical Bulletin*, 22, 2001, pp. 64–84.
- 78 Information on the provenance of these paintings comes from the Tate Archive. Harry Wearne lent seven paintings to the French Institute in New York in 1927 (thought to be NG 5007, 5008, 5011, 5012, 5013, 5014 and 5015). In a memorandum to the Institute dated 25 February 1927, Wearne states that he bought these works from Monticelli via Piquet: 'M. Paul Piquet, jeweller, of the Rue St. Ferréol, was Monticelli's most intimate and devoted friend. During the last months of the painter's life, when his health was failing, it was M. Piquet who took care of him until the end, and it was from Piquet that I purchased the above seven pictures, which had never been out of the painter's possession. I bought them in March 1886, and M. Piquet told me they were great favourites of Monticelli, and that it was hard for him to part with them. He was particularly fond of the "Fleur des Champs" and the two "Nature Morte". These paintings have never been out of my possession nor have they ever been exhibited.'
- 79 Alauzen and Ripert 1969 (cited in note 39), pp. 132 and 412.
- 80 To a certain extent this is also true for the reverse of NG 5010, but as described earlier there may have been some reworking of this particular panel, and in this case the paint application and the pigment used are consistent with the other works by Monticelli, including the cochineal lake on a tin substrate, extended with starch.
- 81 Pigment analysis was carried out by SEM–EDX, which also identified some silicates and some gypsum in this layer.
- 82 Most of this research is based on the findings of Rachel Grout, Research Fellow in the Scientific Department of the National Gallery, London (2001–2002).
- 83 Alizarin crimson was identified by HPLC analysis of a sample of red lake from NG 5009. Although no sample was available for dyestuff analysis from NG 5017, a chalk substrate was identified and it is likely that the same lake was used.
- 84 A. Sheon, *Monticelli and the Rococo Revival*, PhD, Princeton 1966, p. 270, note 4.
- 85 Vincent van Gogh to Theo van Gogh, Arles, Wednesday 8 August 1888 (657) in Jansen et al. 2009 (cited in note 11), Vol. 4, p. 220.
- 86 Vincent van Gogh to Willemeijn van Gogh, Arles, on or about Sunday 26 August 1888 (670) in Jansen et al. 2009 (cited in note 11), Vol. 4, p. 249.