

Van Gogh's Antwerp and Paris picture supports (1885–1888) reconstructing choices

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1 Introduction

In late November of 1885, Van Gogh left his family village of Nuenen in Brabant, in order to enrol at the Antwerp Academy. Disillusioned by the instruction there, he moved on at the end of February 1886 to join his brother Theo in Paris, where he came to settle for two years. Vincent's decision to leave his native Holland for the French capital stemmed from his ambition to become a professional artist. In Holland, he had had little to no contact with other painters, having to largely teach himself using artists' manuals and other books, as well as prints and illustrations. In Paris, this situation was to radically change however. For the first time Van Gogh was exposed to an overwhelming breadth of artistic example in museums and galleries, and came into direct contact with many painters of his day. Some of these encounters originated through Theo who served as art dealer at the up-market Boulevard Montmartre branch of

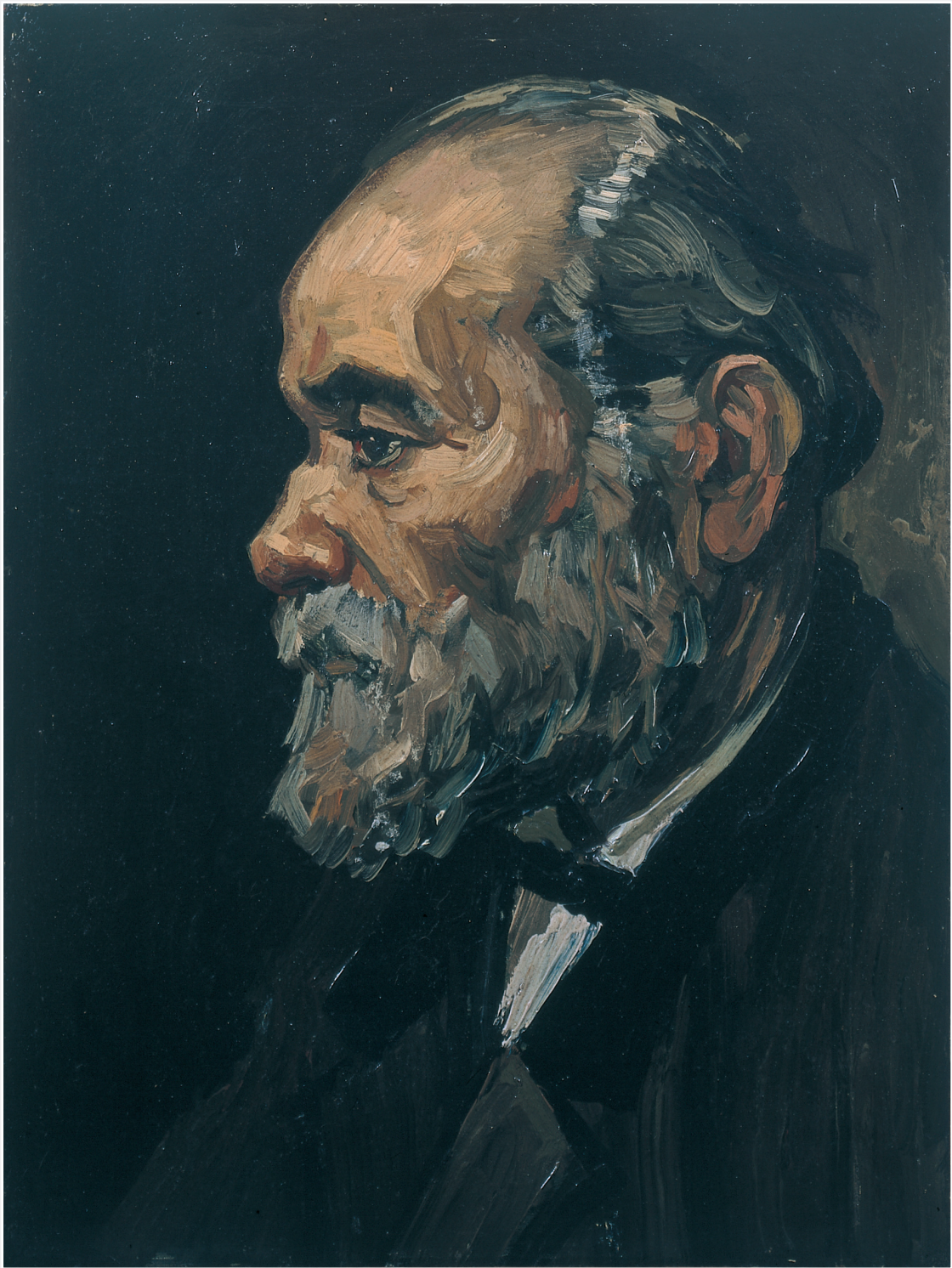


fig. 1 Vincent van Gogh, *Portrait of an old man*, F 205, 7 or 8 December 1885, oil on canvas, 44.2 x 33.8 cm
Van Gogh Museum (Vincent van Gogh Foundation), Amsterdam



fig. 2 Vincent van Gogh, *Head of a woman with loose hair*, F206, mid. December 1885, oil on canvas, 35.0 x 24.4 cm
Van Gogh Museum (Vincent van Gogh Foundation), Amsterdam

Boussod, Valadon and Cie,¹ whilst the shop of the more informal dealer and paint seller, Julien-François (père) Tanguy, also functioned as a meeting place and exhibition space for artists. Vincent developed a friendship with Toulouse-Lautrec, whom he first met as a fellow-student at the Paris academy of the history painter Fernand Cormon in the spring of 1886.² By the spring of 1887, he was strengthening ties with vanguard artists. He had met Paul Signac, and though the precise extent of their contact is unclear, both artists painted several landscapes in the Asnières suburb of Paris at this time. Late in 1887, Vincent organised a group exhibition at the Du Chalet restaurant located on the Avenue de Clichy, demonstrating the bonds he had formed with progressive artists such as Emile Bernard and Louis Anquetin (similarly ex-Cormon students). Though the closeness of these contacts varied, inevitably they left their mark upon his developing talent. Within the short space of two years, he had radically transformed himself from a rather limited painter with a somewhat old-fashioned approach, to a highly promising, up-and-coming member of the avant-garde.

Art historians have attempted to trace this process of development in terms of evolving style and technique in his works of the period.³ Yet visual analysis has generally left aside the issue of the picture supports used, despite the profound influence that these may have on the appearance of individual paintings. This is logical given that, up til now, such technical information was simply not available. To address this hiatus, detailed comparative examination and analysis of the picture supports of ninety-three paintings in the collection of the Van Gogh Museum was carried out. This included six that is all but one, of the surviving pictures he made in Antwerp, as well as almost half of his Paris oeuvre.⁴ Bearing in mind that this did not cover his entire production, none-the-less it provided a representative sample on which to base conclusions. By far the majority, seventy-one of the paintings examined, was on primed canvas, and two were on primed paper-on-canvas. Seventeen other paintings were made on ready-primed cardboard or carton, one on unprepared cardboard, and two on wooden panel. Though all types will be mentioned, it is chiefly the canvas, and paper-on-canvas supports that are considered here. Standard features were inventoried for each support, including dimensions, features of stretching, fibre and weave characteristics, any original trade or format stamps evident, the build-up and composition of priming layers and, importantly, their pictorial function. The accumulated data

were examined for characteristic patterns that might help to illuminate Van Gogh's preferences throughout the period under consideration.

2 Contemporary practice

To situate these technical findings in context some broader knowledge of the practices of late nineteenth century French painters is required. What were the support materials available to Van Gogh, how were these prepared, how did his choices fit in with general trends in the period, and how innovatory was his particular way of using them? Drawing in particular upon Anthea Callen's comprehensive study of this topic, the following section provides the reader with a brief outline of the situation in the period.⁵

• Canvas formats

In Van Gogh's day, commercially primed canvases could be bought ready-stretched on standard-sized wooden frames, either fixed strainers, or stretchers that could be enlarged by tapping out. The three basic rectangular shapes available in France were known as figure or portrait, landscape (*paysage*), and marine. For each numbered size, the three shapes would have one dimension the same, but the other would differ; figure being the widest and marine the narrowest (table 1). Alternatively painters might prefer to buy prepared canvas by the roll, together with bare stretchers, combining these themselves to provide cheaper picture supports. Finally, canvases might be custom prepared by the colourman, or even primed by the artist rather than off-the-shelf types. In both these instances, painters were no longer bound to the standard commercial sizes on offer. From the 1880's, with the introduction of mitred 'universal' stretchers with interchangeable members, one possibility was to compose stretchers of non-standard format by varying the combination of bars of fixed length. Alternatively, stretching frames of any desired format could be made to order. Often painters alternated between these practices throughout their careers.

• Fabrics and weaves

The standard weave for artists' canvas was a simple, tabby weave, but other types were sold. Though not advertised commercially, basket-weave canvases (as sometimes used by Edgar Degas) were also available, sold ready-stretched and primed as off-the-shelf supports. Various types of twill were sold too, regularly used by for example Camille Pissarro and Claude Monet.

LEFRANC & C ^{IE} * PARIS																			
CHASSIS NUS ET TOILES TENDUES SUR CHASSIS																			
POUR LA PEINTURE A L'HUILE																			
N ^{os} des toiles	MESURE d'un côté invariable	DIMENSIONS				CHASSIS NUS		CHASSIS TENDUS										N ^{os} des toiles	
		PORTRAIT	PAYSAGE		MARINE	Portrait-paysage et marine		TOILE ORDINAIRE		Châssis ovale	TOILE 1/2 FINE		TOILE FINE						
			haute	basse		haute	basse	Ordinaire N ^o 110	à Clés N ^o 111		Ordinaire N ^o 112	à Clés N ^o 113	Ordinaire N ^o 114	Ordinaire N ^o 115	à Clés N ^o 116	Ordinaire N ^o 117	à Clés N ^o 118		à Clés N ^o 119
1	21 ^c 5 sur	16 ^c ou	14 ^c		11 ^c 5	» 20	» 40	» 60	» 65	1 50	» 70	» 75	» 75	» 90	3 50	1	1		
2	24.5 —	19 —	16		14	» 25	» 45	» 65	» 75	1 60	» 80	» 90	» 90	1 »	3 60	2	2		
3	27 —	21.5 —	19		16	» 28	» 50	» 70	» 90	1 75	» 90	1 »	1 »	1 25	3 75	3	3		
4	32.5 —	24.5 —	21.5		19	» 30	» 60	» 80	1 »	2 »	1 »	1 25	1 25	1 50	4 »	4	4		
5	35 —	28.5 —	27	24	21.5	» 32	» 70	» 90	1 25	2 25	1 25	1 50	1 50	1 75	4 50	5	5		
6	40.5 —	32.5 —	29.7	27	24	» 35	» 75	1 »	1 50	2 50	1 50	1 75	2 »	2 25	5 »	6	6		
8	46 —	38 —	35.1	32.5	29.7	» 40	» 80	1 30	1 75	3 »	1 75	2 25	2 50	2 75	6 »	8	8		
10	55 —	46 —	43.2	38	35.1	» 50	» 90	1 50	2 25	3 50	2 50	2 75	3 25	3 75	7 »	10	10		
12	61 —	50 —	45.9	43.2	40.5	» 60	1 »	1 80	2 50	4 »	2 75	3 25	3 75	4 25	8 »	12	12		
15	65 —	54 —	48.5	45.9	43.2	» 70	1 10	2 »	3 »	4 50	3 25	3 75	4 50	5 »	9 »	15	15		
20	73 —	59.5 —	56.7	54	51.3	» 80	1 25	2 50	3 50	5 50	3 75	4 25	5 25	5 75	10 50	20	20		
25	81 —	65 —	62.1	59	56.7	» 95	1 50	2 80	4 25	6 50	4 75	5 25	6 50	7 »	11 50	25	25		
30	92 —	73 —	70.2	67.5	64.8	1 20	1 75	3 30	5 25	7 50	5 75	6 50	8 »	8 50	14 »	30	30		
40	1.00	81 —	73		65	1 40	2 »	4 25	6 25	8 50	7 »	7 50	9 50	10 »	16 »	40	40		
50	1.16	89 —	81		73	1 80	2 50	5 25	7 50	10 50	9 75	9 50	12 »	12 75	19 »	50	50		
60	1.30	97 —	89		81	2 »	2 75	6 25	9 »	12 50	10 50	11 »	14 25	15 »	22 »	60	60		
80	1.46	—	1.13.4	97	89	3 »	3 50	8 20	11 50		14 »	14 50	19 »	19 75		80	80		
100	1.62	—	1.30	—	97	3 50	4 50	10 »	14 50		17 »	18 »	24 »	25 »		100	100		
120	1.94	—	1.30	—	97	4 »	6 »	12 »	18 »		21 »	22 »	29 »	31 »		120	120		

Les châssis et toiles tendues hors mesure sont livrés dans les vingt-quatre heures.

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Table 1: The three basic rectangular shapes available in France; from the 1889 Lefranc et Cie catalogue (illustration supplied by Anthea Callen).

The staple fabric for artists' canvas was linen, though alternatives such as cotton or hemp might be specified in trade catalogues. Madapolam, a cheap and closely woven cotton fabric was advertised for use with pastel, or even ready prepared for oil painting. Prepared canvas was available in a broad selection of weights, and weave densities that ranged from as little as 11 up to more than 30 threads per cm. The different qualities on offer ranged from the cheapest *étude* grade, characterised by a thin skeletal weave, through the somewhat better *ordinaire* quality, right up to the *très-fine* and *extra fine* weaves. In practice these designated types might overlap however. A survey of canvases in the Impressionist and Post-Impressionist collection of the Courtauld Institute revealed the full range in use, from the open and thin weave canvases used by Paul Cézanne from the mid-70s to 90s, to the very fine canvas weaves favoured by the Impressionist in the 1870s for example.⁶ Fabric might also be used as a backing for paper supports, mounted on stretching frames. Artists such as Degas and Toulouse-Lautrec used paper-on-canvas, or paper, as part of a direct and sketchy painting technique that utilised the colour and absorbency of the support in an obvious way.⁷

• Preparatory layers

In Van Gogh's day, there were two main procedures for the preparation of artists' canvas. On the one hand, lengths of canvas might be stretched and primed on large frames that in commercial practice traditionally measured around 10 x 2m. Once dry, the strips of prepared canvas could be cut up to make individual picture supports. Alternatively, a piece of canvas was first cut to size, then individually stretched and primed on the working-size frame. A physical distinction may still be made between the two types of support, since in the first case the priming layers covered the entire support (including the tacking margins), whereas in the second they covered the picture area only.

Often this difference in method of preparation is one of the criteria used to distinguish 'commercial' from 'artist' or 'self-primed' canvases respectively.⁸ However, the distinction is not a categorical one, since canvases prepared by the small-scale colourman might show overlapping characteristics. For example, like the larger scale manufacturer, the colour merchant might also prepare canvas in strips, subsequently cutting them up to make individual supports. Similarly, qualitative

features such as uneven ground coverage, may be used to argue that individually prepared canvases were primed by the artist rather than by the hand of a 'professional'. However, in fact lack of quality control might well lead to sub-standard materials being supplied by the colourman. For example, in 1887, Camille Pissarro complained of a canvas supplied by Tanguy, 'It is dreadful and of second quality.'⁹ Though not specified, it is likely that Tanguy himself primed this canvas.

Both pre-cut canvas, and canvas in rolls, was available with different types of preparation that offered varied degrees of absorbency. Absorbent primings were essentially distemper grounds, consisting of chalk or another white inert material, bound in an aqueous medium, usually animal glue. Non-absorbent grounds however were based on lead white in an oil medium. In between these two main types of glue and oil-based grounds however, were many intermediate forms providing semi-absorbent properties. In practice nomenclature could vary, designated types covering different formulations. For example, the earliest absorbent grounds, introduced commercially in France by the Paris colourman Rey by 1821 at the latest (later, Rey et Perrod were visited by Van Gogh, see table 2), in fact consisted of an oil layer on a distemper ground, rather than distemper alone.¹⁰ Similarly, a canvas stamped 'toile absorbante' and supplied in 1871 by the Paris firm Hardy-Alan (table 2) seems prepared with the same type of oil on distemper ground. However, the 1894 catalogue of Paris colour merchant, Gustave Sennelier, now specified absorbent (presumably pure distemper) as well as semi-absorbent grounds.¹¹

Ready-primed canvas with chalk ground was only available by the meter and in white, though absorbent canvas could also be ordered from the colourman to the required size. There is documentary evidence for painters supplied by some of the same Paris colour merchants visited by Van Gogh, though the exact nature of these absorbent grounds has not been confirmed by analysis. Hence Alfred Sisley used an absorbent canvas from Latouche in 1874, and, in 1887, Camille Pissarro used one from Contet, who had taken over the rue Lafayette shop of Latouche in that same year (see table 2).¹² As early as 1881, fellow-painter Paul Gauguin, is known to have prepared his own canvas with thin, chalk in animal glue grounds, this subsequently becoming his preferred picture support from 1887 on.¹³ Around 1887 too, Van Gogh's colleagues, Emile Bernard and Louis Anquetin, were developing a flat decorative painting

style that later became known as Cloisonism, employing fine canvas thinly prepared with absorbent grounds to this end. These artists utilised the absorbent grounds to wick out the paint medium for matt surface effects, using thin veils or touches of colour that soaked into the porous supports.

Distemper layers had the advantage that they dried within a few hours, whereas oil grounds could take several months, depending on the number of layers applied and the seasonal climate. These faster drying properties made absorbent or semi-absorbent grounds cheaper to produce, and more reliable to use, since improperly dried oil ground could cause paint layers to crack. On the other hand, oil grounds were more flexible than aqueous ones, an advantage when pictures were to be rolled up for storage or for transport. Ready-primed canvas with oil ground was also available in a much wider range of tints and surface finish than absorbent canvas. Colour merchant catalogues listed two common types, *à grain* and *à lisse*. The *à grain* texture consisted of one ground coat that left the maximum canvas texture evident, whereas the *à lisse* surface was provided by two coats that filled the weave interstices to a greater degree. Oil grounds were available in pure white, though their glare was usually attenuated by small additions of coloured pigment (commonly fine black and earth pigments) that provided a subtle range of pale tints. Light tinted grounds could simply be used to heighten overall tonality, but in the work of the Impressionists for example, the commonly pale grey grounds came to take on a central pictorial role, providing deliberate colour contrasts.

Paying attention to all the aspects described above, table 3 lists the characteristic features of the primed canvas supports that Van Gogh used in Antwerp and Paris. These tabulated results form an essential underpinning of the discussion that follows, which examines findings in relation to aspects of style and technique.

3 Antwerp; a transition

Though of short duration, Vincent's stay in Antwerp signified his initiation to a more sophisticated urban environment, perhaps even serving as a deliberate testing ground for Paris.¹⁴ It was there that his transition from a 'peasant' to a 'city' painter first began. He set himself a new goal; to master the genre of portraiture as opposed to the more generalised character studies of

Table 2	PAINT-SELLERS VISITED BY VAN GOGH IN PARIS			
Trade stamps/labels ¹	Company name ²	Retail address in the period	Dates of company	Listing
F322, Vase with lilacs, daisies and anemones, stamp on back of canvas (Genève Musée d'art et d'histoire)	Dubus	Boulevard Malesherbes, 60	1877-1898	Specially for painting and drawing
F215b, Portrait of a woman, stamp on back of canvas (Van Gogh Museum, Amsterdam)	A. Fermine	Rue Notre-Dame-de-Lorette, 37	1876-1911	Easel-maker; mannequins easels, maquettes
F324, Vase with cornflowers and poppies, stamp on back of canvas when still on original strainer, recorded in photo before the painting was lined (private collection)	Hardy-Alan	Rue du Cherche-Midi, 36	1868-1920	Colours; painting dealer (from 1877); canvases (from 1884); easels (from 1894); painting and print restorer (from 1906)
F380, Self portrait, stamp on back of carton support, (Kröller-Müller Museum, Otterlo); F378, Basket of apples, stamp on back of canvas (Kröller-Müller Museum, Otterlo)	Gust. Hennequin	Avenue de Clichy, 11	1874-1903	Colours, canvas & brushes
Former label recorded on back of Dante's Death Mask (inventory number VO3/1963, Van Gogh Museum, Amsterdam)	Louis Latouche	Rue Lafayette, 34	c.1870-1887	Colours
F266a, Landscape with factories, stamp visible through lining canvas (Van Gogh Museum, Amsterdam); F378, Still life with apples and a basket, stamp on back of canvas (Kröller-Müller Museum, Otterlo); F380, Self portrait, stamp on back of carton support (Kröller-Müller Museum, Otterlo); F273, Windmills on Montmartre, stamp on back of canvas (Bridgestone Museum of Art, Tokyo)	Hofer Frères (ancienne maison Vallé fondée en 1770)	Grands-Augustins, 3	1770-1890	Colours; painting canvases; photographic accessories; painting dealer, expert and restorer (1888)
F215d, Seated woman with gloves, stamp on back of canvas still on its original strainer (Van Gogh Museum, Amsterdam)	Rey et Perrod	Rue de la Rochefaucauld, 51 (also shop at Rue Notre-Dame-de-Lorette, 64)	1868-1905	Fine colours
Labels on the backs of carton supports: F216a, F216b, F216c, F216e, F216f, F216j, F232, F243a (Van Gogh Museum, Amsterdam)	Pignel-Dupont	Rue Lepic, 17	1883-1895	Colours and wall papers
No stamps or labels known	J.-F. ("père") Tanguy	Rue Clauzel, 14	1874-1894	Fine colours
F118, Still life with potatoes, stamp on back of original canvas transcribed onto lining canvas (Museum Boymans van Beuningen, Rotterdam); F382, Still life with grapes, stamp on back of canvas (Art Institute of Chicago); F452, Four sunflowers run to seed, stamp on original stretcher (Kröller-Müller Museum, Otterlo); F373, The Courtesan (copy after Eisen), stamp on original stretcher (Van Gogh Museum, Amsterdam)	Tasset et L'Hôte	Rue Fontaine-Saint-Georges, 31	1887-1910	Colours
<ol style="list-style-type: none"> 1. Information on trade stamps present on Van Gogh paintings in the Kröller-Müller Museum collection was provided by the chief paintings conservator, Luuk van der Loeff. 2. Information on the companies was compiled from the Paris editions of Didot-Bottin, <i>Annuaire-Almanach du Commerce, de l'Industrie, de la Magistrature et de l'Administration</i>, sharing the research results of Dr. Stéphanie Constantin in Paris. 				

rural workers he had produced in Nuenen, going on to produce at least nine portraits within the short space of two months (four of which are now kept at the Van Gogh Museum). This change of subject matter went hand-in-hand with a turn around in his painting technique, which, at another level, similarly paved the way for his practice in Paris. Van Gogh set about to professionalise his method and consulted Petrus Johannes Tyck, whom he considered 'the best' paint manufacturer in Antwerp, for advice on technical aspects.¹⁵ Moreover, he invested in the purchase of better tools, such as fine quality brushes and durable colours, as well as new types of picture support. Since his letters allow us to

follow his train of thought in the period, it is worth going into this in some depth. Four days after his arrival in Antwerp on 24 November 1885, Van Gogh received loose canvas and around forty stretching frames sent on from Nuenen, where his normal practice had been to combine these elements to make his own picture supports.¹⁶ Examination of Nuenen paintings has shown that the canvas used was of a rather consistent type, with thread counts generally in the range of 13-14 x 14-16 threads per cm, and commercial cream-coloured grounds.¹⁷ The canvas pieces were cut to size and stretched on wooden frames of non-standard format, made by a local carpenter and

contractor.¹⁸ Apparently Vincent kept to this procedure for his very first portrait in Antwerp, F 205 *Portrait of an old man* (fig. 1), painted on 7 or 8 December, since the characteristic weave and non-standard format of the picture support indicate use of the forwarded Nuenen materials.¹⁹ Van Gogh cut a second piece of this same canvas to matching size for the picture support of F 260 *Houses seen from the back*, painted some time between 9 December and the end of February 1886.²⁰ The cramped placement of *Portrait of an old man*, enhanced by the flat handling of the dark background, still recalls the treatment of his Nuenen studies. Indeed to break out of this mould would require a radical change in approach, implemented in the portraits that followed.

Three Antwerp pictures in the collection of the Van Gogh Museum illustrate how, for the first time, the artist went on to employ off-the-shelf canvases that were pre-stretched in a range of standard commercial sizes. For two works he purchased standard figure canvases that were slightly squarer than his usual Nuenen formats (F 207a *Portrait of a woman* and F 212 *Head of a skeleton with burning cigarette*), whilst a third work was painted on a support with landscape dimensions (F 206 *Head of a woman with loose hair* - fig. 2).²¹ Each of these canvases shows a different thread count, no longer corresponding to the typical Nuenen range. Moreover each canvas is prepared with a different type of ground. In a letter of 9 December, he elucidates this change in practice, announcing that the canvases he had brought with him were too small for the portrait heads, since his use of other colours necessitated more space for the surroundings. Indeed, both documentary and technical evidence reveal that the changed dimensions of his picture supports went hand-in-hand with a revision of his palette. Initially he had used paint supplies sent on from the shop of Jan Baijens in Eindhoven and received on 6 or 7 December, but by 9 December he had purchased additional paints and had visited the paint manufacturer Tyck, who had provided information about certain colours.²² His following letters are full of praise for the new colours purchased, including cobalt blue, vermilion, carmine red, cadmium yellow and emerald green.²³ Analysis of paint samples indicates that it was in his portraits that these bright spectral pigments first came to replace the Prussian blue, Naples yellow and earth pigments that typified his Nuenen palette.²⁴ The combined effect of changed format and brighter tonality to create a new spaciousness is well illustrated by two portraits painted in mid- December, F 207a *Portrait of a woman*, and F 206 *Head of a woman with loose hair* (fig. 2).

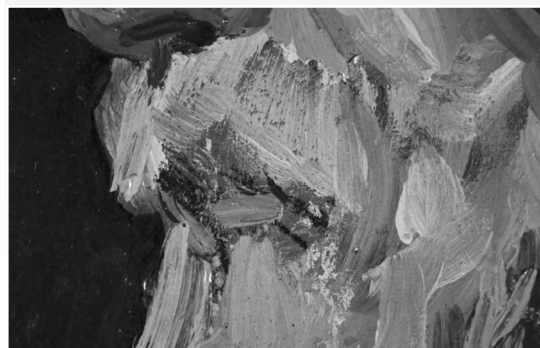


fig. 3 Vincent van Gogh, *Portrait of an old man*, F 205 (see fig. 1), detail of grey layer applied by the artist to tone the light ground.

For the backgrounds Van Gogh made generous use of the pigment cobalt blue, which he considered to be a 'heavenly colour [...] with nothing comparable to create air around things.'²⁵ Essentially this introduction of standard sized supports and revamping of his Dutch palette, set the tone for his practice in Paris.

One other aspect of his Paris technique that is foreshadowed in the early Antwerp picture, F 205 *Portrait of an old man*, should be mentioned here. As described, the picture was made on identical primed canvas compared to that used for F 260 *Houses seen from the back*, both supports being cut from a roll of canvas shipped from Nuenen. However, for the portrait Van Gogh concealed the light pinkish ground using an opaque grey layer, brushed streakily on top.²⁶ Almost certainly this feature reflects his Antwerp encounter with the work of Peter Paul Rubens, who commonly adjusted the light tone of his primed supports with a streaky grey or brown layer of oil paint.²⁷ Certainly Van Gogh went into the subject of Rubens's technique, quizzing the paint manufacturer Tyck on the topic, and, as he felt, receiving an intelligent reply to his questions.²⁸ Rubens often allowed the grey underlayer to play through translucent areas of flesh paint for a lively effect, creating bluish flesh tones that contrasted the warm modelling with touches of pure red in the face or the hands, which Van Gogh so admired.²⁹ Van Gogh on the other hand virtually covered the grey underlayer with opaque brushwork in his portrait, apart from a small area around the mouth, negating its effect in the finished work (fig. 3). It was not until the spring of 1887 that he seems to have returned to the idea of adjusting the pale shade of a ready-made ground with a mid-toned layer, now allowing it to contribute to the final look of the painting (see under sections *Mid-toned grounds* and *Discussion*).

4 Paris

Around 1 March 1886, Van Gogh moved from Antwerp to Paris. Initially he moved in with his brother at 25 rue Laval, until, at the beginning of June, they could switch to a larger apartment with studio space at 54 rue Lepic. The artist quarters of Montmartre were littered with shops selling painting materials, and retail stamps left visible on the backs of his Paris works inform us that Van Gogh visited at least eight of them during the period of his stay (see figs. 4, 6 & 16). Table 2 lists details of these companies, with their retail address in the period. From the letters we may deduce that Van Gogh also purchased artist materials from the colour merchant J.-F. (père) Tanguy, who had learnt the tricks of the trade when employed from 1860 by maison Edouard as a grinder of artists' colours.³⁰ In the summer of 1887, Vincent wrote that when he had begun to work in Asnières (i.e. in the spring of 1887) Tanguy had supplied him with many canvases, but that his witch of a wife had put a stop to this generosity.³¹ So far however, there is no evidence that Tanguy stamped or otherwise marked the canvases he provided. A former label on one of the plaster cast models owned by Van Gogh informs us that he may also have visited the shop of George Latouche, another small-scale art dealer and paint seller who is known to have sold canvas supports.³²

During his first weeks in Paris, Van Gogh painted several works on supports that consisted of ready-primed cardboard or *carton*, rather than canvas. Examinations have shown that the standard sized supports were cut from larger pre-primed sheets, most likely manufactured in the Paris region where factories producing *carton* were known in the period.³³ All the boards show identical features of construction, in terms of their consistent 2mm thickness, built up in two layers of hard-pressed and poorly refined wood pulp.³⁴ Analysis discovered two standard recipes of mixed paint used for the pale grey and white types of ground layer applied, each with a smooth (*à lisse*) surface finish.³⁵ Trade stickers surviving on the back of several *cartons* inform us that they were purchased from the shop of Pignel-Dupont, established at number 17 rue Lepic, just down the street from the brothers' apartment (fig. 4).³⁶ Written in ink are the prices 50 centièmes for the figure 5 size supports, and 65 centièmes for the figure 6 ones, being much less expensive than canvas supports of equivalent size.³⁷ Indeed *carton* was considered a cheap substitute for canvas, suited for learning purposes.³⁸ By the end of June, Van Gogh had used up seven *cartons*

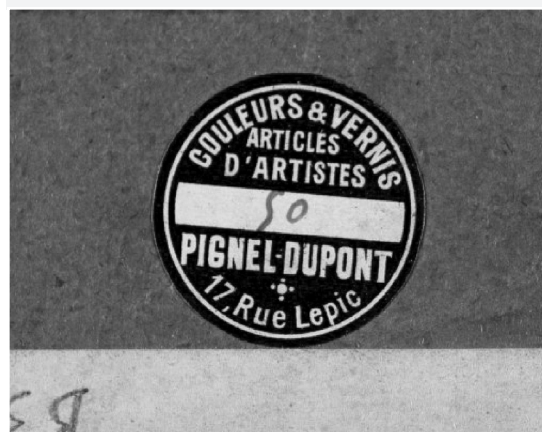


fig. 4 Detail of trade sticker of the company Pignel-Dupont, on the reverse of Vincent van Gogh, *Bottle with peonies and blue delphiniums*, F243a, late June–mid. July 1886, oil on carton, 34.5 x 27.0 cm. The figure 5-sized support is priced 50 centièmes. Van Gogh Museum (Vincent van Gogh Foundation), Amsterdam

for a series of studies of plaster cast models after antique sculpture that he owned, working at the rue Lepic apartment.³⁹ Another two were used for his very first exercises in the genres of floral still life: F 218 *Glass with yellow roses* (that was painted over an abandoned plaster cast study), and F 243a *Bottle with peonies and blue delphiniums*. Afterwards however, Van Gogh's usual practice in Paris went on to be the purchase of ready-made canvases in a range of commercial sizes, only occasionally returning to the use of *carton* for practice in a new style (see concerning F 331, under Discussion).⁴⁰

• Canvas formats

Of the sixty-seven Paris pictures examined, fifty-four could be considered to be of standard format, with virtually corresponding height by width measurements (less than 1cm deviation). This small margin of difference could readily be accounted for by slight variations in the range of standard sizes provided by different manufacturers in the period, as well as by marginal changes in the original dimensions of the canvas resulting from later treatments (such as lining, or substitution of original stretching frames). In the case of six paintings made on the back of Nuenen pictures without tacking margins, though the canvases were roughly cut to fit the shape of standard formats, the height and width measurements show a greater deviation (1–2.5 cm). The canvas support of F 344 *Self portrait with a felt hat*, which does have original tacking margins, falls into this same category of pictures designated as 'close to' a standard format. Six Paris pictures were clearly



fig. 5

Vincent van Gogh, *Sunset in Montmartre*, F266a, March- mid. April 1887, oil on canvas, 21.5 x 46.4 cm

Van Gogh Museum (Vincent van Gogh Foundation), Amsterdam

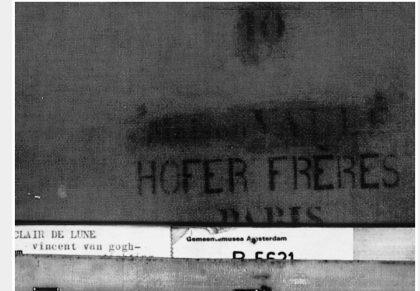


fig. 6

Infra red reflectogram clarifying the firm trade mark of Hofer Frères and size 10, stamped onto the back of the lined picture, Vincent van Gogh, *Sunset in Montmartre*, F266a (see fig. 5).



fig. 7

Vincent van Gogh, *The Moulin de Blute-Fin and vegetable gardens*, F346, March- mid. April 1887, oil on canvas, 45.2 x 81.3 cm

Van Gogh Museum (Vincent van Gogh Foundation), Amsterdam

fig. 8

Vincent van Gogh, *Impasse des deux frères and Moulin de Poivre*, F347, March- mid. April 1887, oil on canvas, 35.0 x 65.3 cm

Van Gogh Museum (Vincent van Gogh Foundation), Amsterdam



fig. 9

Vincent van Gogh, *Courting couples in a park in Asnières*, F314, May-June 1887, oil on canvas, 75.0 x 112.5 cm

Van Gogh Museum (Vincent van Gogh Foundation), Amsterdam

SEPARATE OVERVIEW OF THE STANDARD SIZE CANVASES USED IN PARIS					
Format	Nº. of paintings	Used for figure/ portrait	Used for landscape/ city view	Used for still life	Other subject
Figure/ portrait					
40	1		1		
15	2	1	1		
12	1	1			
10	6	1	3	1	Japanese print
8	9	2	4	3	
6	6	2	3	1	
5	1		1		
3	4	2	2		
Landscape (vert. or horiz.)					
20	3		1	1	Japanese print
15	4	1	1	2	
12	3	1		2	
8	3		1	2	
6	4	2			Skull 2x
4	2	1		1	
3	4	2	1		Kingfisher
Marine (horiz.)					
6	1			1	

not made on standard size canvases, with deviations of 2.5 cm or more in height or width. However, a non-standard height by width format might still be composed of stretcher bars of standard length. For each painting, this information is specified in Table 3. A separate overview of the standard size canvases used in Paris is provided above.

Based on these tabulated findings, the following observations can be made. Of the fifty-four standard size supports examined, thirty had the squarer figure or portrait format, twenty-three a horizontal or vertical landscape format, and only one a marine format. The range of sizes used was 3–40 in the figure format, and 3–20 in the landscape format. Van Gogh's most common choice was figure 8 (nine canvases), followed by figure 10 (six canvases, excluding the figure 10 support of F 266a that was cut down by the artist), and figure 6 (also six canvases).

Like other painters, van Gogh seems to have ignored trade-designated subject categories when using his picture supports. Thus of the thirty figure canvases, only nine were used for portraits, whereas twelve were used for landscapes, eight for still lifes, and one for a copy after a Japanese print. Of the twenty-three landscape canvases, only four were used for landscape, whereas eight were used for still lifes, seven for portraits, and four for other subject matter. However, when counting these examples, one needs to take into account

that often the present design covers up an abandoned picture that may have had another theme. This is thought to apply to twenty-four (i.e. almost one third) of the sixty-seven Paris paintings considered.

Striking is that only one standard marine canvas was used, for the narrow still-life F 281 *Flame Nettle in a flowerpot* painted in late June to mid. July 1886, corresponding to a horizontal marine 6 format. Some months later, between March and mid April 1887, a slightly larger canvas of matching proportions was used for the small landscape, F 266a *Sunset in Montmartre* (fig. 5). In this case however, Van Gogh used an alternative to a ready-made marine format support, cutting a commercial figure 10 canvas roughly across the middle to provide a support that had the same width as a marine 8 canvas, but was 5.5 cm shorter. Painted shapes extend onto the bottom tacking margin provide evidence that the initial picture was cropped at this edge. Furthermore a size 10 format stamp on the back of the canvas, located near the bottom edge rather than in the middle, confirms its original figure 10 format (fig. 6). Two larger Montmartre landscapes executed in the Spring of 1887 also employ elongated supports that were somewhat squatter than the fixed marine formats, approaching the proportions of the double square format he came to favour in some of his last pictures made in Auvers.⁴¹ In these cases, interchangeable or universal stretcher bars of fixed length seem to have been used to compose stretchers in the desired format, combining these with canvas purchased by the meter. For example, the picture support of F 346 *The Moulin de Blute-Fin and vegetable gardens* (March to mid. April 1887) was presumably tailored using a no. 8 bar for the height and a no. 25 one for the width, providing a shape roughly 8 cm shorter than a marine 25 canvas (fig. 7). For F 347 *Impasse des deux frères and Moulin de Poivre* (March to mid. April 1887), the combination of a no. 5 bar for the height with a no. 15 one for the width provided an oblong format that was roughly 11 cm shorter than a marine 15 canvas- (fig. 8).

Different factors may help to explain the lack of marine canvases used, including market forces. Though advertised in trade catalogues, they may have been less in demand and hence less readily available than the staple figure and landscape formats. Also, these advertisements reveal that marine canvases were relatively expensive, costing the same price as the larger figure or landscape ones in the same standard size number, a disadvantage that became more significant at the top end of the size range.⁴² Writing in the summer of 1887, Van Gogh com-

plained that large and long canvases used for landscape proved difficult to sell.⁴³ Together these economic reasons may explain why Van Gogh turned to the cheaper option of combining bare stretchers with loose canvas to manufacture the larger picture supports of his Montmartre landscapes. On the other hand, the need to economise seems to have been balanced with pictorial considerations in these examples. Though initially both canvases were used for an underlying composition of unknown subject, their broad format is deliberately played out in the splayed perspectives of the current landscapes.⁴⁴

Painted very slightly later in May – June 1887, Vincent's large study, F 314 *Courting Couples in a park at Asnières*, is also of non-standard format, though closer to a marine format (size 50) than the examples discussed above (fig. 9). Here the horizontal proportions emphasise the decorative frieze-like character of the composition. In this case however, only the width dimension could have been achieved with a standard length stretcher-bar, perhaps indicating that the stretcher or strainer was custom-made for this ambitious work that seems to have been reworked in several sessions in the studio. Accordingly, a better, more expensive grade of canvas was also used, though the use of higher quality materials for important works was by no means the rule (see concerning F 316 below).

• Fabrics and weaves

A survey of the fabric weaves employed by Van Gogh reveals a normal selection for the period. Virtually all of the seventy-three canvases examined were of simple tabby weave. Only three were painted on a matching pre-primed twill, and none on basket-weave canvas. A striking feature of the canvases that Van Gogh used in Paris is the wide range of thread counts measured. At the bottom end of the range were thirty tabby weave canvases that consisted of very poor quality skeletal weaves, with only 11.5–13.5 thin and irregular threads per cm. Visual comparison with a post 1906 sample of ready-primed *ordinaire étude* from the firm Bourgeois aîné suggests that this gauze-like fabric may have been equivalent to the cheapest *étude* grade of canvas sold.⁴⁵ Though intended for rough studies, Van Gogh used it even for more ambitious works such as his large canvas depicting *Montmartre behind the Moulin de la Galette* F 316, painted in August 1887, which he chose to include in an exhibition at *Les Indépendants* in the spring of 1888.⁴⁶ So far this particular grade of ready-primed canvas has only been found in his Paris works and seems specific to the period. A trade stamp on the back of F 324 *Vase with corn-*

flowers and poppies (private collection) informs us that in one instance Van Gogh purchased a ready-stretched canvas of this type, with a thread count approximating 12 x 12, from the Paris shop of Hardy-Alan (table 2).⁴⁷ At the other end of the thread count range, Van Gogh used very fine fabrics for 6 paintings dated to 1887, with 19–30 threads per cm, the finest type probably equivalent to the extra fine weaves advertised. With one exception (F 297a *Skull*), selective fibre analysis identified linen used for this full range of canvas types described. An even finer fabric, with more than 30 weft thread per cm, proved to be cotton however, possibly the fabric sold as *madapolam*. This fine cotton canvas was used for a small group of paintings made in the second half of 1887, usually with paper laid on top.

• Preparatory layers

In thirty-seven of the sixty-seven Paris canvases examined the ground layers extended over the tacking margins, indicating a ready-manufactured canvas that was primed before it was cut to size. On the other hand, for nineteen canvases investigated, the ground layers covered the picture area only, suggesting pre-cut canvas that was individually prepared by the colourman, or perhaps by the artist in certain cases. Eleven canvases (ten being re-used pictures) were without tacking margins, since they had never been mounted on stretching frames. Instead, original holes through the front edges suggest that the loose canvases were pinned flat onto a solid support or framework for preparation and/or use by the artist.

COMMERCIAL LEAD WHITE IN OIL GROUNDS By far the majority of the canvases examined were purchased with standard, ready-made primings, based on lead white in oil. Detailed comparison revealed endless variety in the exact build-up and composition of the commercial ground layers applied, reflecting the huge subtly varying range on offer. However, these may be grouped under three main types described below, emerging as a useful feature to help determine the Antwerp or Paris provenance of a picture support.

• Double, lead white-on-thin chalk grounds (see table 3.3)

The first type of semi-absorbent ground consists of a lead white in oil layer, on top of a chalk one, presumably bound with glue (fig. 10).⁴⁸ The first chalk ground may be very thin, and is always much thinner than the lead white layer on top. The lead white layer often contains barium sulphate or gypsum as filler, with traces of coloured pigment (ochre's, fine carbon black, and

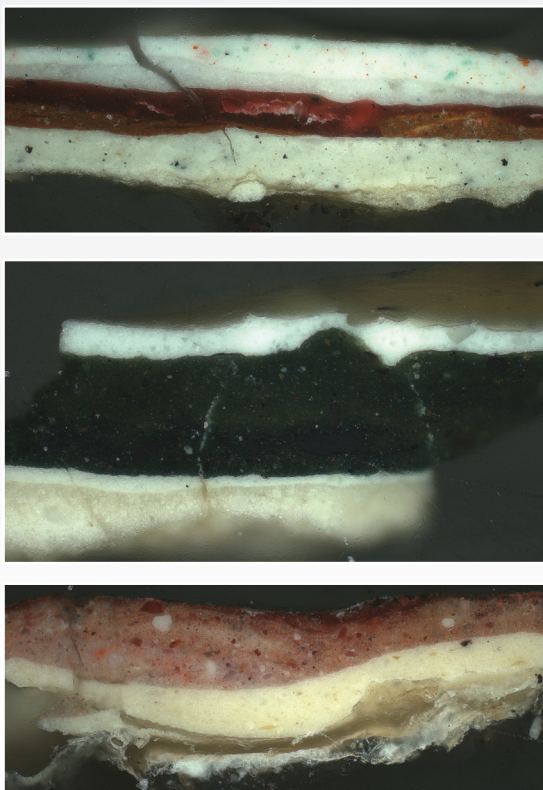


fig. 10 Paint cross-section from the bottom turnover crease of Vincent van Gogh, *Impasse des deux frères and Moulin de Poivre*, F347, (see fig. 8). The sample shows a c. 0.02 mm thick first chalk ground layer, with a second c. 0.06 mm thick ground layer containing lead white, a little barium sulphate, gypsum, silicates, carbon black and ochreous particles. Paint layers of the underlying and current composition are visible on top of the ground.

fig. 11 Paint cross-section from the upper edge of Vincent van Gogh, *Skull*, F297a, autumn 1887, oil on canvas, 41.6- 42.4 x 30.0–30.4 cm, Van Gogh Museum (Vincent van Gogh Foundation), Amsterdam. The bottom of the sample shows two ground layers belonging to the underlying composition. The first thick layer contains chalk and a little lead white. The thinner (up to 0.025 mm) second layer contains lead white, a little chalk, and presumably zinc white. The thick greenish paint layers present on top contain pigments characteristic of Van Gogh's Nuenen or early Antwerp period, including different shades of ochre, umber, Prussian blue, Naples yellow, chrome orange, lead white and zinc white. The top layer is the ground of the current composition, containing lead white, a little barium sulphate and zinc white, as well as the unusual pigment, bone white. This is covered by yellow varnish.

fig. 12 Paint cross-section from the top fold-over edge of Vincent van Gogh, *Vase with Chinese asters and gladioli*, F234, August-mid. September 1886, oil on canvas, 61.1 x 46.1 cm, Van Gogh Museum (Vincent van Gogh Foundation), Amsterdam. The c. 0.06 mm thick ground layer contains lead white, a little orange ochre, umber, silicates and china clay. Size is evident at the bottom of the sample, and the main paint layers are present on top.

umber) providing the required tint. F208 *Self-portrait* differs in that very little lead white is mixed with the first chalk ground, overlapping with ground type 2. However, it shows greater affinity with this first type of ground, due to the inclusion of barium sulphate in the top layer, and the fact that this layer is thicker than the chalk ground underneath it. Exceptionally, the top layer in *Couples courting in a park in Asnières* (F314) contains zinc white, rather than lead white. The effect of this ground is no longer apparent however, since it is thoroughly covered by additional ground and paint layers on top.

It should be noted that to distinguish this type of double ground from a single lead white one (see type 3) might not be straight forward, especially since the lead white is found mixed with similar ingredients in both cases. Identification depends upon having a sample, which includes the first thin layer of chalk ground complete, as confirmed by the presence of a size layer at the bottom of the sample.

This type of ground was found on several Paris works, yet the fact that it also occurs on an Antwerp canvas (F207a *Portrait of a woman*) means that it cannot be considered as exclusive to the period. Nine of the twelve canvases investigated with this type of double ground were of very poor quality loose weave, with only 12–13 thin warp and weft threads per cm. In these cases, presumably the first chalk-in-glue layer would have provided a relatively cheap material to fill the particularly open pores of the fabric, reducing the quantity of more expensive lead white-in-oil paint required on top. Also, as mentioned (see under section Preparatory layers), the faster drying properties of the distemper underlayer would have made the ground cheaper to manufacture. For the canvas supports that were primed before being cut to size, one option might have been to use ready-made absorbent canvas with a distemper ground, known to have been sold by the meter, as a convenient basis for further preparation of the fabric.⁴⁹ The white chalk ground could simply be adjusted with a tinted oil layer applied on top.

- **Double, lead white and chalk-on-thicker chalk and lead white grounds** (see table 3.4)

A second type of semi-absorbent ground consists of a layer of lead white commonly mixed with a little chalk, on a layer of chalk mixed with a little lead white.⁵⁰

Unlike the first type of priming described, here the first chalk-based ground is thicker than the lead white-based

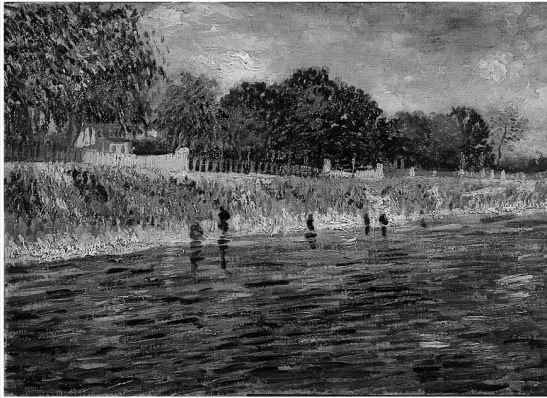


fig. 13
Vincent van Gogh,
Banks of the Seine,
F293, Late April-
late July 1887,
oil on canvas,
46.0 x 32.0 cm
Van Gogh Museum
(Vincent van Gogh
Foundation),
Amsterdam



fig. 16
Stamp of the firm, Tasset et L'Hôte,
present on the original stretcher of Vincent
van Gogh, *The Courtesan (after Eisen)*,
F373, October–November 1887,
oil on canvas, 100.7 x 60.7 cm
Van Gogh Museum (Vincent van Gogh
Foundation), Amsterdam



fig. 17
Vincent van Gogh, *Two dried sunflowers*,
F377, August 1887, oil on cotton canvas,
21.2 x 27.0 cm Van Gogh Museum
(Vincent van Gogh Foundation), Amsterdam



fig. 22 Vincent van Gogh, *The bridge in the rain (after Hiroshige)*,
F372, October–November 1887, oil on canvas, 73.3 x 53.8 cm
Van Gogh Museum (Vincent van Gogh Foundation), Amsterdam



fig. 24 Vincent van Gogh, *Woodland view*, F309a, May–July 1887,
oil on canvas, 46.1 x 55.2 cm Van Gogh Museum (Vincent van
Gogh Foundation), Amsterdam

one on top. The top layer might have a slight addition of zinc white too. This type of ground was quite rare in the Paris pictures investigated, being found on only two works dated to 1887: F 304 *The bridge near Courbevoie* and F 358 *Study for 'Romans Parisiens'*. Though four other Paris paintings did have this type of ground, the canvas supports are in fact fragments cut from earlier paintings: F 275 *View of a park in Asnières*, F 524 *Self portrait with straw hat*, and F 297 and F 297a, both entitled *Skull*.⁵¹ Paint samples show that the dark, blue to green colours of the cut up paintings contained pigments that were still typical of his Nuenen palette, yet the canvas supports do not show the typical Nuenen weave (fig. 11).⁵²

However, as we know (see under section *Antwerp; a transition.*), Van Gogh continued to use Nuenen colours for certain pictures in Antwerp, before revising his palette with the new colours purchased there. Weighing up this technical evidence, the provenance of the re-used canvases seems most likely to be Antwerp, or possibly Holland, but definitely not Paris. Two other canvases bought in Antwerp had this same type of ground: F 212 *Head of a skeleton with burning cigarette* and F 174 *Portrait of an old woman*.⁵³ In summary, one can say that this type of priming was very unusual in the Paris pictures investigated, and most common for Antwerp.

- *Single, lead white-based ground* (see table 3.5)

By far the most common type of priming encountered in the Paris works was a lead white based oil ground, applied in one or two layers of matching or very similar composition (fig. 12).⁵⁴ Barium sulphate, pipe clay, chalk and gypsum might be present as extenders, commonly with traces of the same toning pigments found in the first category of lead white-on-chalk grounds. Among the small group of Antwerp paintings investigated, one also had this particular type of ground: F 206 *Head of a woman with long hair*. Thus whilst typical for Paris, again it may not be considered exclusive to the period.

Exceptionally, analysis of the individually primed canvas support of F 261 *View of Paris* showed zinc white (zinc oxide) mixed into the lead white ground. A known disadvantage of zinc white in oil paint films was that they are relatively brittle, Church [1890] writing; 'When used freely, it often shows a tendency to crack and scale...'⁵⁵ Sharp stress cracks have formed in the ground of this painting, tending to lift the paint on top.

ABSORBENT SUPPORTS Examinations revealed that from the Spring of 1887 onward, Van Gogh began to experiment with alternative types of absorbent surface on which to

paint, replacing the standard, off-the-shelf canvas types traditionally used. Characteristic of these supports, all of which were individually stretched and prepared by the colourman or artist, is that they consist of finely woven fabrics, or smooth paper laid on fine fabric, often left unsized, and with thinly applied ground layers. Examples of these different types of absorbent preparations are described below.

- *Thinly applied, pure lead white on linen* (see table 3.5)

One type of absorbent preparation used, consisted of a very thin layer of lead white in oil (up to around 0.05 mm). The lead white was of a pure variety, without the extenders commonly present in commercial primings. This type of ground was found on F 308 *Woodland*, dated to July 1887, though the support was originally used for an earlier underlying composition of unknown subject. Unfortunately, since the ground was covered up by a new picture, we can no longer tell how it looked. However, a similar thin, pure lead white ground features prominently in the small picture, F 293, *Banks of the Seine*, an outdoor study similarly made in Asnières, some time between May and July 1887 (fig. 13). The priming shows overall in between open brushwork that was skilfully differentiated to describe the various elements of the landscape. It contains no toning pigments and, originally, must have been bright white, heightening overall tonality (fig. 14). The present dull grey shade of the ground is partly due to scanty coverage of the linen threads, darkened by saturation with wax lining adhesive. The thinly primed and very finely woven fabric lent a subtly corrugated texture to dry strokes of paint drawn swiftly across its surface, providing the 'glittering' highlights across the rippled surface of the water that art historians have described (fig. 15).⁵⁶

- *Barium sulphate mixed with lead white and chalk on fine linen* (see table 3.8)

F 309a *Woodland view*, painted in Asnières in May to July of 1887, shows another type of absorbent ground applied to a very fine and apparently unsized linen canvas (figs. 24–25).⁵⁷ Again, since this picture has been re-used, the effect of the original ground is no longer evident. However, paint samples show that the thin white ground contains barium sulphate as the chief component, mixed with lead white and chalk. Probably a low grade of white household paint was employed, since, as nineteenth century sources inform us, cheaper varieties of lead white were commonly adulterated with varying quantities of barium sulphate, up to 75% in the variety known as 'Dutch white.' Merimée [1830] men-

tioned that ‘ceruse (i.e. lead white) made in Holland’ was not a very clear white and was ‘therefore used chiefly in house painting and in priming cloth for pictures; it is often mixed with chalk.’⁵⁸ So far there are very few cited examples of this particular priming mixture used for paintings, though one might expect it to occur more often.⁵⁹

- *Barium sulphate on paper/cotton* (see table 3.8 and 3.9)
Examinations of three pictures painted in the late Summer and Autumn of 1887 showed that these were made on supports consisting of paper laid onto cotton fabric: F 344 *Self portrait with felt hat* and F 373 *The Courtesan* (after Eisen), as well as F 452 *Four dried sunflowers* now in the collection of the Kröller-Müller Museum in Otterlo.⁶⁰ In each case, the paper is very thin, translucent and of a variable yellowish to warm beige hue, as far as one can judge resembling the paper he used to trace and scale up the original print design.⁶¹ In each picture, the paper has been laid onto a matching, very fine plain weave cotton fabric, averaging 24–25 warp x 34–36 weft threads per cm.⁶² A last feature linking these works is that the paper-on-cotton supports were prepared with a thin layer of barium sulphate ground, consisting of the coarsely ground mineral barite (otherwise known as the natural pigment barytes) just sufficient to size the paper and prevent it being overly absorbent.⁶³ Microscopic examination of the picture surfaces, combined with sample cross-sections, were required to determine the layer structures of these three picture supports with certainty, due to the very close appearance of the thin and translucent layers of tracing paper and ground, which in turn strongly resemble the beige colour of unprimed and unbleached canvas. Indeed, previously these works had been taken as oil on canvas.

Examination of the edges of the picture supports showed a common process of manufacture. Generally, the edges of the paper sheet fall within the front edges of the stretcher, having first been cut to fit the size of the picture area.⁶⁴ The paper was then glued onto a larger piece of cotton before priming, either flat or already mounted on the stretcher.⁶⁵ As a result, the ground ran over the edges of the paper onto the fabric. The fact that the priming covers the tacking margins too, now enables us to establish that the cotton belonged to the original support rather than being a later addition.⁶⁶ Retail stamps inform us that the stretchers belonging to F 373 *The Courtesan* (after Eisen) and to F 452 *Four dried sunflowers* were supplied by the Paris merchant, Tasset et

L'Hôte (see fig. 16). Apparently these were custom made to fit the irregular dimensions of the supports, which, in the case of the first painting, seems to have exactly anticipated the format of the print design squared up to virtually twice its original size and with a decorative border added. A reasonable conclusion would be that Van Gogh obtained these supports ready-made from the colourman, were it not that a fourth painting examined, of around the same date, raises evidence to challenge this idea.

The small study in question, F 377 *Two dried sunflowers*, is painted on a remnant of exactly the same cotton, cut from a selvedge of the fabric (fig. 17).⁶⁷ Moreover, it shows the same unusual type of pure barytes ground, though here brushed directly onto the piece of canvas, with no paper laid on top (figs. 18–19). Apparently the cotton fabric was cut loosely to shape and pinned flat for priming, leaving the tack heads evident as reserve shapes in the ground. These makeshift qualities strongly suggest the hand of the artist. That Van Gogh had his own ingredients at hand is substantiated by the fact that he mixed considerable quantities of the same coarsely ground barytes with his colours on the palette too, as revealed by the analysis of paint samples that originated from overlying brush strokes (figs. 20–21).⁶⁸ This technical evidence goes some way to suggest that Van Gogh prepared all four picture supports himself, afterwards tacking the two largest onto stretchers supplied by Tasset et L'Hôte.

- *Chalk on fine linen* (see table 3.2)
Concurrent with the use of a barium sulphate ground for F 373 *The courtesan* (after Eisen), Van Gogh experimented with distemper grounds (see under section *Preparatory layers*) for two other copies after Japanese prints; F 372 *The bridge in the rain* (after Hiroshige) (fig. 22), and F 371 *The flowering plum tree* (after Hiroshige). Whereas the first work has a grey ground containing chalk mixed with bone black (fig. 23), the ground of the second painting contains chalk only. In both cases, the primings were very thinly applied to unsized, finely woven linen. Furthermore, microscopic examination reveals that both primed canvases were lightly abraded before they were used. Possibly this was the deliberate result of sanding, to expose raw canvas nubs that would further help to wick out paint medium into the porous fabric. Equally however, it could be an accidental effect caused by unintentional wearing or rubbing of the fragile surfaces, caused by rolling and unrolling the canvas, or when ready-stretched canvases were left around in the studio.

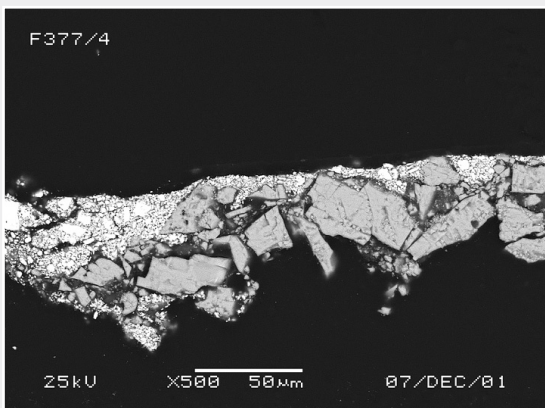
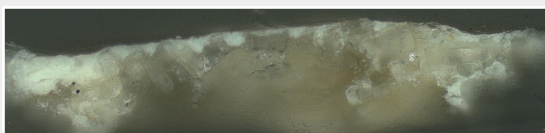
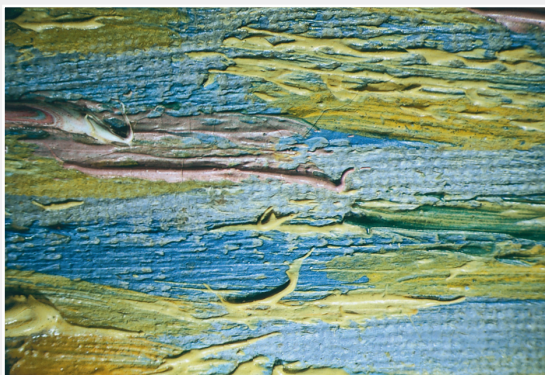
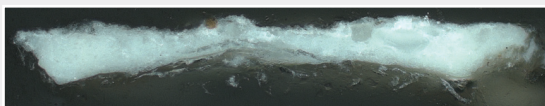


fig. 14 Paint cross-section from the bottom edge of Vincent van Gogh, *Banks of the River Seine*, F293 (see fig. 13). The cross-section shows a size layer with a c.0.05 mm thick, pure lead white ground layer on top.

fig. 15 Vincent van Gogh, *Banks of the River Seine*, F293 (see fig. 13), detail of highlights in the water.

fig. 18 Paint cross-section from the bottom edge of Vincent van Gogh, *Two dried sunflowers*, F377 (see fig. 17), showing the ground to contain barium sulphate (barytes). The thin layer of lead white on top is a later addition.

fig. 19 Backscattered Electron Image of the paint cross-section illustrated in fig. 18, showing the large rectangular barite crystals.

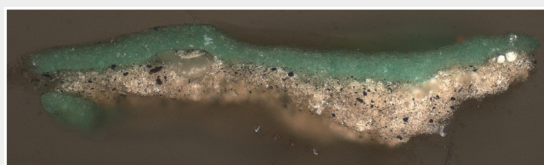
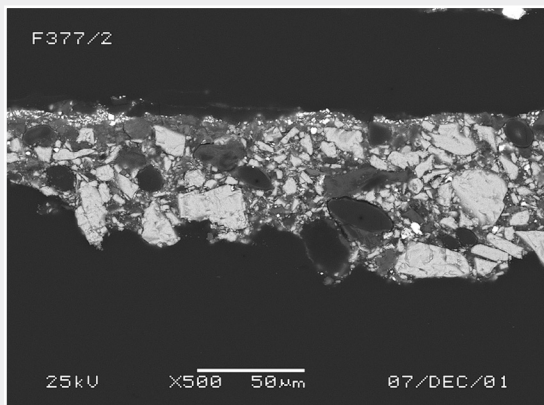
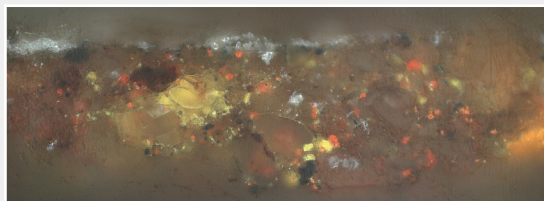


fig. 20 Paint cross-section from a dark brushstroke at the left edge of Vincent van Gogh, *Two dried sunflowers*, F377 (see fig. 17). The brown paint contains barium sulphate (barytes), silicates, vermilion, chrome yellow, ultramarine and an unidentified brown pigment. The thin layer of lead white on top is a later addition.

fig. 21 Backscattered Electron Image of the paint cross-section illustrated in fig. 20, showing the large rectangular barite crystals in the brown paint.

fig. 23 Paint cross-section from the bottom edge of Vincent van Gogh, *The bridge in the rain (after Hiroshige)*, F372 (see fig. 22). The sample shows the c.0.05 mm thick ground layer containing chalk and bone black, with a green paint layer on top.

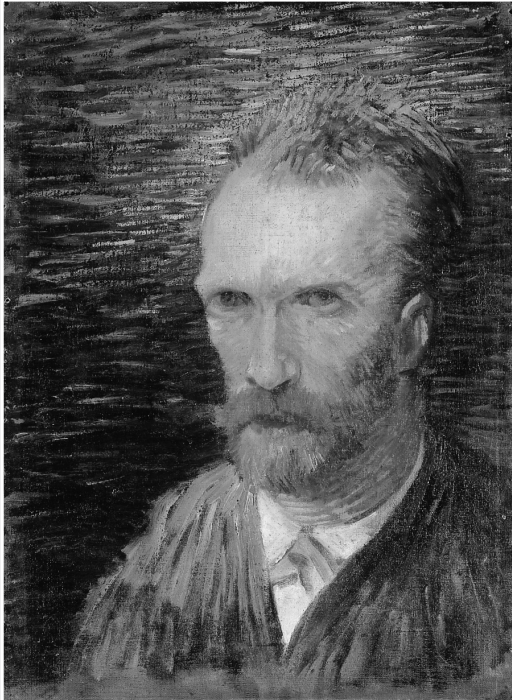


fig. 26 Vincent van Gogh, Self portrait, F109v, mid. June to August 1887, oil on canvas, 42.9 x 31.3 cm Van Gogh Museum (Vincent van Gogh Foundation), Amsterdam



fig. 28 Vincent van Gogh, Flowering chestnut tree, F270a, mid.– late May 1887, oil on canvas, 55.6 x 46.0-46.3 cm Van Gogh Museum (Vincent van Gogh Foundation), Amsterdam



fig. 30
Vincent van Gogh,
*Still life with cabbages
and onions*, F374,
November 1887 –
February 1888, oil on
canvas, 50.0-50.2 x
64.3 cm Van Gogh
Museum (Vincent van
Gogh Foundation),
Amsterdam

The extremely porous nature of the supports is evident in the extent to which they have soaked up wax lining adhesive and/or varnish applied during later treatments, radically altering the ground tints, from light grey to black, and from white to beige respectively.

MID-TONED GROUNDS (see table 3.6 and 3.7) Parallel to this experimentation with pale absorbent supports, Van Gogh began to exploit the more obvious pictorial effects of mid-toned grounds, sometimes applied to textured surfaces. Earlier pictures provide very sporadic evidence for the use of toned underlayers, one being the Antwerp *Portrait of an old man* F 205 in which the pale tint of the ready-made ground was modified with a streaky grey layer that was largely covered up in the completed picture (see under section *Antwerp; a transition*).⁶⁹ Around the spring of 1887 though, Van Gogh seems to have returned to this idea, now allowing the toning layer to stand for parts of the finished composition. This idea may partly have stemmed from a rationalisation of his procedure for painting out abandoned compositions, which, as examinations have shown, often involved first covering up the rejected image with a dark paint layer, before applying a new light ground layer on top. A more deeply toned ground layer could serve both functions in one go.

Two early examples of this method are the outdoor studies of *Woodland view* (F 307 and F 309a–(fig. 24)), painted in May to July of 1887 on top of abandoned works.⁷⁰ Though the re-used supports differed both in terms of canvas weave and ground preparation, Van Gogh simply covered existing layers with a matching pinkish-brown layer as a common starting point for the current pictures. Paint samples verify that in each case, this layer contained the same elaborate mixture of pigments; lead white, red ochre, vermilion, ultramarine, barium sulphate, emerald green, zinc white, carbon black and an organic red pigment (fig. 25). Apparently, exactly the same mixed ground colour was brushed onto the reverse of several Nuenen canvases too, in preparation for their re-use for a series of self portrait studies (F.nos. 61v, 77v, 109v, 179v, and 269v) and a Montmartre landscape (F 388v *Vegetable garden with sunflower*) all painted in the period mid. July–August of that year– (figs. 26–27). The pinkish-brown priming was thinly applied in a single coat, sinking into the unsized backs of these canvases so that it left a slightly rough surface texture.

A third painting in the series of woodland studies dated May–July 1887, F 308, shows a cool pinkish-grey ground

rather than the warm pinkish-brown ones present on the other two discussed. This second ground was similarly brushed onto the canvas when on its stretcher, covering the existing picture area. Again, analysis of paint samples demonstrated that exactly the same ground colour appears on other works, indicating that the artist mixed up a batch of paint and applied it to several canvases at once. These include F 270a *Flowering chestnut tree* that was painted in May 1887, apparently also on top of another composition (figs. 28–29), and F 370 *In the café*; Agostina Segatori in *Le Tambourin*, thought to have been painted some time between January and March of 1887, in this case on top of an abandoned portrait. In each case the pinkish-grey colour consisted of lead white mixed with Emerald green, barium sulphate, fine red ochre and ultramarine. Surface examination of the latter portrait suggests that this grey colour was not applied as a uniform ground layer however, but in different shades that defined the main planes of the background area for example.

In the winter of 1887 to early 1888, Van Gogh continued his experiments with toned ground layers used for three related works; F 289 *Portrait of a restaurant keeper*, F 374 *Still life with cabbages and onions* (fig. 30), and F 522 *Self portrait as a painter* that is signed and dated 1888. For these pictures he employed a matching fine 4.1/ warp faced twill fabric (with an average of 23 warp and weft threads per cm) prepared with a warm pinkish-grey ground layer. Though the warm hue is reminiscent of the artist-applied pinkish-brown grounds discussed above, it is much lighter in shade and has a very different composition (fig. 31).⁷¹ Essentially the ground resembled a commercial lead white-in-oil type, but has a more distinctive tone due to significant additions of the usual tinting pigments (bone black, orange ochre and umber). Paint samples also revealed that, on each painting, the ground had been applied in two stages. Moreover, in each case, particles of orange ochre had been mixed with the size layer present under the ground, presumably to provide a visual check for its even application.⁷² The intimate match of canvas and preparatory layers suggests that the three supports were cut from the same strip of pre-primed twill. Rotating the landscape 15 canvas of the still life to correspond with the upright format of the figure 15 supports of the two portraits, reveals that in each case, the diagonal grain of the twill travels consistently from top left to bottom right (seen on the front or warp face). This suggests that each piece was cut from the length direction of the fabric, presumably to minimise wastage. The

unusual fabric and ground tone, suggest that these supports met the specifications of the painter, rather than being purchased off-the-shelf.

5 Discussion

Systematic examination of Van Gogh's Antwerp and Paris picture supports revealed that, beginning in Antwerp, his customary practice became the purchase of ready-made canvases primed and stretched in a range of standard formats. This sets his method apart from other periods of his production, when he preferred to manufacture his own supports by combining loose canvas with bare stretching frames. An exact comparison of these retailed canvases, inevitably of plain weave and with a lead white in oil ground, revealed the endless subtle variety of the fabric textures and priming tints on offer. The fact that hardly any matching canvases were found supports the idea that Van Gogh generally purchased his supports individually, rather than stocking canvas by the roll. One can now lay to rest the earlier assumption that in Paris, Van Gogh had probably already begun to buy ready-primed canvas by the metre from the company Tasset et L'Hôte, as became his standard practice later on.⁷³ Trade stamps reveal that though he visited their shop in the rue Fontaine by 1887, this involved the purchase of a ready-stretched canvas stamped neatly in the middle, as well as stretchers used for paper-on-cotton supports, rather than loose canvas with the characteristic asymmetrical thread count (approximating 11–13 warp by 15–19 weft threads per cm) encountered in his later works.⁷⁴ Documentary and technical evidence reveal that, besides Tasset et L'Hôte, Vincent visited several addresses in Montmartre to buy different types of ready-primed canvas (and carton), so that one wonders which factors led him to choose a particular support for a given picture. Unfortunately, there are hardly any letters from the Paris period that might help to illuminate his preferences, since Vincent lived with Theo and had no need to correspond. Even his later writings reveal only practical considerations, in Arles weighing up the quality versus price of ready-primed canvas sold by the metre by various companies for example.⁷⁵ Therefore, to understand the artistic consequence of these choices, we have to turn to the visual evidence of the pictures themselves.

Broadly speaking one can say that, for the pictures made during Vincent's first year in Paris, the light primed canvases do not play a conspicuous role in creating

their final look, since they are generally covered up by a full-bodied application of paint. Contemporary artist, A.S. Hartrick, later recalled that when Van Gogh was making his first Paris paintings of still life, flowers and Montmartre landscapes, the 'plunge into pure colour (had) stimulated him violently' so that he had 'piled on the paint in a way that was astonishing and decidedly shocking to the innocent eye as well as that of the more sophisticated...'⁷⁶ In the floral still lifes that he painted in the summer, a characteristic succulent layering of impasto touches may be specifically linked to the example of the painter, Adolphe Monticelli, whom Vincent greatly admired. Despite the very direct impression that the 1886 pictures create in general, in fact technical examinations revealed that they are often built up in several, sometimes distinct sessions of paint application, often covering the light ground at an early stage with opaque areas of warm-toned underpaint. However, around January of 1887, this situation radically changed when Van Gogh switched to a much thinner and more direct painting technique reminiscent of watercolour that would allow the pale toned supports to feature in the finished pictures in a prominent way.

The *peinture à l'essence* method practiced by his friend and colleague, Toulouse Lautrec, is thought to have provided the example for this thinner way of painting, coupled in his portraits with the application of discreet dashes and dots of colour that presented Van Gogh with a less dogmatic variant of the neo-impressionist divisionist touch.⁷⁷ Vincent combined both elements in a new style that was first rehearsed on familiar subject matter, *Shoes F 331*, painted in January or February of 1887. In this first exercise, painted on a cheaper ready-primed carton support (rather than canvas), the technique was thinner but still quite broad and painterly. However, a more delicate and graphic rendition evolved in the course of the still lifes he painted in the period February to March, and especially in the landscapes of March to mid. April 1887.⁷⁸ In these works, thin veils of colour (often less than 0.01 mm) used to tone the light ground were deliberately rubbed or brushed down, so that colour was left in the interstices but removed from the light tops of the primed weave. Sometimes sgraffito texturing was carried out at a later stage of execution in order to recover the light tone of the ground, scraping through wet or semi-dry paint with a hard bristle brush or other implement.⁷⁹ Very occasionally, the paint was even thinned out by dabbing with the finger tops.⁸⁰ In other places the ground was left showing from the start, in between open touches of colour. These joint measures

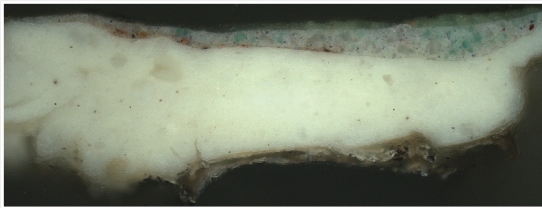
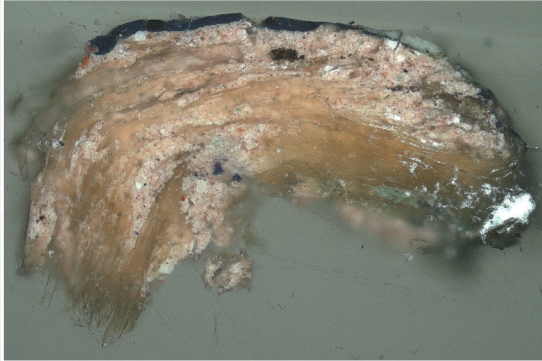
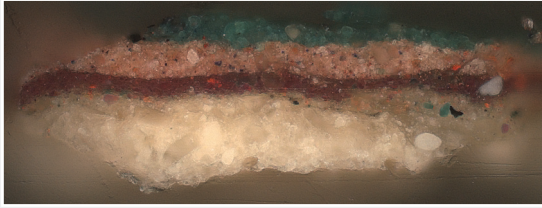


fig. 25 Paint cross-section from the bottom edge of Vincent van Gogh, *Woodland view*, F309a (see fig. 24). The bottom layer is the original ground, containing barium sulphate (presumably barytes), lead white, and chalk. No size is evident underneath this layer, though it is complete. On top are two paint layers belonging to an underlying composition. This was covered up by a pinkish-brown layer, serving as a ground layer for the current composition. This second, artist-applied ground contains lead white, red ochre, an organic pink-red, ultramarine, Emerald green, barium sulphate and possibly a little zinc white. On top is the green layer of the foliage.

fig. 27 Paint cross-section from the left edge of Vincent van Gogh, *Self-portrait*, F109v, (see fig. 26). Canvas fibres are evident at the bottom of the sample, then the pinkish-brown ground layer, and finally a dark blue paint layer from the portrait. The ground contains lead white, red ochre, ultramarine, Emerald green, barium sulphate, carbon black and possibly a little zinc white. Van Gogh brushed this layer directly onto the unsized back of a Nuenen picture.

fig. 29 Paint cross-section from the bottom turnover edge of Vincent van Gogh, *Flowering chestnut tree*, F270a, (see fig. 28). The cross-section shows the c. 0.13 mm thick first ground layer, consisting of lead white with a few orange ochre, and red-brown particles. The second, pinkish-grey ground layer applied by Van Gogh contains lead white, barium sulphate, Emerald green, ultramarine and fine red particles. A green layer is present on top. The first and second grounds are separated by an extremely thin, dark brown layer, that must have belonged to an abandoned composition. A thin green layer is present on top of the sample.

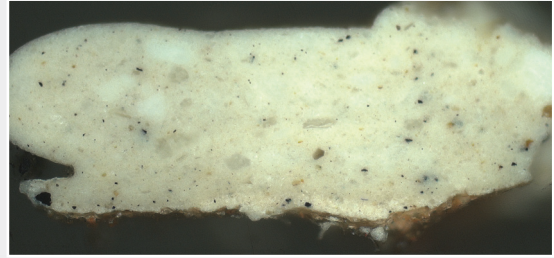


fig. 31 Paint cross-section from the right tacking margin of Vincent van Gogh, *Still life with cabbages and onions*, F374, (see fig. 30). The cross-section shows the c. 0.23 mm thick ground layer, which contains lead white, a little bone black, orange ochre and silicates. The thin size layer underneath the ground contains a few particles of orange ochre.



fig. 32 Vincent van Gogh, *Still life with cabbages and onions*, F374 (see fig. 30). Detail showing the twill canvas weave used to texture paint.

ensured that the reflective priming was left prominent throughout, heightening overall luminosity and providing a cool unifying tone that contrasted the brightly coloured dots and dashes of paint applied on top. For the Montmartre landscapes, the light primings had a representational function as well, contributing to the airy spring-like quality of the scenes depicted. For three landscapes it emerged that the light bluish ground tone creating this effect was in fact a colour mixed by the artist to cover up abandoned designs, imitating the effect of a cool tinted commercial ground. In each of these pictures, F 341 *View from Vincent's apartment*, F 346 *The Moulin de Blute-Fin and vegetable gardens*, and F 347 *Impasse des deux frères and the Moulin de Poivre*, the artist-applied priming contained exactly the same ingredients of a little ultramarine blue, added to lead white and zinc white.

Alongside this new marked exploitation of the light tints of ready-made artists' canvas, from the spring of 1887 Van Gogh also began to experiment with alternative types of absorbent substrate, each with a rather smooth surface finish, and light tone. The materials used included pure (i.e. without fillers) chalk, barium sulphate or lead white grounds, brushed thinly onto unsized and finely woven fabrics, or paper-on-fabric. Owing to a recent campaign of technical research that focussed on the subsequent Arles period, we are able to place these Paris findings in perspective. In October of 1888, Vincent would announce that he and fellow-painter Paul Gauguin, with whom he shared a studio from October to December, intended to prepare their own, cheaper canvas.⁸¹ Technical examinations have demonstrated that they divided a roll of jute fabric for this purpose, preparing it sequentially with pure chalk, barytes and lead white grounds, until the roll was depleted.⁸² We now know that all three types of ground (though applied to relatively smooth surfaces rather than the coarse jute) find a precedent in Van Gogh's 1887 pictures, so that his role in instigating these joint explorations is perhaps greater than hitherto suspected. Indeed, available evidence suggests that for the trials with barium sulphate grounds, Van Gogh lent closely on his Paris experience, continuing to use a mixed animal glue and oil binding medium, rather than the mixture of starch and glue favoured by Gauguin.⁸³ Once again, only monetary reasons are given for these priming experiments in Arles, yet it is important to consider the pictorial consequences of the chosen materials too.

To understand the visual impact intended by the use of absorbent supports for the Paris pictures, one needs to

discount the profound changes in appearance brought about by later wax-lining and varnishing treatments in particular, since seepage of these materials into the permeable painting structures has caused irrevocable darkening of original colours.⁸⁴ Taking this into account, the white chalk ground of F 371 *The flowering plum tree (after Hiroshige)*, now altered to beige, would originally have featured more prominently where it was left exposed along the fine contours of the trees, also heightening the brilliance of thin red and purple glazes in the main tree trunk for example. Similarly, blackened patches of primed canvas left exposed in the clothing and around the fine contours of the figures in F 372 *The bridge in the rain (after Hiroshige)*, would have been lighter grey, contributing to a more balanced colour scheme. Considering the barium sulphate grounds used by Van Gogh, the light beige colour of the support does feature in the thin and sketchily painted background of his small study of F 377 *Two dried sunflowers*, and in the right part of the background of his larger version of the theme, F 452, that is considered unfinished.⁸⁵ In F 344 *Self-portrait with felt hat* and especially the densely painted F 373 *Courtesan (after Eisen)* however, only small spots show coincidentally between brushstrokes. The role of these supports, with their rather neutral hue and smooth surface, seems to have been an instrumental one, facilitating the effects of colour and texture achieved in paint layers on top. These decorative paintings took the jewel-like colour schemes of Japanese prints as their starting point, further substituting the original blacks and greys by more saturated colours, and heightening vivid complementary colour contrasts. Like other painters, Van Gogh may well have considered the use of absorbent grounds for these particularly colourful works as advantageous, since, by reducing the oil content of the paint they would render the colours more brilliant and less subject to change due to darkening of the oil. He expressed thoughts in a similar vein with respect to coarsely ground pigments, which, since they would be less saturated by oil than finely ground ones, would provide fresher colours that might darken less.⁸⁶ Intuitively Van Gogh could not refrain from a more full-bodied application of brushstrokes in certain areas of his *Japonaiserie* pictures however, contrasting the more radical effects achieved by colleagues such as Bernard, Anquetin and Gauguin, who exploited absorbent supports to soak up thin paint layers and eliminate textural brushwork. Earlier, Vincent had explained that he considered a solid paint application necessary to create lasting colour, a view that must have been at odds with this lean approach.⁸⁷

From the spring of 1887, parallel to both these lines of experiment using absorbent supports on the one hand, and exploiting the luminosity of light tinted commercial primings on the other, he also began to use more deeply toned grounds. Analysis of paint samples has shown that the artist mixed a batch of cool pinkish-grey colour, and a batch of warm pinkish-brown, brushing the same ground colour onto several pictures at once in order to prepare them for re-use. He must have been pleased with the effect, since by the autumn of 1887 he had ordered twill canvas supports prepared with a warm-toned ground that was similar to the artist-applied pinkish-brown primings, but somewhat lighter in shade. In the resulting paintings (F 289 *Portrait of a restaurant keeper*, F 374 *Still life with cabbages and onions*, and F 522 *Self portrait as a painter*), he seems to have exploited the pronounced fabric texture to animate his paint surfaces, dragging dryish scumbles of paint over the raised threads of the weave to accentuate its diagonal bias, in contrast to loaded and smoothly worked passages of paint (fig. 32). Especially in the two portraits, crust-like paint surfaces were built up in the process of adjusting texture and colour, in repeated applications of paint. The result closely parallels the wrinkled surface texture of Japanese wood block prints called *crépons* (due to their resemblance to *crêpe* paper) that were known to have inspired him in the period. Hartrick recalls how, when being led around his Paris studio, Vincent had drawn his attention to some *crêpes*, and that he became convinced of his aim to 'get a similar effect in his painting of little cast shadows in oil paint from the roughness of surface'.⁸⁸ To some extent however, this effect also seems to result from labouring with the unfamiliar qualities of the fabric, which must have impeded the crisp gestural brushwork that usually formed such an essential component of the artist's technique.

In F 374 *Still life with cabbages and onions*, the mid-toned ground was left visible in select areas of the finished picture (notably in the cabbage), but in the two portraits on twill it was virtually covered by layered paint strokes on top. This contrasts Van Gogh's way of using the artist-primed canvases in which the pronounced hue of the ground was exploited in a remarkably direct way, especially in the outdoor studies he made around Asnières. On the one hand, the ground colour provided a ready middle tone for an economic modelling of form. On the other hand, it was left showing in between open brushwork as a figurative element, serving to heighten colour and tone by means of complementary contrast.

For example, where bright green dabs in the foliage are set off against spots of pinkish-brown ground colour, the red-green opposites enhance each other. Van Gogh would have had to anticipate the different effect of applying colours to a pinkish-brown or pinkish-grey substrate, rather than a pale tinted one, demonstrating the sophisticated colour mixing skills that he had acquired by this date. In F 270a *Flowering chestnut tree* and F 308 *Undergrowth*, the artist began with an elaborate charcoal or pencil sketch of his subject on the pinkish-grey primed supports, with outlines that would serve as a guide for the dots and dashes of colour to be filled in. In his woodland views with pinkish-brown primings however (F 307 and F 309a), he seems to have virtually dispensed with a preliminary underdrawing, now drawing and modelling form directly with the brush in one go – thereby fulfilling a goal that he had set himself almost a year before.⁸⁹ The relatively close resemblance of the pinkish-brown grounds to the hue and tone of a dark wooden palette, must have allowed him to gauge colour in an unusually direct fashion, fostering such a rapid procedure.⁹⁰ At a microscopic level this is witnessed in paint cross-sections by a partial, slurried mixing of colours within individual paint blobs that were picked up swiftly from the palette. This very immediate approach is consistent with the character of these works as rapid impressions, capturing the transient effects of dappled sunlight filtering through densely knitted foliage.

6 Conclusion

This study demonstrates how, from the spring of 1887, when accommodating himself within progressive art circles in Paris, Vincent came to exploit the pictorial qualities of different types of picture support in an individual way. The various substrates took on a central role in his exploration of the painterly opposites of complementary colours, dark and light tones, and thin and thick paint application. Three main lines of experiment were followed, involving; thin washes and graphic touches of paint applied to luminous surfaces, decorative areas of bright colour applied to absorbent substrates, and loose touches of colour applied to mid-toned supports. The rapid momentum behind these artistic developments demonstrates the extraordinary creative powers that Van Gogh exercised in his quest to forge a personal, avant-garde style.

Table 3. PRIMED CANVAS AND PAPER-ON-CANVAS SUPPORTS USED IN ANTWERP AND PARIS

<p>F. no. The F.no. of the painting refers to its identifying number in the oeuvre catalogue of J.-B. de la Faille, <i>The works of Vincent van Gogh; his paintings and drawings</i> (Amsterdam, 1970, first edition 1928).</p> <p>Title Given titles may be slightly revised in the forthcoming new collection catalogue; Louis van Tilborgh and Ella Hendriks, <i>Vincent van Gogh, Paintings, Antwerp and Paris 1885–1888</i>, volume 2, Van Gogh Museum (Amsterdam and Zwolle, 2005).</p> <p>Date The suggested dates of the paintings anticipate those to be published in Tilborgh and Hendriks 2005, subject to minor change. Whereas the date refers to the current image, often this overlies an abandoned composition. The dates of these reused canvases are with underlined.</p> <p>Height x width (cm) Height by width dimensions are listed for each picture in cm. These dimensions are compared to the extended range of commercial sizes offered by Lefranc & Cie in their catalogue of 1889, as well as the more limited and slightly variant range listed in the Bourgeois aîné catalogue of 1888. In each case the closest match or matches are given. The term “portrait” (used by Lefranc) is interchangeable with the term “figure” (used by Bourgeois). Marginal variation in the standard formats supplied by different manufacturers in the period might lead us to expect small deviations in the measurements of pictures. Furthermore, we need to allow for slight alterations in original picture format as a result of later treatments, such as lining and/or replacing stretching frames. Taking this margin of error into account, the following criteria were used to decide whether a canvas was of standard format, close to standard format, or of non-standard format.</p> <p>STANDARD FORMAT; the height and width measurements deviate less than 1 cm from the given standard format.</p> <p>CLOSE TO STANDARD FORMAT; the height or width measurements deviate 1–2.5 cm from the closest standard format.</p> <p>NON-STANDARD FORMAT; the height or width measurements deviate 2.5 cm or more from the closest standard format. Non-standard formats might be composed of interchangeable or ‘universal’ stretcher-bars of fixed length, as noted where appropriate.</p> <p>Original features Any surviving woven edges of the canvas (so-called selvages) are recorded, as well as original stretching, stretching frames, and format stamps. Such features provide important evidence for the original format of a picture support.</p> <p>Method of priming A distinction is made between canvas supports that were cut from a larger pre-primed piece (primed then cut), as opposed to canvas supports that were cut to size before individual priming on the work-</p>	<p>ing frame (cut then primed). In the former case the priming layers cover the entire canvas, including the tacking margins, whereas in the latter case they cover the picture area only.</p> <p>Priming layers For each picture, the build-up and composition of priming layers was investigated using paint sample cross-sections. In the table, the ground layers are grouped accordingly under a few main types. It should be noted that the small amounts of china clay and silicates identified in these ground layers may be part of the natural ochres present, rather than separate additions. The methods and techniques used to prepare and analyse samples, were as follows;</p> <p>INCIDENT LIGHT MICROSCOPY: the samples were embedded in polyester resin and ground with sic-paper. The resultant cross-sections were examined under a Zeiss Axioplan 2 microscope, both with incident polarised light and incident UV-light (from a Xenon-lamp and a mercury short arc photo optic lamp HBO, respectively). The filter set ‘UV H365’ used for examination in UV-light consists of the following filters: excitation BP 365/12, beam splitter FT395 and emission LP 397.</p> <p>Scanning Electron Microscopy with Energy Dispersive X-ray Spectroscopy (SEM-EDS): SEM-EDS analyses were carried out by Kees Mensch at Shell Research and Technology Centre, Amsterdam, using a JEOL JSM 5900 LV scanning electron microscope and a Noran Vantage EDS-system with pioneer Norvar detector.</p> <p>The primary electron beam energy was 25 keV. Some samples were coated with carbon; others were examined without a coating using the low vacuum mode.</p> <p>FOURIER TRANSFORM INFRARED SPECTROMETRY (FTIR): FTIR analysis was performed with a Perkin Elmer Spectrum 1000 FTIR spectrometer combined with a Perkin Elmer AutoImage System FTIR Microscope, using a Miniature Diamond Anvil Cell with type IIA diamonds.</p> <p>Thermal Hydrolysis and Methylation Gas Chromatography–Mass Spectrometry (THM-GC-MS) in combination with Curie Point pyrolysis: sample material was made into a suspension with a few drops of tetra methyl ammonium hydroxide in methanol, and the suspension applied to a pyrolysis wire. The wire was pyrolysed at 625°C. By the combined effect of heat and reagent, the fatty acids, resin acids and alcohols present undergo hydrolysis and/or methylation. Also the polymer fraction of the sample is broken up into smaller molecules. The sample mixture was separated on a VF 5 ms column by gas chromatography, and the separated components detected and identified using mass spectrometry.</p> <p>HIGH PERFORMANCE LIQUID CHROMATOGRAPHY (HPLC): A volume of 250 µl 3 molar hydrochloric acid was added to the sample. Hydrolysis was performed in a closed vial for 16</p>	<p>hours at 105 °C. Next the sample was evaporated to dryness under a nitrogen flow. A volume of 10 µl of a mixture of ethanol, water and tri-ethylamine (TEA) (2.2:1, v:v:v) was added and the sample again evaporated to dryness. Subsequently, 20 µl ethanol, water, TEA and phenyl isothiocyanate (7:1:1:1, v:v:v:v) were added to the sample and allow to react for 20 minutes at room temperature. The solution was once more evaporated to dryness and re-dissolved in 50 µl buffer A. Analysis was done on a Supelcosil C18 column (250 x 4.6 mm) with a gradient of buffer A: 0.7 molar sodium acetate in water with 2.5 ml TEA, pH = 6.4, buffer B: water and buffer C: acetonitrile. Detection was done at 254 nm absorption.</p> <p>Staining test for proteins: the staining reagent Amido Black 2 was prepared and used as described by E. Martin, “Some improvements in techniques of analysis of paint media”, in <i>Studies in Conservation</i>, 22 (1977), 63–67.</p> <p>Threadcount The average thread counts for each picture support are listed with the highest value first (vertical or horizontal direction). In the very few cases where an original selvedge of the cloth remains, the warp and weft directions are specified. Usually this is unknown however. The procedure for collecting and analysing data was as follows; using x-radiographs, threads were counted over a distance of 2 cm in each direction. This was repeated, usually 5 times, in different areas of the canvas. For each group of counts, an average value was calculated and halved to provide the mean thread count per cm. The confidence interval (CI) is given between brackets. For a definition of CI see International Standard ISO 2602. In this case the CI gives the range of values that have a 95% probability of containing the true value of the mean thread count being investigated. No CI was given for the paintings F377 (on fine cotton) and F289, F374 and F522 (all on will) since multiple thread counts could not be made. The authors are indebted to Arie Meruma and Wim Genuit, Shell Research and Technology Centre, Amsterdam, for their help with processing data.</p> <p>Fibre analysis Selective analysis of fibre samples from twenty-two paintings was carried out. Fifteen samples were investigated at the Netherlands Institute for Cultural Heritage by Muriel Geldof, and seven at the Art Institute of Chicago by Inge Fiedler and Eva Schuchardt (sample forms dated 9–1–2002). The method used was Polarised Light Microscopy (PLM), enabling cotton to be readily distinguished from bast fibres with the morphology of linen.</p> <p>Matches For each picture support, information on ground layers is coupled to the characteristic weave and thread count of the canvas. The pictures are listed in order of increasing thread count within each group. This helps to match up pictures that were painted on identical supports, in terms of the canvas weave and/or priming layers applied.</p>
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Table 3.1.		Unidentified ground (simple, tabby weave canvas)								
F.no. Title	Date Underlined if the canvas is reused	Height x width (cm) ↳ Equivalent commercial commercial size? Lefranc & Cie 1889 ↳ Bourgeois aîné 1888	Original features	Canvas primed then cut	Canvas cut then primed	Ground	Average no. of threads per cm (ci)	Average no. of threads per cm (ci)	Fibre identified	Matches
244 Basket with violets on a stool	<u>April-May 1887</u>	46.0 x 55.0 ↳ Portrait 10 (55 x 46)			X	No sample including the first ground available	12.4 (± 1.0)	11.7 (± 0.7)		

Table 3.2.		Chalk grounds (simple, tabby weave canvases)								
F.no. Title	Date Underlined if the canvas is reused	Height x width (cm) ↳ Equivalent commercial commercial size? Lefranc & Cie 1889 ↳ Bourgeois aîné 1888	Original features	Canvas primed then cut	Canvas cut then primed	Ground 1 layer	Average no. of threads per cm (ci)	Average no. of threads per cm (ci)	Fibre identified	Matches
372 Bridge in the rain (after Hiroshige)	October- November 1887	73.3 x 53.8 ↳ Horizontal landscape 20 (75 x 54) ↳ Landscape 20 (73 x 54)		X probably		No size. Chalk & lot of bone black. Very thin & uneven layer.	19.1 (± 1.0)	19.0 (± 0.9)	Bast fibre, probably linen	Canvas, (but not ground) matches F371
371 Flowering plum tree (after Hiroshige)	October- November 1887	55.6 x 46.8 ↳ Portrait 10 (55 x 46)			X	No size. Chalk. Local application of second whiter ground under painted orange border.	20.1 (± 0.5)	17.1 (± 1.3)	Bast fibre probably linen	Canvas, (but not ground) matches F372

Table 3.3.		Double, lead white on thin chalk grounds (simple, tabby weave canvases)									
F.no. Title	Date Underlined if the canvas is reused	Height x width (cm) ↳ Equivalent commercial commercial size? Lefranc & Cie 1889 ↳ Bourgeois aîné 1888	Original features	Canvas primed then cut	Canvas cut then primed	Ground layer 1	Ground layer 2	Average no. of threads per cm (ci)	Average no. of threads per cm (ci)	Fibre identified	Matches
207a Portrait of a woman	Mid. December 1885	46.2 x 38.4 ↳ Portrait 8 (46 x 38)	Right selvedge		X	Chalk	Lead white & little umber	11.8 (± 0.7) Warp	11.8 (± 0.7) Weft	Bast fibre, probably linen	
216g Venus torso	February- March 1887	40.8 x 27.1 ↳ Horizontal landscape 6 (40.5 x 27) ↳ Landscape 6 (41 x 27)	Original format stamp (6) evident through lining canvas		X	Very thin layer of chalk in glue, incomplete.	Lead white, little barium sulphate, chalk, bone black, umber & yellow ochre	12.1 (± 0.5)	12.0 (± 0.1)		
309 Woodland path	May-July 1887	45.3 x 37.7 ↳ Portrait 8 (46 x 38)			X	Chalk	Lead white & little silicates	12.2 (± 0.5)	12.1 (± 0.6)		
229 The hill of Montmartre with stone quarry	June-mid. July 1886	32.0 x 40.9 ↳ Portrait 6 (40.5 x 32.5) ↳ Figure 6 (41 x 33)	Bottom selvedge		X	Medium rich layer with chalk	Lead white, little barium sulphate, chalk/gypsum, carbon black & few ochreous particles	12.4 (± 0.6) Weft	11.8 (± 0.7) Warp	Bast fibre, probably linen	
310 Wheatfield with a partridge	mid. June- mid. July 1887	53.7 x 65.2 ↳ Portrait 15 (65 x 54)			X	Chalk	Lead white, little carbon black, umber & ochreous particles. Layer 2 may consist of 2 applications.	13.0 (± 1.3)	12.4 (± 0.9)	Bast fibre, probably linen	

F.no. Title	Date Underlined if the canvas is reused	Height x width (cm) ► Equivalent commercial size? Lefranc & Cie 1889 ►► Bourgeois aîné 1888	Original features	Canvas primed then cut	Canvas cut then primed	Ground layer 1	Ground layer 2	Average no. of threads per cm (CI)	Average no. of threads per cm (CI)	Fibre identified	Matches
230 The hill of Montmartre with stone quarry	June – mid. July 1886	56.0–56.3 x 62.2 ► Non-standard Closest to portrait 15 (65 x 54). Possible use of 56.7 cm stretcher-bar for height & 62.1 cm stretcher-bar for width (as occur in land- scape & marine 20-30).		X		Chalk partides	Lead white, little barium sulphate & few black	13.1 (± 1.0)	12.0 (± 0.1)	Best fibre, probably linen	
208a Self portrait with felt hat	<u>December 1886– January 1887</u>	41.5 x 32.4 ► Portrait 6 (40.5 x 32.5) ►► Figure 6 (41 x 33)			X	Chalk	Lead white, little barium sulphate, few black & ochreous particles. Oil medium.	13.2 (± 0.7)	11.8 (± 0.7)		
28 Kingfisher	July – August 1887	26.5 x 19.0 ► Vertical landscape 3 (27 x 19)	Painted red border on the tacking margins	X		Chalk	Lead white, little barium sulphate, gypsum, red & orange ochre & carbon black	13.2 (± 1.1)	12.6 (± 0.5)		
347 Impasse des deux frères and the Moulin de Poivre	<u>March– mid. April 1887</u>	35.0 x 65.3 ► Non-standard. Closest is horizontal marine 15 (65 x 40.5). Possible use of fixed stretcher-bar sizes 5 (35 cm) & 15 (65 cm).		X		Chalk	Lead white, little barium sulphate, gypsum, silicates, carbon black & ochreous particles.	13.2 (± 0.5)	12.9 (± 0.8)		Ground (but not canvas) matches first ground of F307
208 Self portrait	March – early June 1886	27.2 x 19.0 ► Vertical landscape 3 (27 x 19).	Original strainer with format stamp (3)	X		Chalk, little lead white, bone black & silicates	Lead white, little barium sulphate, red ochre, silicates & chalk	14.6 (± 1.1)	12.9 (± 1.0)		
314 Courting couples in a park in Asnières	<u>Mid–late May 1887</u>	75.0 x 112.7 ► Non-standard. Closest to vertical marine 50 (116 x 73). Possible use of 113.4 cm stretcher-bar for width, as occurs in portrait & vertical landscape sizes 80–120.		X		Chalk	Zinc white, little barium sulphate, chalk, silicates/ clay and orange ochre particles	16.9 (± 0.6)	15.1 (± 0.7)	Best fibre, probably linen	
307 Woodland view	<u>May–July 1887</u>	46.1–46.5 x 38.0 ► Portrait 8 (46 x 38)	Underlying composition extends over the bottom and right tacking margins.	X		Chalk	Lead white, many black particles, little gypsum, silicates, clay, ochre, umber and barium sulphate. Applied in two stages.	30.2 (± 1.1)	25.6 (± 1.6)	Best fibre, probably linen	Ground (but not canvas) matches first ground of F347. Canvas (but not ground) matches F309a

Table 3.4.		Double, lead white & chalk on thicker chalk & lead white grounds (simple, tabby weave canvases)									
F.no. Title	Date Underlined if the canvas is reused	Height x width (cm) ↳ Equivalent commercial commercial size? Lefranc & Cie 1889 ↳ Bourgeois aimé 1888	Original features	Canvas primed then cut	Canvas cut then primed	Ground layer 1	Ground layer 2	Average no. of threads per cm (CI)	Average no. of threads per cm (CI)	Fibre identified	Matches
358 Study for 'Romains Parisiens'	Autumn 1887	54.0-54.2 x 73.4 ↳ Horizontal landscape 20 (73 x 54)		X		Chalk & little lead white	Lead white & little chalk	14.5 (± 0.9)	13.6 (± 0.6)		
174 Portrait of an old woman	Mid. December 1885- mid. January 1886	50.5 x 39.7-40.0 ↳ Non-standard. Closest is portrait 10 (55 x 46) or portrait 8 (46 x 38). Probable use of non- standard stretcher manufactured by carpenter in Nuenen & sent on to Antwerp. Equivalent proportions could be achieved using a 50 cm stretcher-bar (as occurs in portrait 12) for the height, and fixed stretcher-bar size 6 (40.5 cm) for the width.		X		Chalk & little lead white	Lead white, little chalk & zinc white	14.8 (± 1.9)	14.0 (± 0.1)	Bast fibre, probably linen	Pre-primed canvas matches F212?
212 Skull of a skeleton with burning cigarette	18 January- early February 1886	32.2 x 24.6 ↳ Portrait 4 (32.5 x 24.5) ↳ Figure 4 (33 x 24)		X		Chalk & little lead white	Lead white & little chalk	14.8 (± 0.9)	14.0 (± 0.1)		Pre-primed canvas matches F 174?
304 The bridge near Courbevoie	Late April- late July 1887	32.0 x 40.0 ↳ Portrait 6 (40.5 x 32.5) ↳ Figure 6 (41 x 33)		X		Chalk & little lead white	Lead white & little chalk	15.1 (± 0.6)	13.5 (± 0.1)		
205 Portrait of an old man	7 or 8 December 1885	44.2 x 33.8 ↳ Close to horizontal landscape 8 (46 x 32.5) or ↳ landscape 8 (46 x 33). ↳ Probable use of non- standard stretcher manufactured by carpenter in Nuenen & sent on to Antwerp. Equivalent proportions could be achieved using a 43.2 cm stretcher-bar (as in landscape & marine sizes 10-15) for height, and fixed stretcher- bar size 4 (32.5 cm or ↳ 33cm) for the width.		X		Chalk, little lead white & brown ochre. Oil medium	Lead white. Oil medium	16.1 (± 0.8)	13.8 (± 0.7)		Pre-primed canvas matches F260 (sent on from Nuenen)
260 Houses seen from the back	9 December 1885- late February 1886	43.7 x 33.3 ↳ Close to horizontal landscape 8 (46x32.5) or ↳ landscape 8 (46 x 33). ↳ Probable use of non- standard stretcher manufactured by carpenter in Nuenen & sent on to Antwerp. Equivalent proportions could be achieved using a 43.2 cm stretcher-bar (as in landscape & marine sizes 10-15) for height, and fixed stretcher- bar size 4 (32.5 cm or ↳ 33cm) for the width.		X		Chalk, little lead white & brown ochre	Lead white	16.0 (± 0.6)	13.5 (± 0.6)	Bast fibre, probably linen	Pre-primed canvas matches F205 sent on from Nuenen)

F.no. Title	Date Underlined if the canvas is reused	Height x width (cm) ↳ Equivalent commercial size? Lefranc & Cie 1889 ⇒ Bourgeois aîné 1888	Original features	Canvas primed then cut	Canvas cut then primed	Ground layer 1	Ground layer 2	Average no. of threads per cm (CI)	Average no. of threads per cm (CI)	Fibre identified	Matches
275 View of a park in Asnières	<u>Mid. to late May 1887</u>	32.8 x 42.0 ↳ Portrait 6 (40.5 x 32.5) ⇒ Figure 6 (41 x 33)	Original support had no tacking margins	?	?	Chalk & little lead white	Lead white & little chalk	16.7 (±1.1)	15.9 (±1.1)		Reused fragment of painting matches F524?
524 Self portrait with straw hat	<u>September– October 1887</u>	41.9 x 30.0 ↳ Vertical landscape 6 (40.5 x 29.7)	Original support had no tacking margins	?	?	Chalk & little lead white	Lead white, little chalk & zinc white?	17.0 (±0.1)	16.4 (±0.5)		Reused fragment of painting matches F275?
297 Skull	<u>May–June 1887</u>	41.6–42.4 x 30.0–30.4 ↳ Vertical landscape 6 (40.5 x 29.7)	Original support had no tacking margins	?	?	Chalk & little lead white	Lead white, little chalk & zinc white	17.2 (±1.1)	13.5? Obscured by horizontal stripes of marouflage adhesive in the x-ray	Bast fibre, probably linen	
297a Skull	<u>May–June 1887</u>	40.4–40.7 x 30.3–30.5 ↳ Vertical landscape 6 (40.5 x 29.7)	Original support had no tacking margins	?	?	Chalk & little lead white	Lead white, little chalk & zinc white	17.5 (±0.9) Obscured by vertical stripes of marouflage adhesive in the x-ray	16.1 (±0.6)	Cotton	

Table 3.5.		Lead white grounds (simple, tabby weave canvases)								
F.no. Title	Date Underlined if the canvas is reused	Height x width (cm) ↳ Equivalent commercial size? Lefranc & Cie 1889 ↳ Bourgeois aîné 1888	Original features	Canvas primed then cut	Canvas cut then primed	Ground	Average no. of threads per cm (CI)	Average no. of threads per cm (CI)	Fibre identified	Matches
603 Still life with grapes	<u>September– October 1887</u>	33.0 x 46.3 ↳ Horizontal landscape 8 (46 x 32.5) ↳ Landscape 8 (46 x 33)		X		Lead white, chalk, little orange ochre & carbon black. Ground may consist of two layers, with less chalk in the top layer	11.9 (±1.1)	11.8 (±0.5)		
369 Portrait of Leonie Rose Davy-Charbuy	<u>March– April 1887</u>	60.7 x 45.7 ↳ Vertical landscape 12 (61 x 45.9) ↳ Landscape 12 (60 x 46)		X		Thin, medium rich layer containing chalk and gypsum, seems to be size rather than first ground. Ground contains lead white, few particles of bone black, umber & presumably other earth pigments. Applied in two stages.	12.0 (±1.4)	11.6 (±0.6)		
340 Carafe and citrus fruit	<u>February to March 1887</u>	46.3 x 38.3 ↳ Portrait 8 (46 x 38)		X		Lead white, chalk & little silicates	12.1 (±0.6)	11.4 (±0.6)		
261 View of Paris	<u>Summer 1886</u>	53.9 x 72.8 ↳ Horizontal land- scape 20 (73 x 54)	Right selvedge		X	Lead white, zinc white & few black and ochreous particles	12.1 (±0.6) Warp	12.1 (±1.6) Weft	Bast fibre, probably linen	
316 Montmartre, behind the Moulin de la Galette	<u>August 1887</u>	81.0 x 100.0 ↳ Portrait 40 (100 x 81)			X	Orange ochre particles under the ground.. Lead white & little clay.	12.1 (±0.6)	12.1 (±0.7)		
248a Vase with gladioli and Chinese asters	<u>August– mid. September 1886</u>	46.5 x 38.4 ↳ Portrait 8 (46 x 38)		X		Lead white, little barium sulphate, umber, orange ochre & black	12.5 (±0.7)	11.3 (±0.1)		

F.no. Title	Date Underlined if the canvas is reused	Height x width (cm) ► Equivalent commercial size? Lefranc & Cie 1889 ► Bourgeois aîné 1888	Original features	Canvas primed then cut	Canvas cut then primed	Ground	Average no. of threads per cm (CI)	Average no. of threads per cm (CI)	Fibre identified	Matches
292 Boulevard de Clichy	March – mid. April 1887	46.0 x 55.3–55.5 ► Portrait 10 (55 x 46)			X	Lead white, little barium sulphate, chalk and very little fine orange and black pigment	12.5 (± 0.1)	12.0 (± 0.5)		
334 Basket with crocus bulbs	January – February 1887	32.5 x 41.2 ► Portrait 6 (40.5 x 32.5) ► Figure 6 (41 x 33)		X		Two size layers. Lead white, little umber, clay & few ochreous particles.	12.6 (± 0.6)	12.1 (± 0.6)	Bast fibre, probably linen	
215 Nude girl seated	<u>April – early July 1886</u>	27.1 x 23.5 ► Portrait 3 (27 x 21.5) ► Figure 3 (27 x 22)		X		Lead white, little barium sulphate, silicates, carbon black & few ochreous particles. Oil medium.	12.8 (± 0.7)	11.7 (± 0.7)		
181 Self portrait as painter	<u>Autumn 1886</u>	46.4 x 38.3 ► Portrait 8 (46 x 38)		X		Lead white & chalk	12.8 (± 0.7)	11.8 (± 0.6)		
255 A pair of shoes	<u>Autumn 1886</u>	38.1 x 45.3 ► Portrait 8 (46 x 38)			X	Yellow-orange iron oxide particles under the ground (no size present in sample). Ground contains lead white, little bone black, gypsum, very few orange particles & one barium sulphate particle	12.8 (± 1.1)	12.1 (± 0.1)	Bast fibre, probably linen	Primed canvas (fabric, size & ground) matches F308
341 View from Theo's apartment	<u>Late March to mid. April 1887</u>	45.9 x 38.1 ► Portrait 8 (46 x 38)	Original format stamp (8), twice on stretcher	X		Lead white, little orange ochre, silicates and clay.	12.9 (± 0.6)	12.0 (± 0.6)		
308 Woodland view	<u>July 1887</u>	46.0 x 38.0 ► Portrait 8 (46 x 38)			X	Size with orange ochre particles. Lead white with very little bone black & orange, presumably ochre pigment. Very thinly applied.	12.9 (± 1.0)	12.1 (± 0)		Primed canvas (fabric, size & ground) matches F255
266a Sunset in Montmartre	<u>March – mid. April 1887</u>	21.5 x 46.4 ► Non-standard Closest is horizontal marine 8 (46 x 27). Portrait 10 (55 x 46) canvas has been cut across its middle.	Original format stamp (10) visible through lining. 1st composition continues onto bottom tacking margin.	X		Lead white, little chalk & few orange particles	13.1 (± 0.6)	11.9 (± 0.6)	Bast fibre, probably linen	
180 Self portrait	<u>Autumn 1886</u>	46.0 x 38.0 ► Portrait 8 (46 x 38)			X	Lead white & chalk	13.1 (± 0.6)	12.1 (± 1.5)		
234 Vase with Chinese asters and gladioli	August – mid. September 1886	61.1 x 46.1 ► Vertical landscape 12 (61 x 45.9) ► Landscape 12 (60 x 46)		X		Lead white, little orange ochre, umber, silicates and clay	13.2 (± 1.3)	12.4 (± 0.6)		
256 Shrimps and mussels	Autumn 1886	26.5 x 34.8 ► Portrait 5 (35 x 28.5) ► Figure 5 (35 x 27)		X		Lead white, few particles of umber & very little gypsum and silicates. Artist-applied 'oiling out' layer on top, mixed with overlying brush strokes.	13.2 (± 1.1)	12.5 (± 0.1)		
299 Road along the Seine near Asnières	Late April– late July 1887	65.3 x 49.2–49.4 ► Vertical landscape 15 (65 x 48.5) ► Landscape 15 (65 x 50)			X	Lead white, very few fine orange particles, silicates and clay.	13.2 (± 0.7)	13.1 (± 0.5)		
321 Front of a restaurant in Asnières	Mid. May – mid. July 1887	27.0 x 18.8 ► Vertical landscape 3 (27 x 19)			X	Lead white, little orange ochre	13.3 (± 1.1)	12.1 (± 0.5)		

F.no. Title	Date Underlined if the canvas is reused	Height x width (cm) ► Equivalent commercial size? Lefranc & Cie 1889 ►► Bourgeois aîné 1888	Original features	Canvas primed then cut	Canvas cut then primed	Ground	Average no. of threads per cm (CI)	Average no. of threads per cm (CI)	Fibre identified	Matches
338 Dish with citrus fruit	February – March 1887	21.0–21.4 x 27.1–27.4 ► Portrait 3 (27 x 21.5) ►► Figure 3 (27 x 22)	Original format stamp (3) on back of canvas	X		Lead white, chalk, little orange ochre & black	13.4 (±1.6)	12.2 (±0.7)		
346 The Moulin de Blute-Fin and vegetable gardens	<u>March –</u> <u>mid. April 1887</u>	45.2 x 81.3 ► Non-standard. Closest is horizontal marine 25 (81 x 54). Possible use of fixed stretcher-bar sizes 8 (46 cm) & 25 (81 cm) for the height and width respectively.		X		Lead white, little gypsum, ochre and silicates	12.8 (±1.1)	12.4 (±0.5)		
206 Head of a woman with loose hair	Mid. December 1885	35.0 x 24.4 ► Horizontal landscape 5 (35 x 24)		X		Lead white, little gypsum & bone black. Applied in two stages.	13.8 (±0.6)	13.3 (±0.6)	Bast fibre, probably linen	
281 Flame nettle in a flowerpot	Late June – mid. July 1886	42.1 x 22.0 cm ► Horizontal marine 6 (40.5 x 21.5) ►► Marine 6 (41 x 24)		X		Lead white, little umber, silicates and/or clay	14.0 (±0.7)	12.5 (±0.1)		
215c Portrait of a woman	March – early June 1886	27.0 x 18.9 ► Vertical landscape 3 (27 x 19)	Retains original mounting on strainer	X		Lead white, little barium sulphate, carbon black, ochre and silicates	14.1 (±1.1)	12.2 (±0.5)		
254 Still life with apples	<u>September–</u> <u>October 1887</u>	45.5–45.7 x 60.2–60.4 ► Vertical landscape 12 (61 x 45.9) ►► Landscape 12 (60 x 46)		X		Two layers. 1st; lead white, little barium sulphate, umber, clay and silicates. 2nd; lead white.	14.4 (±0.5)	12.9 (±0.5)		
270a Flowering chestnut tree	<u>May 1887</u>	55.6 x 46.0–46.3 ► Portrait 10 (55 x 46)		X		Lead white, few particles of orange ochre & an organic reddish-brown pigment.	14.6 (±1.0)	14.0 (±0.1)		
263a Self-portrait	<u>December 1886–</u> <u>January 1887</u>	61.1 x 50.1 ► Portrait 12 (61 x 50)	Retains original mounting on stretcher	X		Lead white, barium sulphate, few particles of umber & ochre. 2nd layer of same composition, but without barium sulphate	15.0 (±1.2)	12.5 (±0.1)		
383 Still life with quinces and lemons	<u>October–</u> <u>November 1887</u>	48.9 x 65.5 ► Vertical landscape 15 (65 x 48.5) May have been purchased in portrait 15 format (65 x 54), since an underlying composition extends onto the bottom tacking margin.		X		Lead white, little barium sulphate, silicates, bone black & ochres. Lot of coloured pigment particles. 2nd layer of same composition, but without barium sulphate	15.1 (±0.6)	13.1 (±0.6)		
370 In the café, Agostina Segatori in Le Tambourin	<u>January –</u> <u>March 1887</u>	55.5 x 47.0 ► Portrait 10 (55 x 46)		X		Lead white, little bone black, red and orange ochre, very little silicates and clay	16.6 (±0.6)	14.0 (±0.1)		
215b Portrait of Agostina Segatori	January – February 1887	26.5 x 21.1 ► Portrait 3 (27 x 21.5) ►► Figure 3 (27 x 22)		X		Size layer containing orange, iron oxide. Ground contains lead white, little barium sulphate, gypsum, silicates, bone black, umber and presumably orange ochre. 2nd ground, covering the picture area only, contains a whiter mixture of the same pigments as in layer 1.	17.3 (±0.7)	13.0 (±0.1)		

F.no. Title	Date Underlined if the canvas is reused	Height x width (cm) ► Equivalent commercial size? Lefranc & Cie 1889 ► Bourgeois aîné 1888	Original features	Canvas primed then cut	Canvas cut then primed	Ground	Average no. of threads per cm (CI)	Average no. of threads per cm (CI)	Fibre identified	Matches
215d Portrait of a woman	March – early June 1886	32.3 x 22.0 ► Vertical landscape 4 (32.5 x 21.5) ► Landscape 4 (33 x 22)	Retains original mounting on strainer	X		Lead white, little chalk, gypsum, few particles of barium sulphate, fine orange, red and black pigment. Seems applied in two layers.	17.4 (± 0.5)	14.7 (± 0.7)		
337 Flowerpot with Chinese chives	<u>February – March 1887</u>	31.9 x 22.0 ► Vertical landscape 4 (32.5 x 21.5) ► Landscape 4 (33 x 22)		X		Lead white & little gypsum	17.4 (± 0.6)	15.0 (± 0.1)		
339 Café table and absinth	February – March 1887	46.3 x 33.2 ► Horizontal landscape 8 (46 x 32.5) ► Landscape 8 (46 x 33)		X		Lead white, little chalk & few fine orange particles	17.7 (± 0.7)	17.0 (± 0.1)		
293 Banks of the Seine	May–July 1887	46.0 x 32.0 ► Horizontal landscape 8 (46 x 32.5) ► Landscape 8 (46 x 33)			X	Lead white Very thinly applied	22.3 (± 0.8)	21.5 (± 0.7)	Bast fibre, probably linen	
216h Venus torso	February – March 1887	41.0 x 32.8 ► Portrait 6 (40.5 x 32.5) ► Figure 6 (41 x 33)	Retains original mounting on stretcher	X		Lead white & little gypsum	25.2 (± 0.7)	20.4 (± 0.6)	Bast fibre, probably linen	

Table 3.6	Painting supports cut from the same strip of (4+1/ warp-faced) twill canvas prepared with a warm pinkish-grey ground					
F.no. Title	Date Underlined if the canvas is reused	Height x width (cm) ► Equivalent commercial size? Lefranc & Cie 1889 ► Bourgeois aîné 1888	Canvas primed then cut	Layer 1	Average no. of threads per cm	Average no. of threads per cm
289 Portrait of a restaurant keeper	November 1887	65.5 x 54.3 ► Portrait 15 (65 x 54)	X	Lead white, little bone black, orange ochre & silicates. Two stages of application. Size with few particles of orange ochre	23 (single count)	23 (single count)
374 Still life with cabbages and onions	November 1887– February 1888	50.0–50.2 x 64.3 ► Vertical landscape 15 (65 x 48.5) ► Landscape 15 (65 x 50)	X	Lead white, little bone black, orange ochre, umber & silicates. Two stages of application. Size with few particles of orange ochre	23 (single count)	23 (single count)
522 Self portrait as painter	December 1887– February 1888	65.0–65.1 x 50.0 ► Vertical landscape 15 (65 x 48.5) ► Landscape 15 (65 x 50)	X	Lead white, little bone black, orange & red ochre. Two stages of application. Size with few particles of orange ochre	23 (single count)	23 (single count)

Table 3.7. Paintings on verso of Nuenen canvases prepared by the artist using the same pinkish-brown ground colour (simple, tabby weave canvases)						
F.no. Title	Date Underlined if the canvas is reused	Height x width (cm) ‣ Equivalent commercial size? Lefranc & Cie 1889 ‣ Bourgeois aîné 1888	Original features	Ground	Average no. of threads per cm (CI)	Average no. of threads per cm (CI)
77v Self portrait	Mid. July– August 1887	44.5 x 33.6 ‣ Close to horizontal landscape 8 (46 x 32.5)	Original canvas had no tacking margins	No size. Single layer containing lead white, a little chalk, barium sulphate, emerald green, red ochre, organic red, zinc white? and vermillion	16.0 (±0.1)	13.6 (±0.6)
109v Self portrait	Mid. July– August 1887	42.9 x 31.3 ‣ Close to figure 6 (41 x 33) ‣ Portrait 6 (40.5 x 32.5) Vertical landscape 6 (40.5 x 29.7)	Original canvas had no tacking margins	No size. Single layer containing lead white, a little chalk, barium sulphate, emerald green, red ochre, organic red, zinc white? and carbon black	16.7 (±0.7)	13.5 (±0.1)
269v Self portrait	Mid. July– August 1887	42.2 x 34.4 ‣ Close to figure 6 (41 x 33) ‣ Portrait 6 (40.5 x 32.5) Vertical landscape 6 (40.5 x 29.7)	Original canvas had no tacking margins	No size. Single layer containing lead white, a little chalk, barium sulphate, emerald green, red ochre, organic red, zinc white? and vermillion	17.1 (±0.6)	13.5 (±0.1)
388v Vegetable garden with sunflower	August 1887	43.2 x 36.2 ‣ Close to portrait 6 (40.5 x 32.5) Portrait 8 (46 x 38) Vertical landscape 8 (46 x 35.1) ‣ Figure 6 (41 x 33)	Original canvas had no tacking margins	No size. Single layer containing lead white, barium sulphate, ultramarine, emerald green, red & orange ochre, little organic red & zinc white?	17.1 (±1.0)	13.5 (±0.1)
179v Self portrait with straw hat	Mid. July– August 1887	42.4 x 32.0 ‣ Close to portrait 6 (40.5 x 32.5) Vertical landscape 6 (40.5 x 29.7) ‣ Figure 6 (41 x 33)	Original canvas had no tacking margins	No size. Single layer containing lead white, a little chalk, barium sulphate, emerald green, red ochre, organic red, zinc white? and bone black?	17.1 (±0.6)	13.6 (±0.6)
61v Self portrait with straw hat	Mid. July– August 1887	41.6 x 31.4 ‣ Close to portrait 6 (40.5 x 32.5) Vertical landscape 6 (40.5 x 29.7) ‣ Figure 6 (41 x 33)	Original canvas had no tacking margins	No size. Single layer containing lead white, a little chalk, barium sulphate, emerald green, red ochre, organic red, zinc white?	17.1 (±0.6)	13.6 (±0.6)

Table 3.8. Barium sulphate grounds (simple, tabby weave canvases)									
F.no. Title	Date Underlined if the canvas is reused	Height x width (cm) ► Equivalent commercial commercial size? Lefranc & Cie 1889 ►► Bourgeois aîné 1888	Original features	Canvas cut before primed	Ground 1 layer	Average no. of threads per cm (CI)	Average no. of threads per cm (CI)	Fibre identified	Matches
309a Woodland view	<u>May–July 1887</u>	46.1 x 55.2 ► Portrait 10 (55 x 46)		X	No size. Barium sulphate, lead white, chalk & little silicates.	30.1 (±1.0)	27.0 (±0.1)	Linen	Canvas (but not ground) matches F307
377 Two dried sunflowers	August 1887	Distorted shape. 21.2 x 27.0 ► Portrait 3 (27 x 21.5) ►► Figure 3 (27 x 22)	Original canvas had no tacking margins. Possible selvage along the top	X	No size. Barium sulphate, little earth pigment & a gypsum particle. (linseed?) oil and animal glue binding medium.	32? Weave obscured by stripes of marouflage adhesive in the x-ray.	22–24 Weave obscured by stripes of marouflage adhesive in the x-ray.	Cotton	Matches cotton used to back paper supports of F344 and F373

Table 3.9. Barium sulphate grounds (paper on simple, tabby weave canvases)									
F.no. Title	Date Underlined if the canvas is reused	Height x width (cm) ► Equivalent commercial commercial size? Lefranc & Cie 1889 ►► Bourgeois aîné 1888	Original features	Canvas cut before primed	Ground 1 layer	Average no. of threads per cm (CI)	Average no. of threads per cm (CI)	Fibre identified	Matches
344 Self portrait with felt hat	September–October 1887	44.5 x 37.2 ► Close to portrait 8 (46 x 38)		X	Barium sulphate & little silicates	36.4 (±1.4)	245 (±0.1)	Cotton (fabric backing)	Matches cotton used for principal support in F377, and for backing paper support in F373
373 The Courtesan (after Eisen)	October–November 1887	100.7 x 60.7 ► Non-standard Closest is vertical marine 40 (100 x 65). Possible use of a fixed size 40 stretcher-bar (100 cm) for the height, and a size 12 one (61 cm) for the width.		X	Barium sulphate & little silicates	34.8 (±0.7)	25.0 (±0.1)		Matches cotton used for principal support in F377, and for backing paper support in F344

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Notes

- 1 C. Stolwijk, 'Theo van Gogh; a life', in C. Stolwijk and R. Thomson, *Theo van Gogh (1857–1891)*, art dealer, collector and brother of Vincent, Van Gogh Museum, Amsterdam, (Amsterdam and Zwolle, 1999), 43.
- 2 There has been some debate concerning when exactly Van Gogh first attended Cormon's studio. The date of spring 1886 follows that to be proposed in L. van Tilborgh and E. Hendriks, *Van Gogh Paintings, Antwerp and Paris 1885–1888*, volume 2, (Amsterdam and Zwolle, 2005).
- 3 For a comprehensive study and stylistic analysis of his Paris production, see B. Welsh-Ovcharov, *Vincent van Gogh, his Paris period, 1886–1888*, (Utrecht-Den Haag, 1976).
- 4 The investigation of picture supports forms just one aspect of the campaign of technical examinations carried out for the forthcoming catalogue, L. van Tilborgh and E. Hendriks 2005.
- 5 A. Callen, *The Art of Impressionism. Painting technique and the making of modernity*, (New Haven and London, 2000). Other important sources of information were: D. Bomford, J. Kirby, J. Leighton and A. Roy, *Art in the Making. Impressionism*, (New Haven and London, 1990), and L. Carlyle, *The Artist's Assistant. Oil Painting Instruction Manuals and Handbooks in Britain 1800–1900*, (London, 2001).
- 6 *Impressionist and Post-Impressionist Masterpieces; The Courtauld Collection*, (New Haven and London, 1987), lists technical details of the supports under each catalogue entry.
- 7 Concerning Edgar Degas' use of paper on canvas supports, see: *The Courtauld Collection 1987*, cat. 7; Callen 2000, 26–27; and D. Rouart, *Degas; in search of his technique*, (New York, 1988), 36–37. Paul Gauguin used paper laid on canvas for two mature works, see C. Hale, 'Gauguin's Paintings in the Metropolitan Museum of Art; Recent Revelations through Technical Examination', in C. Ives and S. Alyson Stein with C. Hale and M. Shelley, *The Lure of the Exotic; Gauguin in New York Collections*, (The Metropolitan Museum of Art, New York, 2003), 177.
- 8 Callen 2000, 68–70, presents criteria to distinguish 'commercial'

- from 'self-primed' canvases, the latter meaning canvases that were stretched before priming. *The Courtauld Collection 1987*, distinguishes 'commercial', from 'artist-applied' grounds that were applied on the working stretcher or strainer. We are grateful to Aviva Burnstock and Caroline Villers for clarifying the visual criteria used to identify these two types.
- 9 J. Bailly-Herzberg, *Correspondance de Camille Pissarro*, (Paris, 1986), vol. 2, 172–173, letter 427, 25 May 1887. Pissarro ordered a replacement canvas from the colourman Contet, which he specified was to be prepared with an absorbent ground, perhaps suggesting that Tanguy's canvas had similarly been of an absorbent type.
- 10 Callen 2000, 55. Mérimée [1830] in Carlyle 2001, 167.
- 11 Callen 2000, 56. The canvas from Hardy-Allen, used by Henri Fantin-Latour, is illustrated in fig. 85.
- 12 For Sisley, see *The Courtauld Collection 1987*, cat. 17, though here the ground is designated as absorbent based on its visual characteristics only. For Pissarro, see Bailly-Herzberg 1986, 172–173. Information on Latouche and Contet was kindly supplied by Dr. Stéphanie Constantin.
- 13 See V. Jirat-Wasiutynski and H. Travers Newton Jr., 'Absorbent grounds and the matt aesthetic in Post-Impressionist paintings', in *ICC Painting techniques; History, materials and studio practice*, A. Roy and P. Smith eds., *Contributions to the Dublin Congress*, (London, 1998), 237. Gauguin's 'Fruit Picking Martinique', 1887, (Van Gogh Museum) was painted on a cotton canvas prepared with a distemper ground. Analysis of the support materials was carried out by Inge Fiedler, microscopist at the Art Institute of Chicago, copy of report in the Van Gogh Museum archives.
- 14 Welsh-Ovcharov 1976, 5–7.
- 15 Letter 550/439, 14 December 1885. Tyck was established as 'Marchand de couleurs pour peintres-artistes' at Rubensstraat 8, Antwerp. Information kindly provided by Dr. Hans Luijten, Van Gogh Museum.
- 16 Letter 545/34, c. 17 November 1885 and letter 548/437, 28 November 1885.

- 17 See technical characteristics listed under individual entries, Van Tilborgh and Vellekoop 1999. Thread counts were not subjected to the methods of statistical analysis now employed. Also, it should be borne in mind that original subtle distinctions in the tints of the ground colours may now be lost, due to the visual effects of accumulated grime and restoration materials. The ground layers of sixteen paintings were analysed by Dr. Elisabeth Jägers, micro-analytical laboratory, Bornheim, Germany, unpublished report dated 18–12–1998, Van Gogh Museum archives.
- 18 L. van Tilborgh, introduction, in L. van Tilborgh and M. Vellekoop, *Vincent van Gogh Paintings, Dutch Period 1881–1885*, vol. 1, (Amsterdam, 1999), 21.
- 19 The thread count is not exclusive to Nuenen however, since two other canvases examined that resemble Nuenen fabric must in fact have been bought in Paris, ready-stretched on standard format frames; the 16.6 x 14.0 canvas used for F370 *Agostina Segatori in the Tambourin café* (with an underlying Paris portrait) and the 17.3 x 13.0 canvas used for F215b *Portrait of a Woman* (with an original Paris trade stamp). Concerning the portrait underlying F370, see S. van Heugten, 'Radiographic images of Vincent van Gogh's paintings in the collection of the Van Gogh Museum', *The Van Gogh Museum Journal* 1995, (Zwolle 1995), 83.
- 20 Most likely, a third piece of the same canvas was used for F272 *Belvedere overlooking Montmartre* (The Art Institute of Chicago), painted over an abandoned composition that depicts an Antwerp scene closely resembling F260 *Houses seen from the back*. Comparing an x-radiograph of F272 with F260 and F205 shows that the canvas support has a matching thread-count and weave characteristics. No comparative analysis of the ground layer present on F272 has yet been carried out however, to confirm that the canvas was cut from the same roll; Thank you to Kristin Lister for supplying an x-radiograph copy of the painting F272.
- 21 Letter 552/441, c. 21 December 1885, complains about the cost of two canvases purchased for portraits.
- 22 Letter 549/438, c. 6 December 1885 and letter 550/439, 14 December 1885.

- 23 Letter 552/441, c.21 December 1885 and letter 553/442, c.25 December 1885.
- 24 All the new inorganic colours mentioned in the letters were identified in samples from the three Antwerp portraits, F174, F206 and F207a. One sample of organic red was analysed, from the faded background of F174 *Portrait of an old woman*, identified as redwood, mixed with madder and possibly purpurin. However, this could be a substitute for the carmine colour mentioned by Van Gogh, who would not necessarily know the composition of the tube paints he purchased. Samples from the dark background of F212 *Head of a skeleton with a burning cigarette*, showed that he returned to the more traditional treatment of his earlier portrait, F205 *Head of an old man*, using pigments characterised of his Nuenen palette, including red and brown ochre, an organic brown, synthetic ultramarine and Naples yellow. For an outline of the analytical techniques used, see Table 3.
- 25 Letter 553/442, c.25 December 1885.
- 26 The grey layer contains vermilion, bone black, chalk, zinc white, an organic red and fine blue pigment.
- 27 See J. Plesters, 'Samson and Delilah'. Rubens and the Art and Craft of painting on Panel', *National Gallery Technical Bulletin*, 7 (London, 1983), 30–49.
- 28 Letter 550/439, 14 December 1885.
- 29 Letter 550/439, 14 December 1885.
- 30 G. Coquiott, *Vincent van Gogh*, (Paris, 1923), 138.
- 31 Letter 574/461, c.17–19 July 1887.
- 32 Concerning Latouche see A. Distel and S. Stein, *Cézanne to Van Gogh: The Collection of Doctor Gache*, (The Metropolitan Museum of Art, New York, 1999), 181.
- 33 Four supports (F267, F294, F296 and F243a) retain their original edges intact, providing physical evidence that the ground was sliced through sharply when the supports were cut to size (whereas overlying brush strokes ran over the support edges). For the manufacture of carton in and around Paris, see Paillot [1829] in Callen 2000, 28.
- 34 The very short and bundled nature of the fibres is characteristic of wood pulp or sawdust. Though exact characterisation of the wood species was not possible, the morphology of fibres suggests a soft wood type. The high lignin content of the wood pulp indicates that it was not chemically refined. The fibres are pressed rather than glued together, so-called pasteless board. For a description of the various board manufacturing techniques, see P. Bower, 'A brush with nature; an historical and technical analysis of the paper and boards used as supports for landscape oil sketching', in *ICC Works of art on paper: Books, documents and photographs*, contributions to the Baltimore Congress, 2–6 September, (London, 2002), 16–20.
- 35 The pale grey grounds contained lead white, a little barium sulphate, gypsum, black and a few particles of different shades of ochre pigment. The white grounds contained lead white, chalk and traces of fine black. In both cases, superficial tooling marks in the surfaces of the grounds suggested that these were first brushed on, then smoothed by light polishing or scraping that left fine parallel scratches.
- 36 In the case of F243a the Pignel Dupont sticker remains on the back of the original picture support. In the case of F216a, F216b, F216c, F216e, F216f, F216j and F232 however, the stickers were transferred from the backs of the cartons to backing supports applied in 1929. No stickers are evident on the backs of F216d and F218, though these might be hidden by the marouflage backing, or have been irrevocably damaged during attempted transfer.
- 37 The two figure 8 supports of F216a and F216b, both with white grounds, were left unprimed.
- 38 Bouvier [1827] in Callen 2000, 26.
- 39 F216a, F216b, F216c, F216d, F216e, F216f and F216j.
- 40 Examples of later Paris works in the Van Gogh Museum collection on primed carton are; F469 *Self-portrait with straw hat*, and F331 *A pair of shoes*. F216i *Venus torso* was painted on unprepared cardboard.
- 41 Examples of the use of this double square format (c.50 x 100cm) in the Van Gogh Museum collection include; F778 *Wheat fields under stormy clouds*, F779 *Wheatfield with crows*, and F816 *Tree roots*.
- 42 See for example the advertisement in the *Bourgeois Affiné catalogue* 1906, 198.
- 43 Letter 575/462, c.23–25 July 1887.
- 44 The underlying subject matter is unknown, but the elongated format might suggest a floral still life such as those he painted in the Summer of 1886. One of these, F237 *One-eared vase with physostegia, gladiolus and lychnis*, has equivalent dimensions to F347 (35.0 x 65.3 cm) according to the 65.5 x 35 cm format listed in De la Faille 1928. A Nuenen picture, F177a *Flying Bat*, measuring 41.5 x 79.0 cm, has dimensions quite close to F346 *The Moulin de Blute-Fin and vegetable gardens* (45.2 x 81.3 cm). Infrared reflectography of the underdrawing in F346 revealed that, unusually, the composition is constructed with two divergent vanishing points rather than the focussed single point perspective that Van Gogh generally favoured in his Paris landscapes.
- 45 Illustrated in Callen 2000, 35, pl.56. We are grateful to Anthea Callen for supplying a scale image of this sample in order to compare the weave characteristics. It cannot be ruled out that Van Gogh's canvas corresponded to *ordinaire* rather than *étude* grade however, since the quality of the two types of fabric might overlap.
- 46 Letter 594/473, c.2 April 1888.
- 47 The stamp is visible on a photo of the canvas on its original strainer, made before the current lining canvas was applied and the strainer replaced. Notes by Louis van Tilborgh in documentation archives, Van Gogh Museum.
- 48 An oil binding medium was identified in the top lead white ground layer of F208a, using FTIR. A positive staining test with the reagent Amido Black 2, characterised a proteinaceous binding medium present in the chalk first ground layer of F347. For details of the techniques used, see table 3.
- 49 Callen 2000, 56.
- 50 An oil medium was identified in a sample from F205 containing both ground layers, using FTIR.
- 51 All four supports consist of loose pieces of canvas, without turnover edges. Apparently these were pinned onto a framework or flat support for use by the artist, explaining tiny holes left through the front edges of the paintings.
- 52 The identified pigments include red and yellow ochre, umber, Prussian blue, and zinc white.
- 53 Whilst two pictures painted in Antwerp but on Nuenen canvas (F205 & F260) also show this double ground structure, they differ in that the top layer contains lead white only, with no additions of chalk or zinc white.
- 54 An oil medium was identified in a sample of ground from F215, using FTIR.
- 55 Carlyle 2001, 517.
- 56 For description of F293, see for example; Håkan Larsson, *Flames from the South. On the introduction of Vincent van Gogh to Sweden*, Eslöv 1996, 109. For a similar ground type see Renoir's *Boating on the Seine of 1879–80* in Bomford, Kirby, Leighton and Roy 1990, 172–175.
- 57 No size was evident in samples, though these included the entire layer build-up.
- 58 R. Feller ed., *Artists' Pigments. A Handbook of their History and Characteristics*, (Cambridge University Press, 1986), 49. Carlyle 2001, 514.
- 59 A closely similar ground was recently identified in Paul Gauguin's *Two Tahitian Women* of 1899, see Hale 2003, 189.
- 60 Examination of the Kröller-Müller painting was carried out by Tienke Oostendorp, report dated 12 August 2002. See too catalogue entry in T. van Kooten and M. Rijnders eds., *The paintings of Vincent van Gogh in the collection of the Kröller-Müller Museum*, (Kröller-Müller Museum, Otterlo, 2003), 181–184.
- 61 The patchy colour of the paper support may have several reasons; including uneven application of the barium sulphate ground, discolouration of the original paper or paper adhesive, as well as saturated varnish and wax applied during later treatments. Concerning the surviving tracing from the Japanese print see M. Vellekoop and S. van Heugten, *Vincent van Gogh, Drawings, Antwerp & Paris, 1885–1888*, vol.3, (Van Gogh Museum, Amsterdam, 2001), 320–326.
- 62 The warp direction was determined by a partially intact selvage present along the top edge of F377 *Study of two sunflowers run to seed*, painted on the same type of cotton.
- 63 The relatively large size of the barium sulphate particles, combined with their blocky shape, suggested the coarsely ground mineral form of the pigment known as barytes, rather than the

synthetic variety known as 'blanc fixe'. Silicates and orange ochre were also found present, common impurities of barites. See Feller 1986, 55.

64 In F344 Self-portrait however, paper was turned over the topside of the stretcher, suggesting that the support had originally been prepared in a slightly taller format.

65 Technical examinations did not find conclusive evidence for one or the other procedure.

66 Often paintings made on paper have been lined onto canvas and mounted on stretchers at a later date, in order to give them the more saleable look of traditional oil paintings. In these cases, the original ground covers the picture area only.

67 The cotton has been stuck onto multiplex at later date, using a lead white-based paint that renders the cotton support illegible on the x-radiograph. A slightly less accurate thread count could be made around the cut edges of the painting however.

68 Substantial quantities of natural barium sulphate were present in two paint samples taken from light yellow and dark reddish-brown brushstrokes in the flowers respectively, presumably added to lend bulk to the impasted paint. However, no barium sulphate was found in a sample taken from the thinly applied, light blue paint in the background.

69 A streaky, translucent brown layer covers the light primed support of F256, *Mussels and Shrimps*. However, paint samples reveal that this layer consists of discoloured binding medium only, with no pigment particles evident. The function of the layer seems to have been to wet out the surface to facilitate rapid and fluent brushwork, rather than as a toned underlayer.

70 An opaque reddish-brown layer, presumably the same colour, is reported to have been removed from the back of F309a when the painting was treated in 1969. Although the reverse is now covered up by a lining canvas, a photograph from before the treatment seems to show a landscape painting by another hand that must have been overpainted by Van Gogh. Documentation files, Stedelijk Museum, Amsterdam. Visual inspection also suggests a possibly match with the ground

layer used for the verso Self-portrait with straw hat F365 (Metropolitan Museum of Art, New York), as well as the ground layers left uncovered on the reverse of F156 *Head of a woman* 1885 (Van Gogh Museum, Amsterdam) and F163 *Head of a man* 1885 (Koninklijk Museum voor de Schone Kunsten, Brussels). However, analysis of paint samples has not been carried out to confirm the matching composition of these colours.

71 The fabric was characterised using an x-ray of F374, by Jennifer Barnett, textile conservator, Amsterdam. Report dated 12-09-03, conservation archives, Van Gogh Museum.

72 Thomas Sully mentions adding vermilion to a paste size for this purpose. *Hints to Young Painters and the process of Portrait Painting* as practised by the late Thomas Sully, (Philadelphia, 1873), 136-137.

Thank you to Maartje Widoor for pointing out this source. The presence of red or orange pigment particles on the surface of the canvas was observed in paint samples from several of the Van Gogh paintings examined, besides these works on twill; namely F215b, F255, F308 and F316 (see table 3.)

73 The suggestion is made in R. Dorn and W. Feilchenfeldt, 'Genuine or fake? — On the history and problems of Van Gogh connoisseurship', in *The Mythology of Vincent van Gogh*, K. Tsukasa ed., (Japan 1993), 280.

74 Several publications address the characteristics of the Tasset et l'Hôte canvas that Van Gogh used in France. For the Arles period see, K. Hoermann Lister, C. Peres and I. Fiedler, 'Tracing an interaction; supporting evidence, experimental grounds', in Van Gogh and Gauguin; *The Studio of the South*, D. Druick and P. Kort Zegers eds., (The Art Institute of Chicago, 2001), 364-366. For the Saint-Rémy period see, E. Hendriks and L. van Tilborgh, 'Van Gogh's 'Garden of the Asylum' Genuine or fake?', *The Burlington Magazine*, March 2001, 151. For the Auvers period see, E. Ravaut, 'The use of X-Radiography to Study Paintings by Cézanne and Van Gogh in the Gachet Collection', in Distel and Stein 1999, 68-69. Though several large views of Montmartre, painted in the spring of 1887, do seem to have employed picture sup-

ports composed of loose canvas and bare stretchers (see under section Canvas formats concerning F314, F346 and F347) none of these canvases match, indicating that they were not cut from the same ready-primed roll.

75 Letter 638/507, 29 June 1888 and letter 643/509, c.13 July 1888.

76 A. S. Hartrick, *A Painter's Pilgrimage through fifty years*, (Cambridge, 1939), 43.

77 Toulouse Lautrec applied dilute oil paints, thinned with oil of turpentine, to absorbent supports such as sized but unprimed canvas and cardboard. Francois Gauzi, *My Friend Toulouse-Lautrec*, (London, 1957), 11 and 61. A clear example of Lautrec's graphic way of applying colour is, *Young woman at a table, 'Poudre de riz'* 1887, purchased by Theo van Gogh in January 1888 and now in the collection of the Van Gogh Museum.

78 See for example F334, F216g, F216h, F337, F338, F339, F340, F266a and F292 respectively.

79 Examples include the reticulated red paint in the building at the lower edge of F341 *View from Theo's apartment* that seems due to dragging a stiff brush or other implement through the paint, sgraffito cross-hatchings using a dry pointed brush in the chair of F339 *Café table and absinth* and scratchmarks made by the bristle hairs of a brush used to blend hatchings in the upper right background area of F338 *Still life with lemons*.

80 Large fingerprints in F339 *Café table* with absinth seem to be deliberate dabs to blot the fresh paint. Clearer examples of the deliberate use of partial fingerprints to soften background paint are F335 *Books* and F336 *Basket with hyacinth bulbs*, painted in the same period though on wooden panel supports.

81 Letter 717/557, 24 October, 1888: 'We shall probably give Tasset a miss altogether, because we are going — to a large extent — to make use of cheaper paints, Gauguin as well as I. As for the canvas, we shall prepare it ourselves for the same reason.'

82 See Lister, Peres and Fiedler 2001.

83 Lister, Peres and Fiedler 2001, 358 and 360. The binding medium of the barium sulphate ground in F377 was analysed using FTIR (identified protein, oil and barium sulphate), GC-MS (identified

(linseed?) oil and a trace of beeswax) and HPLC (identified animal glue). For details of these techniques used, see table 3.

84 Vincent anticipated that deterioration of his thin canvases meant that sooner or later his paintings would have to be lined: letter 801/604, c.5 or 6 September 1889. In the next century similar reasoning led to the common belief that all Van Gogh paintings should be lined as a matter of course, as a prophylactic measure. This opinion is expressed for example in, H. Ruhemann, *The Cleaning of Paintings; Problems and Potentialities*, (New York, 1968), 153. Concerning *Pears* (F358) in the Van Gogh Museum collection: Willem Steenhoff (1863-1932), director at the Museum Mesdag in The Hague and friend of the Van Gogh family, considered that, though not immediately necessary, lining was not undesirable since the canvas had begun to look a bit like a sieve when held against the light. Letter B5626v/1996, 2 December 1926. In keeping with this attitude, the museum collection was subjected to a comprehensive campaign of wax-resin lining in the period 1926-1932.

85 Kröller-Müller Museum 2003, 182.

86 Letter 672/527, c.26 August, 1888.

87 Letter 541/430, late November 1885.

88 Hartrick 1939, 46.

89 Surface examination and infra red reflectography revealed that the, probably charcoal underdrawing of F270a had involved a detailed outlining and shading of the principal planes of the subject. A perspective frame had also been traced onto the canvas, to help establish the main scheme of the composition. A presumably pencil underdrawing in F308 consisted of multiple contours, with no evidence for the use of a perspective frame. In F307 and F309a however, only cursory lines from a perspective frame are evident, with no outlining or shading of forms. Letter 572/459a, to the painter Horace Mann Livens, c. August-October 1886: 'so as we said at the time: in colour seeking life the true drawing is modelling with colour'.

90 Concerning the problem of translating colour viewed on the palette to its effect on different primed surfaces, see Callen 2000, 65-66.

