II Research in the year 2010-2011

1. Identification, Characteristics

Author: Vincent van Gogh (1853-1890)

Title: Landscape with ploughman - photo 1, 2, 3, 4, 5

Period: Nuenen, Summer-Autumn 1885

Signed: bottom left hand side: Vincent – photo 6, 7 (in dark violet)

Undated

Oil painting on canvas on panel: width 29,0 cm x height 14,0 cm



http://picasaweb.google.com/101794905643649634034/VanGogh?authkey = Gv1sRgCNOQ9uasieCbeA#5488492855269336834WanGogh?authkey = Gv1sRgCNOQ9uasieCbeA#548849285526936884WanGogh?authkey = Gv1sRgCNOQ9uasieCbeA#548849285526936884WanGogh?authkey = Gv1sRgCNOQ9uasieCbeA#548849285526936884WanGogh?authkey = Gv1sRgCNOQ9uasieCbeA#548849285526936884WanGogh?authkey = Gv1sRgCNOQ9uasieCbeA#5488498552693684WanGogh?authkey = Gv1sRgCNOQ9uasieCbeA#548849285526936884WanGogh?authkey = Gv1sRgCNOQ9uasieCbeA#548849854WanGogh?authkey = Gv1sRgCNOQ9uasieCbeA#548849854WanGogh?authkey = Gv1sRgCNOQ9uasieCbeA#548WanGogh?authkey = Gv1sRgCNOQ9UasieCbeA%54WanGogh?authkey = Gv1sRgCNOQ9UasieCbeA%54WanGogh?authkey = Gv1sRgCNOQ9UasieCbeA%54WanGogh?authkey = Gv1sRgCNOQ9UasieCbeA%54WanGogh?authkey = Gv1sRgCNOQ9UasieCbeA%54WanGogh?authkey = Gv1sRgCNOQ9UasieCbeA%54WanGogh?authkey = Gv1s







http://picasaweb.google.com/101794905643649634034/VanGogh?authkey=Gv1sRgCNOQ9uasieCbeA#5488492962756406002



http://picasaweb.google.com/101794905643649634034/VanGogh?authkey=Gv1sRgCNOQ9uasieCbeA#5487373479965359410



 $\label{eq:http://picasaweb.google.com/101794905643649634034/VanGogh?authkey=Gv1sRgCNOQ9uasieCbeA\#5487373487493362962\\ photo \ 5$



 $\label{eq:http://picasaweb.google.com/101794905643649634034/VanGogh?authkey=Gv1sRgCNOQ9uasieCbeA\#5487381384662031218photo_6$



 $\label{eq:http://picasaweb.google.com/101794905643649634034/VanGogh?authkey=Gv1sRgCNOQ9uasieCbeA\#5490453807164168162\\ photo \ 7$

Frame of painting:

The painting is in a wooden frame. The frame is simple and was specially made for this painting. It could origin from the same period when the painting was made – see **photo 8**. On the back of the frame there is a small fragment of the same pencil writing that can also be found on the panel on the back of the painting. Unfortunately, it is very difficult to read and we weren't able to read it (also in IR-Luminescence – see Research III).



Provenance:

The painting was purchased on an art & antique auction in the Notarishuis Arnhem on the 10th of March 1987, catalogue nr. 284 "Vincent ges. Ploegende boer – maroufl'e, 14 x 29 cm " - **add. 1, 2**

Directle: Ha Makelaar I.R Bakkerstraat Telefoon 08 Bank: Algen Rekeningn Postrekening	A.G. Evers. G., Taxateur en Veilinghouder 19 - 6811 EH Arnhem 5 - 42 5900 ene Bank Nederland N.V. 55 52:23.854 3185880	
Numm voor Mevr. / wegens geko	erbriefje 10 de Heer XXXX schte goederen in de veiling d.d.	MAART 1987
Nr.	Omschrijving	Bedrag
135 7.48 2.84	¥ Y	220 - 180 - 160 - 560 - 112 - 112 -
	Carlos and and a second	
14 		
1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.		
~		

add. 1 - bill of sale

246	A. Lanstra ges.	doek	8.5	274	S. Luckhoff	karton
247	A. G. H. P. init.	doek		275	J. J. Mengelberg ges. Meisiesportret	marouflê 51 x 41 cm
248	Onbekende meester Zeesezicht	doek 40 x 80 cm	180	276	Onbekende meester Bloemen in yaas	doek 55 x 33 cm
249	Onduidelijk ges. Indisch landschap	maroufie 60 x 109 cm	-	277	1. Zon ges. Riviergezicht	karton 40 x 30 cm
250	Abdullah ges. Werkers op rijstvelden	doek 59 x 94 cm		278	Onbekende meester Boerderij in landschap	paneel 9 x 15 cm
251	N. v. d. Houdt ges. Missionaris bij z'n kerk	doek 150 x 90 cm		279	Onbekende meester Meisjesportret	marouflè 26 x 20 cm
252	H. Vreeling gcs. Meisjesportret	doek 54 x 40 cm		280	Onbekende meester Boerderij in landschap	karton 19 x 25 cm
253	J. Hoogsteyns ges. Damesportret	board 55 x 47 cm		281	Onbekende meester Indianenkamp	20 x 27 cm
254	J. Hoogsteyns ges. Stilleven	49 x 60 cm		282	Bioelende cactus	36 x 26 cm
255	And the second s	50 x 40 cm		283	2 knotwilgen Vincent acs	15 x 21 cm maroufié
256	Damesportret	65 x 48 cm		285	Ploegende boer 2 schilderstukies	14 x 29 cm 160,-
257	Trompetsteeg	52 x 29 cm dock		286	Zee- en stadsgezicht 2 Indische schilderstukjes	30 x 24 cm
259	Dorpsgezicht J. Stoffels ges.	32 x 41 cm paneel		287	in laklijstjes Onbekende meester	maroufle
260	Liggend naakt M. Donath ges.	37 x 63 cm doek		288	Winters landschap A. Remijs ges.	22 x 16 cm paneel
261	Papavers J. van Mourik ges.	50 x 40 cm board	2	289	M. L. Erard ges.	paneel
262	O, Raup ges.	26 x 20 cm doek		290	J. M. Beek ges.	paneel
224	Winters bospad met mallejan	26 x 32 cm		291	Naar Westerbeek	paneel 18 x 24 cm
263	Onbekende meester Herenportret	46 x 36 cm		292	Onbekende meester Koeien aan waterkant	pancel 18 x 24 cm
264	Bosgezicht Thomas ges	29 x 22 cm		293	Beschilderd palet, voorstellende	
266	Bloemstilleven E. Lechner-Oosterman	26 x 22 cm paneel		294	schaapskudde Onbekende meester	paneel
	ges. Vogelnestje	28 x 31 cm		295	Figuren in berglandschap v. Hove ges.	15 x 29 cm paneel
267	Th. Selhorst sr. ges. Molen bij maanlicht	40 x 30 cm		296	Man in interieur Onbekende meester	board
268	H. L. Böck ges. Meisjeskopje van	25 x 20 cm		297	Jo Spier ges.	kleurlitho
269	T. Wielinga ges. Zeilende tialk	paneel 26 x 35 cm		298	S. Kraalj ges.	kleurlitho 22 x 20 cm
270	A. W. C. Spijkers ges. Boerderij in landschap	board 22 x 36 cm		299	Ph. Zilcken ges. De brug naar J. Maris	ets 54 x 68 cm
271	P. Harberts ges. Bloemstilleven	board 30 x 22 cm		300	R. Terwindt ges. Vrouw met kind	gouache 64 x 48 cm
272	W. Scheulen ges. Landschap met	doek 27 x 35 cm	,	301	J. G. A. Koop ges. Rustend meisje	tekening 45 x 39 cm
273	W. Wouters ges. Melktijd	doek 30 x 40 cm		302	J. Nieweg ges. Damesportret	tekening 50 x 34 cm
Maria	stehuie Asabam	1	_	_	Vetline	catalogus, pagina 8
71510						a na ana ang ang ang ang ang ang ang ang

add. 2 - catalogue page

Private collection:

Inventory nr. - none Catalogue nr. - none

Characteristics

The painting is unknown and was once presented in the original in the year 1989 in the Museum van Gogh in Amsterdam to the now former curator Mr. H. van Crimpen, along with a documentation of two scientific researches: into graphology and into preparatory ground and pigments of the paint layer. - **add**. **42**, **43** The painting stayed in the Museum van Gogh for almost 5 months and was to be inspected by different people, amongst others by Ronald Pickvance, a known van Gogh expert.

A reply letter came after 5 months, stating that "... on the basis of its style the painting cannot be ascribed to Vincent van Gogh, neither to his Dutch nor to his French period." The letter also contains a footnote, which explains, that this statement is an information and not equivalent to an expertise. - **add. 3** Further attempts at researching and acknowledging the authenticity of this presented object were postponed, due to inaccessibility of scientific literature, limited research methods, and unavailability of comparative material of van Gogh's artistic output during that time. After 14 years, in 2004, another letter was sent to Museum van Gogh, which contained the question, whether the museum would be interested in the painting and again willing to research it. The answer was: "as far as Van Gogh Museum is concerned, we have nothing more to add to our opinion. Please feel free to contact other experts."- **add. 4**



VAN GOGH							
MUSEUM							

AMSTERDAM

Ner Gagh Museum Postbar 75346 1070 Al Amthédam Ne -311 (0120 575 52 00

fax =31 0020 576 52 23 www.sangoghmutrum.rl

Paulus Potentical 7 Amiletter Reletare 39 36.37 123

Amsterdam, 15 November 2004 Corr. Nr.: EU/187.3.04/eh Re: authentication

Dear

Referring to your letter of 28 oktobe 2004, we would like to inform you that we already made an assessment of the authenticity of the work of art in your postention on 30 August 1987. Atfar as the Van Gogh Museum is concerned, we have nothing more to add to our opinion. Please feel free to contact other experts.

We trust to have been at your service.

Yours sincerely, 1 M

Sjraar van Heugten Head of Collections

add. 4

Now we have the year 2011 and from that time a lot has changed in the scientific approach to art objects and development of even more objective research methods. Especially research and research projects regarding Vincent van Gogh's works of art. Extensive research projects of Vincent van Gogh's works and painting techniques are being conducted. This had motivated us to perform a possibly thorough analysis and research of the mentioned object, and to write a documentation.

2. Composition

The painting is small and elongated. It has a deep perspective. It is proportionally, horizontally divided into 2/3 of sky and 1/3 of ground. It is asymmetrically composed to the right. Perspective lines begin on the left hand side, almost at the edge of the painting on the horizon, at the red roof. Perspective lines run diagonally along the plough-trail, corn sheaves, horse backs and the blue cottage's roofline.



http://picasaweb.google.com/101794905643649634034/VanGogh?authkey=Gv1sRgCNOQ9uasieCbeA#5487428416531477090

photo 9

This type of composition recurs very often in van Gogh's work, in the period of 1881-1885 - add. 5

It is particularly similar in terms of character, atmosphere and mood to the composition of van Gogh's favourite artist – Georges Michel (1763-1843) - add. 6, 7 Vincent van Gogh wrote to his brother Theo, that he would gladly paint

oil studies in Michel's genre and style, specifically for sale - add. 8, 9.

Vincent van Gogh's works: add. 5



Etten, October, 1881

mour Wal similar wal nij biger en 0.0 June. le l 2 ai Nu U ment

Schenkweg, The , The Hague: mid-January, 1882



Meadows near Rijswijk and the Schenkweg, Den Haag, February 1882



Ditch along the Schenkweg, The Hague: second half March, 1882



Iron Mill in The Hague, late July, Den Haag 1882



The Hague 14 August 1882



The Hague 29-30 July 1883



Landscape with a Stack of Peat and Farmhouses, Drenthe, September-December 1883



Landscape in Drenthe, Drenthe: Second half of September-Early October, 1883



Ploughman with Two Women, Drenthe: c. 13 October 1883



Ploughman and Three Women, Drenthe: c. 13 October 1883



Ploughman with Stooping Woman, and a Little Farmhouse with Piles of Peat, Drenthe: November, 1883



Nuenen, December, 1883



Nuenen, December, 1883



Old Tower of Nuenen with People Walking ,Nuenen , Mai 1884



People Walking in Eindhoven, Antwerp: February, 1885



Man Loading a Cart, Nuenen: second half August, 1885

add. 5



Georges Michel, Route dans la campagne RF 1759, 16 Recto, Fonds des dessins et miniatures, Reserve des grands albums, Album Michel Georges - 2 - folia 17, rapporte an recto e Musee du Louvre, Departement des Arts graphiques.

add. 6



Georges Michel, Route dans la campagne RF 1759, 16 Recto, Fonds des dessins et miniatures, Reserve des grands albums, Album Michel Georges - 2 - folia 17, rapporte an recto e Musee du Louvre, Departement des Arts graphiques.

add. 7

Quote:

These effects are telling enough, and Michel's secret is such that it depends (as with Weissenbruch) on taking accurate measurements, seeing correct proportions of foreground to background, and correctly feeling the direction the lines take through perspective. These are not things one finds by chance (Michel's work is abundant enough, and from it I see clearly how he was on a height, so to speak, doing it with ease) but things one *knows*, and I believe that before the period when everything started going well Michel was sometimes amazed and disappointed that things *weren't working*.

To Theo van Gogh. The Hague, Sunday, 11 February 1883, vangoghletters.org: Letter nr. 312

add. 8

Quote:

The flat areas there behind Loosduinen, it's just like Michel, and the lonely beach too. When, since our recent letters, I reflect less on the future than on the more or less present, I still have hopes that when you come we'll take the decision that I should do a number of small watercolours for you just to try it out, and perhaps smaller paintings.

To Theo van Gogh. The Hague, Sunday, 29 and Monday, 30 July 1883, vangoghletters.org: Letter nr. 369

add. 9

Vincent van Gogh was fascinated by Georges Michel's works. Especially by Michel's compositions and knowledge in his works. - add. 8

3. Iconographic description

Presentation: "Landscape with ploughman"

1. A landscape of field crops under a clouded sky. There is a farmer in the middle of the field, to the right - **photo 10**

He is wearing a wide, yellow hat - add. 10 - 15,

He is wearing a blue shirt and brown-grey trousers - add. 16, 17



http://picasaweb.google.com/101794905643649634034/VanGogh?authkey=Gv1sRgCNOQ9uasieCbeA#5487381341079409074

photo 10

This type of hat on the researched painting is very similar to the hats on van Gogh's drawings from the period Summer-Autumn 1885 in Nuenen. – add. 10-15



Vincent van Gogh, Man Feeding Chickens (or Sowing), The Hague: March, 1883 add. 10



Vincent van Gogh, *Sower,* The Hague: early July, 1883 add. 11



Vincent van Gogh, Two Heads, July-Sept., Nuenen 1885 add. 12



Vincent van Gogh, Reaper, July-September, Nuenen 1885 add. 13



Vincent van Gogh, Peasant with a Fork, Nuenen, July-Sept. 1885 add. 14



Vincent van Gogh , Nuenen , August 1885 add. 15

The blue shirts of the Brabant farmers are similar to the one in the researched painting – add. 16, 17, 18



add. 16





Quote:

As a rule, the peasant figures here are blue. That, in the ripe wheat or against the withered leaves of a beech hedge, so that the hidden nuances of darker and lighter blue are brought alive again and made to speak by contrast with gold tones or reddish brown, is very beautiful, and has struck me here from the first.

The people here instinctively wear the most beautiful blue that I've ever seen. It's coarse linen that they weave themselves, warp black, weft blue, which creates a black and blue striped pattern.

To Theo van Gogh. Nuenen, between about Thursday, 5 and about Thursday, 26 February 1885. vangoghletters.org: Letter nr. 483

add. 18

2. A farmer walking behind a horse-drawn plough.

The horses are harnessed in typical "Brabantse" or "Gelderse" horse collars, called "Brabantse haam" and "Gelderse haam" – photo 11, add. 19



http://picasaweb.google.com/101794905643649634034/VanGogh? authkey=Gv1sRgCNOQ9 uasieCbeA# 5487381355476261458



'BRABANTSE' HAAM Nederland, ca. 1890



Gelderse' haam voor paard Nederland, rond 1880



'Brabantse' haam voor paard, Nederland, rond 1910,

add. 19

3. On the right hand side, there is a small farm: a farmhouse, a small cottage, a big covered haystack typical of the Netherlands called *Hooiberg*. There is a big hay/peat stack with a few sheaves standing in front of it - **photo 12**, **add. 20 - 22**



http://picasaweb.google.com/101794905643649634034/VanGogh?authkey=Gv1sRgCNOQ9uasieCbeA# 5487381361495120082

Almost identical composition and iconographic elements of the farm are present on another painting by Vincent van Gogh – add. 20



Vincent van Gogh, Farmhouses in Loosduinen near The Hague at Twilight, Oil on canvas on panel, 33.0 x 50.0 cm.,The Hague: August, 1883

add. 20

Similarly painted sheaves by Vincent van Gogh, just like on the researched painting – add. 21,22



Vincent van Gogh, Sower with Hand in Sack, Etten, September 1881 add. 21



Vincent van Gogh, Sower with the Basket, Etten, September 1881 add. 22

Similar type of "Hooiberg", reminiscent of a typical big covered dutch haystack - add. 23, 24



add. 23 - Doldersummerveld, Noord Drenthe, www.hooiberg.info



add. 24, Leerdam, Lanphen, www.hooiberg.info

4. On the horizon, on the left hand side of the painting: a tree group and two red roofs, a gray rectangular building, with some sort of straight white paint element – **photo 13**



http://picasaweb.google.com/101794905643649634034/VanGogh?authkey=Gv1sRgCNOQ9uasieCbeA#5491115451817271954

This grey rectangular roofless object could be the old cemetery tower in Nuenen. Its roof was disassembled in May 1885. – add. 25



Vincent van Gogh, Old Church Tower at Nuenen ('The Peasants' Churchyard'), Nuenen: late May-early June, 1885

add. 25

5. Next to the rectangular object on the researched painting, on the left hand side stands a tall group of trees, on the right hand side stands a smaller group of trees. Further to the right, there are two smaller hill shaped tree groups – **photo 14**



http://picasaweb.google.com/101794905643649634034/VanGogh?authkey=Gv1sRgCNOQ9uasieCbeA#5490453815541319810

There is an almost identical iconographically presented area of the cemetery tower on van Gogh's painting – add. 26 It is possible that both paintings depict the same location.



Vincent van Gogh, Old Tower in the Fields, The Oil on canvas on cardboard 35.0 x 47.0 cm., Nuenen: July, 1884, F 40, JH 507 add. 26

6. The straight white paint element on the researched painting - **photo 14**, might be a light reflection and may come from the bright plates or tiles that cover the wall, which stands on the outer edge of the tower and cemetery grounds.

This type of light reflection on the researched painting also appears on van Gogh's other paintings - add. 27 - 31



Old Tower at Nuenen with a Ploughman, The, Oil on canvas, 34.5 x 42.0 cm. Nuenen: February, 1884

add. 27



Old Church Tower at Nuenen, The Oil on canvas on panel, 47.5 x 55.0 cm, Nuenen: May, 1884

add. 28



Old Tower of Nuenen with People Walking, The, Oil on canvas on panel, 33.5 x 44.0 cm. Nuenen: May, 1884

add. 29



Vincent van Gogh, Churchyard in Winter, Nuenen: December, 1883

add. 30



Vincent van Gogh, Churchyard in Winter, Nuenen: December, 1883

add. 31



7. In the middle between the dense, high trees there are two buildings with red roofs
- photo 15

http://picasaweb.google.com/101794905643649634034/VanGogh?authkey=Gv1sRgCNOQ9uasieCbeA#5487381404593387122 photo 15
<u>The location, where the old cemetery tower once stood, is marked on an old military</u> <u>map from 1900</u> – add. 32



add. 32

4. Material description and condition

Canvas

The canvas is cut evenly at the edges and adjusted to the panel's size (veneer plywood) and glued on. Panels of this type were industrially manufactured and used, among other things, in furniture manufacturing since 1860. The canvas is painted on the edges, which indicates, that the painting was painted on the canvas, when it was already glued to the panel. There are visible traces of blue paint on the back of the panel and poorly visible pencil writings – **photo 16 - 19**. They are clearly visible in IR Light but are unfortunately illegible – **add. Research III p. 101?**



 $\label{eq:http://picasaweb.google.com/101794905643649634034/VanGogh?authkey=Gv1sRgCNOQ9uasieCbeA\#5487415237052111346photo 16$



http://picasaweb.google.com/101794905643649634034/VanGogh?authkey=Gv1sRgCNOQ9uasieCbeA#5487415240195581810 photo 17



http://picasaweb.google.com/101794905643649634034/VanGogh?authkey=Gv1sRgCNOQ9uasieCbeA#5487415245296820514

photo 18



http://picasaweb.google.com/101794905643649634034/VanGogh?authkey=Gv1sRgCNOQ9uasieCbeA#5487415243879071970

Density of canvas:

13/14 vertical weaves, 14/16 horizontal weaves / cm. The canvas is thin and delicate.

Information about identical density of canvas that was used by van Gogh in Antwerp and brought from Nuenen - "Van Gogh's Antwerp and Paris Picture support (1885 – 1888) reconstructing choices – Ella Hendriks and Muriel Geldof – p. 45 - 46⁻¹

Thickness of panel: 0,3 - 0,4 cm

Preparatory ground:

two layers - add. Research III

Conservation 1987:

Prior to the assumption that this painting may be a work by Vincent van Gogh, the surface dirt on the painting has been removed with an alcohol solution, natural soap and turpentine. Paint layer cavities were puttied with chalk priming; a few minor retouches were made with retouching paint by Schmincke. A thin layer of varnish made by Lefranc & Burgeois was applied to the painting. - **photo 20**



Condition:

In general, the painting is in good condition. The paint layer is stable; there are visible spots of chipped paint, especially on the thicker pastosities. **- photo 21**. On the whole paint layer, there are many small, thin, delicate cracks (craquelures) that run vertically. **- photo 22, 23**



http://picasaweb.google.com/101794905643649634034/VanGogh?authkey=Gv1sRgCNOQ9uasieCbeA#5487397370951165698



 $\label{eq:http://picasaweb.google.com/101794905643649634034/VanGogh?authkey=Gv1sRgCNOQ9uasieCbeA\#5488492976288710818photo 22$



http://picasaweb.google.com/101794905643649634034/VanGogh?authkey=Gv1sRgCNOQ9uasieCbeA#5488493030276897042

photo 23

5. Painting technique

Underdrawing, outline:

In black, applied thin: On the cottage - roof – left side, Haystack or Peat stack – left side, Plough trail – right side in front of the horses, Horses – applied outlines on the upper part and hind leg - photo 24, 25, 26





 $\label{eq:http://picasaweb.google.com/101794905643649634034/VanGogh?authkey=Gv1sRgCNOQ9uasieCbeA\#5487415247820532930photo 25$



photo 26

<u>There are two clear indications in van Gogh's letters concerning this</u> <u>technique</u> - add. 33, 34

Quote:

A very heavy burden has largely fallen from my shoulders of late. Last year I repeatedly tried to paint figure studies. Well, I was driven to desperation by the way they turned out. Now I've started again and I no longer have anything directly hindering me in the execution, because I draw much more easily than last year. Then I got confused every time I lost my drawn sketch while painting. And had to work a long time to do that sketch, so that if I could only have the model for a short time absolutely nothing turned out well.

But now I don't give a rap if the drawing is erased, and I always do them directly with the brush, and enough form comes into it to make the study useful. This is why I say that I see my way more clearly now; I know that I'll need many studies, but they won't be more difficult for me than drawing them. And so plenty of painting this year and we'll have light. That's certainly my hope. This winter I plan to paint studies of heads like the few drawn ones I sent you. I would do that right away were it not that the figures have to be followed in the fields while the season lasts. I did the first two figures that I painted this year just the same way as I tried last year — drawing first and then filling in the outline. That's what I would call the dry manner. In the other manner one in fact does the drawing last and begins work by first seeking the tones without worrying much about it, about the drawing, just trying to put the tones roughly in their place in one go and to gradually define the form and the subdivision of the colours. Then one gets more of that effect of the figure coming out as if it's surrounded by air, and it takes on a softer quality. While the colours become more delicate, because one goes over them often and sweeps one colour through another. You will surely see the difference if the first two I've done now stay in their present state.

To Theo van Gogh. The Hague, on or about Friday, 3 August 1883, vangoghletters.org: Letter nr.370

Quote:

What has given me a degree of encouragement of late is that, although I haven't painted for several months, I believe there's progress nonetheless in the *painted* studies done last year and now. This is because things like drawing and measuring proportions, with which I had a lot of trouble then, now fall into place more or less, and so as I sit before nature I need only think about painting, instead of thinking about two things at once, as it were, drawing and painting. When working it up, one again has to deal with both at once, but that's different again. To Theo van Gogh. The Hague, on or about Friday, 3 August 1883 vangoghletters.org: nr. 370

add. 34

This second "manner" technique is present on the researched painting – see underlined text passage in add. 33

Paint layer, palette:

White, white-yellowish, grey, bright yellow, medium yellow, bright green, bright blue, medium blue, dark blue, bright brown, medium brown, dark brown, medium red, violet, lilac. Pure colours and a mix of colours were used. The colouring tone is made up of a small, limited number of paint tubes. The researched painting is painted with a limited palette as well – add. 35, 36

There is a pinkish-grey (violet-grey) or pinkish-brown (violet-brown) paint layer on the researched painting. That paint layer is clearly visible on the whole area of the painting.

More about this subject can be found in:

Van Gogh's Antwerp and Paris Picture supports (1885 – 1888) reconstructing choices, Ella Hendriks and Muriel Geldof w Art Matters: Netherlands Technical Studies in art vol. 2, 2005, p. 57; http://www.vangoghsstudiopractice.com/ - video from the 13th May 2011

"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, vermillion, ultramarine, barium sulphate, emerald green, zinc white, carbon black and an organic 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 (F388v *Vegetable garden with sunflower*) all painted in the period mid July to 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, F308, 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. The include F270a *Flowering chestnut tree* that was painted in May 1887, apparently also on top of another composition (figs. 28-29), and F370 *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."

More can be found on the following website: <u>http://www.vangoghsstudiopractice.com/2011/05/taking-samples-the-restorers-choice/</u> Video from May 13th 2011

<u>The chemical and physical research of the painting is covered in detail in the later</u> part of the documentation. – **see add. Research III**



sketch - Letter nr. 253 - www.vangoghletters.org,

add. 35

Quote:

Moreover, I now have all the essentials for proper painting.

And a supply of paint — big tubes (which work out much cheaper than small ones), but you will understand that I've limited myself to simple colours in both watercolour and oil: ochre (red, yellow, brown), cobalt and Prussian blue, Naples yellow, terra sienna, black and white, supplemented with some carmine, sepia, vermilion, ultramarine, gamboge in smaller tubes. But I refrained from buying colours one ought to mix oneself.

I believe this is a practical palette, with sound colours. Ultramarine, carmine or something else are added if absolutely necessary.

To Theo van Gogh. The Hague, Saturday, 5 August 1882, vangoghletters.org: Letter nr. 253

Application of paint layers and painting method:

- Very quick, without hesitation, criss-crossing brush strokes. Put wet on wet and wet on dry.
- Distinct gaps right down to the priming brown-violet.
- Dynamic brush usage by linear strokes and single paint blots.
- Specific direction of paint application by single brush strokes to achieve a stronger effect of depth of the farmer, the cottage, the horses and other elements of the painting.
- Surface is in rotation, even and impasta, in some places like a relief.
- The Signature is executed without hesitation or restriction wet on dry.
- Brush strokes: short, quick, width: +/- 0,5 cm, +/- 0,3 cm and < 0,3 cm.
- Brush stem scrape (on the hip joint of the horse) photo 25
- Brush strokes:

Sky: horizontal, vertical, diagonal **- photo 27, 28, 29** Landscape, field: horizontal Farmer: vertical, horizontal Horses: diagonal, vertical Farm: horizontal, vertical, diagonal



http://picasaweb.google.com/101794905643649634034/VanGogh?authkey=Gv1sRgCNOQ9uasieCbeA#5488494114928458546

photo 27



http://picasaweb.google.com/101794905643649634034/VanGogh?authkey=Gv1sRgCNOQ9uasieCbeA#5488494162743796066



photo 29

<u>There is an interesting sentence in one of van Gogh's letters from the</u> <u>28.05.1885, which could give us a clue about when Vincent van Gogh</u> <u>had changed his style and painting technique to more pastosity</u> - add. 37

Quote:

This time I haven't smoothed out the brushstroke, and besides the colour is very different too. I haven't yet made a head that's so much *painted with the soil*, and more will certainly follow now.

To Theo van Gogh. Nuenen, on or about Thursday, 28 May 1885, vangoghletters.org: Letter nr. 505

A comparison attempt with other works by van Gogh - add. 38,39

There is another painting by Vincent van Gogh that bears similarities to the researched painting in terms of composition, style, atmosphere and character:

Landscape with Church and Farms, Nuenen, April 1885, Oil on canvas, 22 x 37cm, F 185A, JH 76I, Los Angeles, Los Angeles County Museum of Art



http://picasaweb.google.com/101794905643649634034/VanGogh?authkey=Gv1sRgCNOQ9uasieCbeA#5488495624464208946



http://picasaweb.google.com/101794905643649634034/VanGogh?authkey=Gv1sRgCNOQ9uasieCbeA#5488495634795678354

black/white

Another work by van Gogh that shows similarities in format and painting technique is

the painting: Old Station at Eindhoven, The, Nuenen, January, 1885, Oil on canvas, 13.5 x 24.0 cm. F 67a, JH 602 – add. 40.



II Research in the year 2010-2011

1. Physical-chemical research - Summary Editing: Dr. Zofia Kaszowska

Object:

The painting "Landscape with ploughman", signed Vincent (bottom left), small: Height – 14 cm, Width – 29 cm, Oil on canvas glued on panel.

Goal of research:

Identification and distribution of the painting's materials. The attempt at dating this work of art and possible credit to Vincent van Gogh.

Material (Sample taking):

Due to the size (small) and very good condition of the painting, we have taken small samples for our research on the edges of the painting. We have put these samples in acrylic resin, sharpened them by hand and polished them. Six cross-section samples were prepared. In order to make these samples more clear for the analysis of their stratigraphic structure, we have taken microscope photos in daylight as well as in UV-Light.

Instrumental methods for the analysis of cross section samples:

- 1. X-ray fluorescence-spectroscopy scanning electron microscope (SEM) along with Energy-dispersive X-ray spectroscopy (EDX)
- 2. Raman spectroscopy (Raman)
- Fourier transform infrared spectroscopy (FTIR) Attenuated Total Reflectance (ATR)

Interpretation of the results of instrumental analysis, additional methods:

 Specialized photography (digital): Infrared-light, Sodium-luminescence, UV-light and traditional X-ray photograph - Faculty of Conservation and Restoration of Works of Art from the Academy of Fine Arts in Kraków, Poland

Summary:

1. Preparatory ground:

The cross-section samples have shown: the painting has two ground layers. The lower layer is applied thick and is transparent – it is warm white. Blue pigment particles can be seen in this layer. The upper ground layer is thin and opaque and of cold white color.

CaCO₃ (Chalk) is the ground-filler of the lower layer. The upper ground layer is BaSO₄ with white pigments based on Zinc – we weren't able to exactly determine

whether these are <u>Lithopones</u> (BaSO₄ + ZnS) or a mixture of <u>Barium sulfate</u> (BaSO₄) and <u>Zinc white</u> (ZnO).

The blue pigment particles in the lower ground layer could be <u>Ultramarine</u>. The only evidence for this is the presence of Na, which was confirmed by SEM-EDX. Binding agent results are not clear. It seems that it's most likely an oil binding agent. FTIR-ATR analysis has clearly shown, that the surface of the canvas (linen) was coated with a protein binding agent (probably animal glue).

2. Paint layer:

Cross-section samples show that the paint layers are mixed together. Thus we can say that it's painted wet on wet. The following material (substance)-groups have been identified:

White – <u>Lead white</u>, <u>Zinc white</u>, <u>Barium sulfate</u>, <u>Chalk</u>, <u>Kaolin</u>. Due to the fact that Barium sulfate is always present along with Prussian blue, it can be assumed that the painter used the blue oil color with BaSO₄ as filler. Maybe the presence of chalk can be explained as filler for oil colors.

White Kaolin can also be a component of earth pigments (Earth colors – ochre) that are present in the researched painting (SEM-EDX analysis confirms this). There are at least two such earth pigments in the painting: a yellow and a red color. Since the non-organic pigments are present in the color mixture, the cross-section identification is, at current scientific methods, impossible.

Cobalt blue and Cadmium yellow were also found in the paint layer. Cross-sections also show traces of black paint particles (not analyzed).

Secondary products were identified in the paint layers. They are the result of an interaction between some pigments and fatty binding agents – the so-called metallic soaps. Zinc soaps were clearly found. More about Zinc soaps: Katrien Keune, *Binding medium, pigments and metal soaps characterised and localised In paint cross-section*, ISBN 90-77209-10-7, Amsterdam 2005, p. 144-149.²)

All of the earlier mentioned pigments were used by painters in the 19th century as well as on the turn of the 19th and 20th centuries. The structure and composition of the ground of the researched painting fits well into this period.

Ella Hendriks and Muriel Geldof: *Van Gogh's Antwerp and Paris Picture supports* (1885-1888), reconstructing choices, "Art Matters: Netherlands Technical Studies in Art", vol. 2, 2005,

p. 39-75.³)

The authors show, among other things, the diversity of the researched samples of the preparatory ground of Vincent van Gogh's paintings from the years 1885 to 1888. Even though the structure and composition of the priming from their samples isn't identical to the samples of the researched painting, there is another property that seems important here. The authors write on page 57:

"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 F205 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". ⁴)

On the white priming of our researched painting, there is a pinkish-grey (violet-grey) paint layer. Due to the fact that this paint layer isn't present on all of our cross-section samples, it can be assumed that we're dealing here with some kind of lower paint layer. That paint layer can be seen in many parts of the painting with the naked eye.

Special photographs show the condition and composition of the painting. They are also proof, that the signature hadn't been corrected or manipulated in any way. The signature is an integral part of the painting.

Addendum 1 Microscope- Photography – Cross-section samples in white light and in UV – Light

Photo 1 (a-f). White light



a) Sample 1: grey-blue layer from the sky area b) Sample 2: intense blue from the sky area



c) Sample 3: green-yellow layer – field area d) Sample 3bis: green-yellow layer – field area



e) Sample 4: violet-brown layer – field area f) Sample 4bis: violet-brown layer – field area

Photo 2 (a-f). Microscope – Photography. Cross-section samples in UV-Light



a) Sample 1: Grey-blue layer from the sky b) Sample 2: intense blue layer from the sky



c) Sample 3: green-yellow layer from the field d)Sample 4: violet-brown layer from the field

Addendum 2

Elemental analysis – SEM-EDX of cross-section samples 3bis, 4bis

Photo 1. Microscope-Photography of cross-section sample 3bis with marked points of the SEM-EDX - analysis



- Ill. 1 X-ray-fluorescence spectra of a point-analysis SEM-EDX for marked points on Photo 1 (cross-section sample 3bis)
- a) Point 2 CKa ZnLa PbMa O Ka ZnKa PbMg PbMz PbL 44 2.70 0.90 1.80 3.60 4.50 5,40 7.20 8.10 6.30 keV







d) Point 5



e) Point 7



f) Point 8



g) Point 9



h) Point 10







j) Point 12



k) Point 13



Photo 2. Element map of the cross-section sample 3bis -SEM-EDX



Photo 2. Microscope-Photography of the cross-section sample 4bis with marked points of the SEM-EDX - analysis



Photo 3. X-ray-fluorescence-spectra of a point-analysis - SEM-EDX for marked points on Photo 2 (cross-section sample 4bis)





















Ill. 4. Elemental-map cross-section sample **4 bis** – SEM-EDX

Addendum 3 Point-Raman-Analysis on cross-section samples



Photo 1. Microscope-Photography - Sample 2 - marked: 1. Raman - Analysis,



Ill. 1. Raman-spectrum for point 1. (Photo 1) (2156, 2093 cm⁻¹: Prussian blue; 1049 cm⁻¹: Lead white)

Photo 2. Microscope-Photography - Sample 3 - marked points of Raman - Analysis, Ill. 2. Raman – Spectrum for points on Photo 2



a) Point 1 (2154, 2091 cm⁻¹: Prussian blue; 1049 cm⁻¹: Lead white)



b) Point 2 (1049 cm⁻¹: Lead white; 2154 cm⁻¹: Prussian blue)

c) Point 3 (1049 cm⁻¹: Lead white; 987 cm⁻¹: BaSO₄; 2154 cm⁻¹: Prussian blue)





Photo. 3. Microscope-Photography - Sample 3 - marked points of Raman-Analysis Point 2 – Lead white (1049 cm^{-1}) , Point 4 - calcite: $(\text{chalk}) (1086 \text{ cm}^{-1})$

Ill. 1. Raman – Spectrum for points on Photo 3

a) Point 1 (2154 cm⁻¹: Prussian blue; 1049 cm⁻¹: Lead white)



b) Point 3 (1085 cm⁻¹: calcite; 1049 cm⁻¹: Lead white)



Addendum 4 Cross-section samples analysis – FTIR-ATR Method



Photo 1. Microscope-Photography – Sample 1 with marked areas that were analyzed - FTIR Method

Ill. 1. FTIR- Pictures - area marked blue on Photo 1. gained through integration of selected absorption spectra characteristic for: a) carbonates, b) carboxylate Zn (?), c) stearates/palmitates Zn, d) BaSO₄, e) fats, soaps, f) acrylic resin for samples and selected spectra (g, h)




g) Spectrum from map "b" for the appropriate pixel on the map



h) Spectrum from map "d" for the appropriate pixel on the map



Ill. 2 FTIR-pictures (from the area marked green on photo 1) gained through integration of selected absorption spectra characteristic for:

a) carbonates, b) soaps ZN(?), c) BaSO₄, d) fats, soaps, e) acrylic resin for samples ?, g) ? and selected spectra (h,i)





h) Spectrum from map "b" fort he appropriate pixel on the map

i) Spectrum from map "c" for the appropriate pixel on the map



Ill. 3. FTIR-pictures (from the area marked yellow on photo 1) gained through integration of selected absorption spectra characteristic for: a) carbonates, b) soaps c) protein, d) and selected spectra (e)





e) Spectrum from map "c" for the appropriate pixel on the map





Photo 2. Microscope-Photography – Sample 3 with marked areas that were analyzed - FTIR method

Ill. 4. FTIR-pictures (from the area marked red on Photo 2) gained through integration of selected absorption spectra characteristic for: a) ester b) ester and soaps c) carboxylates ?, d) carbonates and selected spectra (e)



e) Spectrum from map "c" for the appropriate pixel on the map





a) carbonates b) fats c) fats, soaps d) Prussian blue e) carboxylates f) aluminosilicates g), (?), h) other aluminosilicates und BaSO₄ (?) and selected spectra (i,j,k,l)



(PIN0)

a) 1392 cm⁻¹ (basic lead carbonate) b) 1732 cm⁻¹ (fats)













i) Spectrum from map "d" for the appropriate pixel on the map

j) Spectrum from map "f" for the appropriate pixel on the map



k) Spectrum from map "g" for the appropriate pixel on the map





1) Spectrum from map ",h" for the appropriate pixel on the map



Photo 3. Microscope-Photography – Sample 4 with marked areas that were analyzed - FTIR Method

Ill. 6. FTIR-pictures (from the area marked yellow on photo. 3) gained through integration of selected absorption spectra characteristic for: a) carbonates b) ester und resin c) stearates/palmitates Zn, d) fats, soaps e) aluminosilicates, f) other aluminosilicates and selected spectra (g.h.i)



c) 1536, 1451, 1398 cm⁻¹ (palmitates/stearates Zn) d) 2917, 2850 cm⁻¹ (soaps and fats)



e) 1038 cm⁻¹ (aluminosilicate)



f) 3687, 3653, 3016, 1026, 1003, 908 cm⁻¹ (other aluminosilicate, kaolin type)



g) Spectrum from map "c" for the appropriate pixel on the map



h) Spectrum from map "e" for the appropriate pixel on the map



i) Spectrum from map "f" for the appropriate pixel on the map



Addendum 5 Interpretation of the instrumental analysis



Photo 1. Microscope-Photography of cross-section sample ",1", taken from the greyblue sky area (x = 29; y = 11,5)

	Type of layer	Results of	Interpretation
		AIR-FIIR analysis	
1)	Blue paint layer	BaSO ₄	Baryte white
2)	White paint layer	zinc salts from carbon acids (zinc soaps?) calcium carbonate	white (ZnO) or (ZnS) chalk
3)	red-violet paint layer	calcium carbonate fats	chalk oil binding agent
4)	White layer of preparatory ground	BaSO ₄	Baryte white
5)	Transparent layer of preparatory ground	calcium carbonate fats	chalk oil binding agent
6)	Glue on the canvas	protein	Animal glue (?)

Table 1. Results of cross-section sample "1"



Photo 2. Microscope-Photography of cross-section sample ",2", from the intense blue sky area (x = 29; y = 11,5)

A canvas fiber and the fixed paint layer are visible. It is possible that the brush stroke went outside the canvas edge.

	Type of layer	Results of ATR-FTIR analysis	Results of Raman-analysis	Interpretation	
1)	blue paint layer	basic lead	Lead white	Lead white	
		carbonate	Prussian blue	Prussian blue	

Table 2. Results of cross-section sample "2"



Photo 3. Microscope-Photography of cross-section sample "3", from the green-yellow field area (x = 0, y = 4,5)

	Type of layer	Results of	Results of	Interpretation		
		ATR-FTIR	Raman-			
		analysis	Analysis			
1a)	Yellow – upper	basic lead	Lead white	Lead white		
	paint layer	carbonate	Prussian Blue	Prussian Blue		
1b)	White – upper paint	basic lead	Lead white	Lead white		
	layer	carbonate	Prussian Blue	Prussian Blue		
1c)	Blue – upper paint	iron ferrocyanide	Prussian Blue	Lead white		
	layer		Lead white	Prussian Blue		
2)	Green-Brown -	basic lead	Lead white	Lead white		
	lower paint layer	carbonate		kaolin as a		
		hydrated		component for		
		aluminosilicate		Bolus armenus or		
		(kaolin type)		carrier for organic		
		silicate		red pigment		
		carboxylate		sand (?)		
		BaSO ₄	BaSO ₄	Baryte white		
			Prussian Blue	Prussian blue		
3)	White preparatory	Not analysed	-	-		
	ground					
4)	Transparent	Not analysed	-	-		
	preparatory ground					

Table 3. Results of cross-section sample "3"



Photo 4. Microscope-Photography of cross-section sample "3bis", from the green-yellow field area (x = 0, y = 4,5)

	Results of SEM-EDS	Interpretation
	analysis	
1)	C, O, Zn, Pb	Lead white, Zinc white
2)	C, O, Zn, Pb	Lead white, Zinc white
3)	C, O, Zn, Pb	Lead white, Zinc white
4)	C, O, Zn, Pb	Lead white, Zinc white
5)	C, O, Zn, Pb	Lead white, Zinc white
6)	C, O, Zn, Pb	Lead white, Zinc white
7)	C, O, Pb, traces of Zn	Lead white
8)	C, O, Pb, Zn, Cd	Lead white, Zinc white, Cadmium yellow
9)	C, O, Zn, Pb	Lead white, Zinc white
10)	C, O, Zn, Al, Pb, Co	Cobalt blue, Zinc white, Lead white
11)	C, O, Zn, Al, Pb, Cd, Ba, Fe	Lead white, Zinc white, Baryte white,
		Cadmium yellow, Fe pigment
12)	C, O, Zn, Al, Si, Pb, Cd, Ba,	Lead white, Zinc white, Baryte white,
	Fe	aluminosilicate (ochre?), Cadmium yellow
13)	C, O, Zn, Al., Si, Pb, Cd	Lead white, Zinc white, aluminosilicate,
		Cadmium yellow
14)	C, O, Zn, Al., Pb	Lead white , Zinc white

Table 4. Results of cross-section sample "3bis '



Photo 5 Microscope-Photography of cross-section sample ",4", from the violet-brown field area (x = 28, y = 0)

	Type of layer	Results of	Results of	Interpretation
		ATR-FTIR - Analysis	Raman- Analysis	
1)	Violet paint layer	basic lead carbonate hydrated aluminosilicate (Kaolin type) silicate	Lead white Prussian Blue	Lead white Prussian Blue Kaolin –carrier of Bolus or of an organic pigment Sand (?)
2)	Blue paint layer	stearate/palmitate, Zn	Lead white	Zinc white Lead white
3)	White preparatory ground	Not analysed	Lead white calcite (chalk) –probably a signal from the adjacent layer	-
4)	Transparent preparatory ground	Not analysed	calcite (chalk)	chalk
5)	Glue from the canvas	Not analysed	-	-

Table 5. Results of cross-section sample "4"



Photo 6 Microscope-Photography of cross-section sample ",4bis", from the violet-brown field area (x = 28, y = 0)

	Results of SEM-EDS-	Interpretation
	Analysis	-
1)	C, O, Al, Pb	Lead white, aluminium hydroxide as carrier
		for red organic pigment
2)	C, O, Al, Si, Pb, Fe	Lead white, aluminosilicate (ochre, bolus?)
3)	C, O, Al, Si, Pb, Fe	Lead white, aluminosilicate (ochre, bolus?)
4)	C, O, Al, Si, Pb, Co	Lead white, Cobalt blue
5)	C, O, Al, Si, Pb, Ca	Lead white, aluminosilicate, chalk
6)	C, O, Zn, Pb, Ca	Lead soap (?)
7)	C, O, Zn, Pb, Ca, Ba	Lead white, Baryte white, Zinc white
8)	C, O, Mg, Pb, Ca	calcium soap(?)
9)	C, O, Al, Si, Pb, Ca	aluminosilicate
10)	C, O, Al, Pb, Ca	Lead white
11)	C, O, Zn, Al, Si, Pb, K, Ca	organic substance
12)	C, O, Na, Pb, Ca	chalk, ultramarine
13)	C, O, Na, Si, Pb, Ca	silicic acid
14)	C, O, Si, Pb, Ti	silicic acid

Table 6. Results of cross-section sample "4bis "

Addendum 6 Special photography

Painting in white light



X-ray photography



http://picasaweb.google.com/101794905643649634034/VanGogh?authkey=Gv1sRgCNOQ9uasieCbeA#5487449050158992370

UV-Light



http://picasaweb.google.com/101794905643649634034/VanGogh?authkey=Gv1sRgCNOQ9uasieCbeA#5487449052909904178

Signature in UV-Light



http://picasaweb.google.com/101794905643649634034/VanGogh?authkey=Gv1sRgCNOQ9uasieCbeA#5487449065041493826

Sodium luminescence



Infra-red light



Signature in infra-red light



http://picasaweb.google.com/101794905643649634034/VanGogh?authkey=Gv1sRgCNOQ9uasieCbeA#5487449781117418626



Pencil writing on plywood, on the back side in Infra-red light

http://picasaweb.google.com/101794905643649634034/VanGogh?authkey=Gv1sRgCNOQ9uasieCbeA#5487449787265851058

Pencil writing on the back of the frame in infra-red light



 Documentation of research on the elemental composition of pigments of the painting "Landscape with ploughman", oil on canvas, on panel, 19th century, signed *Vincent*, with the use of the portable XRF spectrometer Editing: Dr. Mirosław Wachowiak

Object data

Oil painting painted on canvas on panel

dimensions: 29 cm x 14 cm

signed; Vincent

Research on elemental composition of pigments on the paint layer with the use of the portable XRF spectrometer



Points of measurement

Measurement	Calculated values for individual elements												
	S	K	Ca	Cr	Fe	Со	Zn	Pb	As	Sr	Cd	Sn	Ba
White 2.	219	60	50	64	37		7825	11544		65	140	105	<u>550</u>
12.	285	56	37	41	139	87	7221	11561	44	70	636	76	376
21.	82	73	46	61	560	532	4830	7945		105	225	135	677
Yell. 9.	208	59	53	62	305	163	6320	9714	142	115	188	187	830
Yell. 13.	167	<u>87</u>		<u>89</u>	215		6341	7221		<u>226</u>	879	99	1328
Green 16.	253				136		6897	11678		76	1272	80	389
Blue 1.	442	54	50		52	126	2200	17284	61		101	96	238
<mark>3.</mark>	417				46	107	737	16155	86		113	104	290
<mark>4.</mark>	281					66	7573	12816		66	152	261	295
<mark>23.</mark>	133	<u>89</u>	53	<u>116</u>		81	6100	7310		<u>169</u>	181	124	1338
<mark>22.</mark>	<u>311</u>					63	6122	10888		64	138	108	249
<mark>5.</mark>	107	<u>89</u>	54	120	49	112	5532	6268		<u>157</u>	225	142	1464
<mark>6.</mark>	265				114	394	6456	11216		74	290	99	491
<mark>15.</mark>	272	61			154	292	6410	7869		66	<u>426</u>	63	<u>520</u>
<mark>7.</mark>	219	59	54		568	393	4309	8684		81	319	126	<u>586</u>
<mark>19.</mark>	274	73			150	239	6815	10267		86	742	66	413
<mark>1</mark> 1.	109	69	66	79	1070	674	3805	6297	54	135	422	144	893
10.	87		53	72	2445	517	2879	5946		114	275	146	<u>764</u>
17.	215	69	78		295	127	5934	8497		77	1157	68	545
18.	239				<u>304</u>	135	6484	9432		82	1002	66	511
Red 8.	168			82	193	159	6503	8904		<u>166</u>	384	91	950
14.	237				168	197	6839	10539		82	435	76	379
Violet 20	153				766	104	5455	8134		<u>160</u>	390	124	995

Tabular summary of calculated values for individual elements.

1. sky blue	S, Ca, Fe, Co, Zn, Pb, As, Sn, Ba
2 aloud white	Zr. Dh. Do
2. cloud white	Zn, Pb, Ba
2 alar hluo	A mix of three whites \mathbf{S}_{1} Co Eq. (25) \mathbf{Z}_{2} \mathbf{D}_{2} \mathbf{S}_{2} Cd Sn Do
5. sky blue	S, Ca, Fe, Co, Zh, Fb, Sr, Cu, Sh, Ba
1 warm also have	S Eq. Co. Zr. Dh. Sr. Cd. Sr. Do
4. warm sky blue	S, Fe, CO, ZII, FO, SI, CU, SII, Da Ultromoring with white and cadmium vallow
5 gravish white	Ca Fe Co Zn Ph Sr Cd Sn Ba Cr
J. greyish white	Ultramarine with white and vellow
6 horizon white	S Fe Co Zn Ph Sr Cd Sn Ba
0. horizon white	Cobalt blue
7 shirt blue	S Fe Co Zn Ph Sr Cd Ba Sn
7. shirt blue	Cobalt blue with umber
8 red	S Ca Fe Co Zn Ph As Sr Cd Ba Sn Cr
0.100	Organic red
9 vellow	Cr Ba Sr Fe
J. Jenow	Barite vellow? ochre? organic vellow?
10 brown	S Ca Cr. Fe Co. Zn Ph Sr. Cd Sn. Ba
101 010 001	umber
11. brown	S K Ca Cr Fe Co Zn As Ph Sr Cd Sn Ba
	Brown with cadmium vellow
12 white	Zn Ph Cd Ba
12: 11110	Zinc white with lead white and cadmium vellow
13. vellow	Ba. Cd. Cr. Sr. Fe Zn. Pb. S. Sn
101 90100	Cadmium vellow with barite white , possibly with barite vellow
14. red	S. Ca. Fe. Co. Zn. Pb. As. Sr. Cd. Ba. Sn. Cr
	Organic red
15. dark blue	S, Fe, Co, Zn, Pb, Sr, Cd, Ba
	Cobalt blue
16. green	Cd, S, Fe, Sr, Zn, Pb, Ba, Co
C	Cadmium yellow with white
17. signature	S, K, Ca, Cr, <u>Fe</u> , Co, Zn, As, Pb, Sr, <u>Cd</u> , Sn, <u>Ba</u>
-	umber on cadmium yellow
18. next to signature	S, K , Ca, Cr, <u>Fe</u> , Co, Zn, As, Pb, Sr, <u>Cd</u> , Sn, <u>Ba</u>
	Cadmium yellow, umber and Prussian blue?
19. dark blue	S, Fe, Co, Zn, Pb, Sr, Cd, Ba
	Cadmium yellow, umber and cobalt blue
20. violet	S, Ca, Fe, Co, Zn, Pb, As, Sr, Cd, Ba , Sn
	Organic red with Barite white and umber? ochre?
21. horse forehead	Zn, Pb, Fe, Co, Ba
white	Zinc white with lead white, adjacent to it cobalt blue and umber
22. sky blue	S, Fe, Co, Zn, Pb, Sr, Cd, Sn, Ba
	Ultramarine, cobalt blue with lead white and zinc white
23. sky blue	S, Fe, Co, Zn, Pb, Sr, Cd, Sn, Ba Sr
	Ultramarine, cobalt blue with barite white or barite yellow

Painting palette

Lower layers - probably based on lead white and barium sulphate

white -

probably zinc white with the addition of lead white,

barite white [possibly/also separately pure zinc and lead white]

yellows -

cadmium yellow, possibly barite yellow

blues-

ultramarine – particularly on the sky area, cobalt blue – horizon, shirt,

probably Prussian blue by the upper edge on the sky area above the clouds

brown -

iron - umber or synthetic mars brown

red -

organic

Optically perceived colors on the painting:

violet – probably from a mixture of organic red and ultramarine green – author's mixture of cadmium yellow and white

XRF spectra of individual measurements

The measurements of the picture's paint layer and samples were carried out by means of the portable XRF spectrometer completed at the IF-FM PASci in Gdansk, Poland.

The spectrometer consists of the X-ray tube (IS601.5, Italstructures) as an excitation source, producing collimated beam of 4 mm diameter, and the X-ray detection system (AXAS, Ketek) equipped with thermoelectrically cooled silicon drift detector (VITUS-SDD). The maximum values of the X-ray tube voltage and current are 60 kV and 1.4 mA, respectively. During the measurements the tube was operated at 55 keV and 1 mA, and under such working conditions it was possible to excite efficiently the K α lines of elements in the range up to Z \approx 50.



XRF spectra for individual measure points





Measurement date: 7-19-2010 Measurement time: 12h:50m:47s Live time : 120 s Real time : 123 s Dead time : 2.4 % ZERO = -30924.30 eV GAIN = 29768.20 eV/ch FANO = 0.11 NOISE = 120.00 eV



QXas for Windows ...





6.

QXas for Windows



QXas for Windows



Tue Oct 11 21:01:38 2011



QXas for Windows





QXas for Windows



CXas for Windows



Tue Oct 11 21:20:14 2011



QXas for Windows



Measurement date: 10.7-2011 Measurement time: 9h.51m:44s Live time : 120 s Real time : 122 s Dead time : 1.6 % ZERO = -30924.30 eV GAIN = 29768.20 eV/ch FANO = -0.11 NOISE = 120.00 eV









QXas for Windows





QXas for Windows











QXas for Windows






QXas for Windows

