

Alexander Roslin's Self-portrait 1790 at Malmö Konstmuseum

A study of Pigments and Painting Technological
Construction



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Kristian Andersson

**Degree project for Master of Science (Two Year) in
Conservation
30 hec**

**Department of Conservation
University of Gothenburg
2015:1**



UNIVERSITY OF GOTHENBURG

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KONSTMUSEUM
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Program in Conservation of Cultural Property
Graduation thesis, MA/Sc, 2014

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ABSTRACT

This Publication is an in-depth study of an oil painting by the Swedish artist Alexander Roslin (1718- 1793), the Selfportrait 1790, which belongs to the Malmö Konstmuseum in Sweden (inv. nr. MKM 891). Roslin was a very successful portrait painter producing portraits of members of the aristocracy and of many prominent individuals of the time. The aim of the investigation of the Self Portrait 1790 was to discover the materials, the technical construction and the painting techniques utilized in the portrait and to analyse these results in the painting's historical context. The methodology used was ocular inspection supplemented by photographic documentation supplemented of raking light, macro/micro photographic documentation, IR- and UV-flourescence and reflectography, IRFC (Infrared false colour) and UVFC (Ultraviolet false colour) techniques as well as X-ray documentation and Raman probe investigation. The archaic style of the painting, in reference to the year of its dating 1790, can define it as an anachronism. The investigation concluded that the painting was deliberately created as an artistic statement of adhering to older traditional academic conventions. The identified pigments on the painting were; prussian blue, cinnabar light, carmine, naples yellow light, a row of different ironoxides, probably even some umbers, lead white and one or more type-s of black (type wineblack, boneblack or similar). The binding media was a drying oil, according to the historic references, likely some nut oil, for instance walnut oil. The Painting appeared to have been built up in a traditional three- step fashion over a traditional double ground (a red Ironoxide followed by a slightly thinner broken white layer of lead white, chalk , charcoal and probably a touch of some ironoxide.)

It was also possible to detect fragments of a drawing with some form of charcoal in the painting.

The study is presented in two parts where the second part consists mainly of photographic documentation with references and commentaries. Due to the lack of previous research in the field it was necessary to add a publication with a shorter summary of painting technique and painting materials of the historical period in which the artist was active (see Index in this Publication).

Title: Alexander Roslin's Self-portrait 1790 at Malmö Konstmuseum.
A study of Pigments and Painting Technological Construction

Language of text: English

Number of pages: 75

Keywords: Roslin, Self-portrait 1790, 18th Century Painting Techniques, Painting materials, Analyzing Techniques, False colours, Raman probe, UV-, IR-, X-ray

ISSN 1101-3303

ISRN GU/KUV—15/1—SE

Preface

To analyze a painting with the methods used in this investigation can be of great value and contribute to new information regarding painting technique. The knowledge that emerges from this type of investigation is most likely to aide painting conservators, a field in which there is often a great need for a deeper understanding of such complex objects as a painting, of its the material content, type of construction and deterioration factors amongst many more. However, the knowledge gained can also be of value to art historians and anyone else interested in the subject.

In trying to come to grips with the enormous value of the subject for painting conservation, it may be useful to compare the profession of painting conservation with that of a medical surgeon. Both incorporate a type of advanced craftsmanship combined with an utterly complex and largely theoretical knowledge. Knowledge of the materials of paintings, chemical foundations, technical constructions, types of deterioration and damages, in the comparison as above, consists of the subject of anatomy and within painting conservation is of the same value.

That this type of information and knowledge regarding preservation and conservation matters, can hardly be overestimated and hopefully emerges as obvious to most of us.

The more knowledge and understanding there is about a painting from these perspectives, the better is the foundation and circumstances for future preservation and conservation.

In making this work possible, I would like to thank my mentor, Professor Jonny Bjurman.

For valuable advice and suggestions regarding the structure of the work, I will thank my Examiner Bosse Lagerqvist Ph. D.

I also will thank (in alphabetical order): Ph.D. student Medical X-ray physics, Malmo, Lund university, Ph.D Magnus Dustler and Ph.D Daniel Förnvik, Medical X-ray physics, Malmo, Lund university. Physician, Docent, Regionöveläkare Bild och funktionsmedicin, of the region of Skane, Associate professor Peter Leander. Professor, Medical X-ray physics, Malmo, Lund university, Soren Mattsson. Product specialist, Hamamatsu, Hans Sodenkamp.

Gratitude is also expressed towards Bruker optics with certain thanks to Product specialist Lars-Ake Johansson for supply of and assistance with the X-ray fluorescence investigation of the painting that will be published in a separate issue.

A certain gratitude is expressed of Malmö Artmuseum for showing confidence and help regarding the investigation with the mutual aim to expand our knowledge of the painting and of the artist. A certain warm gratitude is therefore directed to Director of the Museum. Göran Christenson, Intendent Marika Lagercrantz and Museum technician Göran Söderstedt.

For assistance with the translation of the investigation from Swedish to English I wish to express my gratitude to Alexander Wensby.

I will also direct gratitude to my friend since many years, the Artist Lars Åsling for assistance with computer graphics and Robert Hallström and Henning Hamilton for their technical support.

CONTENT

1. INTRODUCTION	1
1.1 Background	1
1.2 Objective and research questions.....	1
1.2.1 Materials and painting technological studies –preparations.....	2
1.3 Problem definition, limits and boundaries	2
1.3.1 Issue Positions regarding the historical source material on practical painting	3
1.3.2 The difficulties and limitations regarding a scientific analysis of materials and painting technical architecture	3
1.3.2.1 Material Analysis - organic materials	3
1.3.2.2 Binding media	3
1.3.2.3 Verification of specific Iron Oxide Pigments.....	3
1.3.2.4 Painting Technical structure	3
1.3.3 Issue Positions regarding color and styles of painting	4
1.3.3.1 Problems regarding current difficulties of using color theory in the form of a systematic model and a tool for analysis of paintings	4
1.3.3.2 Problems regarding current practical analysis, color vs. material, some logical motives for a paintings technical construction and material content	5
1.3.4 Limitations	6
1.4 Choice of method and disposition – introduction	6
1.5 Theoretical approach	7
1.6 Research Area.....	8
1.6.1 Existing source material of art historical and historical character	8
1.6.2 Historical source material regarding painting techniques and materials.....	8
1.6.3 Natural science studies	8
1.7 Disposition.....	9

2. 18th CENTURY OIL PAINTING -relating to the artist	
painting traditions, materials, structural build up	10
2.1 Academies, the education of an artist	10
2.2 1700s, painting materials, oil painting – introduction	11
2.2.1 The establishment of special occupational groups for the production of artist supplies	11
2.2.2 Canvas material for painting - 1700s France.....	11
2.2.3 Primers: materials, structural build up, Historical Development	11
2.2.4.1 Double grounds	11
2.2.4.2 Light or even white grounds as a foundation for image production	12
2.3 Pigments used in 18th century oil painting techniques	12
2.4 Binding media in European easel bound 1700s paintings	12
2.4.1 Water-based adhesives	13
2.4.2 1700s, -use of “mixed” techniques?	13
2.4.3 Resins.....	13
2.4.4 Final varnishes from a historical perspective	14
2.4.5 Other materials / additives	14
2.5 Technical aids: - Model dolls.....	14
2.5.1 Projection Equipment: Camera lucida - Camera obscura and similar Opportunities	15
2.5.2 Examples of other available aids: - " Claude Glass " , various optical tools.....	14
2.6. The build up of the imaging portion of the painting	
–developments.....	15
2.6.1 The support -traditional double ground –build up and coloristic function.....	16
2.6.2 Light or even white grounds as a basis for image production.....	16
2.6.3 The pictorial part – the Three-step model	16
2.7 The Three-step model, step by step, -practical implementations	
2.7.1 Esquisser: The preparatory sketch.....	17
2.7.2 Preparatory color studies - Simple oil sketch (-es ?).....	17
2.7.3 The Esquisse step (as part of the Ebaucher step) –layout of the composition -work description on canvas.....	17

2.7.4	The Ebauche'rstep –Underpainting	18
2.7.5	The initial polychrome work with the different oil colors on the painting.....	18
2.7.5.1	Grisaillepainting -1700s	18
2.7.6	Peindre ' a' fond (Empatèr) – the over painting.....	18
2.7.7	The Retoucher step - final adjustments.....	19
2.7.8	Handling of sinking of binding media, on the pictorial surface.....	19
2.8	Different techniques, mainly brush techniques for the application of the paint in the pictorial part of the painting.....	20
2.8.1	A la prima painting.....	20
2.8.2	Impasto	20
2.8.3	Scumbling.....	20
2.8.4	Stippling	20
2.8.5	Glazing.....	21
2.8.6	Frottis	21
3.	ALEXANDER ROSLIN (1718-1793)	22
3.1	Introduction: A brief presentation of the artist.....	22
3.2	Roslin's training becoming an artist.....	22
3.3	A technical examination of the three Roslin paintings at the Gothenburg Art Museum, Sweden	23
3.3.1	Introduction	23
3.3.2	The Double portrait -1754	23
3.3.3	The Portrait of G.P. Creutz c 1764	23
3.3.3.1	Intermediate varnishes.....	24
3.3.3.2	Color build up with (Genuine) Ultramarine	24
3.3.4	The Portrait of the widow Anna Johanna Grill with son and daughter -1775.....	24
3.3.4.1	State and Condition	24
3.3.4.2	The technical architecture of the painting	24
3.3.4.3	Note: The Esquisserstep -Chalk/ Gesso priming - a comparison	25
3.3.4.4	Bituminous materials – pigments	25
3.3.4.5	Rubens " Hybrid technique "	25
3.4	An overview of the pigments on the three Roslin paintings at the Gothenburg Art Museum	26

4. ROSLINS SELF PORTRAIT 1790 (MMK 891)	
A PRESENTATION OF THE PAINTING AND ITS PROVENANCE: The environment and circumstances surrounding the creation of the painting, the artist's own statements	27
4.1 Recipients of the Painting?.....	28
4.3 The two replica paintings to the Self-portrait 1790	28
4.4 The Salon exhibition of 1791	28
4.5 The two authenticated paintings that participated the Self-portrait 1790 at the Salon Exhibition in 1791	29
4.6 The provenance of the painting - a summary	30
5 THE SCIENTIFIC INQUIRY.....	31
5.1 Introductory ocular assessment, conventional photographic Documentation.....	31
5.2 Raking light documentation	31
5.3 Documentation within the IR –spectra	31
5.3.1 Infrared fluorescence: -in this context almost to be considered a surface investigation method.....	32
5.3.2 IR-reflectography: -a method for in depth investigation	32
5.3.3 IRCCD.....	33
5.3.4 FC False colors	33
5.4 Documentation within the UV –spectrum	33
5.4.1 UV fluorescence (UVA	34
5.4.2 UV –reflectography	34
5.4.3 UVFC (UV False Colours).....	34
5.5 Raman spectroscopy	34
5.5.1 FT- Raman -Raman Probe Analysis.....	34
5.5.2 Reference tests -Raman chamber	35
5.5.3 Reference tests – Reference tests – the painting investigation, Raman probe	35
5.6 Macro / micro documentation	35
5.7 Radiographic documentation (X-rays).....	36

6. THE SCIENTIFIC SURVEY –RESULTS	37
6.1 Raking Light Documentation	37
6.2. IR- fluorescence.....	37
6.2.1 Infrared fluorescence	37
6.2.2 IR –reflectography	38
6.2.3 IRCCD.....	38
6.3 UV -fluorescence (UVA)	38
6.3.1 UV –reflectography	39
6.4 IR - UV false colour documentation – compilation	39
6. 4.1 IRFC (IR false colors)	39
6. 4.2 UVFC (UV-False Colours).....	42
6.4.3 Pigment - painting palette –compilation	
Ocular audit, IRFC - and UVFC analysis: -Conclusion	43
6.5 Raman spectrography	44
6.5.1 Raman chamber reference tests	44
6.5.2 The investigation of the painting itself – Raman probe	44
6.6 Macro / micro documentation.....	45
6.7 X-ray analysis	45
7. DISCUSSION AND CONCLUSIONS	47
7.1 The causes of image formation and structural build	
up of the painting - a hypothesis	47
7.2 The image formation - a visual reflection	47
7.3 The composition of the painting - two examples for	
comparison with works by Titian and van der Helst.....	48
7.4 The painting -materials and the structural build up	49
7.4.1 The canvas.....	49
7.4.1.1 Structure of the weave	49
7.4.2 (Eventual) Pre -gluing –Sizing	49
7.4.3 Double ground	50

7.4.3.1 Primer layer 1 – Redbrown type of layer	50
7.3.3.2 Primer Layer 2 - broken white layer	50
7.4.4 The Pictorial section of the painting.....	51
7.4.4.1 Pigments	51
7.4.4.2 Binding media	51
7.4.4.2.1 Drying oil (-s).....	51
7.4.4.2.2 Water-based binding media.....	52
7.4.4.2.3 Resins	52
7.4.5 Finalvarnishes.....	52
7.5 The imaging part of the painting build-up: -structural building	
Steps -a reconstruction of the process	52
7.5.1 Introduction	52
7.5.2 Initial preparation -Esquisse –pre study/ies , idea sketch/es	
oil sketch (-es)	53
7.5.2.1 Roslin and the use of model dolls	53
7.5.2.2 Roslin oil sketch/es.....	54
7.5.2.3 Use of projection aids?.....	54
7.5.2.4 Claude glass and other optical aids	54
7.6 Roslin and the Esquisse part (as a part of the Ebaucherstep):	
Construction of the drawing on the canvas	55
7.6.1 The drawing performed on a finished double ground	55
7.7 The Ebaucherstep - Roslin's initial work	56
7.7.1 Conclusion -Roslin's initial work with oil paint on the	
painting, transmission to the next step	56
7.7.2.1. Conclusion regarding a reinforcement of	
the linedrawing on the painting	57
7.8. Handling of the uneven sinking of binding media in	
the painting, during the technical build up.....	57
7.9. The Peindre a ' fond step - (the over painting stage).....	58
7.10 Treatment against uneven reflections of pictorial surface	
- insulating surface -completely or partially.....	58

7.11 The Retouching step –final adjustments	58
7.12 Final varnish	58
7.13 Experience and conclusions from a reconstruction study -a reference for the inquiry	59
7.14 Other notes	60
7.15.The Painting- Conservation report / Condition report	62
7.15.1 Previous preservation documentation	63
7.15.2 Parts of the painting that are not original.....	64
7.15.2.1 stretcher and lamination canvas	64
7.15.2.2 Laminationcanvas.....	64
7.15.2.3 The laminating adhesive - a visual assessment	65
7.15.3 Other Information.....	65
7.15.4 Damages and restoring treatments in conjunction with the original fabric	65
7.15.4.1 Original canvas –fibermaterial	65
7.15.4.2 Putty fillings	65
7.15.4.3 Retouchings	65
7.15.4.4 Finalvarnishes.....	65
7.15.5 The painting's regular placement, lighting conditions	66
7.15.6 Roslin's paintings - state and condition - an overall impression.....	66
7.15.6.1 Roslin's use of intermediate varnishes	66
8. EVALUATION OF INQUIRY.....	67
8.1 Introduction	67
8.2 Ramanprobe.....	67
8.3 Macro / micro photographic documentation and analysis	67
8.4 False color techniques.....	67
8.5 UV documentation, analysis.....	68
8.5.1 UV –reflectography	69

8.6 IR fluorescence	69
8.6.1. IR reflektography	69
8.7 Conventional photographic documentation	69
8.8 The need for more information and knowledge in some areas of the study	70
8.8.1. Scientific analysis of drying oils	70
8.8.2. Scientific analysis of separate layers particularly on the pictorial part.....	70
8.8.3. The need for adequate reference materials.....	70
8.9 Some concluding thoughts.....	71
9. Summary.....	72
10. Litterature and sources	76
10.1 Internet	76
10.2 Unpublished sources	76
10.3 Printed litterature and sources	76
10.4 Historical source material	81

TABS

Tab 1	3.4 An overview of the pigments in the three Roslin paintings at Gothenburg Art Museum.....	26
Tab 2	Reference Oil colors for IR-and UV- False Color analysis.....	40
Tab 3	6. 4.1 Technical analysis results IRFC technology pigment analysis -the painting's palette, and wig bow	41
Tab 4	6. 4.2. UVFC (UV-False Colours).....	42
Tab 5	6.4.3 Pigment - painting palette -compilation Ocular audit, IRFC - and UVFC analysis: - Conclusion	43

CD-Appendix CONTENT

11. Pictures and Illustrations directly connected to the main part	87
4.3 The two replica paintings to the Self-portrait 1790 –p.28	87
<i>fig.5. A. Roslin, Selfportrait 1790, replica. Format: 103 X 81 cm</i>	<i>87</i>
<i>Uffziegallery, Firenze.....</i>	<i>87</i>
<i>fig.6. A. Roslin, Selfportrait 1790, replica "fato in Parigi 1790" Format: -</i>	
<i>Deposition i Institut Tessin, Paris Lundberg.....</i>	<i>87</i>
4.5 The two authenticated paintings that participated the Self-portrait 1790 at the Salonexhibition in 1791-p.29.....	88
<i>fig.7. A. Roslin, Bust of elderly man cradling Miniature Portrait in the hands, Lie Louis Perrin (Salbreux) 1791,; 58 x 49 cm, Reims ,Musee ´des beaux-arts.....</i>	<i>88</i>
<i>fig.8. A. Roslin, Portrait of Natural Scientist Louis Jean Marie Daubenton 1791</i>	
<i>Size: 81 x 65 cm Musee ´des beaux arts Orleáns</i>	<i>88</i>
5.2 Raking light documentation -31.....	89
<i>fig.9 Lighting stack(6 X 75 W) with adjustable amount of light, placed on the left side of the painting</i>	<i>89</i>
5.3.2 IR -reflektography: -a method for in depth investigation -p.32	89
<i>fig.10. Interior documentation with IR – reflektographyi.....</i>	<i>89</i>
5. 3.4 IRFC (IR- false colours) –p.33.....	90
<i>fig.22 . Detail of the palette of the painting , documented with IRFC technology.....</i>	<i>90</i>
5.4 Documentation within the UV –spectrum –p. 34	90
<i>fig11. Interior, UV-documentation</i>	<i>90</i>
5.5 Raman spectroscopy –p.34	91
<i>fig.12. Interiordetail: Ramanprobeinvestigation of the Selfportrait 1790, the laboratory at the Institute of Conservation Gothenburg</i>	<i>91</i>
<i>fig 13. Reference tests were performed on color samples on canvas prepared with a traditional doubleground with the Raman probe</i>	<i>91</i>
5.7 Radiographic documentation (X-rays) –p.36	92
<i>fig.16. Interior detail, radiographic documentation (X-ray clinic UMAS Malmö)</i>	<i>92</i>
6.4.1 UVFC (UV-False Colours) –p.40	93
<i>fig.23. Detail the palette on the painting, documented with UVFC- technique</i>	<i>93.</i>

5.8 Macro / micro documentation –p.35.....	92
<i>fig.14. and fig 15. In this investigation macro/micro photographic analysis using a digitalcamera mounted with bellowoptics and a computer, largely replaced the use for conventional optical microscopy. Documentation was done both with middle and small format</i>	<i>92</i>
7.3 The composition of the painting - with two examples for Comparison with works by Titian and van der Helst –p.47.....	94
<i>fig.17. A. Roslin, Selfportrait1790.....</i>	<i>94</i>
<i>fig18. Bartholomeus van der Helst,Portrait of the artist Paulus Potter 1654. Format: 99 X 80 cm. Maurithius, Haag</i>	<i>94</i>
<i>fig.19. Tizian. Portrait of Karl Vwith horse at Muhlenberg 1548 Format: 332 cm X 279 cm.Prado,Madrid</i>	<i>94</i>
Complementary pictures	95
<i>fig.20. Roslin Selfportrait 1790. Detail, wig bow.....</i>	<i>95</i>
<i>fig.21. The depicted palette on Roslins Selfportrait 1790, detail</i>	<i>95</i>
7.4 The painting -materials and the structural build up –p.48.....	96
<i>fig.22 Lower right side edge of the painting with marked out area for analysis of the technical build up. Complementary investigations were performed along all the edges.</i>	<i>96</i>
<i>fig.23 Detail the palette on the painting, documented with UVFC- technique.CD-app</i>	<i>96</i>
<i>fig.24 Lower right side edge of the painting with marked out area for analysis of the technical build up. Complementary investigations were performed along all the edges.....</i>	<i>96</i>
<i>fig.25. Illustration of the technical build up of the painting in present condition.....</i>	<i>96</i>
<i>fig.26 Illustration of an estimation of the technical build up of the pictorial part of the painting.....</i>	<i>96</i>

12. References to the investigation -The three investigated Roslin paintings at the Gothenburg Art museum

Colorsample documentation (see 3.3, p.23 and 3.4, p.26)..... 98

fig.29.	A.Roslin. the Doubleportrait 1754 (GKM inv. nr. WL 85).....	99
fig 30.	3.1 Color samples.....	99
fig.31.	6.3 " "	99
fig.32.	3.1 UV " "	99
fig.33.	6.3 UV " "	99
fig.34	3.1. Color sample line drawing	100
fig.35	6.3 " " " "	100
fig36.	A. Roslin. Portrait of G. P. Creutz c.1764	101
fig.37	Color samples.....	101
fig.38	" "	101
fig.39	" "	101
fig.40	" "	101
fig.41	" "	101
fig.42	" "	101
fig.43	Color sample line drawing	101
fig.44	" " " "	112
fig.45	" " " "	102
fig.46	" " " "	102
fig.47	" " " "	102
fig.48	" " " "	102
fig.49	" " " "	102
fig.50	" " " "	102
fig.51	A.Roslin.Portrait of the widow Anna Johanna Grill with son and daughter 1775 (GKM nr.WL 85)	103
fig.52	Color sample	103s
fig.53	" "	103
fig.54	" "	103
fig.55	" "	103
fig.56	" "	103
fig.57	Color sample line drawing	103
fig.58.	" " " "	103
fig.59	" " " "	103
fig.60	" " " "	104
fig.61	" " " "	104

12.2Bitumenous materials and Impasto technique 105

fig.65.	Roslin, the Portait of Anna Johanna Grill with son and daughter 1775, detail, upper left part, centersection	106
fig.66	Roslin, the Portait of Anna Johanna Grill with son and daughter 1775 detail, lower right part against the frame,Atlassilk frock with background.....	106
fig.67	The Doubleportrait1754, detail, centerpart of the painting, example of the impastotechnique on the painting.....	106

13. Photo documentation Alexander Roslin,

Selfportrait 1790 (MKM 891) (see 5.1,p. 31) 107

<i>fig.68 Frontside of the painting</i>	108
<i>fig.69 Backside of the painting</i>	109
<i>fig.70 The lower leftpart of the painting, detail, silkfabric</i>	110
<i>fig.71 The upper left part of the painting, detail, the right half of Roslins face</i>	111
<i>fig.72 Top left centerpart of the painting, detail, silkfabric,right arm</i>	113
<i>fig.73 The right centerpart of the painting, detail, hands</i>	114
<i>fig.74 The upper right part of the painting, detail, GustavIII</i>	115

14. Raking light documentation

(see 5.2, p.31 and 6.1, p.37) 117

<i>fig.75 Raking light documentation of the painting</i>	118
<i>fig. 76 Raking light, detail, centerpart of the painting, detail, face</i>	120
<i>fig.77 Left centerpart of the painting, detail, Roslins right shoulder part</i>	121
<i>fig.78 Centerpart of the painting, detail, the medal of Vasa. Not even this detail on the painting contains any mentionable impasto</i>	121
<i>fig.79 Raking light, details, centerpart of the painting, hands</i>	122

15. IR-documentation (see 5.3, p.31 ff and 6.2,p.37ff) 123

<i>fig.80 IR-flourescence, full picture with shown parts of an underlying drawing The documentation with a IR-modified Nikon D1 without added filters produced superior results in this respect. of the different methods used</i>	124
<i>fig.81 IR-flourescence, right half of the painting, assymetrical lighthening from the leftr. IR-72 filter with a IR - modified Nikon D1 camera</i>	125
<i>fig.82 IR-flourescence, detail, the facial part of the painting. Documentation with a IR-modified Nikon D1 camera without added filters. Parts of the underlying drawing is clearly visible . See also opposite page.</i>	126
<i>fig.83 IR-flourescencedocumentation, with reminisenses, securedly verified, enhanced with blue lines. The drawing material might be black shale. Possible but not verified traces of smaller adjustments occur on some parts, such as at the shadowparts around the nose</i>	127
<i>fig.84 IR-flourescence, middlepart of the painting, detail, Roslins right shoulder part with traces of an underdrawing. See also fig 85</i>	128
<i>fig.85 IR-flourescence, with enhanced securidly verified linedrawing with blue lines. Roslin appear to have been slightly freer in following the linedrawing on this part regarding color application, compared to the applications on the face</i>	129
<i>fig.86 IR- flourescence. Wratten IR 89B filter with a IR-modified Nikon D1</i>	130
<i>fig.87 IR-flourescence. Double polarisationfilters with a IR-modified Nikon D1</i>	131
<i>fig 88 IR-flourescence, upper part of the painting. IR-modified Nikon D1. Enhancement of contrast showing brushtechnique (Photoshop CS5 software)</i>	132
<i>fig.89. IR-reflectography, upper left part of the painting, detail, the face of the artist. The underdrawing is clearly visible even using this type of technique (Hamamatsu high performance vidiconcamera (C2400 - 03)</i>	133

<i>fig 90 IR-reflectography, detail, part of the face of the artist</i>	134
<i>fig 91 IR-reflectography, upper rightpart of the painting, detail, Gustav III</i>	135
<i>fig.92 IR-reflektographe, left centerpart of the painting, detail, Roslins upper right right shoulderpart</i>	135
<i>fig.93 IR-reflektography, centerpart of the painting, detail, medal of the Vasaorder</i>	135

16. UV – documentation

(see 5.4, p.33 ff and 6.3, p.38 ff)	137
<i>fig.94. UV- induced flourescence, documented without filters. Note damages such as at the two depicted faces and compare i:e with X-ray documentation, see p. ff</i>	138
<i>fig.95 UV- induced flourescence, B+W 77 KR 1,5 Filter, (Skylight 1.1X)</i>	139
<i>fig 96 UV-induced fluorescence, B+W 77 0.22 2 X (Yellow filter)</i>	140
<i>fig 97 UV- reflektography, IR-UV-cutfilter</i>	141
<i>fig 98 UV-induced flourecense, lower part of the painting, detail, without added filters</i>	142

17. Macro/micro and detail photo documentation

(see 5.6, p.35 ff and 6.6, p.43 ff	144
<i>fig 99 Macro/ micro documentation, centerpart of the painting, detail, medal of the Vasa</i>	145
<i>fig 100 Macro/ micro photo documentation, upper right part of the painting, detail, Gustav III</i>	147
<i>fig 101 Macro/ micro photo documentation, upper center part of the painting, detail, example of the background</i>	147
<i>fig 102 Macro/ micro photo documentation, right center part of the painting, detail, hands</i>	147
<i>fig 103 Lower centerpart of the painting, detail, silkdress and hands</i>	148

18. X-ray documentation

(see 5.7, p.36 ff and 6.7, p.44 ff)	150
<i>fig 104 X-ray documentation, mosaic montage</i>	151
<i>fig 105 X-ray documentation, upper left centerpart of the painting, detail, facial part</i>	152
<i>fig 106 X-ray documentation, right centerpart of the painting, detail, the artists right hand</i>	153
<i>fig 107 X-ray documentation, left centerpart of the painting, detail, Roslins right shoulder</i>	153
<i>fig 108 X-ray documentation, upper centerpart of the painting, detail, repair</i>	153

19. Technical equipment used for the investigation:..... 155

<i>fig.109 Technical illustration over photo documentation</i>	159
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1 INTRODUCTION

This paper presents the results from a survey of Roslin's Self Portrait 1790 (Inv.no.MKM 891), which hangs at the Malmö Art Museum. The focus of the survey was the pigments in the painting and the painting's technical construction. The intention of the study was to provide an overview of the state and condition of the painting giving a foundation and reference point for future preservation relating to it.

1.1 Background

My interest in the artist Alexander Roslin (1718-1793) began over twenty years ago during my Painting Conservator training and an examination I did at the Gothenburg Art Museum of three of the artist's paintings. Already at this point, Roslin's Self Portrait from 1790 (at Malmo Art Museum) came to serve as an external reference, to in the future have the possibility of a more in-depth study of this work as well was conceived of importance for several reasons. While the obvious advantage of such a study would be a technical analysis of the artist's palette visualized in the painting where colors are shown almost pure, the painting also represents a magnificent work at the very end of the artist's long career. In the form of a self-portrait, perhaps there was even a certain motivation and opportunity for the artist to demonstrate/prove his great skills? Furthermore, the painting is visually different from contemporary pictorial representations. Its creation is believed to have taken place in Paris in the midst of extremely turbulent political conditions. The painting opens up many questions for the viewer and is interesting from several points of view in addition to the topics and issues that are primarily the focus of this current study.

1.2 Objective and research questions

The objective of the survey was to, gain an understanding of the painting's anatomy, the choice of materials with focus on pigments and its technical architecture. The kind of:

- Pigments present in the painting, if possible with some general conclusions regarding binding property.
- Technical architecture of the painting the artist has used.
- Painting technical architecture in relation to the painting's contemporary traditions.
- Any specific preferences for artist in the approach to and selection of materials and methods.
- Regarding the painting's - even for the time - visually archaic appearance: are there available couplings in materials and painting technical architecture that can support one or more hypotheses about the painting's visual identity.
- Present state and condition of the painting.
- An aim of a in depth study of the Painting to function as a future reference point for the preservation of the painting.
- The extent to which it is possible to get current information, using only the non-invasive methods of investigation available, for evaluation of possibilities and limitations.

1.2.1 Materials and painting technological studies preparations

The survey required a fairly comprehensive collation of sources as the information available was, in many respects, very limited. These conditions meant that the necessary work of compiling background information greatly exceeded the scope of a Masters thesis. Sections of the relevant materials were therefore compiled into two separate papers.^{1 2}

Given the conditions listed above and as this survey strove to get as much information as possible regarding the material conditions surrounding the painting, it constituted the painting itself as an object as the main source of new information.

1.3 Problem definition, limits and boundaries

The main knowledge gaps regarding Roslin's Self Portrait 1790 concern information and facts about the painting as an object: how the painting is constructed, what materials were used and, if possible, for what reason. Due to the restoration and preservation documentation being deficient, a series of questions follows regarding what injuries and interventions the painting suffered in the past, combined with the natural changes of the materials in the painting over time.

The scientific results obtained together with ocular assessments present new knowledge that could/can be received prior to art-historical and historical facts and, at best, in conjunction in order to offer new knowledge. However, it is rare that the required historical and artistic information is preserved and documented. One example from this investigation concerns the circumstances surrounding Roslin's training as an artist abroad e.g. who his teachers were. Roslin himself has not left any information – as far as it is known - about these aspects of his profession. From the mid -1700s, individual preferences of the artist's choice of craftsmanship became increasingly common and the academic rules of painting were applied less strictly. The painting under study was created about 40 years after this development began, why knowledge of the origins of the craft of the artist in this context had been of special value. Our knowledge of the academic painting techniques in the 1700s is not as comprehensive as one could wish. Research into Roslin has in these respects been extremely limited. Regarding earlier scientific investigations on materials and the paintings construction, the pictorial section consisting of different layers that make up the imaging portion of the painting is the most interesting subject amongst the objectives of this investigation. These parts and layers as a whole represent as a section the thickness of the painting (excluding any impasto) and is rarely more than approx. 1 - 1,5 mm in average thickness, probably often even less. No reasonably available non-invasive type of scientific analysis methods are currently available (2013) apart from i.e. cyclotron analysis,³ for a more detailed access to the extremely rich content that is available on this part of the painting. This limitation in the analytical instruments may be partly compensated for with reasonable assumptions, which, nevertheless, are secondary to the value of verified facts.

¹ Andersson (2011a)

² Andersson (2011b)

³ A method for analysis that in most cases can't be considered a realistic alternative mainly due to access and costs. Another type of method, L.A.M. Technique, (see 10.1 Internet), can not either be considered to be within reach for most researchers.

1.3.1 Issues and Positions regarding the historical source material on practical painting

There are numerous sources on this subject, varying in relevance. Which of them that may be reliable and therefore useful however is another matter. With some exceptions, the majority of historical sources from people who themselves were not professional artists. Regarding the material, it is often the case that data is mixed with no indication of the original sources. The result can sometimes be that of what is claimed in the beginning of a text further on in same text argues for the opposite: situations like these contribute to that written historical material often had to be taken with some skepticism.⁴ Part of what is reported in the 17th and 18th century sources is clearly of older date, sometimes much older, so it is difficult to get a clear picture over how relevant the description of the present time was. Even during the 1700s, the knowledge transfer emerged mainly directly from master to disciple or conveyed to the student by the studio to which the aspiring artist was attached. These conditions must be weighed against the preserved written source material. An especially important historical source in this context consists of J. B. Oudry (1686 -1755) who was a professional artist with several links to Alexander Roslin. Roslin worked within an academic tradition but beyond Oudry we otherwise lack source material with a straight connection to the artist regarding choice of materials and working techniques. That we have so little knowledge about Roslin's teachers and education abroad becoming an artist constitute a major shortcoming in the study of his painting.

1.3.2 The difficulties and limitations regarding a scientific analysis of materials and painting technical architecture

1.3.2.1 Material Analysis - organic material

The limitations were mainly regarding the lack of existing possibilities to verify the organic material on the painting. Prior to beginning this study, the verification capabilities of the Ramanprobe were unclear, which under favorable conditions have capacity for analysis even of organic matter.

1.3.2.2 Binding media -substance/material

The capacity to analyze the featured (organic) binders in the painting was very limited with the noninvasive methods selected for this study.

1.3.2.3 Verification of specific Iron oxide Pigments

Iron oxide pigments represents a very large and heterogeneous group of pigments with a wide color/denomination range. They can despite similarities in their chemical structures have very different technical characteristics in paint in regard to opacity, glazing, color intensity and so on. The different trade names in this large group of pigments can also vary widely and are not always clearly defined. During the 1780s, synthetic versions of Iron oxide pigments (known as *Mars pigments*) emerged, which was a subdivision of the pigment group that otherwise was usually recovered from different soil deposits (the pigment group is sometimes referred to as earth colors).

1.3.2.4 Painting Technical structure

Are we currently in possession of the instruments and test procedures required for a

⁴ Massing (1998) s.334

reasonably detailed analysis of the painting's structure, step by step from the foundation to the finished image? The answer must unfortunately be considered no, and this applies especially to the lack of opportunities to give more detailed analysis of the individual layers, the layers of the build up from the foundation, up to the final image formation.

1.3.3 Issues/Positions regarding color and styles of painting

With such a highly complex composite and skillfully executed piece of work as Alexander Roslin's Self-portrait 1790, our ability to experience and comprehend in an ocular way colors from different types of materials seems more to emerge from human perception than from some fixed material and mutual color qualities that we comprehend from separate chemical compounds e.g. the color pigments. Several of these compounds can perform very differently depending on where they are placed in a painting's technological context and in regard to the varieties of paint application. They could differ dramatically from the same colors on the artist's palette, both in color values and color hues. In contrast to for example a 20th century painting which is usually performed more or less in *À la prima* techniques making it much easier for technical analysis, we here have a type of object made in a very calculated, planned way with a very complex type of construction, containing great skills and knowledge. Almost all types of paint application have been used such as *À la prima*, Scumbling, Stippling, Frottis and refined Glazing techniques.

Furthermore, the materials used with each of these application techniques can together with the context of placement, vary from the point of view of color. Due to the high level of pictorial realism, it is often not easy or even fully possible to determine or grasp parts of the construction of the pictorial buildup. The frequent use of the Frottis technique (a smothering method) that heightens the realistic impression of the painting adds to this situation. This investigation is partly built on material analysis as main verification of pigments. The perception of colors in the painting can as described vary dramatically for identical pigments/materials, depending on context and techniques used.

1.3.3.1 Problems regarding current difficulties of using color theory in the form of a systematic model and a tool for analysis of paintings in this context

Regarding the concept of color, all types of colors have relativity - a color's appearance is entirely dependent on the context in which it is placed. A chemical substance or compound that we usually perceive and connect to a specific color / -value, -hue can as mentioned, be very different in color terms when placed in a pictorially technical context of a painting. The more complicated the painting technical structure is, the more complex these conditions become. At the same time, the motives of the various chemical substances and compounds' placement and occurrence in a painting usually are based on how they intend to be perceived by color terms. Does a workable and comprehensive logical framework regarding the topic color theory in order to set it up as an external parameter and reference towards originated scientific results that can serve as a model to explain the painting technical architecture exist currently? The answer must, unfortunately, be considered to be no. We have access to a variety of explanatory models, each with their benefits and limitations. However, no model can offer fully comprehensive explanations. Moreover, much of the subject color is still unexplained and unexplored and touches notoriously on a wide range of research fields.

To exemplify the main problem in this particular context the two color scientists Newton (1642 (43) - 1727) and Goethe (1749-1832) will illustrate two different types of approaches. Newton represents/advocated the measuring, modeling and exact science, hence the kind of approach that today is both the norm and in this context, if possible, would have been desirable to use fully. In contrast, a scientist like Goethe proceeded instead from the "eye" as an active medium for the color experience, which not only records but also processes the impressions in a highly subjective as well as very complex way. Goethe's theorizing begins with the very human nature of the psyche and its great complexity. Based on scientific conclusions from the natural sciences, several of Goethe's conclusions from this perspective have today subsequently been proven to be incorrect. The concept (perception) of color is closely linked both to different types of materials *and* to the technical architecture of a painting.

1.3.3.2 Problems regarding current practical analysis, color vs. material, some logical motives for a painting technical construction and material content.

A painting like the Self-portrait 1790 is constructed in a way intended to deceive or seduce our senses and our perception through a number of illusions in which colors make up an integral part. One of the subjects i.e. painting technical architecture as this survey is intended to study, rests on the rationale that the painting is done succeeding the various systems and methods to deceive or seduce our senses.

Regarding the analysis of the materials themselves, fixed external parameters in the form of reference samples with known chemical composition can be used. Multiple additional pieces of information can often be added in order to evaluate the results available and obtained in connection with the investigation. The situation gets complicated with a material analysis in connection with the subject color. We can connect a chemical compound or substance more or less directly to a specific type of color / -hue, value, when analyzed separately. When this chemical compound / subject is then inserted into a structure and naturally performs color in terms of context, which forms the very foundation of the painting's technical architecture, the color -related properties, as described earlier, can change dramatically and this simultaneously without the chemical properties having changed/been altered. As just one example, one can take the pigment *Ivory Black*⁵ (refers to genuine *Ivory Black*, but also applies to e.g. *Charcoal Black*), which becomes warm brown when applied as a glaze but in A ' la prima technique rather becomes a bluish black and cool in nature; this stands out even more clearly if (as often is the case) it is mixed with e.g. white. Color, here in the sense of color / -value, -hue, does not constitute a fixed value in itself and at a material analysis of colors in a painting is directly linked to our ability to perceive and our perception facing the various materials and conditions: such as current location, the type of applications used, matters as we understand and perceive them among other things in the form of various color experiences (properties that of course also can vary individually depending on the viewer). Color features can equally well be related to the materials used, as to their existence and function in the different parts of the *technical architecture* of the painting. Should one take the issue further, the research question could be rephrased as to how an

⁵ Modern Ivory Black usually consists of Bone Black - a pigment that appears warm in character and that has been mixed with a blue pigment (synth. Ultramarine, or similar) to imitate the character of the original type of Ivory black, that appears more cold in its original appearance.

aesthetic distribution of various materials on a surface is perceived by a viewer regarding such color experience. In this respect, the main issue de facto would land in research fields concerning human perception and in this context suggests the great complexity of the subject.

1.3.4 Limitations

The following constraints were imposed on the survey:

- To base the investigation on the use of non-invasive, reasonably available survey methods, in comparison to the severe limitations that this implies.
- As far as possible, omit purely iconographic and more art historical aspects of the painting.
- A parallel and more detailed examination of the two replicas that are linked to the painting was due to practical (geographical) reasons excluded.
- Limiting to a feasible extent attempts at explanatory reasoning based on various color theory models regarding the concept of color and color experiences.
- No consistent effort was made regarding analysis of the binding media of the painting, property beyond what could be indicated or verified by noninvasive examination
- Malmo Art Museum owns eight oil paintings by the artist - one with questionable provenance - together with a chalk drawing/ preparatory sketch by the artist. The study focused on only one of the artist's works; however, in this context, the main object.

1.4 Choice of method and disposition - introduction

The answers to questions such as how a painting is constructed, what materials and which painting techniques were used, within what tradition a painting is made etc. – are concealed yet available through the object – in the painting itself. An old painting is also part of a historical context. It is produced and created based on various given conditions and relationships within a specific period in time. The documentation is almost always flawed concerning the object itself, especially regarding the aspects of preservation throughout the centuries. Based on these dual relationships regarding a defined material object, created under specific conditions within a specific time interval, the working methodology of a survey consequently has to be distinctly interdisciplinary. Crucial to the actual value of the scientific results and the information obtained through the technical investigation is that these results and the information in the following steps could be put in a logical context as to add to our knowledge.

A defined object like a painting can be analyzed using a variety of methods predominantly from the natural sciences, which came to constitute one of the main sources for one part of the investigation. The other main source came to be constituted by art historical data in connection with the painting, historical sources whenever possible and previous relevant research on the topic in general. By the choice to use only non-invasive, reasonably available analytical methods (2014) the results achieved and, above all, the experience gained from the investigation paired with the strict ethical boundaries, were considered to have considerable future relevance. Using a variety of methods in a single analysis was deemed significant in demonstrating the extent to which one can obtain a satisfactory amount of verified test results with this type of approach. Given the opportunity to get an overview of what can be improved

in regard to the technology with non-invasive analysis, new chances appear continuously. This investigation had the opportunity to expose the main difficulties and current knowledge gaps and developing opportunities for information gathering, using only non-invasive methods. It also exposed the need for more method development versus current opportunities, need for complementary techniques, new technologies, and within what areas there are most urgent needs for development from the point of view of available information.

The type of painting the investigated painting represents is one of a very calculated and carefully planned type of technique, both in terms of materials and construction; once each step had been performed there was preparation for the next step. The choice of material and the paintings technical construction that the present survey is mainly intended to study rests on the foundation that the painting is done after the various systems and methods intended to deceive or seduce our senses - painting technological logic or if one prefers: the Art of illusion. Although we do not possess Roslin's vast knowledge of painting technique, as he has left behind for us with a wealth of paintings, executed on the basis of his knowledge and sophisticated skills. His paintings are constructed and apparently working from various forms of painting technical logic; in turn, they are based on certain universality as to how we perceive colors and shapes and our ability to "read" pictorial shapes. These are conditions that due to the meticulous creation of the objects of painting allows for critical analysis.

1.5 Theoretical approach

That detailed knowledge of an object - mainly for material content and technical architecture of a painting as well as for the anatomy of the object - is necessary for providing a knowledge base for future preservation /conservation, appears as obvious to most of the professionals related to the field of conservation. To gain this information in basing the investigation on the exclusive use of non-invasive examination methods is in line with the goals defined, inter alia, of ICOM (International Council of Museums), AIC (the American Institute for Conservation of Historic and Artistic Works) and ECCO (the European Confederation of Conservator - Restorer 's Organisations).

It is apparent (see 1.3.3.2, p.5) how difficult it is to apply a solid color theory model to gain further knowledge of a painting, which consequently also applies presently with the survey of Roslin's Self- Portrait, 1790. Nevertheless, one can venture to say that the painting's structure and function is dependent on an underlying universal logic based on how we perceive shapes, colors, lights and shadows, irrespective of the chosen color theory model serving as theoretical basis.

Roslin made the painting as an artist and not as a color theorist.

Regardless of the extent to which one might desire to impose fixed standards and structures onto the discoveries and originated scientific results of studying the self-portrait i.e, by the help from any specific colortheories, it is likely to be much more beneficial for the understanding of the painting's structure and material content to assume the same approach as once Roslin himself i.e. to as far as possible try to approach the painting from an artistic point of view. Approaching the painting from an artistic point of view implies the acceptance of a certain universality in our ability to perceive such things as colors, shapes, three-

dimensionality, etc. Conditions for this approach seem to have been equally valid for the 1700s at the painting's creation as they are for a viewer today. The approach also involves trying to avoid to explain in a deeper sense, the causes of these phenomena. The aim is then to try to illustrate some fundamental conditions, mainly regarding colors: the way they generally get perceived, which in turn acts as justification for the choice of materials and choice of construction. Far from all aspects will be involved presently but an idea of some basic conditions and a perception of the painting – even in its complexity (and difficulty of analysis) should be completed to serve as a guide, especially for the understanding of the painting's technical construction and choice of materials.⁶

1.6 Research Area

1.6.1 Existing source material of art history and art historical character

The amount of source material of natural scientific nature about the artist is in disproportionate amount to his significance within the field of art history. Several of the topics on the artist and his works are often similar but affected by different authors, often with different approaches and within the field of Art history. Besides a number of smaller publications and articles, even those to a large degree produced by art historians and mainly of older date, the most important studies of Roslin are constituted by Gustav Lundberg (and particularly his magnificent work of the artist in three bands published in 1957).⁷ In 1993 a book on the artist by Per Bjurström was published which also includes more general conclusion regarding aspects of portrait painting.⁸ In 2007 a minor work on the artist by Magnus Olausson was published⁹ and the same year a magnificent volume, edited by the same and with contributions by other authors. It was an edition in conjunction with a solo exhibition of the artist at the Stockholm National Museum in 2007 -2008.¹⁰ Based on historical and art historical terms, the artist and his time period could be considered well documented.

1.6.2 Historical source material regarding painting techniques and materials

Most of the relevant historical source material in these aspects treating the subject is available online - see chapter 10. Litterature and sources, 10.1 Internet p.76.

1.6.3 Studies within the field of natural science

Besides the study conducted at the Gothenburg Museum of Art (Andersson 1995)¹¹ and an

⁶ Andersson (2011a), This compendium treating older painting techniques and with a focus on the 18th century can hopefully add some completing information regarding the subject.

⁷ Lundberg G.W. (1957) *Roslins liv och verk, avec une resume' en francais et catalogue des oeuvres I-II I* /Allhems förlag

⁸ Bjurström P. (1993) *Roslin* Wiken, Höganäs /ISBN 91-7119-555-6

⁹ Olausson M. (2007b) *Alexander Roslin* / Värnamo /ISBN 978 91 27 088 38 2/ (Natur & Kultur) ISBN 978 91 7100 770 4 / (Nationalmuseum)

¹⁰ Olausson M.(red.) (2007a) *Alexander Roslin/* Stockholm/ Nationalmuseum/ Serie Nationalmuseums utställningskatalog 0585 – 3222; nr 652/ ISBN 978 91 7100 77 1/

¹¹ Andersson K.(1995) *Alexander Roslin - Undersökning utav tre av konstnärens målningar på Göteborgs konstmuseum* / Göteborgs universitet / Institutionen för Kulturvård / ISRN GU / KUV -94 / 19 – SE / ISSN 1101 – 3303

article by Nilsson / Svensson that was published in *The Bullentin of Nationalmuseum* 2007¹² there are no previously published works on Roslin within this context. This is obviously a major flaw but can also be seen as symptomatic along the line of existing knowledge of artists of older date, even very well-known ones. The causes are probably multiple. The Art of Conservation is a relatively new science, which, as the field progresses, requires new and enhanced knowledge. The increased scientific opportunities for further knowledge have become available only recently; in some cases just in the last few decades. In an international comparison, Sweden is a small country and the resources that are spent on studies of artists in major nations simply are not available for that purpose in Sweden.

1.7 Disposition

The background and the starting conditions for the examination are outlined in Part 1, which is followed by Part 2 treating painting traditions and materials for the current century in connection to the artist. Part 3 begins with a presentation of the artist himself, followed by a summary of the investigation of the three paintings 1990 at the Gothenburg Art museum as a reference. Part 4 gives a presentation and review of the studied painting itself, the circumstances surrounding its creation and provenance. Part 5 presents the scientific study of the painting and Part 6 the results from the same study. Overall results and conclusions are made in Part 7; supplemented with a review of the painting's condition and condition. Part 8 Treats experiences and conclusions from the study itself, followed by a concluding section, Part 9 which consists of a compilation of the results.

¹² Nilsson B./ Svensson A. (2007) Alexander Roslin Virtuoso Painter of Fabrics and skilled Craftsman In: *Art Bullentin of Nationalmuseum Stockholm/* Vol.14 / Editor: Lena Holger / Stockholm / s.99-102 / ISSN 1401- 2987

2 18th CENTURY OIL PAINTING - painting traditions, materials, structural building relating to the artist

2.1 Academies, the education of an artist

The Academy of Fine Arts in France was established in 1648 and came to have many followers.¹³ The emergence of the Academy (and Academies) can perhaps be seen - especially in France - as part of the strong centralization of state power that occurred during the century. To be considered an established artist in France at the time included presenting/showing artworks at the exhibition at the Salon in Paris. In order to exhibit at the Salon, the artist had to have studied at the Royal Academy. If an artist worked in an academic tradition this meant that s/he also joined a number of standards and methods for the image formation. These standards were however not quite as strict and uniform during the 1700s as one might easily get the impression of; from about the mid-century many of the academic rules were relaxed. In the oldest literature that can be attached to the academies very little is described about practical treatment e.g. how to build up different color layers and other practical handlings of color. Regarding the existing literature later in the century - of which only a small portion involves practical painting-, most of the material on the topic is written by people who themselves were not professional painters. One of the most important aspects for study of an individual artist's materials and working techniques during this period is to, if possible, connect him/her to a certain studio/ studio practice; furthermore to the Studios and individual artists that the artist him/herself studied with and could have been associated with. The working methods as well as some of choices of material of the individual artists could vary nevertheless. Especially two conditions tend to be common for artists linked to academic painting tradition throughout most of the 18th century: the use of so-called *double grounds* (see 2.2.4.1 p. 11) and an acceptance of the so-called *three step model* (see 2.7 p.17 ff).

2.2 1700s, painting materials, oil painting – introduction

With some significant exceptions (see 2.3. p.12) the artist materials were the same as in the previous century. At this point in time, it also became increasingly obvious that the condition of some older oil paintings were better than others. Judging from the source material, there was large interest in these matters for most part of the century. Interest in painting technology among many artists was probably also due to aspects of sustainability. The artists now had access to extensive historic reference material regarding older oil paintings in varying states and conditions. Towards the end of the century however there was also a trend towards a deterioration and neglect regarding the craftsmanship of the profession. Oil painting was even at the beginning of the current century considered a new type of technology. Other characteristics from the middle of the century and onward were major experimentation with different materials and techniques, as well as a progressive simplification of working methods.

¹³ Massing (1998), p. 319

2.2.1 The establishment of special occupational groups for the production of artist supplies

During the 1700s, especially in larger cities like Paris and in environments linked to Roslin, canvas preparations and various art materials were established to be produced by specific craftsmen. The preparation of painting grounds was (and still can be) a tedious and time-consuming process. Concepts of the Academy of fixed ideal measures of canvas formats for different types of subjects probably also facilitated the emergence of ready-made canvas material for painting.¹⁴

2.2.2 Canvas material for painting - 1700s France

Canvas was the dominant type of support for 18th century oil painting. However, the current research and previous material on the subject is not substantial. Referring to the results from a survey by Vanderlip Carbonell¹⁵, hemp is claimed to have been the predominant canvas material used for oil painting during the main part of the 18th century in France and not as one might have expected linen cloth; it was found in the survey that 85.7 % were for hemp compared to 7.1% for linen. The results are remarkable, not least considering that in this context linen (and even flax) in most respects constitute a vastly superior material. Traditionally the fabric was pre-glued, usually with a type of animal glue. The historical source material during the 1700s also gives examples of dissenting opinions regarding the need for sizing and may even directly advise against this operation (see Oudry¹⁶). The types of glue appeared in two versions depending on whether the origin was plant or animal.

2.2.3 Primers: materials, structural build up, Historical Development

Aside from some lively experimentations, the priming materials used were the same as in the previous century - mainly some sort of Iron Oxide Pigments and chalk (calcium carbonate), White lead and Charcoal black. Judging by the historical source material, the binder most in use was a drying oil. The most common type of priming was the so-called *double grounds*, which, as earlier mentioned, was a tradition tied to the academies. The problems with after darkening with these types of support were probably the main reason for the trend towards use of lighter (even white) primings towards the end of the century.

2.2.3.1 Double grounds

A double ground in this context means that a reddish brown layer has been put over the canvas and a sizing consisting of Iron oxide pigments, (e.g. Red ochre with several variants) followed by (usually) a thinner broken white layer usually consisting of Ceruse (White lead and Chalk), broken with a black pigment (usually Charcoal black) and with little hints of some added type of Iron Oxide pigment, the latter to break an undesirable bluish streak on the painting surface (see also colouristic function 2.6.1 p.16). According to the historical source material, the binder in both types of layers was usually a drying oil, although variations may have occurred.¹⁷

The broken white layer as a basis for image formation, laid over a reddish-brown layer

¹⁴ Standard measures for canvas formats is mentioned among others by Pernety, see Pernety (1757) p.193.

¹⁵ Vanderlip Carbonell (1980)

¹⁶ Oudry (1752) p.17

¹⁷ Massing (1998) p.150 ff.

provides a visually pleasant cold foundation to build the painting on, usually with a hint of bright grey blue. The double grounds originated from Italy and got their real breakthrough in Europe during the 1600s. The technological advantages of paint are many.

2.2.3.2 Light or even white grounds as a foundation for image production

During the late 1700s the use of bright and even blank white grounds became more common as an alternative to dark grounds. Gradually this development became more dominant and by about 1830 the use of dark grounds had ceased completely.¹⁸ The reasons for this were probably several including awareness of the risk of the paintings darkening but also the development of more simplified painting methods.

2.3 Pigments used in 18th century oil painting techniques

The pigments used under this period were virtually identical to the pigments used in the century before with two important exceptions: *Prussian blue* (Iron hexa cyano ferrat (III)) invented in 1709 according to current knowledge (yet probably invented even slightly earlier) and *Rinmans green* (Cobalt Green i:e trivial names). The latter pigment (a cobalt (II) oxide - zinc (II) oxide pigment) however was commercially available only after 1830 and hardly in use due to multiple reasons. The use of Prussian blue however spread quickly and the pigment became extremely significant and popular as earlier there had been a lack of a cheap and reasonably durable blue pigment, particularly one suitable for oil painting. A pigment like *Naples yellow* (Lead (II)-antimonate, $Pb(SbO_3)$ or $Pb(SbO_4)_2$) was introduced even earlier but is another example of a pigment that came to be common during just during the 1700s. The provenance of Naples Yellow is somewhat less clear. The pigment was primarily to replace the chromatically weaker pigment *Lead tin yellow*, which, by now, the tin was replaced with Antimon. Naples Yellow counts as a synthetic pigment, nonetheless, the fact is that it also occurs both in natural and mineral form; the later type for example in regions outside Naples and that was known even during the 1700s.¹⁹ It is also worth noting that Synthetic Iron Oxide pigments (often referred to as *Mars Pigments*) starting in the 1780s began rising in popularity, probably due to the often greater color intensity within this group of pigments in comparison with many natural Iron Oxide Pigments (often referred to as "Earth colors").

2.4 Binding media in 1700s easel bound European paintings

Worth considering in this context is that according to historical sources the use of siccative nut oils (usually walnut oil) was extensive during the 1700s, especially in countries like France.²⁰ Paintings with this provenance have probably many times been wrongly attributed to have been performed in linseed oil media. Nut oils were considered to have superior properties over linseed oils in aspects of yellowing, why it was preferred; another reason was possibly that they were especially beneficial for getting siccative qualities (and when

¹⁸ Bleyl (1982),

¹⁹ Dossie (1758), p.92

²⁰ Massing (1998), p. 342

preferred, a favourable gel consistence)with a Lead derivate, such as Litharge.

2.4.1 Water-based adhesives

Regarding the use of some paint colors in oil painting technique especially, there is a likelihood that in some cases a water-based adhesive was used (such as Carbo hydrateglues). The most prominent pigment, judging from the historical source material, was regarding *Carmine* and of the (drying) oil medium in this context. Carmine is the most widely mentioned red laquer paint pigment during this period in France.²¹ The country was known to both produce and export Carmine of high quality during this time period. The pigment is not lightfast and materially poor, even to the extent of having to be considered a very deficient color material, especially when it is thinly applied and when viewed from aspects of sustainability. Historical examples are that this dye / pigment could be mixed with e.g. *Cherrygum* (a vegetable Carbohydrateglue in properties similar to Gum Arabic). The above described condition of materials that were well known during the 1700s, as it was also that the pigment may work better in other media than in drying oils. Why a more stable red paint type of pigment, such as *Crimson madder*, does not appear to have been used more extensively - according to the historical source material - is unclear. Additionally *Crimson madder* in this context works much better in the (drying) oil medium. This kind of color is of particular interest from the standpoint of binding media.^{22 23 24} Furthermore, it is in the present unclear to what extent older traditions used water-based adhesives for certain pigment types and to what extent these traditions continued in practice, such as during the current century (e.g. with pigments like Azurite, Genuine Ultramarine etc.).

2.4.2 1700s, - use of “mixed” techniques ?

Contrary to previously held public perceptions regarding the sole use of drying oils in oil paintings during earlier development of this technique, it has, in recent research in at least one verified case been paired with other (visual) indications: in detected elements with e.g. egg tempera, among others in amplifying different types of highlights.²⁵ In regards to painting, the technique has many advantages, a fact which may indicate that the method was also used at times during the 1700s. However, verification for any extended use of this technique is currently lacking. No information has been found regarding the use of *Putrido* technique (or other similar techniques). Nevertheless, this does not rule out that the given technology was used; not least the experimentation and material interest during this period could indicate that it occurred. What speaks against the use of this type of technique in the 1700s is that it is reasonable it should have been documented and therefore would have emerged in the historical source material.

2.4.3 Resins

According to the historical source material, the most common materials for final varnishes

²¹ Raft (1972)

²² See for example. Dossie (1758), p.54ff

²³ Raft (1972)

²⁴ Groen (1997)

²⁵ Wetering (1997). p.238ff

were Venetian turpentine and Mastic resin, used independently or in combination. As the most common additive was turpentine even oil additives could occur. How extensive the use of resin- oil colors was during the period is unclear, not least as working methods could vary significantly, especially from the mid-century. Resins could also be used in the form of intermediate varnishes with paint layers.²⁶

2.4.4 Final varnishes from a historical perspective

Besides their regular use, final varnishes could also be tinted to harmonize and blend contrasts in the image formation - an important relationship in all cases which may not have received the recognition it deserves, such as in connection with removal / reduction of varnishes.²⁷ For varnishes in the 1700s see e.g. Jombert.²⁸ The 17th century author Felibien also gives a number of examples of varnish recipes²⁹; these could have been just as relevant during Roslin's period. Traditionally, final varnishes were applied on oil-paintings during this period. Judging from the historical source material there was decent awareness of the benefits of letting the painting get reasonable time for drying/oxidation before the final varnish was added. The time for this could vary from application up to a year. During this time, the painting could, at least according to older documents, sometimes be temporarily coated with a varnish of egg white (sometimes with added sugar, which facilitates removal) that collected dust and dirt particles (see e.g. Poussin's correspondence with Freart de Chambres).³⁰

2.4.5 Other materials / additives

In addition to different pigments and binding media, common materials that may be present in a painting may be chalk; also to be mentioned is the possibility of different additives, such as alum and various copper compounds and derivatives of lead. These materials may have varying functions (driers, fillers etc.), depending on where, and in what quantities and in context they are used in a painting. Small additions of pure pigment types mentioned is only due in function as siccativ.

2.5 Technical aids: - Model dolls

Within the art of modelling and portraiture, the use of model dolls was since long established. Poussin (1594 - 1665) - as one prominent example - was known for using a range of model dolls that helped him in his compositions.³¹ In a former Roslinstudy (Andersson 1995, p.50) depicts a contemporary model doll that is made in "natural" size and with a practical androgynous character. Such model dolls could be faced in the desired outfit with fixed folds, design and desired lighting. The model doll(s) could be placed with additional paraphernalia and composed into a desired subject. With the use of the model dolls, *Ebauchered* paintings

²⁶ Massing(1998) s.347ff

²⁷ Ibid

²⁸ Jombert (1766) p.143ff

²⁹ Felibien (1667) p.300-301

³⁰ Blunt (1964) p.86, 112, 126-128,153

³¹ Sandrart (1675) s.253

(pre-modelled paintings) could be performed on the spot where orders were taken out for a further stage of completion in the artist's studio.³²

2.5.1 Projection Equipment: Camera lucida - Camera obscura and similar opportunities

The use of various instruments in the style reminiscent of a *camera obscura* dates back to the Middle Ages. These methods were likely due to a surge in the development of lenses and optics during the 1600s. The artist David Hockney has launched a theory that these types of aids occurred in the history of art to a far greater extent than has hitherto been known.³³ To what extent these techniques were used during the 1700s is difficult to establish as information is limited. In regard to simpler imaging aids, the artist could also use the ancient technique of grid e.g. in the form of a frame with tensioned wires in a square pattern (possibly also supplemented with diagonal composition lines) placed between himself and the subject and with the same square pattern written in the required format on the canvas.³⁴

2.5.2 Examples of other available aids: - "Claude Glass" , various optical tools

In addition to the use of ordinary mirrors and magnifying glasses even the possible use of dark -colored glass to make it easier to assess light and shadow conditions in a painting (shadows get shortened) could be resorted to. These special glasses were called 'Claude Glasses' (after Claude Lorraine 1602-1682). The technique itself can be very useful for these purposes.³⁵

2.6. The build-up of the imaging portion of the painting -developments

There were various conventions regarding pictorial construction at the beginning of the 18th century. Developments, particularly in the latter part of the 1700s however, went toward a greater simplification in practice. Besides the development of painting technology, deterioration in technique and care for sustainability in some places became prominent towards the end of the century. However, it is above all important to consider at the same time that the individual working methods of artists could vary significantly and the urge to experiment was big factor in this from around the middle of the century. Traditional academic working processes with image reconstruction, as mentioned earlier, were very calculated where each step in the construction was a preparation for the next. Possibly in reaction to this strict working technique the latter part of the century held a development which increasingly came to appreciate the unfinished, more spontaneously crafted artwork such as unfinished sketches, "Bozetto"³⁶ in contrast to art created from more rigorous computational procedures.

³² Lundberg (1957) del I, p.250, give an example of that the use of modeldolls even could include that of animals. A situation is mentioned where Roslin and his colleagues had to evaluate the modeldoll of a horse, made in wood (the model later became donated to the Academy).

³³ Hockney (2001)

³⁴ This workingmethod would have had several advantages compared to i;e a "Camera obscura method", possibility to work in daylight, no mechanical projection etc.

³⁵ As a modern variant for testing the technique, its possible to use glass such as meant for such as welding. A technique that also can be useful i:e in retouching, conservation matters.

³⁶ Bozetto: Italian term for sketch

2.6.1 The support -traditional double ground –build up and coloristic function

With the choice of a double ground, the artist could with this structure start from what was reasonably perceived as a rather cold and neutral greyish tone. Going from cold to warm tones in pictorial build up was obviously a preference in earlier times as well. The artist also had a common "color-foundation" for the overlaying colors so that they in turn would better harmonize (compare with *imprimitura*). These described conditions probably are the explanation for the popularity of this working method within the academic context: a broken white top layer, most often of the Ceruse-type (white lead with chalk) with touches of charcoal and a small addition of an Iron Oxide Pigment. The broken white layer as a basis for image formation over a reddish-brown layer (usually a reddish or redbrown Iron Oxide Pigment layer) provides a pleasantly cold foundation to build the painting on, usually with a hint of pale blue-gray and not unlike some of the rag paper used for drawing at the time. The use of *Ceruse* most likely had a double function as chalk increases transparency while at the same time it would make the surface smoother. Both pure White lead and the mixed color Ceruse are often mentioned in the historical source material as separate types of paint, their mutual properties having different characteristics (Ceruse was of course also a cheaper type of paint material³⁷). Iron oxide addition had, as mentioned, the purpose of adjusting the amount of blue on the painting surface which otherwise easily could be perceived to dominate. If the function with double ground method was retained then the white layer on the painting would be thin enough to be able to interact with the (thicker) underlying red-brown layer (this feature is not always maintained in priming layers even with such great painters as Rembrandt, see Groen³⁸). The main drawback of this technique is that there is always a substantial risk of future after-darkening of the image area.

2.6.2 Light or even white grounds as a basis for image production

There was a development in the use of bright, even white grounds, in the latter part of the century as an alternative to the frequent use of double grounds. One of the problems with the use of double grounds was, as previously mentioned, the risk of after-darkening of the images. This was why for example Oudry (1686 -1755) proposed a form of compromise at this stage of the technical construction.³⁹ Oil painting, despite its extensive practice, was seen even during much of the 1700s as a new technology so there was due great interest regarding its technology, especially in terms of sustainability. By this time, there was since approximately 150 years a fairly comprehensive amount of materials for reference. Using a lighter or even white painting surface would be a return to an older painting tradition and probably a direct critical reaction to the problems in the use of dark grounds.

2.6.3 The pictorial part – the Three-step model

It was the convention for artists connected with the Academy to make use of the so-called Three-step model. The ideas with the three-step construction of a painting, originates (which in this context with so much else) from Italy. Several Academy Authors, eg de Piles (1635 -

³⁷ Ceruse is concerning pigments often mentioned separately in historic source material. Lootwit is the equivalent dutch term for this type of modified pigment.

³⁸ Groen (1997)

³⁹ Oudry (1752), p.6-7

1709) and Felibien (1619 -1715) referred during the second half of the 1600s to a three-step process for building up an oil painting: (Esquisser) Ebaucher - Empater – Retoucher ⁴⁰. The working process is also described much later in detail in Jomberts (1748-1825) expanded edition of the Piles 1776, and still later by example of Bouvier (1766-1836) ⁴¹. Regarding the structure of the various work steps so was the conventional way of painting applicable Venetian labor traditions, i:e to work simultaneously over the painting surface and in this way gradually build up the whole pictorial image. A workmanner that justifiably also can be assumed consistently even had been the workflow for build up of 1700s oil paintings made in the Academic tradition.

2.7 The Three-step model, step by step, -practical implementations

2.7.1 Esquisser: The preparatory sketch, (most often included in the ebaucherstep)

Sketch composition or *Invention* - “what is created in one's conception before starting to paint and painting before the work begins”. Drawing (or Dessin): “The visible image of one's thoughts”. ⁴². This step could be performed on paper. If conclusions can be drawn from the fact that so little sketch material is preserved from several different artists from this period, it could indicate that this step was often performed directly on the canvas; a canvas ground which allowed for corrections of the drawings (for instance with use of oil media).

2.7.2 Preparatory color studies - Simple oil sketches

As an aid to the choice of colors and to determining the main coloring and lighting conditions, one or several simple oil sketches were made following the preparatory sketch. At this stage coloring and lighting conditions were marked out roughly. Oil sketches could be of two types: one as described above, as well as a more elaborate oil sketch/pre-study to present to a prospective client.

2.7.3 The Esquisse step (as part of the Ebaucher step) –layout of the composition -work description on canvas

L' essquisse was usually performed with chalk on a colored ground, as was the norm. In the next step, the contours were reinforced with some “plain and cheap paint materials, such as Green Earth, Umbra or similar pigments”. At this stage of the pictorial build-up, the artist had a pleasant light gray-blue surface in a slightly cool tint to work on (as mentioned earlier, similar to that of rag paper used during this period). Several contemporary "visualized paintings in paintings" records images of subjects with, most probably, chalk, often pictured in a double holder pen with a light and a dark color. ⁴³ Changes and adjustments with dry chalk at this stage, could (and can) be easily corrected with e.g. cloth, feather, or a sponge with a little water. Changes were obviously most easy made on an oil-primed ground with appropriate saturation (or slightly basic pre grinding).

⁴⁰ Massing (1998), p.353ff. se also Jombert (1766), p.107-117, and i:e Oudry (1752), p. 8

⁴¹ Bouvier (1827)

⁴² Massing (1998), p.353ff

⁴³ As just one example, see Olausson (2007b), p.203

On a traditional double ground the binder usually consisted of oil in accordance with the contemporary source material that refers to the use of simply oil medium.

2.7.4 The Ebaucher step -Underpainting

The build-up of paint-layers - color or "Coloris" (color, light , shadows) - to paint with opinion without "tormenting the colors with the brush or with a palette knife ." ⁴⁴ This step would only start when the previous steps were completed and applications were dry. De Piles (1635-1709) suggested that the surface should only be painted over again with the same color and be in several layers when previous layers had dried. The carnation parts should be the thickest. Oudry (1686 - 1755) suggested in this step to work with brown tones to assume the focal point of the painting and work out lights and half-tones. Furthermore, he suggested that changes could be made and that one should avoid reinforcing the line drawing with paint to prevent future visual changes to the painting. Local colors could then be set even at this stage. Common to most of the historical sources when they describe this step of pictorial build up is that they recommend a color choice of brown or brownish tones, something that has practical and coloristic benefits. An example would be the capability of (many) brown color tones to "bind" divergent types of colors, both in A la prima or when overlying paint layers are used. The use of various brown tones, particularly in Venetian painting tradition, is often crucial in using this technique to its fullest potential. Useful pigments, such as (raw) Umbers or different Ochre pigments could be used, also some bituminous pigments such as Kassel Brown, Cologne Earth (and others variants) function well. Both pigment types offer a wide range between dark and light shades. Generally, the color application would have to be quite thin in this step in order to fully exploit the coloristic benefits from the ground for the determination of light, shadows and volumes. In comparison this step is probably freer in the actual execution in the further build-up.

2.7.5 The initial polychrome work with the different oil colors

Judging from the imaged studio interiors of paintings from the time (not least from Roslin himself ⁴⁵) and according to historical source material, this step could be as follows: after the initial work in shades of brown followed the engagement of the local colors, quite early in this phase of the image construction. The historic source material often emphasizes the necessity of cleanliness in handling the different color tones. The necessity of the painting to have some "body" to build the color tones onto, so that later on it will not brighten or sink into the support/ground and thereby be chromatically changed, is also noted. The variations in transitions to the next step in the technical build-up were overall rather substantial, depending on individual preferences of the artists (and probably also among the individual works of an artist).

2.7.6.1 Grisaillepainting -1700s

Using *grisaille*-technique in the initial stage of image construction of a painting was rather prevalent before the 1700s, according to the historical source material and other information

⁴⁴ Massing (1998), p.354

⁴⁵ One good example is Roslins Portrait of E. Jeurat 1753, see Lundberg (1957),part II-III, p.14, cat.nr.64

such as technical analyzes, was no convention in this century. This type of working method instead appears to have largely fallen into disuse for the era. Regarding historical source material and based on the knowledge that we have it seems conversely that it was part of an early use in the technical build up of moving up and strengthening the local colors. The focus was often mentioned in regard to building solid volumes as a foundation for forthcoming layers, not least for glazing and similar aspects.⁴⁶

2.7.7 Peindre a' fond (Empatèr) – the over painting

In this step, the final colors were painted. The artist could here use all available techniques for applying color from *A la prima* to Scumbling, Stippling, Glazing and Frottis. Jombert (1748-1825) advised that it was important to paint the same surface several times over with the same color so that the ground got no chance to shine through and "kill the color".⁴⁷ Nevertheless, most authors cautioned that clarity of colors could be troubled by repeated applications. De Piles (1635-1709) and Dupuy de Grez (1640-1720) warned for overworking of the colors and the need to work methodically and cleanly to avoid colors to appear muddy.⁴⁸ Oudry (1686-1755) speaks in this stage regarding the use of *Impasto* and overpainting and stresses the need to mix colors as accurately as possible; he also remarked that cleanliness is essential in this step.⁴⁹

2.7.8 Retoucher - final adjustments

Partial glazing and minor adjustments were supposed to be done in this step - mainly in *A la prima* technique and with the ability to make adjustments. Final steps and corrections could be easily executed on (the supposed) dry support. There is a possibility that the retouching step sometimes could also include thin to very thin brown glazes such as of a bituminous type. Bituminous glazing could occur in this final stage of the build-up and can be of extremely high coloristic value, which can speak for a great popularity. This last step - finishing corrections - was performed when the painting was so dry that the colors were at no risk of becoming muddy and so that some pigmentation problems (e.g. Charcoal black) would not cause harm.⁵⁰ For authors like Binet (1569 - 1639) and Le Brun (before 1635 - ?) writing in the early 1600s, glazing was the last stage in the production of a painting. The approach was convention around mid- 1700s. The glazes concerned were oil glazes - glazes with resin additives developed during the second half of the century.⁵¹ By the mid 1700s Jombert (1748-1825) describes a different approach regarding glazes: Retoucher - for him the last stage, intended to give the surface brown glazes to provide "more power".⁵² Lighter areas would never be glazed as being adjusted they would simply be repainted.⁵³ Jombert defined a glaze as a fine transparent color, usually of ultramarine or a red coat and added with a soft brush

⁴⁶ Massing (1998). s.354. The Grisaille technique emerged during the century to a method of its own, i:e such as depicting objects as sculptures and as a tool for decoration painting.

⁴⁷ Massing (1998), p.354

⁴⁸ De Piles (1708) s.70 Jombert (1766) s.130-131

⁴⁹ Oudry (1752) s. 8

⁵⁰ Felibien (1667) p. 298

⁵¹ Massing (1998) p. 355

⁵² Ibid

⁵³ Ibid, p. 354 ff .

and then expelled with a badger brush. The surface would need to be absolutely dry before glazing could be done. He was against adding intermediate varnish/-es before the glaze as it ruined the colors. The glazing oil would be as light as possible in color.⁵⁴ Felibien (1619-1715), as a comparison, felt one could do retouches an endless number of times as long as one painted on a dry surface and the colors were not troubled. Oudry (1686-1755) counted inlay of glazes to this last step.⁵⁵

2.7.9 Handling of sinking of binding media, on the pictorial surface

In crafting the painting, the artist was forced to respond to sinking in by parts of the binding media on the painting. This occurs primarily by the binder in the paint sucked in uneven on the surface with the result that the colors reflect unevenly and are difficult to assess for the viewer. According to historical source material, a common way to fix this problem was to re-oil these parts. The historical source material provides a number of suggestions for treatment.⁵⁶ Oudry (1686-1755) propose a kind of solution by using intermediate varnishes, a *modus operandi* that he also describes as a quite rare approach for the time.⁵⁷

2.8 Different techniques, mainly brush techniques for the manual application of the paint on the pictorial part of the painting

The various layers and part-layers which results from the mechanical applications may of course vary enormously regarding thickness and relative character. Differences in the ratio of pigment, binder and possible additives of the applied material must also be considered.

2.8.1 A' la prima painting: The colors are mixed directly to achieve the desired color and hue of the color. A la prima painting is particularly prominent in portions of the painting where the paint is applied thick e.g. in lighter parts and in the highlights (thick in highlights, thin in the shadows - a general rule applied consistently by painters of Roslin's genre and complies with the ocular perception of light).

2.8.2 Impastotechniques: Pasty A' la prima painting (*impasto*) is also used in the form of various relief effects, often achieving greater illusion of realism and depth and is therefore a method with value in itself.

2.8.3 Scumbling: Solid and semi-opaque colors applied thin, usually with a dry brush - "brushing" the color of the current surface. The method can be particularly satisfactory for achieving various structures of different fabrics, which together with the other methods can provide an almost photographic realism in creating the desired pictorial image.

Inpass: Regarding the parts that appear to have been scumbled on a painting, it is in this context also of particular importance to consider (especially at a technical analysis) the

⁵⁴ Ibid, p. 355

⁵⁵ Oudry (1752) p.

⁵⁶ Massing (1998) s.344

⁵⁷ Oudry (1752) s. 11

practice of regular grinding of the paint layers. Grinding/scraping was, judging by the historical source material and visually judging by many paintings' appearance, a common practice, not least within 1700s painting in academic tradition. The grinding could be done with e.g. pumice but also by scraping the surface with other appropriate tools.

2.8.4 Stippling: A technique of applying the paint by pushing it on with the brush tip against the painting surface. One can also build various structures on already applied layers of paint, both in wet and dry technique and wet on wet. The technique is very useful and consistent in e.g. build-up of highlights, adjusting the light/color intensity etc.

2.8.5 Glazing: Painting with glazing is based on exploiting conditions of transparency where underlying color(s) shines through the covering paint layer. Most characteristic for glazing technique in terms of color is warmth and the second most characteristic is broken shades. Glazing technique concerns the colors but can also apply to surfaces and textures, in yet other cases it can be applied to the *chiaroscuro*. A glaze is perceived as warmer than if the same color / shade would be made with opaque paint materials. Light passing through a transparent or neutral color underneath will alter the color towards the brown / red-orange color spectra, something that must be considered in the assessment / analysis of the differences in color. The underlying painting - so to speak - is usually at an advantage in the overall context of being more or less solid in execution thus having some "body", as well as being freer, more spontaneous and less precisely obtained. This is due to glazing technique having the ability to "smooth out", why these layers often serve a pictorial gain: to create some tension against a contrasting foundation.

2.8.6 Frottis : Frottis is a type of advanced displacement technique commonly performed with the aid of special displacement/smoothing brushes, often depicted on paintings with artists at work (including Roslin⁵⁸). Today this brush type is usually named *fan brushes* and are mostly flat (traditionally they were usually round and compared to the modern equivalent rather thick). Frequently used brush material was badger; a variety of other materials such as goat hair was probably used as well. The technique is invaluable in the creation of an almost photographic pictorial presentation.

⁵⁸ One example occur on Roslins Portrait of E. Jeurat 1753, see Lundberg (1957) part I-III, p.14, cat.nr 64

3 ALEXANDER ROSLIN (1718-1793)

3.1 Introduction: A brief presentation of the artist

Alexander Roslin was born in Malmö, Sweden on 15th of July 1718. Roslin studied first in Sweden and after some years held residence on the continent: first at the court of Bayreuth and then spending about five years in various locations in Italy such as Venice, the court of Parma, Naples and a stay in Rome. In Florence, Roslin became inducted into the Academy of Arts in 1748. In 1752 the artist arrived in Paris where he came to spend most of his life with the exception of a few years residence in Stockholm and St. Petersburg during the 1770s. Just 18 months after arriving in Paris, he was unanimously elected into the French Academy, despite the fact that he was both a foreigner and furthermore belonged to the Protestant church. With obviously great social talents, paired with a virtuous skill as an artist, Roslin was making a meteoric career as a portrait painter. He benefitted from his ability to portray his models in a way that they wished to appear and as a portrayer of splendor and extravagance, (one of the artist's trademarks was that of being an astoundingly skillful painter of textures and fabrics). Roslin can be considered one of the very best representatives of Rococo Painting of the time. To have one's portrait painted by Roslin came to constitute marker of status in itself. Clients were mainly the aristocracy, foreign representatives of the diplomatic corps as well as members of the court in France or courts abroad or those connected thereof. Roslin never managed to paint the French king as a live model, however, he portrayed Russia's Catherine II (1729 -1796) and several portraits of King Gustav III of Sweden (1746-1792). He also did some portraits of famous scientists such as Carl Linnaeus (1707 -1778). Despite his repute, Roslin did not escape critics.(for examples in this paper, see: 4.4, p.30,7.5.2.1,p.51) One of the more prominent critics was the intellectual Diderot (1713 -1784); Diderot, as a comparison, preferred artists such as J. B. Chardin (1699-1779), incidentally Roslin's neighbor at his home/studio at the Louvre. Roslin's work can vary in quality, most likely due to conditions such as high workload and also being an artist who (according to himself) abstained from assistants. In 1759 Roslin married the artist Suzanne Giroust (1734 -1772). The couple had four children. Roslin was to spend his last years in Paris and was consequently in place in the 'eye of the storm' to experience some of the most turbulent years of the Revolution. Unlike many of his role-models, he died of natural causes at his home on July 5, 1793, just months before a decision was taken by the current rulers to further investigate "suspicious foreigners". In the estate inventory, it emerged that Roslin was one of the richest artists in France.⁵⁹

3.2 Roslin's training becoming an artist

Regarding Roslin's education, we have very limited knowledge. Beyond the basic training with Admiralty Cartoonist Lars Ehrenbill (1697-1747) and then approximately 5 years of study in Stockholm for the court painter George Engelhard Schröder (1684-1750), very little is known regarding Roslin's further studies on the continent. The Count de Caylus (1692-1765) stated in 1752 when the Roslin was in France that "Roslin has studied with the greatest

⁵⁹ Olausson (2007a),p.47.

of masters";⁶⁰ unfortunately, which masters are intended by this statement is lacking in the source material. An artist learns and develops throughout his life. Roslin, after his prime education, worked as an artist all his life until the very last years, when his previously extensive production rate came to be drastically reduced.

3.3 A technical examination of Roslin's painting: The three Roslin paintings at the Gothenburg Museum of Art, Sweden, a reference

3.3.1 Introduction

Based on visual observation, Roslin used all the techniques of assessing the colors of the paintings that are described in 2.7.8 p.19 - an exception is the Impasto technique, which occurs deliberately only in the Double portrait 1754. Binding media for pigments are based on ocular judgment that in all cases are (primarily) considered to be that of drying oils.



fig 1. A.Roslin. Doubleportrait 1754 (GKM inv. nr. WL 85) with colorsample.

3.3.2 The Double portrait -1754

The painting is performed with a traditional double ground. The design of the almost porcelain like portrait of the woman, corresponds well with contemporary ideals which were introduced by art theorist Roger de Piles (1635-1709); possibly included as recommended by this time Genuine Ultramarine is in parts of the women's portrait.⁶¹ A red lacquer, probably of Carmine type, is also included in the painting based on visual assessment e.g. the man's costume. In comparison to the two other examined paintings, the many relief-like impasto inlays of colors against an otherwise very flat surface are significant. The painting may be considered to be in very good condition. It has undergone conservation treatments and is laminated.

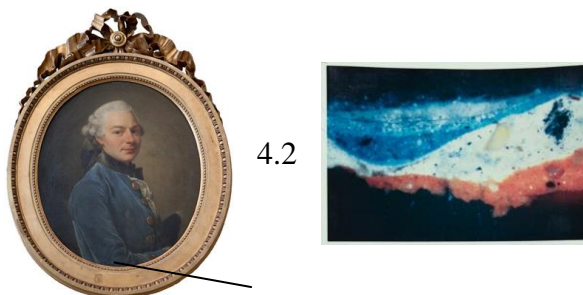


fig 2. A. Roslin, Portrait of G.P. Creutz c.1764 (Inv.nr.292 GKM)

⁶⁰ Lundberg mentions E. Jeurat and Hyacinthe ColinVermont as two of Roslins teachers at the French Academy, see Lundberg (1957), part II-III p. 14 – 15.

⁶¹ Roger de Piles (1708)

3.3.3 The Portrait of G.P. Creutz c 1764

The pictorial part is built on the same type of foundation as the Double portrait 1754 i.e. a traditional double ground. The painting is very smooth with minimal impasto. The painting may be considered to be in very good condition with, remarkably, small amounts of craqueleurs. It has undergone conservation treatments and is laminated.

3.3.3.1 Intermediate varnishes

Paint samples show that Roslin here used intermediate varnishes in the manner Oudry recommended in his lecture in 1752⁶², (see CD appendix).

3.3.3.2 Color build up with (Genuine) Ultramarine

Roslin with this painting used a method unique for the 1700s: under painting with Genuine Ultramarine. Traditionally, under-painting for this pigment consists of a grey layer, for example *Ultra Marine* ash (Smalt, as a comparison, usually has pure white underpainting). Later on in the 1700s the use of Prussian blue as a groundlayer to Genuine Ultramarine occurred more and more. This working method may seem grotesque to a modern viewer but was in use at the time (this fact was bypassed during the investigation in 1990). The technique of using just Prussian blue as underpainting for Genuine Ultramarine is described by e.g. Bouvier.⁶³

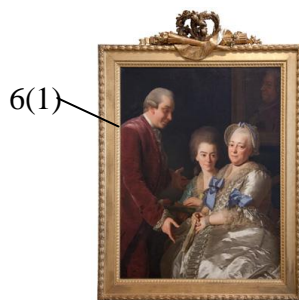
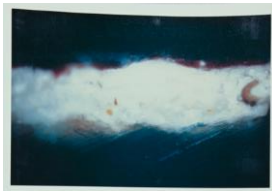


fig 3. A.Roslin. Portrait of the widow Anna Johanna Grill with son and daughter 1775 (GKM inv.nr 1027)

3.3.4 The portrait of the widow Anna Johanna Grill with son and daughter in 1775

The pictorial part of the painting is made on a rather thick white chalk ground and therefore differs distinctly to the two other examined paintings. The use of light and in this case even a white ground agrees well with the trend towards the end of the century of using lighter grounds.

3.3.4.1 State and Condition

The painting is in remarkably good condition, yet very fragile. The painting is also unlaminated but has been subjected to other means of preservation/restoration, obviously of older date such as some aged repairs and retouchings. Several of the craquelé patterns on the painting, especially in the brown portions, suggests the presence of bitumenous materials (see 3.3.4.3. below). Some craquelé patterns may also be the result of using too much binder in these parts, alternatively, too heavy insulation of the - in itself very absorbent – chalk ground. Solvents damages in connection with varnish removals are also a possibility as to the present state. The painting has, besides the above mentioned issues, otherwise no dramatic craquelé

⁶² Oudry (1752), p. 11

⁶³ Bouvier (1827), p. 43ff

patterns. With respect to time, and seen from an overall view, the painting has to be considered to be very well preserved.

3.3.4.2 The technical architecture of the painting

How Roslin more in detail once *ebauchered* the painting may in all cases remain an open question until further possibilities for investigation arise. However, what is clearly shown even on visual observation is that the same type of Iron Oxide Pigments that are visible at the notch on Mrs Grills face goes back to an underlying layer resonates with several of the more colored overlay colors on the models. Several of the chromatic colors used are very sparingly applied as well, while tied together over this uniting coloristic resonance ground. A technique that is obviously very systematic and relates to many of the artist's other paintings. In a comparison of the Grill painting in 1775 with the Double portrait from 1754, it appears that the former in any case, as judged by the author, is technologically more advanced in its execution. The extensive impasto accents that are so richly represented at the Double portrait 1754 are completely lacking in the Grill painting 1775.

3.3.4.3 Note: The Esquisserstep -Chalk/ Gesso priming - A comparison

At the Esquisser step, working on a white chalk ground, the artist needed to use a colored crayon such as a red or black chalk. On a white or lightly toned ground (as a whole consisting of glue and chalk), it is in most cases not possible to remove the under-drawing entirely, for example due to adjustments. Remnants from these steps are probably left in the ground even after the removal of drawing lines. This could mean that fragments and a hint of earlier drawing may actually be found in the Grill painting 1775, an opportunity for further research (Red chalk, unfortunately, is not visible with e.g. an IR analysis with current analysis methods in of 2012-14).

3.3.4.4 Bituminous materials - pigments

The relatively well-preserved dark background layers of the Grill painting 1775, likely consisting of one (or a few) types of Bituminous Iron Oxide Pigment types, such as Kassel brown, may have to do with Roslin's knowledge of how to best handle this pigment type. Traditionally, this was, even during the time, considered a relatively unstable pigment. This type of pigment could be stabilized by mixing it with e.g. *Venetian turpentine* - a kind of resin from larch trees. Used individually the materials have several negative characteristics but in conjunction with each other they can improve in durability and stability. The various methods of preparation of bituminous materials may also have had a significant impact on sustainability and, of course, the varying composition depending on the locality. In some cases, regarding the overall subject, it is worth noting that eventually another type of materials might have been involved, perhaps pine tar.⁶⁴

3.3.4.5 Rubens "Hybrid technique "

The literature sometimes refers to something (a speculation) classified as "Rubens hybrid technique". It is believed that Rubens (1577-1640) at some point came to reconcile the Flemish and Venetian traditions by (description simplified) assuming a light or even white ground where the motif in the next step was freely and skillfully made up with plenty of binding media/ solvents in a monochrome brown tone. The further build-up of the under- and over-painting with different colors was performed with the same vibrant and - in the case of

⁶⁴ CD app. 13.2, p.120-121, 207-209. see also Dossie (1758), p.118ff

Rubens - virtuosic approach. The overlaying colors were then bound together on this mutual ground. Roslin's technique used in the Grill painting 1775 on the other hand suggests a much more calculated approach where each step of the construction is well planned as a basis for the next, hence lacking the type of spontaneity described above. A direct comparison cannot therefore be considered feasible. However, both artists could start from a light or even white ground and use a brownish underpainting.⁶⁵

3.4 An overview of the pigments in the three Roslin paintings at Gothenburg Art Museum

Tab 1

Comparison of pigments contained						
Type of pigment	Chemical technical verification SEMEDX			Ocular verification		
	D.portrait 1754	Creutz c.1764	Grill 1775	D.portrait 1754	Creutz c.1764	Grill 1775
Cinnabar	X			X	X	X
Brown Iron oxide pigment	X		X	X	X	X
Prussian blue	X	X		X	X	X
Ivory/ Bone black	X			X	X	X
Lead white	X	X	X	X	X	X
Yellow iron ochre	X	X			X	X
Green earth		X	X	X	X	X
Charcoal black	X	X		X	X	X
Red laquer type Carmine			X	X		X
Type Kassel brown			X			X
Red iron ochre	X	X		X	X	
Naples/Lead/ Lead tin – yellow	X					
Burnt umber		X				
Natural Ultramarin		X				X

⁶⁵ Bleyl (1982), p.42ff, see also Sonnenburg (1979)

4 ROSLINS SELF PORTRAIT 1790 (MMK 891)

- A PRESENTATION OF THE PAINTING AND ITS PROVENANCE: The environment and circumstances surrounding the creation of the painting. The artist's own statements

In 1790, the year to which the investigated painting is dated, Roslin was 72 years old and had only three years left to live. At this time, his health had declined with periods of long convalescence. His eyesight had also deteriorated. He seems to have spent most his time in Paris (or its neighboring surrounds), where the investigated painting consequently should have been painted. Paris was during this period ravaged by extreme turbulence from the political upheavals which erupted a year previously in the revolutionary year of 1789. Roslin was in the midst of the storm and gave himself expression of the prevailing conditions of society. In a few excerpts to his relative A.U.Wertmuller (1751-1811), he wrote the following (the letter is dated October 22, 1789):

*" [...] forced the King and his family to stay in Paris. This however do not preventing us, from that we still live in fear and terror of our lives and possessions. "*⁶⁶

*"The terrible vision to meet the unfortunate victims' heads that people have impaled on sticks and carries in triumph, means that you do not dare to show oneself on the street or go run some errands "*⁶⁷

Roslin commented further on the living conditions during the period as can be exemplified by another letter to his relative Wertmuller here included with an excerpt (the letter is dated: Paris October 17 1791):

*"Over the last three years I have had only got orders of two torso images, from which I formerly earned between ten to twelve thousand francs a year. Due to this I did not have to touch my capital as I am now, to my great sorrow is forced to do "*⁶⁸

In the absence of orders and perhaps due to his failing health during this time Roslin instead seems to have been in frequent attendance of sessions at the Academy. The Academy was at the time an arena of conflict with fierce confrontations and revolutionary battles, not least with the participation of painter Jacques Louis David (1748 - 1825) who was now one of the strongest opponents and critics to the Academy. Roslin's own feelings and perceptions of the major changes that took place within the Academy, the Salon (exhibition) and the changes in painting in general during this time is expressed here in another excerpt from letters to Wertmuller (dated Paris October 17, 1791 - the same year that the Self Portrait 1790 was exhibited at the Salon); he writes, among other things, the following:

⁶⁶ Lundberg (1957) part I, p..250-251

⁶⁷ Ibid, p.260-261

⁶⁸ Lundberg (1957) part I, p. 261

"Here we shall soon witness the Academy's full desolution. Sign Painters and Boulevard sculptors have managed to get permission to show off their so-called " Masterpieces" at the Salon (exhibition), along with the members of the Royal Academy "

" For anyone trying to excel as a skilled artist is only scorn "

" .. And I look no further than in the interest to destroy the last school that remains in Europe and who honored France " ⁶⁹

4.1 Recipient(s) of the Painting ?

No information about any potential or intended recipient(s) of the painting has emerged. It is possible that the painting was intended for his children. There is also a possibility that the painting might have been thought of as a counterpart to a portrait of Roslin's wife, but such verified details have not emerged. ⁷⁰

4.3 The two replica paintings to the Self-portrait 1790



photo:Nordiska museet

*fig.4. A. Roslin, Selfportrait 1790, replica
Format: 103 X 81 cm
Uffiziegallery, Firenze ⁷¹*



photo:Nordiska museet

*fig.5. A. Roslin, Selfportrait 1790, replica
"fato in Parigi 1790"
Format: -
Deposition in Institute of Tessin, Paris ⁷²*

Previously the painting in the Uffizi Gallery, Florence was considered the original but today the portrait at the Malmö Art Museum is considered the original painting and the one in Florence a replica. The data of the portrait hanging in The Tessin Institute is scarce. As seen in reproductions of the two replicas i.e. as by the artist himself and not copies, they have some variations in the image format. The Uffizi portrait varies in size over the original, 103 X 81 cm over 102 x 79 cm, whose edges also has been cut - information on eventual cut edges of the former has not emerged. Already in 1748, Roslin made a self-portrait which he donated to the Uffizi in 1776; in 1791 this painting was replaced by the Uffizi portrait. The previous self-portrait of 1748 has not been found

⁶⁹ Lundberg (1957).part I, p.260

⁷⁰ Roslins Portrait of Marie Suzanne Giroust 1770 ?, see Olausson (2007a) p.269, cat.nr 98

⁷¹ Lundberg (1957), part I.p.255

⁷² Ibid, p. 282.

4.4 The Salon exhibition of 1791

The Salon Exhibition of 1791 was for the first time open to all. Roslin's paintings were exhibited by number and were no longer collected under his name. This exhibition was the last one in which Roslin participated (the last Salon Exhibition was held incidentally three months before Roslin's death in 1793, after which it was closed altogether). Roslin participated with three paintings - however, according to Lundberg it was eight works.⁷³ Two of the paintings which are identified are visually more reminiscent of the contemporary designs and therefore differ greatly in appearance compared to that of the Self-portrait-1790. Which of the self-portraits Roslin participated with in the exhibition is not verified. The following review of the Salon Exhibition in 1791 was made by the author of *La Be'quille de Voltaire au Salon*: "Dear Mr. Roslin. You certainly have not missed your goal because you look really majestic, and all these medallions, these beautiful awards, as if they would show that you are skilled! I would wager that this prince that is at your easel in each case is your second cousin? I want in all cases to say to you Mr. Roslin that with all your orders you do not comply with your time. I would probably suggest you that you instead depict your models from behind, admittedly missing the faces, but in return you can indulge shapes and fabrics."⁷⁴ According to Olausson,⁷⁵ the review above does not do justice to the painting in comparison to other critics who particularly appreciated Roslin's Self portrait 1790. The accompanying portrait at the exhibition of Pe'rriin Salbreux (see 4.5 below) was considered by the critics as the worst of the works.

4.5 The two authenticated paintings that participated alongside the Self-portrait 1790 at the Salon Exhibition in 1791

As shown by a comparison with Roslin's Self Portrait 1790, the visual design of the paintings below are very different and demonstrates rather how portraiture looked toward the end of the century. These facts speak vividly that the design and construction of Roslin's Self Portrait 1790 had a deliberate view and purpose (see 7.1, p.47)

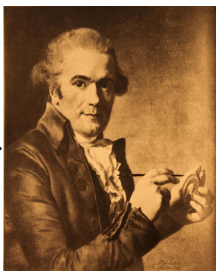


photo:Nordic Museum
fig.7. A. Roslin, *Bust of elderly man cradling Miniature Portrait in the hands Lie Louis Perrin (Salbreux) 1791*
Size: 58x 49cm, *Musee´des beaux arts Orleáns*^{76 77}

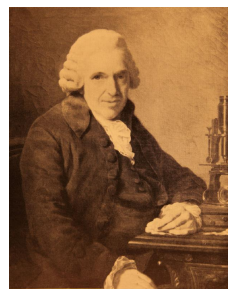


photo:Nordic Museum
fig.8. A. Roslin, *Portrait of Natural Scientist Louis Jean Marie Daubenton 1791*
Size: 81 x 65 cm
Reims ,Musee´des beaux-arts^{78 79}

⁷³ Lundberg (1957)

⁷⁴ Olausson (2007a), p.135

⁷⁵ Ibid. spelling of the name varies

⁷⁶ Olausson (2007a), s.206

⁷⁷ Lundberg (1957), kat.nr.616

4.6 The provenance of the painting

The following information is taken from the National Museum's ,Exhibition catalogue:⁸⁰

- Oil Painting on canvas. Size: 102 X 79 cm
Provenance: Roslin's descendant CF Martineau , Adèle-Pauline Martineau ; Alfred Oudot: Seligman's auction, Galerie Petit, Paris 9.12mars 1914.Oilpainting on canvas . (Nr.389); of Sortails ; sold to Baron von Reitzes , New York 1951 ; banker Henry Mannerfried, New York , 1957; purchased from him 1961-62
Exhibitions: Paris 1878 No 623 : Malmö 1962 , no. 79 ; Bordeaux 1967, No 185; Stockholm in 1991 , No. 13.
Literature: catalouge 1914 -15 , nr.151 ; Svenonius 1943 s.2f , 6f ; Svenonius 1948 , p.11 ; Lundberg 1957 pl.183 II , III, pp. 104, no. 603 ; (bibliography); Lundberg, 1972 , p 188, 190; Johansson, 1983 Page 18f ; Bjurstrom 1993 p.61 , 169, 173ff , 234.

The portrait comes in three versions were the two hangs in the Uffizi Gallery, Florence and one at the Tessin Institute in Paris. The self-portrait 1790 and one of the replicas belonged to Roslin's descendants.

⁷⁸ Olausson (2007a),s.206

⁷⁹ Lundberg (1957),repr.180, kat.nr.614

⁸⁰ See 10.3 Printed Litterature and sources. Olausson, 2007a, p. 79

5 THE SCIENTIFIC INQUIRY

This chapter of the work deals with the scientific part of the study. Information and facts from this chapter were designed to enable evaluation against the compiled facts and information from previous chapters; at best to have the opportunity to present comments on the information and facts from the investigation that could be placed in a logical and explanatory context and thus be able to present new facts and increase our knowledge about the topic. For information on technical equipment paired with a schematic sketch of the survey see CD appendix chapter 19 p.155 ff).

5.1 Introductory Ocular Assessment - Conventional Photographic Documentation

After a meticulous visual examination of the painting followed thorough photographic documentation. The photographic documentation was partly intended to serve as a future reference for assessing support of the preservation of the object. The documentation was conducted both with small digital format (Canon 5D MarkII, combined with their professional optics) and medium format. For medium format documentation a Hasselblad Camera was used (501 D with Zeiss optics and combined with a digital back cover (Phase One 16mp).

5.2 Raking light documentation

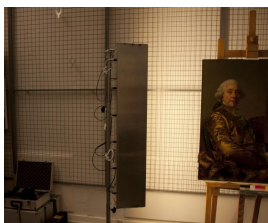


fig.9 Lighting stack(6 X 75 W) with adjustable amount of light, placed on the left side of the painting.

Lighting the painting was made from the left side using a stack of lights (6 X 75 W) with adjustable light flow. The photographic documentation consistently used a reflector screen aiming for more clarity and information value for the documentation (see CD appendix chapter 14 p.117 ff).

The method was used primarily for the detection of:

- Surface defects
- Deformation depending on the type of materials used
- The presence of craqueleurs
 - If applicable also informations and conclusions of the various types of craqueleurs, impasto brush tracks and/or similar types.

5.3 Documentation within the IR spectra

For analysis of the painting within the IR spectra, eight parameters have been used due to the fact that it never can be confidently established on what level important information is

retrieved. Individual differences in the sensitivity of the technical equipment can also be significant for obtaining more information.

The parameters used for the investigation were the following:

- 1 IR reflektography - a review of the whole painting with an analog infrared video camera.
- 2 IR documentation with an IR modified Nikon D1 .
- 3 IR - filters, IR 72
- 4 IR - filters, Wratten 89B
- 5 IR - filter Wratten 89B in combination with contrast enhancement , software (Canon digital professional) .
- 6 IR - documentation , using dual- polarization filters (how and why this method work in practice is still not fully understood) .
- 7 IR test with unmodified CCD cameras of different brands and marks.
- 8 IR false colors

5.3.1 Infrared fluorescence

This method is sometimes called *infrared luminescence*, the latter part with a somewhat obscure meaning - IR fluorescence is a more accurate name and in this context to be question of a surface investigation method. In this context the method is almost to be considered a surface investigation method. IR beams (the IR rays) which are within the electromagnetic spectrum and adjacent to the part of the visible light at 760nm continues further in the upper part and into radio wave spectrum. However, only a small fraction of the wavelength range is of interest: examining the painting covers the range from c.760 nm to c. 2400 nm (the sensitivity of a digital camera is in most cases between c. 700 - to a maximum c.1100 nm, and this is the usual range for investigations of this sort).

The method has been used for the detection of:

Retouchings

Underdrawings

Brush manner,

Pigment identification and to a degree, some adhesive identification (see 5.3.2 below).

As stated this method is akin to the UV fluorescence (see 5.4.1, p.34).

5.3.2 IR -Reflectography



fig.10. Interior documentation with IR - reflectography.

The method has been used primarily for the detection of:

- Retouchings and over-paintings
- Pentimenti (different "saponification" phenomena)

- Preparatory stages of the pictorial build up, as well as eventual remaining lines of drawing
- Various modifications, brush tracks, etc. Alternatively, the absence of the same.
- Any eventual hidden inscriptions:
 - Signatures
 - Irregularities in sketching out the actual painting,
- Some possibilities for verifying the type of initial layer, if any, faded, scumbled out and overpainted parts.

The method is considered for In –depth investigation.

Aiming for a clearer verification and evaluation, the results obtained were later combined and evaluated with the results from foremost all UV and X-ray examination.

5.3.3 IRCCD

The infrared field close to visible light and which can be detected with a CCD camera is called IRCCD (780 - 1100nm). Some pigments such as Lead white becomes transparent in this range which means underlying parts may appear under favorable circumstances. Despite low expectations with this type of spot analysis within the IR -spectra, it may still be judged necessary to carry out after all relevant information or hints may have emerged. Furthermore, it is not taxing or complicated to perform. The tests were performed with several different digital cameras of the CCD types.

5.3.4 IR False colors

The method is useful as a non-invasive verification method, especially in the context of a more comprehensive analysis which includes both organic and inorganic materials, mainly regarding pigments; as reference, performed samples with known pigments types with drying oil medium ("raw cold-pressed" linseed oil). The colors will have no real relevance (hence the name "false colors") but works well in conjunction with a comparative analysis. Together with the results from the initial UV survey, the amount of possible input materials primarily for the pigments aimed at being identified can hereby be limited in view of the further analysis.

5.4 Documentation within the UV -spectrum



fig11. Interior, UV-documentation.

Unlike the IR spectrum, the sensitivity of the UV spectrum, both in terms of CCD technology and CMOS technology and considering conventional camera optics, is rather low; Quartz optics will improve UV documentation, but is extremely costly and difficult to access. Like the current IR spectrum, it is also of great value within the UV spectrum to use a plurality of parameters to obtain greater range of information.

For the UV survey, five parameters were used, all combined with UV lighting coming from so-called blacklight:

- 1 UV -fluorecense -no filter
- 2 UV filter KR - B + W 77 KR - 1.5 Skylight 1.1X
- 3 UV filter - B + W 77,415 Ultraviolet cut

- 4 UV filter - B + W 77,420 Ultraviolet cut
- 5 Yellow filter - B + W 77 0.22 2X
- 6 UV -Reflectography - B + W 77,403 Ultraviolet

5.4.1 UV fluorescence (UVA)

UV light can induce visible fluorescence in some materials. This method was used primarily for the detection of:

- Determination of some binding media
- Varnishes
- Repairs
- Retouchings
- Identification of some certain pigments.

The amount of information from a UV -documentation may vary, depending on the choice of filter types in particular, as to why the documentation is presented with several photographs.

5.4.2 UV - Reflectography

For the UV reflectography a UV-cut filter was used. The literature typically refers to the use of a so-called UV / Skylight filter. Real UV –Reflectography however requires a far more costly type of filter that only records what, in this respect, is invisible to the eye regarding UV radiation. Documentation with UV - reflectography provides information on the deeper levels of the painting. This documentation requires very long exposure times of up to a minute and a half, despite a relatively large aperture (5.6 and 11.0). The survey was lacking a UV- meter, as well as more detailed information regarding the UV -spectrum of the UV -lamps used.

5.4.3 UVFC (UV False Colors)

This method is used mainly for pigment identification and is similar to the IRFC method with the difference that it works within the UV-range and with UV illumination; as filter only a UV-cut filter was needed - a common Skylight filter can work as well with this technology. UVR -absorption combined with the visible absorption. A modern digital camera has, as previously mentioned, compared to the sensitivity within the IR –range, a rather low sensitivity within the UV -spectrum. Even larger photographic brands of the types used in the investigation have remarkably low UV -sensitivity. For UVFC -assay, here a conventional unmodified digital camera, Canon D5 Mark II with conventional optics and various UV filters was used.

5.5 Raman spectroscopy



fig.12. Interior detail: Raman probe investigation of the Self Portrait 1790, at the laboratory at the Institute of Conservation Gothenburg

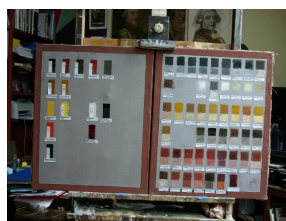


fig 13. Reference tests were performed on color samples on canvas prepared with a traditional doubleground with the Raman probe. Parts of the color samples were covered with a rather thin layer of varnish (in this case a synthetic varnish – keton resin).

5.5.1 FT- Raman -Raman Probe Analysis

The method was mainly used aiming for:

- Material Identification (organic and inorganic materials)
- Certain identification of materials linked to the technical architecture of the painting.

5.5.2 Reference tests -Raman chamber

Reference spectra were performed using the Raman Chamber of nearly a hundred different types of materials, mainly pigment types, for further comparative analysis.

5.5.3 Reference tests – Raman probe

In parallel to the above mentioned methods, probe tests were carried out with a wide amount of relevant pigments and pigment types mixed with drying oil (raw cold-pressed linseed oil). Probe tests were conducted mainly in the vertical position. Assumed types of oil colors -as far as it was possible to judge from ocular observation - were painted on the same type of support as was revealed by previous investigations of the painting. The tests were to be performed with scanning frequencies varying between 250 - 2000 times and with Mw numbers varying between 100 to 300 Mw. Furthermore, part of the test was performed with the color samples partially varnished on the prepared canvas. The varnish (Ketone resin) was applied rather thin. The investigation of the painting was done in situ with equipment at the Department of Conservation in Gothenburg, Sweden. The direct examination of the painting was conducted using the probe assembly with reference samples made from both the Raman chamber and the probe unit. Raman spectroscopy with the probe is a non-invasive method which can, under favorable conditions, be a relatively quick method for the analysis of chemical compounds, both organic and inorganic - in this case of an oil painting on canvas.

5.6 Macro / micro documentation

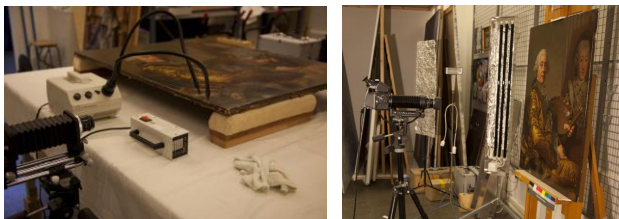


fig.14. fig 15.

In this investigation macro/micro photographic analysis using a digital camera mounted with bellow optics and a computer, largely replaced the use for conventional optical microscopy. Documentation was done both with middle and small format.

Macro enlargement usually denotes magnification of up to about 25 times (with a stereo microscope, one can usually magnify up to 40 times). Microscope cold light sources were used in the documentation. The method was used primarily for the detection of:

- Different types of surface textures
- Pigments
- Layered structures
- Studies of types of build up of paint layers e.g. wet on wet, wet on dry techniques
- Attempts at some adhesive identification.

The complement of UV -illumination (handheld lamp) was added aiming to detect different varnish layers and for the identification of certain pigments.

5.7 Radiographic documentation (X-rays)



fig.16. Interior detail, radiographic documentation (X-ray clinic UMAS Malmö).

This survey was possible to carry out due to the particularly kind assistance of Peter Leander, MD, Associate Professor, Region Senior Picture and Functional Medicine, Region Skåne, Sweden. Radiography is not a photographic procedure but rather a clinical diagnostic technique involving the use of electromagnetic energy outside of the UV spectrum. X-rays can be absorbed in painting components such as pigments, primers (support), which may give some idea of compounds included, its concentrations and thickness. The investigated pigments that block X-rays are particularly heavy metals such as *White lead* (alkali lead carbonate), *Naples Yellow* (alkali lead antimonate) and *Red lead* (lead monoxide) and, to some extent, a pigment such as *Cinnabar* (mercuric sulfide).

Examples of pigment absorption of X-rays:

Red / Yellow - ocher medium

Umbers –medium

Carmine lacquer – low

Prussian blue – Medium

Charcoal black – low

This method has been used primarily for:

Aiming to provide greater understanding and demonstration of the artist's technique

Detection of pigments, even hidden underneath the visual pictorial parts

Eventual changes in composition or underlying picture(s)

Clarification of some of the brushwork technique

Tube voltage : 40 Kilovolt,

Power Tubes: 250 Milliampere

Exposure Time: 38 Milliseconds.

Values were overall far below the background radiation that the object naturally is exposed to in a year. As a comparison to the investigation above, an ordinary X-ray of a human wrist that is usually performed with a force of approximately 40-50 Kilovolt and a human body of ca. 80 -90 kilovolts. Thin objects require, as shown, a significantly lower kilovolt number.

Investigation of digital radiography compared with analog is preferred for several reasons e.g. - low level of radiation but (in comparison) high image quality, documentation in real time, the possibility of fast digital image adjustment and image enhancement, its easy operation and low cost per image and no risks associated with chemical processing, with the risk of poorer image results.

6 THE SCIENTIFIC SURVEY -RESULTS

For the full report, see also references to the image captures in the CD appendix p. 87 ff.



fig.17. fig18. Raking light.

6.1 Raking Light Documentation

As shown in the photo documentation, the surface is extremely smooth and practically without impasto. The information of the surface structure mainly emerges from the weave structure of the fabric support, in so far as it appears on the image surface; a fact that has likely been markedly accentuated by the Laminating implement. The absence of pronounced impasto parts can, in this case, be considered an artistic choice and not linked to damages from lamination. A comparison could be made with the previously investigated (and un laminated) Grill painting -1775, at the Gothenburg Museum of Art, which also is very smooth in texture, in this case even regarding traces from textile structure. Furthermore, a comparison can also be made against the very rich impasto parts present in the investigated Double Portrait 1754 at the Gothenburg Museum of Art. ^{81 82}

6.2. IR- fluorescence



fig.18 IR- fluorescence full picture with parts of a visible underdrawing.



fig.19 IR-fluorescence, detail with line drawing remnants enhanced .

6.2.1 Infrared fluorescence

The IR -documentation clearly revealed parts of an underlying drawing best seen with infrared fluorescence technique. The drawing is made with a dark, probably black, chalk. Most likely a type of dry chalk was used which meant the drawing could be easily changed and adjusted on the support. It is very likely that the chalk was a natural drawing material and not a fabricated one e.g. type pigment/glue water, charcoal of wood or similar. This is due to the fact that the drawing material has not significantly emerged in overlaying oil color and considering the precision of the line drawing – nevertheless, the possibility for the line drawing once being fixed to some degree cannot be fully ruled out. A common material in this context for the time was the black carbonaceous shale, a harder material which easily allows for performing fine line drawings. The fact that the color is dark (probably black) also tells us that the artwork was done on a light - as in this case this broken white – surface: a traditional

⁸¹ CD app.13.2, p. 120, 14, p.133-138

⁸² Andersson (1995) , app. p.90

type of double ground with a broken white layer on top of a reddish brown layer. Another type of working technique, and one that could be used especially at larger sized paintings, was to perform the (chalk) drawing directly on the red brown ground. The opportunity was then open after initial imaging to broadly stipple or paint over the surface with a white or broken white layer. This technique is called *Bottegiande* and is linked to Venetian painting tradition. However, due to choice of drawing color, this is not the case for this painting.⁸³

6.2.2 IR –reflectography



fig. 20. IR-reflectography, detail.

Using infrared reflectography, invisible parts of the painting and more detail of the painting can appear more distinctly. Even the IR -reflectography showed visible traces of an underlying drawing, in this case not as clearly as with infrared fluorescence (see photographic documentation CD appendix ,chapter15 p.123 ff). Darkening of the painting is practically unavoidable as the pictorial part has been created on a dark surface i.e. double ground (see 2.6.1.p.16), a relationship which, in this case, has been accentuated due to the later wax/wax resin lamination procedure. As a basis for comparison of the artwork against the IR - fluorescence documentation, it is difficult to determine the meaning of some information, for example, verification of eventual dirt from (coal) artwork on the reflectography documentation. The fluorescence documentation as a comparison shows a very clean line drawing. The reflectography documentation was performed in sections for the opportunity of a "mosaic" compilation. In the portions where a line drawing was discovered, the equipment was adjusted to accentuate these conditions why the assessment of other information may be related to this increased contrast.

6.2.3 IRCCD

No additional information emerged during this examination and the expectations of this was low from the outset. The analysis was still judged to be necessary to perform due to the possibility of revealing relevant information.

6.3 UV -fluorescence (UVA)



fig.21. UV- induced fluorescence, full picture without addition of filters. Compare documented repairs such as on the facial parts for comparison with X-raydocumentation.

⁸³ Eastlake (1847), part II, p.283

UVA documentation verifies at least three different layers of varnishes, possibly more can occur. The top layer visually gives the impression consisting of one or more extremely thin layers of synthetic type of varnish (ketone resin).

The varnishes cannot be deemed to belong to the original. The oldest underlying varnish is likely to consist of natural resin varnish; they are likely made in connection with the first conservation of the painting. Common materials were Mastic resins and Venetian turpentine (larch tree resins) along with Damar resins that was introduced in the 1820s. As a guess, the majority of the varnish material could consist of just Damar resin, which was (and is) in a better position compared to other natural materials for yellowing and its natural wax content being well known to be rather easy to remove and not least less costly.⁸⁴ If fragments or remnants of original varnishes are left on the painting under the thick overlying varnish was not possible to judge. Regarding older, more heavy-handed restoration methods, chances are that the original varnish has once been cleaned down to the paint layers (conservation documentation is missing). The layers of varnish have possibly also been changed more than once before. Macro documentation (see CD appendix) of the painting's viewing area shows several aspects of wear and tear that may have occurred in connection with the lamination and / or in connection with the use of solvents such as regarding rectification of varnish(es).

6.3.1 UV -reflectography

Documentation with UV -reflectography provides information regarding the deeper levels of the painting. In this particular case however, this method revealed no significant new information, which nonetheless has a value in itself.⁸⁵

6.4 IR - UV false colour documentation - compilation

6. 4.1 IRFC (IR False colors)



fig.22 . Detail of the palette of the painting , documented with IRFC technology

Regarding the numbering of the colors of the painting's palette, see CDappendix chapter 7.3 p.95

⁸⁴ Note: If the original varnish once have been removed down all the way down to the colorlayers, instead of being reduced, which here is fully possible regarding older restoration treatments, Damarresin would be a particularly bad choice of resin in directcontact with colorlayers, considering future removals.

⁸⁵ CD-app. 15, p.157

Reference Oil colors for IR-and UV- False Color analysis

Tab. 2

Red pigments	Green pigments	Blue pigments	Yellow pigments	Black pigments	White pigments	About 35 different Iron oxide pigments
						Under different trade and trivial names from the color range from light yellow yellow over red to dark brown
1.Cinnabre	1.Verdi gris	1.Prussian blue	1.Indian yellow (syntethic)	1.Bone black	1.Lead white	
2.Minium	2. Synthetic Malachite	2.Pariser blue	2.Naples yellow light	2.Natural Ivory black	2. Chalk	
3.Natural Alizarin lake	3. Natural Malachite	3. Milori blue	3.Naples yellow dark	3.Charcoal black		
4.Artificial Alizarin lake (ref.)	4. Green Earth	4.Indigo (synthetic?)	4.Lead tin yellow	4. carbon black		
5. Natural Carmine lake	No green arsenic pigment was aviable for reference	5. Natural Ultramarin	5. Yellow orpiment			
6. Dragons blood		6. Synthetic Ultramarin (ref.)	6.Yellow ochre			
		Cobolt blue (ref.)	7.Natural Raw sienna			
		Natural Azurite				
		Azurite (syntethic)?				

6. 4.1 Technical analysis results IRFC technology pigment analysis -the painting's palette, and wig bow:

Tab.3

Ocular verification	IRFC-results	Commentary
1. Green mixed color, for example Prussian blue/ Yellow ochre	Prussian blue/ Yellow pigment	Rather clear verification
2. Prussian blue	Prussian blue	Clear verification/ pigmentgroup
3. Brown ironoxide, Raw umber type ev. even a Bitumeous Ironoxide type Casselbrown	Casselbrown or similar	Clear verification/ pigmentgroup
4. Brown Ironoxide, Green umber type	Green umber type	No clear pigmentspecific verification
5 . See 4. above with addition of Lead white	See 4. above with addition of Lead white	See 4. above plus clear verification of Lead white
6 (Decomposed) type of Red laquer, from historical point of view, most likedly of Carminetype	Carmine/ Madder	No clear pigmentspecific verification
7. Green mixed color such as Prussian blue/ Lead white with addition of a yellow pigment such as Naples yellow	No clear pigmentspecific verification regarding separate pigments	No clear pigmentspecific verification regarding separate pigments
8. See 7. with greater addition of Lead white	See 7. above with larger amount of Lead white	See 7. above
9. Brown ironoxide	Brown ironoxide	No clear pigmentspecific verification
10. Brownyellow ironoxide, type Raw Sienna	Raw Sienna	Clear verification
11. Cinnobar / Lead white	Cinnobar / Lead white	Clear verification
11a. Se 11. with addition of more Lead white	Se 11 above with addition of more Lead white	Clear verification
11b. Se 11a above, with addition of more Lead white	Se 11a above with addition of more Lead white	Clear verification
12 Yellow ironoxide, type Light ochre.	Light ochre	Clear verification
13. Naples yellow light	Naples yellow light	Clear verification
14. Lead white	Lead white	Clear verification
15. Redbrown ironoxide type English red	Redbrown ironoxide type English red	Clear verification
16. Cinnobar light ⁸⁶	Cinnobar light	Clear verification
17. (Wig Rosette) One or more black pigments type Ivory-, Bone- Charcoal / -black with small amount of White lead . Possibly with a tiny addition of Prussian blue.	Black pigment (-s)	No clear pigment specific verification

⁸⁶ The Cinnabar part doesn't show a clear addition of Minium as in the case with the Double portrait 1754 (see Andersson,1995). If Minium is present, it is anyhow most likedly not possible to verify with this investigationmethod. Minium turned with the equipment used yellowbrown in color, see fig. 22 above.

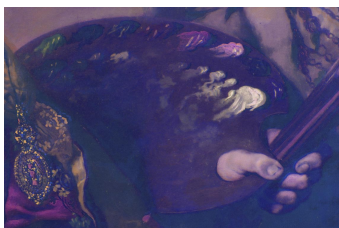


fig.23. Detail the palette on the painting, documented with UVFC-technique.

6. 4.2. UVFC (UV-False Colours)

Tab.4

	Colorpigments ocular verification	UVFC- analysis results	Commentary
1.	Green type of mixed color, type Prussian blue / Light ochre		No clear verification
2.	Prussian blue	Prussian blue	Rather clear verification
3.	Brown ironoxide, type Raw umber, ev. type Casselbrown	Raw umber / Cassel brown	No clear pigment specific verification
4.	Brown ironoxide type Green umber	Brown ironoxide	No clear pigmentspecific verification
5.	Se 4. above, with addition of Lead white	Se 4 above, with addition of Lead white	No clear pigment specific verification
6.	(Decomposed) Red laquer, type Carmine/ Madder	Carmine/ Madder	No clear pigment specific verification
7.	Green mixed color, type Prussian blue/ Lead white with addition of a yellow pigment such as Naples yellow with addition of a brown Iron oxide		No clear pigment specific verification
8.	Se nr. 7. above with more addition of Lead white		No clear pigment specific verification
9.	Brown ironoxide	Brown ironoxide	No clear pigment specific verification
10.	Brownyellow ironoxide, type Raw Sienna	Raw Sienna	Clear verification
11.	Cinnabar / Lead white		No clear verification
11a.	See nr. 11. above with more addition of Lead white		No clear verification
11b.	See nr. 11.a . above with more addition of Lead white		No clear verification
11c.	See nr. 11.b. above with more addition of Lead white		No clear verification
12.	Yellow ironoxide, type Light ochre	Lightochre	Clear verification
13.	Naples yellow light	Naples yellow light	Clear verification
14.	Lead white	Leadwhite	Clear verification
15.	Redbrown ironoxide, type English red	Redbrown ironoxide, type Burnt terra di Sienna/ Indian red	No clear pigmentspecific verification
16.	Cinnabar light	Cinnabar light	Clear verification
17.	(Wigbow) Black pigment (-s)	Black pigment (-s)	No clear pigmentspecific verification.

6.4.3 Pigment - painting palette - compilation

Ocular audit, IRFC - and UVFC analysis: - Conclusion

For numbering of the colors of the painting's palette - see p. 57.

Markers

A -Clear verification of both Pigments Group and specific pigment

B -Ready verification of Pigments Group (effective mixtures finished verification by at least one pigments)

- -No clear verification

Tab.5

	Ocular verification	IRFC-verificaton	UVFC-verification
1.	Green mixed color, such as Prussian blue/ Lightochre	B	B
2.	Prussian blue	A	
3.	Brown ironoxide type Umber / ev. type Kasselbrown	B	B
4.	Brown ironoxide type Green umber	B	B
5.	See nr. 4. above with addition of Lead white	B	B
6.	(Decomposed) Red laquer type Carmine/ Madder,, from historic context most likedly the former	B	B
7.	Green mixed color such as Prussian blue/ Lead white / Naples yellow	-	-
8.	See nr. 7. above with greater amount of Lead white	-	-
9.	Brown ironoxide	-	B
10.	Brownyellow ironoxide, type Raw Sienna		
11.	Cinnabar / Lead white	A	-
11a.	See nr. 11. with greater amount of Lead white	A	-
11b.	Se nr. 11a, with greater amount of Lead white	A	-
11c.	See nr. 11b. above, with greater amount of Lead white	A	-
12.	Yellow ironoxide, type Light ochre	A	A
13.	Naples yellow light	A	A
14.	Lead white	A	A
15.	Redbrown ironoxide, type English red dark	A	A*
16.	Cinnabar light	A	A
17.	Black pigment (-s)	B	B

* alternatively Burnt Terra di Sienna / Indian red

6.5 Ramanspectrography

6.5.1 Ramanchamber reference tests

The tests were to be performed with scanning frequencies varying between 250 - 2000 times and with Mw numbers varying between 100-300 Mw. As expected, different pigments and pigment types but also other materials such as different binders, varied extensively well regarding possibility of verification with this type of analysis. Eg it was considerably more difficult to obtain a clear spectrum of the pigment Light Naples Yellow than in eg Naples Yellow dark. The preceding was visually seen the most interesting in current analysis of the painting. Substantially chemically similar pigment types, such Charcoal black and Genuine Ivory Black was extremely difficult to try to distinguish analytically with the given method for analysis. Very heterogeneous pigment types as Iron oxide pigments could vary greatly when it came down to the production of spectra, which was expected, and variations could be very wide. Analysis of some organic pigments such as Carmine, could sometimes work quite well and at other times, not at all regarding clear spectra diagrams,(atmospheric disturbances?). Spectra results were strongly affected by even a very thin (synthetic) varnishlayer on the reference tests regarding current opportunity for clear verification of underlying pigments.

6.5.2 The investigation of the painting - Ramanprobe

The Raman Probe equipment was during the two days set for investigation, subject to three power shortages, of which the most serious was happening during the night and affected the unit's cooling system. No pre protection had been made, as this never before had happened. The result was an overall operating range of only about four hours and the equipment options may therefore not be considered to be fully investigated in these respects. However, what appeared to be clear already at the initial tests of oil paint on canvas with even thinly covered layers of varnish, was that they adversely could affect the possibilities for analysis. On the investigated painting appears several varnishlayers, probably by several different types of materials. Observing the absolutely necessary and also substantial safety margins of the survey, there was no scope for increasing the strength of the laser beyond the limits previously tested in reference studies. It would probably been possible to increase the intensity of the laser and still been able to have had a good safety margin. It was decided, however, to give up this opportunity.

Instead, the increased scan rate decided was from 300 scans at 600 scans. Besides own references, was also used. According to the aviable reference, we had, the problem with varnishes v.s. material verification for example Oil paint did´nt emerge, more than in a subordinate clause in an article by Vandenebee⁸⁷. The results from this investigation may be a contribution to further recognize these conditions. It is an open question how far the analysis would have been possible to develop even with a longer time interval for the actual survey. Crucial to the outcome was probably the overlying varnishlayers appearing in several layers on the painting. Layers that also most likely consists of several different types of

⁸⁷ Vandenebee et al (2000)

materials (including one or more types of natural resins). On the painting occurs at least three separate layers, possibly more, of varnishes that fully, partly or partially covers the painting surface. The top comprehensive varnishlayer (-s) based on a visual assessment, probably is a type of synthetic varnish) and is extremely thinly applied. The thickness of the underlying varnishes are hard to grasp, but judging by UV -documentation, some layers, are rather thick, (see CD appendix chapter 16 UV- documentation p.137 ff).⁸⁸

6.6 Macro / micro documentation

Examples are given of numerous mechanical wear and tear over practically the whole painting surface. Perhaps visually most striking in brown glazes / alternatively remnants of old varnish (- es), and probably originated in connection with the lamination treatment, but also through previous engagement with solvents, for example during former varnish removal (-s).Several parts of the image have become " rasterized " in its surface structure and in a way that hardly can be a part of the original appearance. The structure of the fabric itself also has been accentuated markedly depending on the lamination procedure. Both the characteristic brush trails and several of those on the painting depicted brushes indicates on some part the use of hog bristle brushes, (paired with other less definite types). The macro / micro mode shows clear traces of Frottis (displacement technique) where brush marks have been smoothed away. Attempts were made with studies of surface structures in the coating in order to verify the presence of water-based media (" crater structures "), particular in the part that was verified as a red laquer (type Carmine) among others on the depicted palette. Attempts were made primarily with illumination / reflectance from different angles. A secure authentication was not possible due to the rather thick overlying layers of varnishes. Regarding a more detailed assessment and safer determination of different pigments and pigment granules types on the painting, it would in most cases require equipment with greater opportunity to enlarge , possibly supplemented by analytical aids than was available in the investigation.^{89 90} The abundance of dust particles, on this level of enlargement, posed to the complications , however, analysis / documentation were still possible to perform.

6.7 X-ray analysis

No earlier changes in the composition was revealed by X-ray documentation. The documentation indicates a very careful and thoughtful approach , apparently facilitated by the careful line drawing, (see IR -CD appendix chapter 15 p.123ff). As shown in the documentation, the fabric has several injuries, in one case, the hole has been filled up with a piece of replacement weave, added asymmetrically to the original fabric (see X-ray documentation CD appendix). Repairs have been made applying the putty direct against the lamination canvas.The same thin brushwork technique has been used as was the case with the surveyed Roslin paintings at the Gothenburg Museum. The use of Stippling technique to amplify light highlights are clearly visible, such as on the forehead, to mention only one

⁸⁸ CD-app.. chapt.15, p. 153-159

⁸⁹ Ibid. 13,p.118-119, chapt.17, p.167-174

⁹⁰ Andersson (1995) App.. i.e. p. 91-93

example. In comparison with the X-rays that were once taken of the Roslin paintings at the Gothenburg Art Museum, and was performed with analog technology, the contrast of image documentation, this time was lower.

7 DISCUSSION AND CONCLUSIONS

7.1 The causes of image formation and structural build up of the painting - a hypothesis

The troubled relations in the society at the time, and the conflicts within the academy, likely came to determine both the choice of subject matter and a deliberate form of construction of the examined painting. The strikingly archaic and anachronistic pictorial image portraying himself can, if one wishes, be interpreted as a form of protest against the prevailing conditions and the major changes and upheavals that took place not the least within the Academy at the time. Meanwhile, the painting can simultaneously be seen as a representative portrait or if one prefer, a memorial to the artist himself and a manifestation to his long and successful career as a professional.

Portrait Orders decreased dramatically over the period of the painting's creation, something that surely contributed to the painting being a self portrait. In addition to the conscious choices described above. It also as a contributing factor, will be a reasonable assumption that the artist, on an emotional and more irrational level, certainly found it more comfortable during this turbulent and dramatic period, to be able to move himself into a considerably more agreeable time and place, as depicted on the the painting – but a time and a place that now inexorably belonged to the past. The hypothesis that the painting had a conscious purpose of considering " l'ancien regime " is also substantiated by the technical investigation which demonstrates a very typical older academic type of technical construction, using a traditional double ground, and classical composition method (se.7.3 , p.48). Even inserting the Swedish king on the painting, a known supporter of ' l'ancien regime ', paired with himself in a for the time archaic costume, can also be interpreted as part of a selected purpose. This hypothesis can be further manifested with a comparison of the two verified paintings that accompanied the Selfportrait 1790 at the Saloonexhibition 1791, and that in their visual layout in contrast to the investigated painting, more followed present styles of their time (see 4.5, p. 29 ff)

7.2 The image formation - a visual reflection

The pictorial layout even tells a lot about different types of expertise and knowledge that are beyond the scope of this work. Some of it, however, can be worth mentioning even in this context: Apparently Roslin found it inappropriate to have Gustav III himself looking at the artist, as he at the same time wanted to keep the perspective depth, using the depicted painting slightly angled. The result is a compromise with the King depicted, in for a portrait unusual angle. The King is fittingly also lengthwise depicted somewhat above the artist himself. Furthermore, by skillfully working with light and shadows with his own facial outlet, his portrait compared to earlier partraits that is of a rather square face here instead appear rather elongated. A fact that probably was no coincidence as this is consistent with the King's long and narrow and more oval head shape. An engraving image (on copperplate) with a profile

portrait of Roslin (etched by Bene'dict Alphonse Nicolett from Cochin) ⁹¹ shows that he had a quite sharp and upturned nose. In just the same way as with the investigated portrait of Creutz c.1764, who according to contemporary information in this respect had the same physiomy, the artist have on the portrait very cleverly through pose ' , light and shading, offset this (possible) relationship.^{92 93}

His right shoulder have been adjusted and lowered so that it provides an elegant line and expression, from the throat down to the body. The two eyes are centered, so that they follow the viewer and provides direct contact, from anywhere in the room. If his pose ' can be perceived such as dignified, haughty or even arrogant, can only be assessed from a twenty hundreds perspective and is therefore of little value here. Of interest, however, is the more general valid expression that the painting conveys and which pictures the artist so that he can be perceived as attentive and alert, with the elbow in the air instead of resting on the armrest of with a given structure of the reading of the painting, focusing primarily on face and right hand. Something that together with other "markers" probably was intended to convey an impression of both assertive skills and drive. The type of imagery is in these respects are very timelessly designed and identical to the techniques of how the same qualities are deliberately emphasized pictorial today eg in advertising, and different deliberately personal portrait presentations on many magazine covers, eg some finance papers as only one example. Roslin's knowledge of this kind, beyond the purely technical painting skills, was as briefly described here – obviously very wide. ^{94 95}

7.3 The composition of the painting - with two examples for comparison with works by Titian and van der Helst



fig 25, Examples of types of comoposition techniques.

Even only at a visual observation and considering the time for the creation of the work, it's easy to get the impression that Roslin as earlier mentioned, made his Self portrait 1790 in an almost ostentatiously conventional traditional academic manner. Apart eg the for the time archaic clothing costume , he could hardly have chosen a more conventional academic composition form than the one he once chosed (the compositionform is sometimes called " root 2 " composition). This composition shape was very common and popular especially among older masters. In the CD appendix (chapter 11 p.94) fig.25 above is shown in addition to Self-portrait 1790, line drawings from two paintings of the same type of compositionform by two of Roslins favorites, Bartholomeus van der Helst (1613-1670) and by Titian (1488 / 90 to 1576). Roslin here connected to older established traditions instead of

⁹¹ Lundberg (1957) part I, p.144, drawing by C.Cochin the younger, etching by Nicolet, Institute Tessin,Paris

⁹² Lundberg (1957), part I, pp.144-145

⁹³ CD-app chapt..14, pp.123-132

⁹⁴ Lundberg (1957), del I, p.144-145

⁹⁵ CD- app. p14, p.123-132

working in a for the time more contemporary manner. The results from the natural scientific investigation were as well demonstrating a traditional academic structural build up of the painting with the choice of a double ground. Compare also with the two authenticated portraits that accompanied the Self portrait 1790 at the Salon in 1791(see 4.5. p.29).Despite that the technical build up of the two accompanied paintings at the Saloonexhibition 1791, haven't been investigated, all the other information given and in combination, suggests a quite thought out intention with the Selfportrait-1790..

7.4 The painting -materials and the structural build up

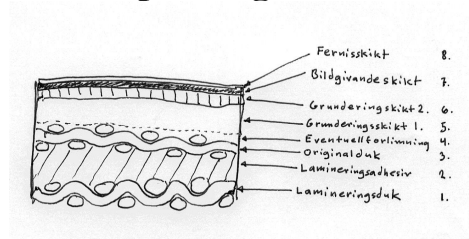


fig.26. Crossection

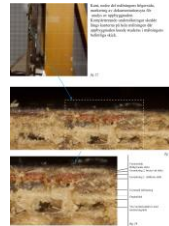


fig 27. Crossection

7.4.1 The canvas

A secure noninvasive verification of the fiber material was not possible to perform with the means available at the investigation. The macro /micro photographic documentation could not obtain clear enough results to extract a specific type of fiber, mainly due to the fact that the whole canvas material is soaked in a wax /wax resin material. No loose fiber residues from either of the two fleeces (lamination /original -cloth) emerged from inside the mounting frame.The possibility of proving/disproving the canvas material to be hemp (see Vanderlip - Carbonell 2.2.2 p.11) was theoretically possible to authenticate through macro /micro studies of the fiber cross-section along the painting's edges. Hemp fibers differ significantly from for example linen and flax. In practice however, it proved impossible to verify, not due to insufficient magnification but due the low relative contrast within the material, in large part due to the wax / waxresin impregnation and the tools available at the investigation (regarding, filters and lighting opportunities at the time).

7.4.1.1 Structure of the weave

The painting is laminated on its back and well covered with primings and layers of paint and varnishes on the front and do not give much information away regarding weave structure, due to this circumstances. Radiographic documentation visualize the canvas clearly and show a relatively dense canvas fabric. Estimation: Spots per cm. ca 10, warp per cm: ca.12. ⁹⁶

7.4.2 (Eventual) Pre -gluing -Sizing

Macro / micro documentation (see CD appendix chapter 11 p.96) suggests a possible pre-gluing of the canvas, but the conclusion is uncertain due to the soaked in wax / wax resin media who limited the opportunity for analysis. Traditionally canvases were preglued, usually with an animal glue. Divergent opinions regarding the need for pre-glueing , occurs in

⁹⁶ CD-app. pp.136-139

the historical source material from 1700's. One example is of Oudry (1686-1755)⁹⁷. Multiple links exist between Roslin and Oudry but if Roslin in this case followed Oudry's recommendations is left as an open question. The issue also has most relevance if the cloth once was produced after Roslin's specific desires due to that the canvas is most likely purchased finished. Verification exists that Roslin bought ready made canvases.⁹⁸

7.4.3 Double ground

Both the Double- portrait - 1754, and the Portrait of G.P. Creutz c.1764, (see 3.3, p.22) is constructed in a identical or nearly identical manner, as the Double portrait -1790. A working method and tradition as mentioned earlier, that was strongly linked to the traditions within Academy using double grounds.

7.4.3.1 Primer layer 1 – Redbrown type of layer

Visual assessment, macro / micro analysis, showed in comparison to the groundlayer above, a rather thick reddish-brown layer of Iron oxide type Pigments. The type of Binding media was not possible to verify with the chosen analytical methods used for the survey. Original binding media once used for the ground is often extremely difficult to verify due to that overlay adhesives penetrates through from the surface. According to the historical source material drying oils was the most common, but also eg protein glues and different oil emulsions could occur.

7.3.3.2 Primer Layer 2 - broken white layer

Visual assessment, macro /micro analysis showed a thinner broken white layer of Cerusetyp , ie White lead mixed with chalk and with a smaller amount of Charcoal Black. Based on the visual assessment also likely with some impurities, probably in part consisting of a small amount added Iron oxide Pigment (-s). The chalk content has helped to make the surface smoother (further enhanced by grinding, eg with pumice). The chalk content has also helped to give the layer a certain transparency against the underlying red-brown layer, which is the very idea of this technique. The result is a kind of light blue-gray surface, slightly cold in character, very reminiscent of some of the (stock) types of papers used and popular for drawing work at the time (eg preparatory sketches). To give the surface a less bluish and more neutral bright blue-gray tone, a small amount of Iron oxide, type Ochre or Umber pigment often was added. A tiny hint of Iron oxide is enough to break off and neutralize a shade of blue that might otherwise be disturbing and dominant for the further color applications. The binder in this layer has certainly from the beginning been consisting of a drying oil medium. White lead works very poorly in water-based media. Possibilities of analysis of binding media was as mentioned earlier hampered and perhaps even impossible to verify due to absorption of added binding media on top.

⁹⁷ Oudry (1752),p.6

⁹⁸ Nilsson B./ Svensson A. (2007) Alexander Roslin Virtuoso Painter of Fabrics and skilled Craftsman In: *Art Bulletin of Nationalmuseum Stockholm*/ Vol.14 / Editor: Lena Holger / Stockholm / pp.99-102 / ISSN 1401-2987

7.4.4 The Pictorial section of the painting

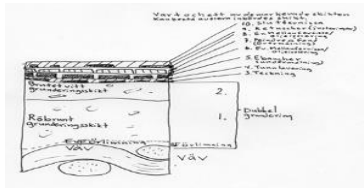


fig.28 Structural build up of the painting, pictorial part..

7.4.4.1 Pigments

Underdrawing: The artist most likely used a black crayon, type shale. Black shale is a much harder material than, say, charcoal and would facilitate the execution of a precise line drawing of the type found in the painting better.

The colors (pigment / binder) of the painting:

The color pigments was verified on the painting was as follows:

Clear verification of both pigment group and specific pigment :

Prussian Blue, Brown Iron oxide, type Raw Sienna, Cinnabar light, White lead, a yellow Iron oxide pigment, type Light ochre, Naples yellow light.

Clear verification of pigment group:

Brown Iron oxide, type Burnt Umber (possibly even for a bitumenous type pigment, type Kassel brown/ Cologne earth or similar), Brown Iron Oxide, Greenish Ironoxide, type Green Umber, Brown Iron oxide, Brown Iron oxide, type Dark English red / Burnt Terra di Sienna / Indian red, Red type of laquer (probably of Carmine type) .

Green colors:

Green color on the painting consist of various mixtures of the pigments above, eg Prussian blue, mixed with various brown-yellow or yellow type Iron oxide pigments, like Raw Sienna, Light ochre, alternatively mixed solely or in combination with Naples yellow light.

Black pigments:

In the painting there occur one, but probably more than one type of Black pigments, that could not be further verified by the tools for the investigation. In addition to a pigment type as Charcoal Black, is presumably due to different pictorial benefits of the pigments, also used Bone black and / or Genuine Ivory black type pigment-s. For the current time a rich variety of black pigment types were aviable for the artists.

7.4.4.2 Bindingmedia

No technical verification of the binder-s on the painting was executed. The hope was to carry out a non-invasive verification of at least some binders by Raman probe. Something that didn't proved possible mainly due to the painting's thick varnish layers, but possibly also due to extremely short time for applying this method (see 6.5.2, p.44). The following conclusions are primarily based on visual analysis (see also 5.5, .34).

7.4.4.2.1 Drying oil (- s)

Based on visual evaluation the binding media consists predominantly of drying oil (- s) . Traditionally the most common type of drying oil in Roslin environment and milieus, were nut oils prepared with derivate of lead for siccative purposes. Other types of drying oils traditionally used, often purposely, for certain types of colors, was linseed oils and poppy oils.

7.4.4.2.2 Water-based binding media

On the painting was verified a red lacquer type pigment, probably of Carmintype, which was the most dominant red lacquer paint material during the period. Carmine pigments works poorly in oil technology and was/is therefore often used in conjunction with an aqueous medium. Examples of the historical source material often refers to Cherrygum (a carbohydrateglue, in qualities similar to for example Gum arabic)⁹⁹. Attempts were made with macro /micro studies of relevant surfaces on the painting such as the palette, though this aqueous laquers, after drying, on macro/micro level usually gives crater-like surfaces and in this respect can help to facilitate binder verification. Depending on the painting's thick varnish layers it was not possible to provide secure authentication using this method.

7.4.4.2.3 Resins

If Roslin mixed resins directly into the paint in construction of the painting, is an open question. He has previously used intermediate varnishes in this stage of the pictorial construction why this is possible (see Creutz , 3.3.3 , p.23). Investigation of the edges of the painting in the macro / micro technology with UV was performed without any authentication of this working method emerged. Analysis with sharper tools, especially regarding UV -light might been able to present more information than was possible at the time of examination. The question of eventual use of resin oil colors has therefore to be kept open.

7.4.5 Finalvarnishes

Current varnish layers on the painting is not considered original and therefore of secondary value in this context. If traces / fragments of original varnish are hidden under the more recent varnishlayers, could not be determined. Varnish removal in earlier times was most often much more " heavy-handed " than today. The removal of the original varnish (-es) and the application of new, can have been made more than once. A reasonable assumption is that the first elimination occurred in conjunction with the wax /waxresin lamination, which based on visual assessment, apparently are of an older date (documentation is lacking). In earlier times similar and sometimes identical varnishmaterials to the original varnish could be used in revarnish treatments, circumstances that further complicate future analysis. If remnants or fragments of original varnish occur on the painting, remains an open question.

7.5 The imaging part of the painting build up: -structural building steps - a reconstruction of the process

7.5.1 Introduction

This, in comparison with the overall construction, very thin part layer (average of about < 1mm), is the most informative, most complex structured part of the painting and characterized by containing the largest amount of different types of materials. At the same time it's more detailed information especially regarding the structure set up in this part is the most difficult to deter, not least because of this parts intrigued complexity. The report is

⁹⁹ Groen (1997), see also i:e Dossie (1758), p. 57

therefore based especially in the painting section, on reasonable assumptions regarding construction, in its turn based on what is known from historical sources and current practices. Lessons learned from the reconstruction study (see 7.13 , p.59 ff) and with concordant references to the approach outlined by the artist himself, such as depicted in paintings under construction in several of his own works ¹⁰⁰. Exactly in detail how Roslin proceeded with the construction of the painting, will most likely never be known. The following chart should be able to provide a reasonable description of the work process step by step, based on the results obtained from the survey and based on what we know about the materials, working traditions and painting technical logic.

7.5.2 Initial preparation -Esquisse –pre study (-ies), idea'sketch (-es) oil sketch (-es)

After Roslin received the idea for the painting, testing and adjustment of subject most likely would have taken place. Roslin has most likely used a model doll 1:1 together with other paraphernalia , mirrors etc., to determine the composition. Some preliminary studies with chalk on colored paper could then have followed. Only one oilsketch from the artist has emerged (in this case a more worked out oil sketch of the type that was intended for the presumed customer, see 7.5.2.2 below) which may suggest that the artist on orders often constructed the motif directly on the canvas. ^{101 102}. In this case, with himself as a model so the artist should, however, have had more time for preparation and reflection than in a normal contract work.

7.5.2.1 Roslin and the use of model dolls

The assumption that Roslin used model dolls, hardly requires any great imagination, considering his attention to his often extremely detailed and realistic representations of different fabrics and costumes (which of course is one of the artist 's signature and part of his fame). Roslin was for his income dependent on what is reasonably to assume to have been that of a very spoiled clientele, speaks further in support of this type of working method. (See for example the complaints from some of Maria Theresas (1717-1780) daughters about the time Roslin demanded for making a portrait ¹⁰³. As another example, Diderots (1713-1784) criticism of Roslin's work at one time with "arms of wood " may insinuate on the use of model dolls . ^{104 105}. With use of model dolls the artist could ebauche his orders in situ for later completion in his studio. The obvious efficiency of this working method could speak for a proven routine by the artist. A historical note from a visit in Roslins studio during his stay

¹⁰⁰ Lundberg (1957), part I, Selfportrait 1780, part II-III, p.14, kat.nr 64, Etienne Jeurat 1753, p.15, kat.nr. 63, Hyacinth Colin de Vermont 1753

¹⁰¹ The preparatory sketches during the era became to be more and more appreciated, a reason speaking for more sketches should have had a chance to be preserved.

¹⁰² A sign that Roslin mainly performed the preparatory drawing directly on the canvas can be the fact that so few preparatory sketches are preserved, we know of only one example that according to Bjurström ” really is the only drawing by Roslin that we most likely can dare to attribute to the artist, or rather the drawing that makes the foundation for any other attribution” Obviously the drawing is a prestudy to the Portrait of Jean Eric Rehn (see Bjurström 1993, p. 193).

¹⁰³ Andersson (1995), p.49-50

¹⁰⁴ Lundberg (1957),part I, p.121

in St. Petersburg indicates just the above described working habits.¹⁰⁶

7.5.2.2 Roslin oil sketch (-es ?)

Roslin should in preparing for the painting been in need of (at least) one simple oil sketch, (presumably made in broad strokes) to determine the main coloring and choice of colors and layout of lights and shadows. For the Double portrait -1754, exists a well worked out oil sketch of the type that could be used to present to a prospective purchaser of a work.¹⁰⁷ We are not aware of any prospective purchaser or oil sketch from Roslin's hand regarding the Self-portrait 1790 (a reservation must be invoked about the replica at the Tessin Institute, Paris, due to that the dimensions did not emerge, see 4.3, p.28) .

7.5.2.3 Use of projection aids?

Regarding Roslin, and considering the very exact underdrawing on the investigated painting, there exists the possibility of using these (in some cases) timesaving working aids. The evaluation that speaks against the use of these methods by the artist are several and consists primarily of the following:

1. The relevant projection techniques, focus primarily on line drawing. Even such a skilled artist as Roslin would without a reasonable doubt, have had the need for more in depth pre studies. Lines in itself is an abstraction, due to that they (generally) do not exist in reality, a reality which instead consists of lights, shadows, areas and volumes. Drawing in this context is rather a language and a tool to assimilate reality, instead of a direct realistic means for depiction. In order to be able to reproduce a design in a realistic way, and even for a skilled artist, a line drawing is most likely not enough, due to that the artist really deeply must *understand* what he (or she) intends to depict through in depth studies of, surfaces and volumes, lights and shadow conditions. Mechanical projection especially regarding the actual painting part can hardly be considered a satisfying tool for the artist in this respect.

2. The fact that the composition is so consciously composed around a series of composition lines (see 7.3, p.48) rather indicates that Roslin more freely composed and revised the design in an inspired way, than that he with a technical device depicted by lines a finished composition. More likely considering the work on the canvas in this step, for freedom and convenience in the creation, might been use of eg a grid frame, with threads in a square pattern (possibly supplemented with diagonal composition lines) and placed between himself and the subject and with the same square pattern written in the required format on the canvas. This working method would have several advantages over eg a " camera obscura " approach , when it was not dependent on the shielding of light and allows as a comparison for a more freely way of composing and producing.

7.5.2.4 Claudeglass and other optical aids

Regarding the possible use by the artist of a device such as a so called Claude Glass (see 2.5.2, p.14), it is impossible to verify if Roslin himself used this (simple) tool due to that no documentation have emerged. Observing the great usability of this type of simple device, the question should be kept fully open and may even been seen as quite possible. The device and technique is so useful that it without doubt could have been of benefit even for such a driven

¹⁰⁶ Olausson (2007a) p. 39

¹⁰⁷ Ibid, p.172,cat.nr.69

artist as Roslin.¹⁰⁸ What seems clear judging parts of the painting's extremely intricate details, and considering the artist's age and his testified deteriorating eyesight at the time for creation of the painting, is that he for managing these type of worksteps, must have used one or more types of optical aids.¹⁰⁹

7.6 Roslin and the Esquisse part (as a part of the Ebaucherstep): Construction of the drawing on the canvas

The investigation revealed a very thorough, detailed and if one like, meticulously executed exact line drawing. Traces from changes didn't emerge. IR -reflektography (see 6.2.1, p.37 and CD appendix chapter 15 p.123 ff) registered some darker indefinite spots that could be reminiscences from adjustments to the artwork, but verification is uncertain. The finished result obviously was a very carefully executed line drawing with even many of the smallest details registered.

At this stage of the work process Roslin had a pleasant light gray-blue painting surface, in a slightly cool tint to work on, (see 2.6.1, p.16) possibly of the same type as the preparatory sketches was performed on (type colored rag paper). Drawing material most likely have been the same in both cases, a black chalk, possibly supplemented with a light type of chalk? in a doubleholder of the type that the artist himself have depicted in several of his paintings¹¹⁰. No evidence was found that Roslin in this stage of the pictorial build up used a grid pattern. In use of the grid system, grid lines can/could be deliberately built with white chalk, white chalk lines that later could be completely absorbed in the overlying paint materials and without the risk of future impact on the surface (pentimenti). Changes and adjustments with chalk could at this stage be performed easily with eg a cloth, feather, or a sponge with a little water, Preferably performed on a oil primed ground with appropriate saturation (or slightly basic grinding)¹¹¹. It is from this circumstances therefore a reasonable assumption that Roslin after some pre sketches, performed the major work on the underlying drawing on the canvas.

7.6.1 The drawing performed on a finished double ground

The choice of color on the chalk, speaks for that Roslin didn't use Bottegiandetechnique¹¹² due to that this dark tone of course is preferable to a lighter or white variant that would have been better suited to (in this case) the redbrown first groundlayer. The order of procedure of the construction of the ground vs. underdrawing may thus be verified. The fact that the chalk

¹⁰⁸ The use of guidelines doesn't exclude eventual use of projection methods. One example is Vermeer (1632-1675) that possibly made use of both guidelines and projection methods. See also Wadum (1995)

¹⁰⁹ As one example, see Olausson (2007a), p.73

¹¹⁰ Several depicted paintings on paintings from the period, among others by Roslin himself, shows a predrawing of the motive with chalk, most often in a penholder with a light and a dark color on its ends

¹¹¹ Current historical source material most often describes a build up of the ground with oil media, a working method that of course facilitates for adjustments with such as chalk.

¹¹² On larger formats, the drawing could be performed directly on the red brown ground, depending on the further choice included Bottegiande technique.

probably also is black and not eg redbrown (another common color) is indicated by IR - documentation that (unfortunately) usually have a difficult time registering this material. The execution of this type of artwork can tell a lot about the artist himself and his workmethods, very much more than when we are only referring to considering and evaluating the finished result of his choice, allowed by the artist to let us see. To my knowledge it is the first time that we are able to get to study these conditions in one of Roslin's paintings at least in a documented way. Roslins drawing is extremely thin and precise, changes are few. One can eventually assume traces of pigment around several lines which may suggest minor adjustments, but verification is unsecure (see IR reflectography CD appendix chapter 15 p.123ff). Possibly he followed the line drawing slightly less accurate when he reinforced it with color in the artwork of silk , than he did in the face. One can perceive the drawing work as rigorous, almost pedantically done, really same term planning and touch that he shows in his handling with the colors of the finished result. The photographic documentation has just marked the lines assessed as safe, there are likely to be many more parts of the photo documentation that is directly connected with the drawing ¹¹³.

7.7 The Ebaucherstep - Roslin's initial work

The artist in this step started to reinforce the design, volumes and lighting conditions. Roslin most likely worked in the same way as he have described the working process in a pictorial way on several of his own works, such as his portrait of his wife on his self-portrait from c 1780 ¹¹⁴ and of course even considering the pictorial build up of King Gustav III at the investigated painting: An initial thin painting in brown tones, followed by insertion of the local colors at an early stage of the build up. Roslin worked in a Venetian painting tradition where the painting traditionally in the initializing step were built up with various brown tones. The use of various brown tones is often crucial in order to use this technique to the fullest. Generally, paint application at this stage preferably had to be rather thin in order to fully exploit the pictorial harmonic qualities from the underlying surface. An example would be (several) brown color tones ability to be able to " bind " together divergent colorvalues/ -hues to a harmonic unity.

7.7.1 Conclusion -Roslin's initial work with oil paint on the painting, transmission to the next step

The assumption is that Roslin after an initial construction in shades of brown, put in local colors quite early in the image production. The historic source material on painting technique often emphasize the necessity of the painting in this step to have some "body" so the color tones later on not subsequently will be brightening up or will sink into the ground support and thereby be changed, particular in the carnation parts ¹¹⁵. That Roslin followed this type of guidelines in the technical build up of his paintings is indicated not the least by the overall good condition of his oeuvre. Advice could also be given to let colors be built up in layers

¹¹³ CD- app. chapt.15, pp.139-152

¹¹⁴ Olausson (2007a) p.268,cat.nr.97

¹¹⁵ Oudry (1752), p.10. Se also Massing (1998), p.354

with the local colors, a work manner which according to some sources to have sustainability benefits ^{116 117}. Regarding the Selfportrait 1790, especially some of the more chromatic color types that occur in the painting such as Naples yellow, can easily sink into the ground (and give color tones that in this context with a dark brown undertone pulls sharply against bright green !). This if the foundation is not first built up on a reasonably solid foundation of colors within the same color range as in this case Naples yellow light, such as yellowish types of ochres ¹¹⁸). The transition from the Ebaucher step to the Peindre a'fond step was not possible to discern and securely authenticate with the analysis techniques that were available at the investigation.

7.7.2.1. Conclusion regarding a reinforcement of the linedrawing on the painting

From an ocular judgement and from the emerged results from the investigation, no traces occur from a reinforced linedrawing on the investigated painting. Aging of paintings can sometimes enhance reinforcements in form of relief on the painting surfaces. Attention to these unwanted circumstances was made even during Roslins time, among others by Oudry (1686 –1755) an Artist and teacher with a clear link to Roslin himself, who for the given reasons disapproved enforcement of the line drawing ¹¹⁹. A reservation must be made for the possibility of the workhabit of grinding/ scraping the pictorial surface.

7.8. Handling on the uneven sinking of binding media on the painting, during the technical build up

Roslin, as most artists using the described type of pictorial build up at this stage had the need to counteract that the binding media at this phase of the work would have sunk in unevenly on the surface and as a result reflecting the colors unevenly. Judging from the historical source material, the most common approach (then as now ?) likedly was to pull over the surface with a binder such as a drying oil ¹²⁰. During the 1700s it existed an awareness for the risks of yellowing. A nut oil like walnut oil yellows less but some yellowing is probably even here always inevitable in the long run. Oudry (1686 - 1755) suggests as an alternative, the use of an intermediate varnish ¹²¹. An approach that he simultaneously mentioned was quite uncommon (his statement was made in 1752) . Roslin has, as mentioned earlier, evidently used intermediate varnishes during the making of the portrait of G. P. Creutz c.1764 (see 3.3.3.1, p.23) and connects here to Oudrys ideas, but how consistently he used this work method is for now not possible to judge. A reasonable assumption is that he may have used both a drying oil such as Walnut oil and intermediate varnishes. Viewed from the paintings state and good condition, this speaks for an economical use of binders. For the same reasons Roslin must have been very frugal with the use of solvents such as turpentine and / or Lavender oil ¹²²

¹¹⁶ Massing (1998),p.354 ff

¹¹⁸ Some paintings such as from Roslins visit in Parma, Italy, contain color values within these intervals, see Olausson (2007b), p.131, kat. nr. 16, p.186, 187

¹¹⁹ Oudry (1752), p.14

¹²⁰ Massing (1998) p. 344

¹²¹ Oudry (1752), p. 11

¹²² Personal experience of the latter media, gave an impression of that aless quantity was needed for the same

7.9. The Peindre a ' fond step -the over painting stage

In this step the final colors were applied. If Roslin followed the advice from Oudrys instructions, impasto should have been applied in this step (impasto parts are though almost nonexistent on the investigated painting). Visually Roslin here in this part of the technical build up, demonstrate use of almost all available techniques for applying color. From A´ la prima to Scumblings, Stipplings, Glazings and Frottis. X-ray documentation (see CD appendix chapter 18 X-ray documentation p.150) shows eg how sensitively Roslin used stipplingtechnique to highlights the structure of for instance the face.

7.10 Treatment against uneven reflection of pictorial surface - insulating surface -completely or partially

See 7.8. above.

7.11 The Retouching step –final adjustments

Roslin in this final phase, made minor adjustments, primarily in a la prima technique, were at least some are possible to detect even at only an ocular glance. Probably with the ability to make adjustments due to in this stage with working over a completely dry surface. With its remarkably skillful execution, it is a reasonable assumption that these admissions at least in part and especially in this case presenting a selfportrait of the artist/craftsman, was intended to show off skills and the artist's technical ability. Optical aids most certain have been used for several extremely fine details on the painting. An unconfirmed possibility is that the Retouchingstep included thin to very thin brown glazes of eg of bitumenous type. Roslin has previously made use of bituminous materials (see 3.3.4.4, p.25), which can be of excellent coloristic value in the final steps of execution, eg for adjusting the lights and enhance the mood of a painting. The sad fact is though that we will never know if this ever happened in due to the former varnish removals that then would have wiped this solvent sensitive types of pigments away.

7.12 Final varnish

The painting in its original state, with all likelihood had a final varnish, and most likely applied with several thin layers. Possibly the artist applied the last adjustments regarding eg gloss, in situ at the Salonexhibition.

7.13 Experience and conclusions from a reconstruction study -a reference for the inquiry



fig.29. The painting under construction in the Ebaucher step with transition to the Peindre a ' fond step.

The study was performed on the same type of doubleground as the original and using the same types of pigments that emerged during the investigation. Several color inserts that provide visualization of the original 's ultimate sharpness are located in the Retouching step and most often performed in a'la prima technique.

Aiming at in a deeper sense try to understand the coloristic construction and functioning of the Self-portrait -1790, this can not be done if one only assumes the color traditions and color perceptions that have been dominant from the early 1800s, the painting is far more complex in its structure and composition. If, in this particular context only one aspect should be highlighted (and concerning 18th century painting and especially portraiture in general), it is the refined and subtle work with hot and cold color shades and hues in this type of workmanner. Perception wise, we have here apart from the actual color sense also to consider the sense of sensitivity. These conditions and production methods, - being able to get the cold tones without eg need to use blue - is deeply and directly linked to the painting technical work manners in Venetian painting tradition and makes for one of this method 's advantages and sophistication. The main secrets lies in the choice of the pictorial build up and is based on a few fairly simple basic principles that (now) commonly are referred to as – Rayleigh effects¹²³. The concept is based on the fact that a light color that overlays a dark colored appearance where the foundation layer somewhat shines through - comes across as a cold tone, and vice

¹²³ Referring to John Strutt, 3:e baron Rayleigh, British physician and Nobel prize winner (1842-1919)

versa - a dark tint put over a light colored appearance, comes across as warm.

- Perhaps the most important in this context, is that the knowledge of these conditions is crucial to grasp a real knowledge of such a complex structured painting as in this case - *at a scientific analysis* - where the scientific results then can be placed into a logical structure and context.

- The colors of the painting (and the painter palette) can with other words significantly differ (and once have been differing) from the colors perceived from the painting.

7.14 Other notes

- Scumbling is probably at least as common on the painting as fine glazings. On some parts are the scumblings so thinly applied that they rather can be " felt " than directly be perceived by the "eye ". Whether these types of separate layers can be clearly deduced eg at an average color analysis is an open question. The margin of error should be very large and the information content is likely to many times be even directly misleading. - Probably exists at this level, often also no clear distinction between scumblings and glazes, mainly due to pigment type and amount of binding media.

The huge value of using different brown tones becomes evident at a reconstruction study.

Despite the painting's color -related complexity and structure - still try to conclude something about the subject based on the current starting points, one can for example look a little closer at the coloristically most central part of the painting - the golden silk fabric of the artists clothes: As previously mentioned, Roslin, likely after a brownish initial underpainting built up the volumes with (mostly) different iron oxide pigments within the yellow and yellowish-brown color range. This aiming to give the volumes and forms "body" and form a foundation for stronger color pigments, in this case especially Naples Yellow (which otherwise can easily sink into the substrate and greatly change the color / denomination)¹²⁴(If Roslin used intermediate varnishes in the same way as he evidently used on the portrait of G. P. Creutz c.1764, is not known .¹²⁵ Naples Yellow can function as a semi- translucent pigmentation when applied. Based on visual assesment, the darker and cooler shades seem thereafter to have been restored with deeper yellow tints. Roslin here also made use of one or more black pigments, which when given a glaze finish, and in this context, especially manifests themselves in the form of warm brown color tones. Reddish tones have been used primarily to indicate the direction of the shapes and volumes. Based on visual assessment, in all cases primarily using one or more Iron oxide type pigments for this purposes. An Iron oxide pigment type with good glazing properties that from a visually viewpoint seems to appear on the painting and on the pictured palette, is a pigment of the type Burnt Terra di Sienna (see 6.4.3, p.42). Reconstruction studies also showed the presence of Prussian blue in the gray-green background, a pigment that in its complementary color functions, harmonize and enhance the golden yellow tones on the suit. As a comparison with eg a 19th century painter who most likely in a similar way faced the task of enhancing eg some blue and green colors,

¹²⁴ CD-app., chapt.19.17.3 p. 204

¹²⁵ CD-app. Chapt. 13, pp.114-116

would have made use of the more chromatic colors and complementary color relationship. He would certainly in this phase of the work, when it became an issue with the local colors in most cases, would begun to think of (what today is referred to as) the complementary colors of the yellow and the red spectrum. This due to the awareness of these conditions that existed during this period (and further ahead in time) eg with M.E. Chevreuls (1786 - 1889) color hue circles and new discoveries on the subject. A 18th century painter did not have the same theoretical base but instead likedly learned how these conditions work out from a intuitive and empirical ground. Moreover was glazing technique widely in use during this century. A method of raising the color pregnancy of different colors may be to glaze over a colorlayer with its complementary color. One way to do this might be to for example glaze over a blue part with just brown (brown can be considered as a yellow with lower intensity, the result would otherwise obviously be green). A red colored surface can likewise in this way be glazed over with a brown with a tinge of green. Regarding the brown colors, as example of the brownish Iron oxides of different types of umbers, so do they work exellent as simultan contrastcolors, and where the hues easily can be made to pull in different aimed directions. It is also possible to enhance colorpregnancy through the use of "positive" and "negative" colors. As an example it's possible to enhance a red color by setting it against appropriate gray shades and colors. The technique has been used by Roslin in the process of making the facial parts ¹²⁶.



fig. 30. The depicted palette on Roslins Selfportrait 1790.

¹²⁶ Eastlake (1847) reprint Dover, New York, part II, p.373, see also Andersson (2011a) regarding treatment of colors.

7.15. The Painting: Conservation report / Condition report

Malmö Art Museum

CONSERVATION REPORT / CONDITION REPORT -Painting

Artist: Alexander Roslin

Title: Self Portrait -1790

Reg No: MMK 891

Material / Media: Oil on canvas

Size / Dimensions: Mounting / Mount:102 X 79 cm

Inspected by: Kristian Andersson, Painting Conservator **Date:** 2012-07-27

General condition: Must be assessed to be in good condition. Present damages primarily consist of very fine scratches in the thinly applied recent layer of final varnish. The very fine diagonal needle type craqueleurs are likely a result of inadequate handling during a former conservation lamination procedure.



fig.31. The painting , state and condition

Red marker: Puncture/ retouching. Green marker: Retouching. Blue marker: Stain , type flyspeck .

For damages, also see photo documentation (CD-appendix). Makro/micro studies showed mechanical wear and tear of the surface layers. The painting surface also shows darkening. These conditions can be partially linked to the natural aging process yet are mainly due to that the painting is constructed over a dark foundation, in this case a traditional doubleground. The lamination work can be assessed as rather skillfully performed using a light wax /waxresins adhesive. The wax/waxresin lamination has unfortunately also contributed significantly to the darkening factor. Wax/waxresin lamination is regrettably, with the methods currently available (2012-13), often considered to be almost irreversible as an intervention on a painting. Wax as a material is not to be thought of as a stable substance and will by time eventually turn sour. The investigation of this study was partly intended to serve as a future reference for observing changes on the painting and for help for future preservation.

Status/Condition:

1.Abraision	2.Dent	3.Hole
4.Puncture	5.Scratch:	6.Accretion
7. Adhesiv rest/	8.Stain: Partial smudge	9.Adhesive residue
10.Draw	11. Fingerprints	12. Discolouration
13.Mould	14. Foxing	15.Buckling
16.Cockling	17. Crease	18. Wrinkling
19.Crimp	20.Tear	21.Patch
22. Surface dirt	23.Oxidized varnish	24. Uneven varnish
25. Cracks in varnish	26.Retouchings	27. Weak binding
28. Craquele´	29.Cupping	30. Convex raising of paintlayer
31. Flaking paintlayer	32. Lacuna	33. Worned edges
34. Fragile	35. Pigment loss	36.Fragments missing
37. Warped frame	38.Colorbleeding	39. Insect damage
40.Repair	41.....	

Widespread (A) = General (G), Middle (M) = Centre (C) The upper left quadrant (EW) = Top left quadrant (TL) Upper right quadrant (HEY) = Top right quadrant (TR) Lower left quadrant (Bottom left quadrant (BL) Lower right quadrant (NH) = Bottom right quadrant (BR)

Frame:	A Tergo :
Richly ornamented gilded frame, Very fragile, need to be reviewed.	The painting lacks back protection. The mounting of the painting in the ornamental frame would need to be reviewed.

7.15.1 Previous preservation documentation

Documentation is lacking in regard to previous preservation interventions for the painting. According to a verbal, and as such naturally disputable, source at the Malmö Art Museum, the painting was treated in the early 1990s by a conservator. Nevertheless, this is plausible considering the overall good condition of the painting and in view of retouches and what appears to be a modern type of final varnish. No details emerged whether any interventions on the painting were made in conjunction with the solo exhibition of the artist at the National Museum in Stockholm, 2007-2008.

7.15.2 Parts of the painting that are not original



fig. 31. The backside of the painting.

7.15.2.1 Stretcher and lamination canvas

The painting has since its conception in France been exported to the United States (see 4.6, p.30). Taking into account the extensive tradition of painting conservation in Europe and France and the fact that the painting at one time was up for sale may indicate that preservation treatment could have occurred in France. The supporting frame, which by visual assessment was established to consist of a wooden crossframe with bevelled edges, does not constitute original and has likely been changed in connection with the lamination work ¹²⁷.

The information contained on the frame is:

A paper label on the top left of center , with the following typed text:

Malmö Museum
Roslin - Exhibition
Summer of 1962
Cat. No . 79

A round blue ink stamp at the bottom on the vertical cross, a type of seal with a monogram that is visually hardly interpretable and with a German text:

* im Bundes (illegible) * 1 * Unterricht * Zentralstall (illegible) fur
Denkmalschutz *

On the vertical cross are hand-written notes in pencil and/or chalk.

Top figure is 61 followed by the middle with one with a brown piece of paper partially covered text, (illegible).

7.15.2.2 Lamination of canvas

The lamination fabric is greatly darkened by the adhesive used, which is usually a good sign regarding its adherence to the original canvas (a part of the lamination fabric on the upper right however shows a slightly brighter spot (see CD appendix ...)). There was no abundance of laminating adhesive present on the back of the canvas.

- Warp: number of threads per square cm: ca 10
Woof: number of threads per square cm: ca 10.

¹²⁷ Stretchers occur according to historical source material already around the midth of the century and is mentioned by Pernety, (1716-1796). He mentions the construction as "chassis a ´clefs" Pernety (1764), p. 129ff

7.15.2.3 The laminating adhesive - a visual assessment

Macro /micro magnification showed a rather thick layer of a light beige wax, alternatively waxresin layer, which, as previously mentioned, may indicate that both the lamination sheet and the original fabric were primed before bonding. UV-exposure indicated the possible presence of resin but verification of this is uncertain. The lamination adhesive has, as mentioned, only marginally penetrated the support fabric on the back of the canvas.

7.15.3 Other Information

Seeing as documentation is missing, one cannot entirely rule out the possibility of former lamination works prior to the present one e.g. with glue media, despite the lack of indication of this. Wax and especially wax-resin lamination became common in the 19th century but has been used well into the 20th century. The working method was progressively abandoned mainly due to the change in color-related and optical conditions in the painting treated as well as from the method's lack of reversibility .^{128 129}

7.15.4 Damages and restoration treatments in conjunction with the original fabric

Radiographic documentation revealed several punctures in original canvas. The punctures have been filled up against the lamination fabric with putty. One portion has an insertion of cloth not placed in line with the thread directions of the original cloth; this insertion is of a different type than the original fabric. This part has also since been pasted with putty.

7.15.4.1 Original canvas –fibre material: The results of the investigation by Vanderlip - Carbonell¹³⁰ claimed a dominant use of hemp during Roslin's period, which is highly interesting regarding the state and condition of this part of the painting and for paintings with a similar provenance using insufficient materials. With further research on the topic a greater understanding of the state and conditions of paintings from this era can be reached.

7.15.4.2 Putty fillings: Putty inserts, as mentioned earlier, performed against the support fabric due to punctures in the original canvas. What materials were used is not possible to determine as they were not exposed

7.15.4.3 Retouchings: Disturbing color changes did not occur in the painting, which might reveal something about the assumed age interval since the last restoring treatment.

7.15.4.4 Finalvarnishes: One can observe that the varnish has probably been changed more than once making it a reasonable conclusion that this at least once has been made in conjunction with lamination/restoring measures. There was no documentation found to support if the painting was treated by a conservator for a solo exhibition of the artist at the National Museum (Stockholm) in 2007-08. It would probably be extremely difficult to find traces and fragments of an original varnish (to the extent it might occur at all on the painting). When revarnishing, materials of the past in whole or in part was of the same type or identical to the original varnish, analyzing them would hereby also prove further difficulties in securing authentication. The surface varnish is very thinly applied and gives a visual impression to

¹²⁸ Andersson (2011a), p.91

¹²⁹ CD-app., see: makro/mikrodocumentation, ie. pp.93-114

¹³⁰ Vanderlip-Carbonell (1980)

consist of some sort of modern synthetic varnish. The varnish is quite blank, which is attenuated to some extent depending on the texture of the painting. A close scrutiny revealed that the varnish contained quite a lot of dust particles ¹³¹ ¹³².

7.15.5 The painting's regular placement: lighting conditions

Compared to the situation about twenty years ago, the painting has since then switched walls –while in the same room- and is now much better placed avoiding any incident of light with indirect lighting. The painting is, as before, hanging in a stable indoor climate on an inside wall. In the museum context, one must always consider audience access versus object exposure. However, in this context, the painting cannot be considered vulnerable regarding public exposure.

7.15.6. Roslin's Paintings - State and Condition - An Overall Impression

Taking into account the interest in sustainability issues in the 1700s, even an artist as Roslin would have been involved in these aspects of painting and gained knowledge that emerges to this day in his works. Academy members had to consider various issues regarding sustainability characteristics in the choice of materials. A historical remark is preserved where Roslin on one occasion in the role of an academy member had to evaluate a blue color by the name of *Outremer factise* ¹³³. His knowledge of painting materials and durability aspects must have been substantial, not least in regard to the overall good condition of his surviving paintings. .

7.15.6.1 Roslin's use of intermediate varnishes: The full extent of Roslin's use of intermediate varnishes is not known; this consideration should be an observandum for a conservator regarding future needs for interventions, especially involving solvents. Roslin's paintings can, with this type of structural build up, be far more sensitive than would otherwise be the case presently, there is no available information to determine if and then to what extent resins by choice were used as a binding media for painting.

¹³¹ Andersson (2011a), p.91

¹³² CD-app.. see: makro/mikrodocumentation, ie. pp.93-114

¹³³ Lundberg (1957), part I ,p. 249

8 EVALUATION OF THE INQUIRY

8.1 Introduction

Due to the limitations in prior information and past research on the artist and specifically regarding aspects dealt with in this study, any new information is of particular great value. Meanwhile, an evaluation of the present investigation itself must be made in order to discover by the experience and, above all, the conclusions what would be potential improvements for future research. This would in this case then concern studies mainly of oil paintings with similar methodology as i.e. completely non-invasive analysis, performed with reasonably available methods and equipment.

8.2 Ramanprobe

Tests using a tool such as a Raman probe for determining pigments and binders on canvas can be a viable method but should probably not be a first choice. A study with this method of analysis on varnished objects would, in most cases, be considered as speculative/off-chance, as in the case presently. In this case, the varnish layers of the studied painting were (in retrospect) considerably thicker than those of the reference tests (see UV documentation CD appendix chapter 16 p-137 ff)¹³⁴. It is possible that at least some safe verifiable results could have been obtained if the study had had a more extended duration (see 6.5.2, p.40). A necessary limitation of the method of analysis, as mentioned before, was also the large safety margins regarding current strength of the power of the laser. Based on the given experience, the Raman probe analysis for e.g. pigment identification would mainly be relevant where one can get around the problem of varnish treatment/s on top of color layers in an investigation. Safe conclusion could not be drawn from eventual investigation possibilities regarding different thicknesses of varnishlayer/s.

8.3 Macro / micro photographic documentation and analysis

Regarding macro/micro documentation, in this context relating to an alternative method of extracting samples from the object, this method has the benefits of being completely non-invasive and can be considered a viable alternative. Many paintings that in earlier times have been laminated have had their edges sharply cut straight, often fixed with paper tape, in varying states and conditions due to aging, wear and tear, as with the painting for this investigation. However, one positive consequence of this is the possibility of a certain visual perspective and comparatively encompassing analytical studies of the painting's overall construction, based on macro/micro documentation along the painting's edges.

However, this analytical method is demanding and developing. Research is ongoing regarding the potential for alternatives regarding improved instruments and methods for macro/micro documentation in these respects, as well as possibilities for UV-documentation of separate

¹³⁴ CD-app. particularly visible, p. 139

layers in the structural set up, all according to reasonable access. The opportunity for spot-analysis becomes, as mentioned, many times incomparably greater with this method compared with traditional invasive sample cuts. Camera bellow technology combined with first-class optics and a good digital camera provides opportunities for magnifications from 1:1 up to several hundred times magnification. The excess of dust particles in the (recent) varnish on the painting posed some difficulties in the photographic documentation and often constitute a general type of problem in this type of documentation. The dust particles are not particularly noticeable in ordinary ocular viewing but become problematic with documentation at this level.

Regarding ocular fiber analysis method, developments can make this method viable for achieving more accurate results; in all cases, for a material such as hemp. The time frame for the present study was too limited for refining this non-invasive technology (e.g with the use of different filters and others opportunities).

8.4 False color techniques

False color technology for UV- and IR-analysis should receive more attention as the method is very useful, relatively easy to use and is based on non-invasive analysis. The equipment can conveniently be compiled by itself – a condition that paradoxically could also be a reason that the analytical method is more explicit. With this approach in this context, the equipment is also relatively inexpensive. The readily compiled equipment supplied by the market cannot be justified on the basis of quality or the pricing at which it is marketed according to personal experience.

Furthermore, a possible improvement might be found in further exploration of the rebuilding/modification by so-called digital (video) cameras for evaluation and potential complement to other equipment. During the investigation there was no access to the ND filter (neutral density filter) - an accessory that should be included in the equipment. In its place, a solution was found by using IR-UV-cut filters in retrospect with a conventional photographic documentation of the painting with an unmodified Canon D5 Mark II. IRFC analysis with this type of solution worked perfectly although the result was a smaller divergence in the fit of the two images as needed, depending on the initial set up. Finally the technique might sometimes be a valuable tool as a complement to noninvasive analysis methods focusing on inorganic analysis such as XRF (X-ray fluorescence) analysis.

8.5 UV Documentation and Analysis

Regarding existing camera optics for using this method of analysis it is of greatest value to have adequate access to quartz optics as this becomes so much more informative regarding the UV-spectrum. In preparation for future studies it is recommended this type of optics should be tested and evaluated. If this holds true then a number of acquisitions can be made at an economically reasonable level, despite otherwise high costs. An alternative would be to

rebuild the adaptation of the quartz lens to a suitable camera (Canon system camera was used in the study, which is likely to have a huge advantage because their type of lense mount allows by minor modification the use of a wide range of lense types of different makes). Access to a UV-meter should also be included in an investigation.

8.5.1 UV-reflectography

Documentation required very long exposure times of up to a minute and a half, despite a relatively large apperture (5.6 and 11.0). At time of the study a UV-meter was not accessible and more detailed information concerning the spectrum of the UV fluorescent lamps were used. The method for documentation could further be optimized with longer exposure times, smaller apperture and with the help of a suitable exposure meter and optimally quartz glass optics.

8.6 IR-fluorescence

The result of IR-fluorescence was in some cases not satisfactory, mainly due to some over-exposure of the images. Over exposure can probably be countered, in this case, by using primarily the ND -filter (neutral density filter), which should be able to provide an optimal result. This type of filter, as previously mentioned, was not available at the time of study.

8.6.1. IR Reflectography

The use of analog- rather than digital equipment turned out to be far superior regarding sensitivity. The cost of the analog devices is also a fraction of that of the corresponding digital variety. The type of analog equipment that is to be preferred, both from economic and qualitative terms, is understandable the latest models (early 2000s at least); otherwise both quality and sensitivity of analog equipment may vary significantly. Today, quality can be matched even with digital equipment. In addition, the possibility of one-shot documentation of the object will obviously be a great advantage in contrast to the ‘mosaic’ mounting of the image material that is otherwise necessary; an advantage at a very high cost nonetheless.

8.7. Conventional photographic documentation

A lesson learned with the conventional photographic documentation was the superior quality that could be achieved by using a digital medium format technology in comparison to the conventional digital, small format. This was true despite the fact that the digital small format technique was to be considered first class for its kind (Canon D5 Mark II, combined with their professional optics). The medium format technology used was a Hasselblad Camera with Zeiss optics combined with a digital back (Phase One HP20 16mp - according to the manufacturer¹³⁵ with a conscious choice to do without any software). Once the software is improved, according to the manufacturer, corresponding parity also is made to the image material previously documented (a record which of course occurred in RAW format). This

¹³⁵ Referring to personal notes from a workshop at the shop Scandinavian photo, Gothenburg 2012

might be worthy of consideration for all forms of picture documentation aiming at a large durable record.

8.8 The need for more information and knowledge in some areas of the study

8.8.1 Scientific analysis of drying oils

Conclusions are based on the results, discussions and evaluations, gained from deriving reference samples for drying oils (reference samples with drying/oxidation period of about 4-5 months) and mainly concerning experiences from the Ramantechnology. There remain doubts regarding the possibilities of verifying certain older drying oils (at least 80-100 years old), such as Linseed oil and Walnut oil, in their fully oxidized state i.e. their chemical similarity in “final”structure and composition, i.e. questioning if a distinction might be even possible in practical analysis? at least regarding the chosen method for analysis and also here considering the extreme sensitivity of Raman spectroscopy. Vandenaabeele¹³⁶ makes use of Walnut oil and Linseed oil with three entirely consistent peaks at a Raman spectroscopy analysis that emerged clearly verifiable even at reference tests for the investigation.

Vandenaabeele’s reports showed twenty peaks of Linseed oil and twelve for Walnut oil. Just how these values are available in a practical material analysis with a complex composition as on an oil painting and considering the time aspect of oxidation, may, depending on the experience from the study, however, remain unanswered (a presumed risk that many peaks can overshadow the underlying records of any other peaks plus the time effect of similarity regarding final oxidation).

8.8.2 Scientific analysis of the layers’ build up

Information is required most from the object where it is least retrievable, especially with the resort of reasonably available methods for analysis. A possibility for separating and analyzing different layers on a painting, especially the layers making the pictorial part, would probably be the method that would prove the most informative. Any reasonably available technology for the opportunity for non-invasive detailed analysis was not accessible when conducting the study (2012-14).

8.8.3 Need for adequate reference materials

Comprehensive reference materials, mainly concerning the contemporary pigments, adhesives and weaves for the painting’s conception would of course be of critical value in conjunction with an analysis.

¹³⁶ Vandenaabeele (2000)

8.9 Some concluding thoughts

In attempting to gain a deeper understanding and greater knowledge of a painting as in the present study, it is striking how challenging it is to study a painting – or any object- without devoting considerable interest to its observer/audience. The artist himself once served as both viewer and as proxy for a future intended audience during its creation. In this regard, the observer/s shares a common platform with the artist, as a point of reference and perspective.. Perhaps one can say that an artist, in a crucial way, must be his/her audience. This is especially relevant regarding an artist such as Roslin who was probably much just his audience. He shared the likelihood of social codes, attributes, attitudes and values in order to best communicate with his customers, both through himself and by his works. These are conditions that, in addition to his technical skills, most likely were crucial to his success. As a 21st century speaker, this is worth considering, given that he obviously also communicates with us seen in how he is appreciated. This despite the fact that we lack many of the references and attitudes that were commonplace in his contemporary audience. In this context therefore, it is worth to be humbled by the finding that in all probability, we can never quite perceive and understand Roslin's paintings as were once intended to be perceived, even though we probably perceive much from a more general, less time-bound perspective. Roslin's work communicates obviously also with us. Regarding communication and what the artist wanted to convey in a material sense this is in turn dependent on the artist's choices and handling of what this investigation has had a primary focus on: the choice of materials and painting technical architecture i.e. *the painting's anatomy*. If one agrees with the description of the conditions observed above, the following will appear in summary: Many of the issues with current knowledge of the painting and its anatomy, in addition to the topics mainly discussed in this work, also, and to a critical and higher degree, should include subject areas of psychology of perception and probably also a topic such as neurobiology. As these subjects areas appear so intimately linked. A broad, thorough and well-grounded interdisciplinary approach is probably necessary in order to reach an even more thorough and comprehensive understanding (at least considering conditions that are not lost to us through their fixed-term nature in time). It is *how* the material conditions of the painting work to fool or seduce our senses (and possibly creating new values) that makes for the actual motives and the underlying logic of the painting's structure, it's technical build up and materials and -outmost for the object's existence.

9 Summary

This chapter presents the results from the investigation of the painting aimed at answering the questions made at the beginning of this study in chapter 1.2, p.1.

1.Pigments on the painting:

Underdrawing: The artist most likely used a black crayon, type shale. Black shale is a much harder material than, say, charcoal and would facilitate the execution of a precise line drawing of the type found in the painting better.

The colors (pigment / binder) of the painting:

The color pigments was verified on the painting was as follows:

Clear verification of both pigment group and specific pigment :

Prussian Blue, Brown Iron oxide, type Raw Sienna, Cinnabar light, White lead, a yellow Iron oxide pigment, type Light ochre, Naples yellow light.

Clear verification of pigment group:

Brown Iron oxide, type Burnt Umber (possibly even for a bitumenous type pigment, type Kassel brown/ Cologne earth or similar), Brown Iron Oxide, Greenish Ironoxide, type Green Umber, Brown Iron oxide, Brown Iron oxide, type Dark English red / Burnt Terra di Sienna / Indian red, Red type of laquer (probably of Carmine type) .

Green colors:

Green colors in the painting consist of various mixtures of the pigments above e.g. Prussian blue mixed with various brown-yellow or yellow type Iron oxide pigments like Raw Sienna, Light ochre, alternatively mixed solely or in combination with Naples yellow light.

Black pigments:

In the painting there occurs one, but probably more types of black pigments, that could not be further verified with the instruments of the investigation. In addition to a pigment type such as Charcoal Black, presumably due to different pictorial benefits, other pigments e.g. Bone black and/or Genuine Ivory black type pigment/s probably is used. In the artist's time, a rich variety of black pigment types would have been available.

2 Some general conclusions regarding binding media on the painting

No technical verification of the binder-s on the painting was executed. Verification with Raman probe didn't prove possible due to the painting's thick varnish layers /(extremely short time for execution?). The following conclusions are primarily based on visual analysis:

Based on visual evaluation, the binding media consists predominantly of drying oil (- s) .

Traditionally the most common type of drying oil in Roslin environment and milieus, were nut oils prepared with derivate of lead. Other types of drying oils traditionally used, often purposely, for certain types of colors, was linseed oils and poppy oils. Water-based binding

media: On the painting was verified a red lacquer type pigment, probably of Carmintype, which works poorly in oil technology and was/is therefore often used in conjunction with an aqueous medium. Examples of the historical source material often refers to Cherrygum.

Depending on the painting's thick varnish layers it was not possible to provide secure visual authentication through macro/micro studies (craterformations) .

Resins: The question of eventual use of resin oil colors/intermediate varnishlayers, has for now to be kept open.

3 What type of painting technical architecture, the artist has made use of ?

The technical build up of the painting is as follows:

Varnishlayers

Pictorial layers

Broken white layer

Red brown rather thick layer

Eventual sizing layer

Canvas

Varnishlayers are not considered to be original. If fragments/rests of original varnish remains under present varnishlayers, it was not possible to verify.

Pictorial layers, - see separate description below.

The broken white layer as part of the doubleground, consist from macro/micro-evaluation of Ceruse (Lead white, Chalk) mixed with Charcoal and most likedly, regarding impurities, also a tiny amount of Ironoxide pigment (-s). Evaluation of the rather thick red brown layer, indicates Ironoxide, which also was the typical material for this type of traditional construction. The build up is of the same kind as have been used on two of the three investigated paintings at Gothenburg Art museum, from 1754 and c. 1764.

In historical sourcematerial most often a presizing is described as a traditional constructonmethod. Eventual verification was not possible to do, due to later restoration activities (wax/ waxresin-lamination).

Canvas material, can probably despite lamination damages, be defined or at least to a degree (verification/exclusion of hemp) in a noninvasive way, due to more precise tools, that wasn't available at the time for the investigation.

Conclusion of the technical build up of the pictorial layers based on ocular view, scientific investigation, historical source material and technical reconstruction studies:

Despite that not an all out and in full depth investigation of the technical build up was possible to investigate it appears clear that Roslin made use of the traditional Three step model, that for the most part of the century was the conventional working method within the Academies.

The Ebaucher step: After a very precise and accurate line drawing that once have been performed on the light grey foundation (Esquisse part) on the canvas, most likedly followed by a further build up and enforcement of the layout with brown washes. The local colors have been applied in an early phase of the workprocess. A workprocess that in this stage would have been the same as is shown in part on the depicted painting of Gustav III on the investigated painting.

The Peindre a'

Fond step:

All possible techniques for applying the paint have been used, such as A' la prima, Scumblings, Glazings, Frottis to name a few. An exception is the use of pronounced Impasto techniques sometimes favored by the Artist earlier in his career. An opportunity exists for the surface to have

been levelled in the various stages of the workprocess (type grinding, scraping). The flat surface is not as a prime fact conceived to later restoration injuries (that have affected the surface) but to a deliberate artistic choice.

The Retouching

Step: The retouching step have in it's main part been performed A'la prima and probably foremost added with some enhancing glazings. Some optical vehicles must have been used in this step, considering the levels of fine details on some parts of the picture and considering the deteriorating eyesight of the Artist at the time.

Final varnish (-es): It was in tradition for the time to varnish oil paintings, the present varnishes on the painting can not be considered original. No information was retained on eventual residues of original varnish as well as the type of handling adjusting insinking of binding media during the work steps (intermediate varnishlayers ?) and eventual use of oil resin colors (a reference for use of intermediate varnishes by the artist exists with the Portrait of G.P. Creutz c.1764). The question of a once use of original tinted varnish (-es) in the final steps of the work process have to remain open.

4- The painting technical architecture in relation to current traditions?

The development for the time was working on lighter, sometimes even white types of support. a development that started during the latter part of the century. Roslin has here very consequently been working in a typical previous academic tradition including the use of a dark ground.(an interesting reference is Roslins painting of Mdme Grill with son and daughter from 1775 were he actually worked on a white ground -chalk/ glue -emulsion?).

5- Any for the Artist specific preferences in approach and selection of materials and methods?

None for the artist specific choices of materials or techniques used that could have been considered original and outside the current traditions could be found. Instead Roslin with his choice of materials and workmethods emerged as a quite typical representant for at the time older academic traditions (see also 4 above).

6. Regarding the Paintings even for the time interval visual archaic appearance: Emerged facts regarding materials and painting technical architecture that can support one or more hypotheses about the painting's visual identity ?

The technical build up of the painting emerged to have been done in a strictly traditionally academic fashion that was not following the artistic developments for the the time of the creation of the work 1790. An more absolute conclusion of an intended purpose with this choice would be a similar investigation as performed, of the two verified paintings accompanying the Selfportrait 1790 at the Saloonexhibition 1791, Visually these two paintings in comparison makes for a contrast and are much more in line with portrait traditions of the time.The technical older type of structural build up agrees well with the visual archaic contence.

7- Present state and condition of the Painting?

General condition: Must be assessed as well. The painting have undergone probably several conservation treatments. Previous preservation documentation is lacking. The painting surface also shows a certain after darkening. Relationships can be partly linked to natural aging, but mainly because the painting is constructed over a dark foundation, a traditional double ground. The wax/waxresin lamination unfortunately also have contributed significantly to the darkening factor. Main damages on the painting consists of holes, punctures, worn edges, after darkening, wax/waxresin lamination. The painting is as before hanging in a stable indoor climate and on an inside wall with appropriate lighting conditions.

8-Present an in depth study of the Painting functioning as a future reference point for the preservation of the painting

Due to the in depth investigation done with this work, paired with the rich amount of high quality pictorial documentation made, a solid foundation should be at hand for future observations and conclusions, based on part from the different methods for analysis used for this investigation.

9-How far is it possible to get current information retrieval using only the reasonably available non-invasive methods of investigation, evaluation of possibilities and shortcomings ?

Possibilities:

An obvious fact from the experience from the investigation aiming at attaining maximum information value with this choice of work method is the need of and the synergy effect of using several different methods of analysis for a final evaluation.

The question is in this context mainly concerned with the need for a mechanical removal of samples from the painting.

The conclusion is that by using several methods for analysis, foremost in depth macro/micro-investigation of different spots on the painting, combined with other methods, in particular XRF (x-ray fluorescence), it is possible to a very large amount with noninvasive means attain the information needed. A further development of especially the Macro/micro investigation methods especially together with i.e UV-light and with the access to the edges of an painting/investigation object, would offer a rich amount of information. With the same technique it would also be possible to easier verify types of fibers of the canvas such as hemp. Regarding the analysis and separation of drying oils from a chemical standpoint, it might be an almost impossible task considering the similarity of the different oils in their final oxidized stages.

Main limitations at present (2014):

The main limitations is the lack of reasonable available possibilities to analyze separate layers of a painting, particularly in the pictorial part. Possibilities with i.e Cyclotrone or eventually L.A.M technique, can in this context not be considered a realistic alternative due to availability and costs for most conservators.

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Appendix
Alexander Roslin Selfportrait 1790
a study of pigments and technical construction

11. Pictures and Illustrations directly connected to the main part

4.3 The two replica paintings to the Self-portrait 1790 –p.28

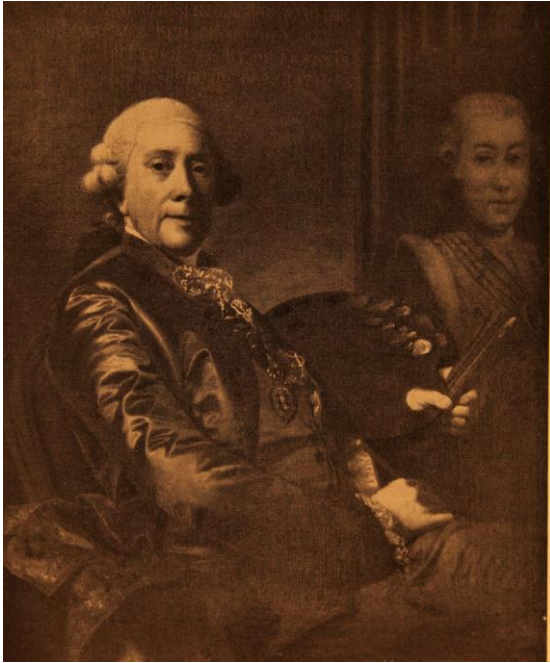


photo:Nordiska museet
fig.5. A. Roslin, *Selfportrait 1790, replica*
Format: 103 X 81 cm
Uffiziegalleriet, Florens¹³⁷



photo:Nordiska museet
fig.6. A. Roslin, *Selfportrait 1790, replica*
"fatto in Parigi 1790"
Format: -
Deposition i Institut Tessin, Paris Lundberg¹³⁸

¹³⁷ Lundberg (1957), del I.s.255

¹³⁸ Ibid, s. 282.

4.5 The two authenticated paintings that participated the Self-portrait 1790 at the Salon exhibition in 1791-p.29

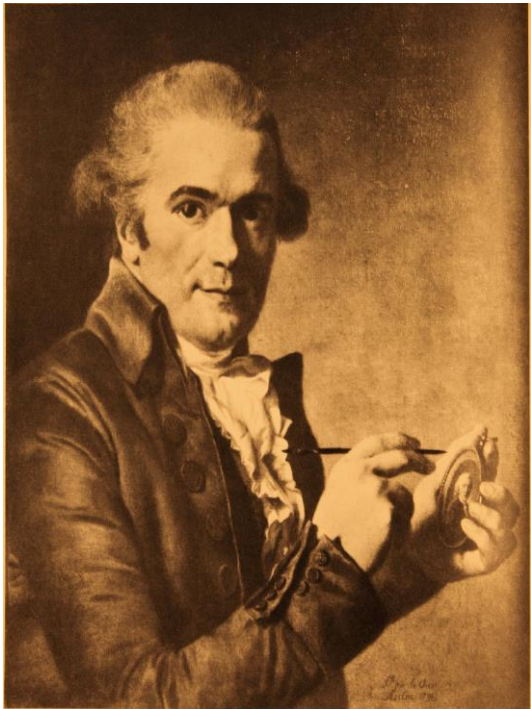


foto:Nordic Museum
fig.7. A. Roslin, Bust of elderly man cradling Miniature Portrait in the hands Lie Louis Perrin (Salbreux) 1791
Size: 58 x 49 cm
Reims ,Musee ´des beaux-arts ^{141 142}

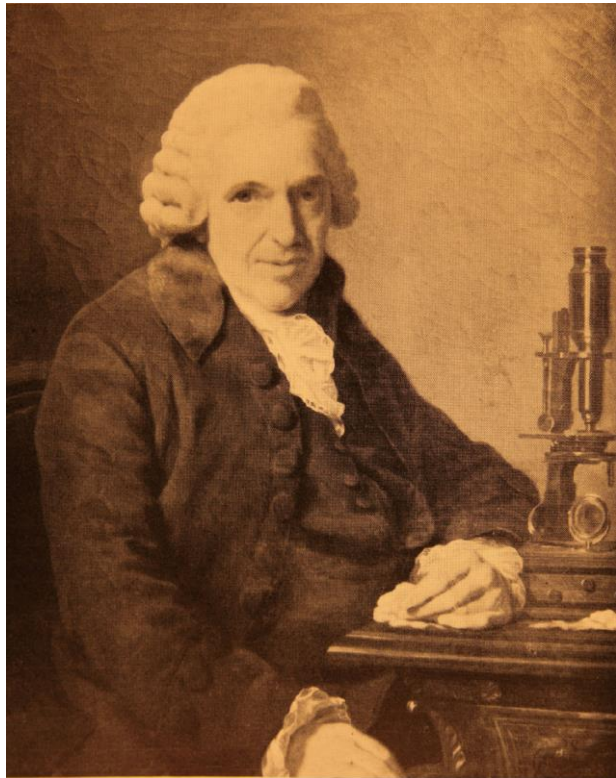


foto:Nordic Museum
fig.8. A. Roslin, Portrait of Natural Scientist Louis Jean Marie Daubenton 1791
Size: 81 x 65 cm
Musee ´des beaux arts Orleáns^{139 140}

¹³⁹ Olausson (2007a), s.206

¹⁴⁰ Lundberg (1957), kat.nr.616

¹⁴¹ Olausson (2007a),s.206

¹⁴² Lundberg (1957),repr.180, kat.nr.614

5.2 Raking light documentation -31



fig.9 Lighting stack(6 X 75 W) with adjustable amount of light, placed on the left side of the painting.

5.3.2 IR -reflektography: -a method for in depth investigation -p.32

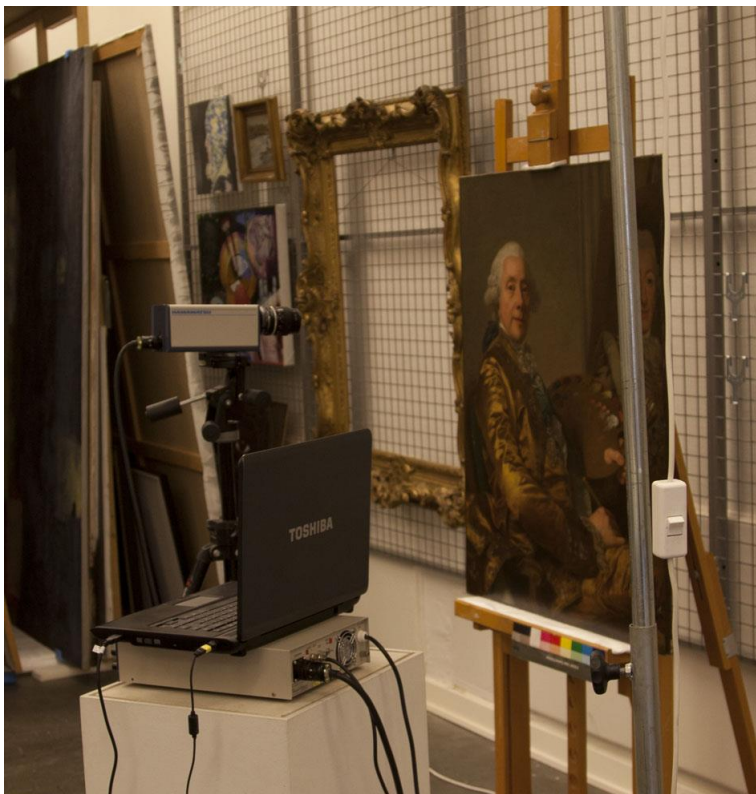


fig.10. Interior documentation with IR -reflektographyi

5.3.4 IRFC (IR- false colours) -p.33



fig.22 . Detail of the palette of the painting , documented with IRFC technology.

5.4 Documentation within the UV –spectrum –p. 34



fig11. Interior, UV-documentation.

5.5 Raman spectroscopy –p.34



fig.12. Interiordetail: Ramanprobeinvestigation of the Selfportrait 1790, the laboratory at the Institute of Conservation Gothenburg



fig 13. Reference tests were performed on color samples on canvas prepared with a traditional doubleground with the Raman probe, Parts of the color samples were covered with a rather thin layer of varnish(in this casea syntetic varnish of ketonetype)

5.7 Radiographic documentation (X-rays) –p.36



fig.16. Interior detail, radiographic documentation (X-ray clinic UMAS Malmö).

5.8 Macro / micro documentation –p.35



fig.14.

In this investigation macro/micro photographic analysis using a digital camera mounted with bellows and a computer, largely replaced the use for conventional optical microscopy. Documentation was done both with middle and small format

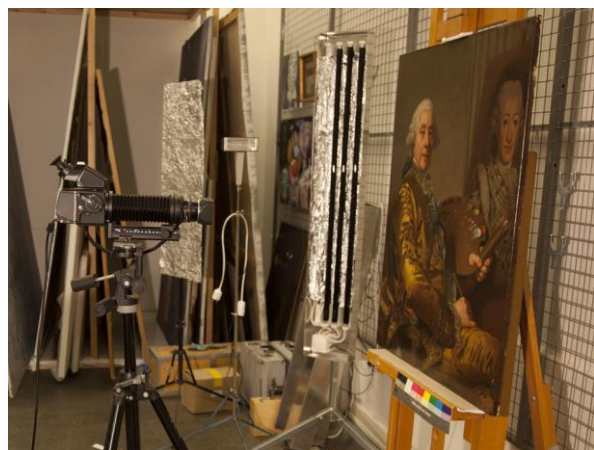


fig 15.

6.4.1 UVFC (UV-False Colours) –p.40

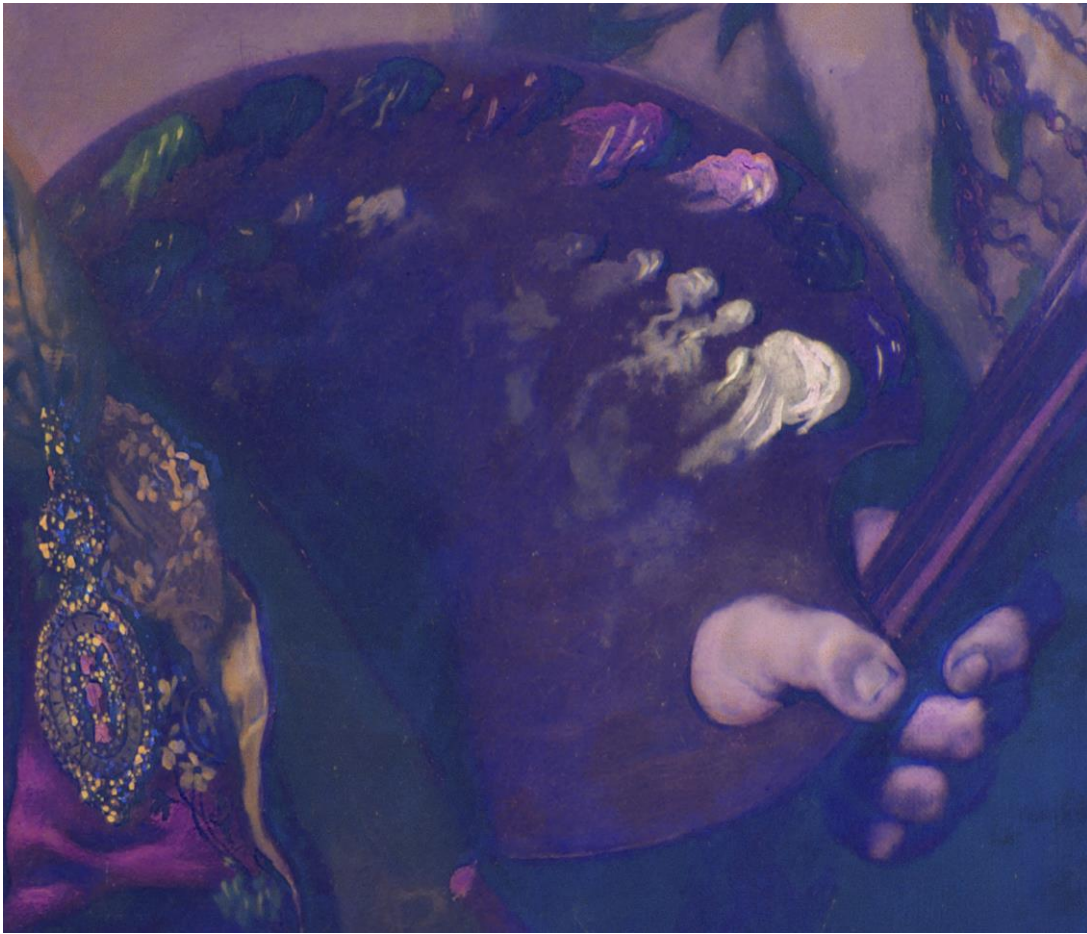
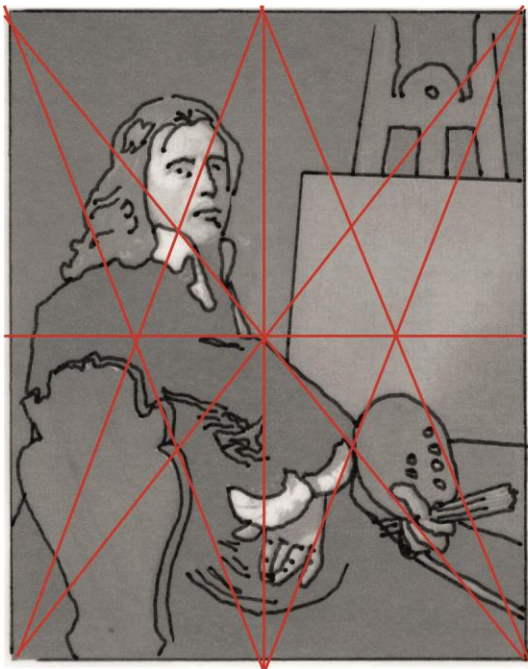


fig.23. Detail the palette on the painting, documented with UVFC- technique.CD-app

7.3 The composition of the painting - with two examples for comparison with works by Titian and van der Helst –p.48



fig.16. A. Roslin, Selfportrait 1790



*fig17. Bartholomeus van der Helst
Portrait of the artist Paulus Potter
1654 Format: 99 X 80 cm
Maurithius, Haag*



*fig.18. Tizian
Portrait of Karl V with horse at Muhlenberg
1548 Format: 332 cm X 279 cm
Prado, Madrid*

Complementary pictures p.49

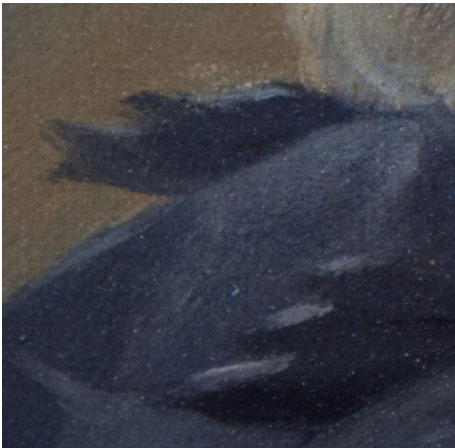


fig.19. Roslin Selfportrait 1790. Detail, wig bow.

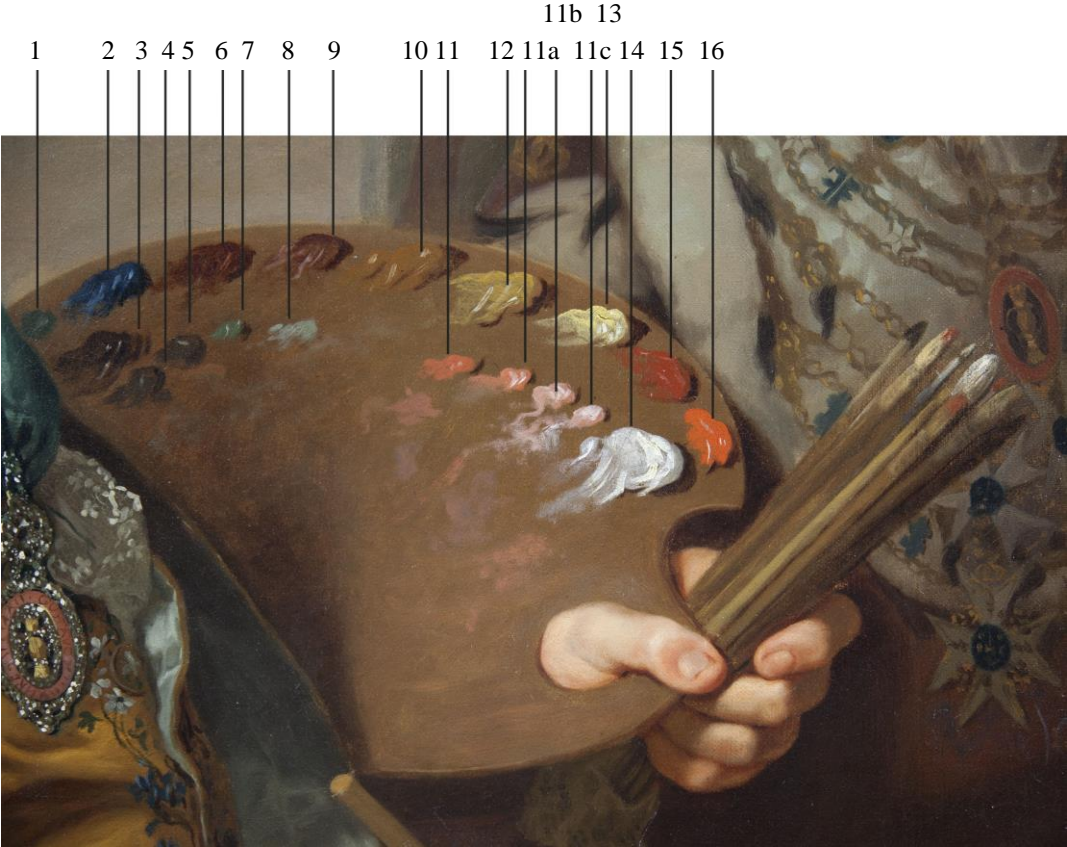
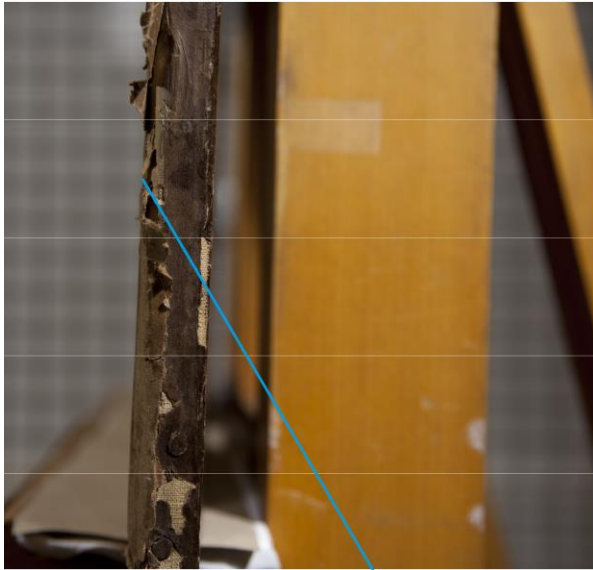


fig.21. The depicted palette on Roslin's Selfportrait 1790, detail.

7.4 The painting -materials and the structural build up –p.49



Lower right side edge of the painting with marked out area for analysis of the technical build up. Complementary investigations were performed along all the edges.

fig 22

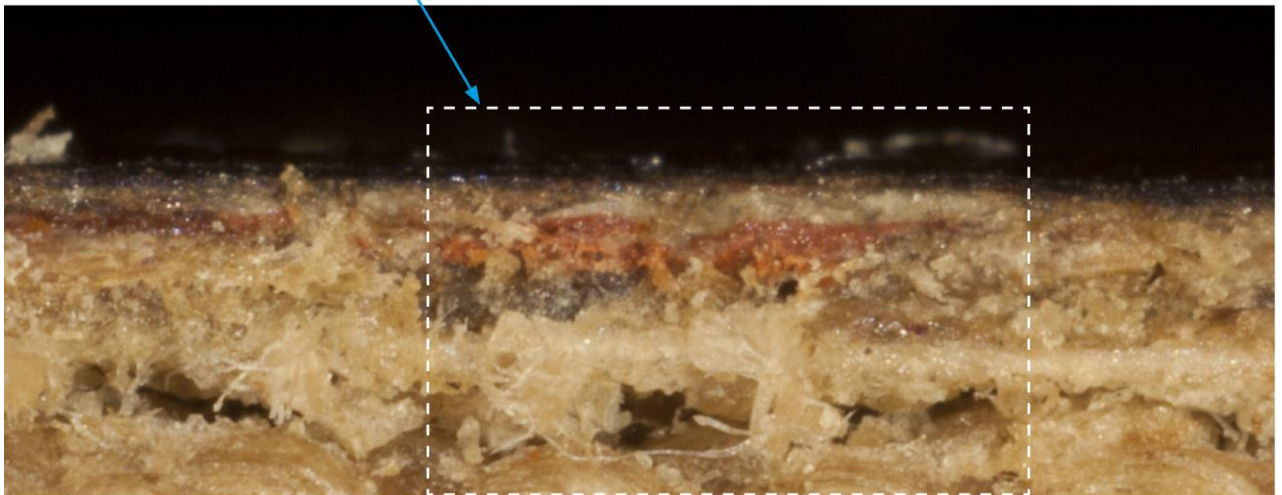


fig 23



Varnishlayer
 Pictorial layer
 Groundlayer 2 broken white layer
 Groundlayer 1 redbrown layer
 Eventual pre sizing
 Original canvas
 Wax/Wax resin layer with part of the lamination canvas

fig 24

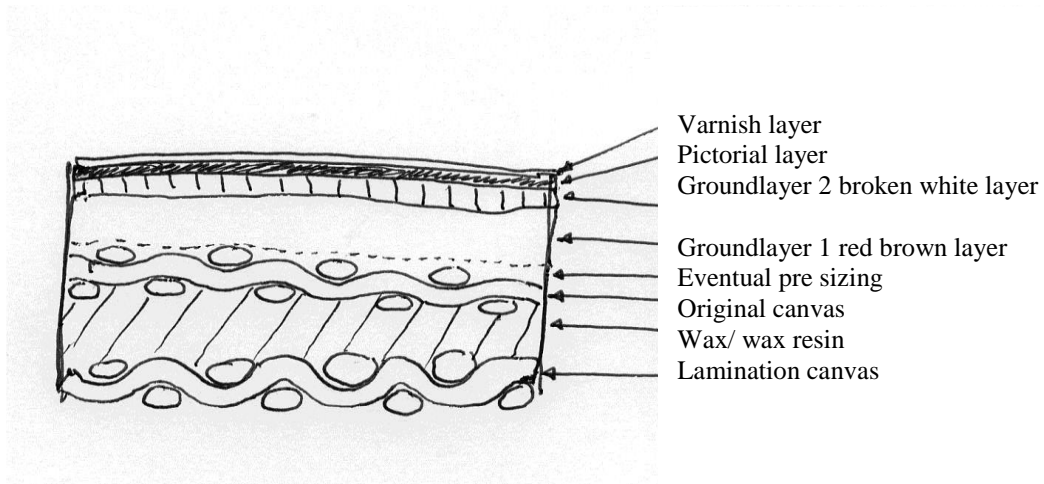
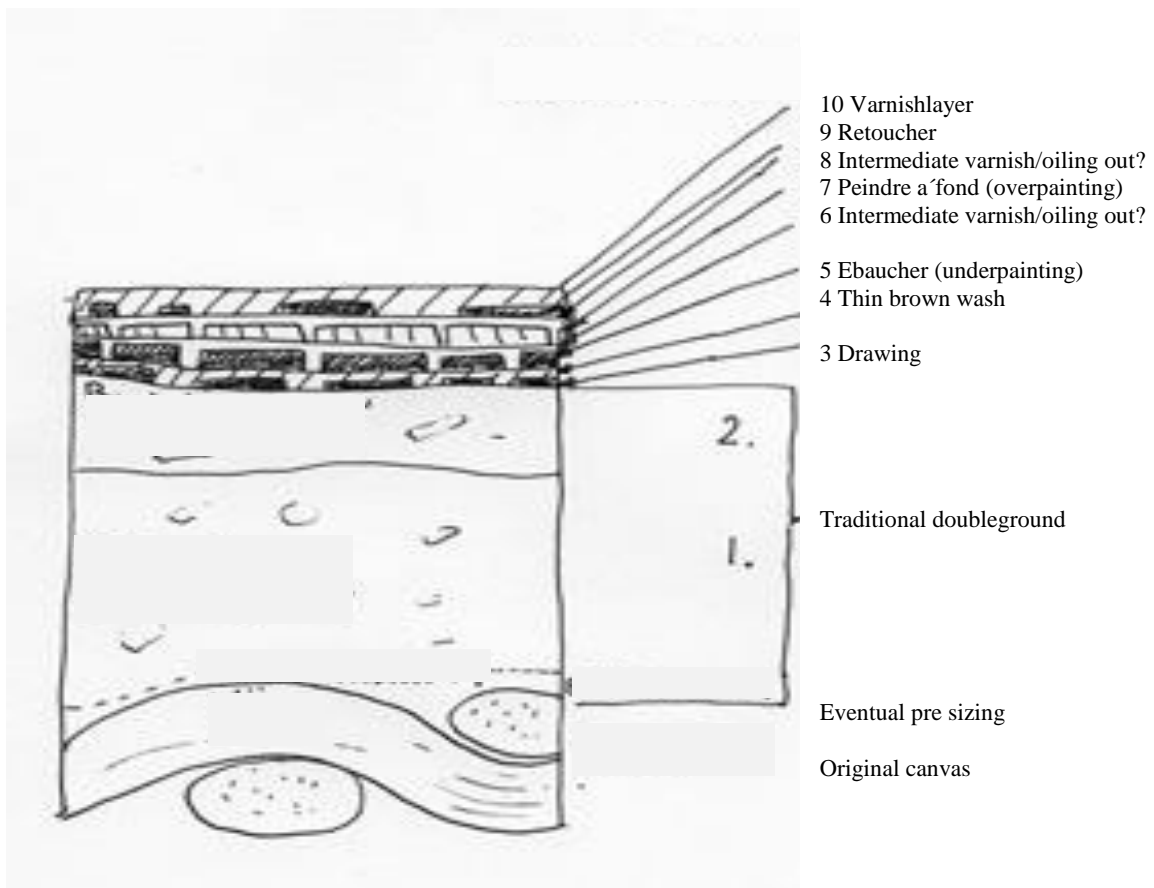


fig.25. Technical build up of the painting in present conditior



26 Line drawing pictorial build up.

12 References to the investigation

**The three investigated Roslin paintings at the Gothenburg
Art museum - Colorsample documentation
(see 3.3, p.23 and 3.4, p.26)**



fig.27. A.Roslin. the Doubleportrait 1754 (GKM inv. nr. WL 85)



fig.28. 3.1

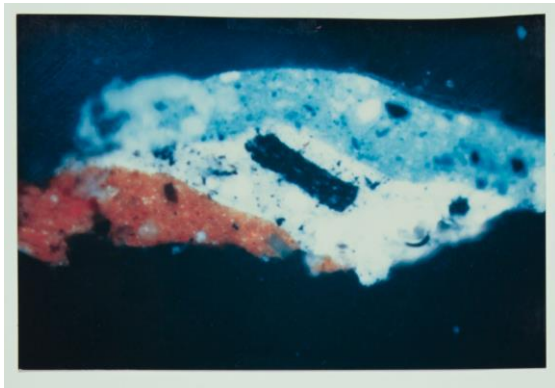


fig.29. 6.3



fig.30. 3.1 UV



fig.31. 6.3 UV

Preface:

Not the least from the experience from the reconstruction study (see 7.13, p. 59) raised questions how clearly visible extremely thin color layers in fact can be in an analysis of colorsamples ?

Most likely is the visibility of large variation and margins for misjudgement probably great regarding understanding of the function of the color buildup. The type of paintings that Roslin is a representant of contains a wide variety of fine scumblings/glazings and use of i.e. frottis techniques. UV-documentation is crucial to grasp the paint build up, especially in clarifying i.e. intermediate varnishlayers.

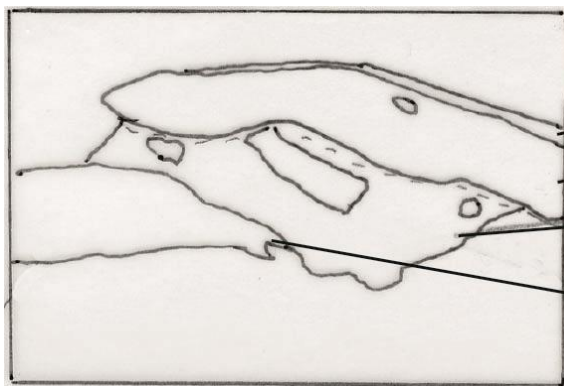


fig. 32

Red 3.1 Red part, frock:

1. Varnish
2. Cinnabar with Lead white
3. Lead white with an amount of Cinnabar
4. Topgroundlayer (broken white layer),
Lead white with Chalk, addition of Charcoal
and less addition of an Iron oxide pigment
5. Bottomgroundlayer (rödbrown layer), natural
Iron oxide pigment

The ocular evaluation of the sample, indicated also touches of Minium in the Cinnabar layers.



6.3. Blue part, background *fig. 33*

1. Varnish
2. Prussian blue, Lead white with Chalk
(Cerusetyp).
3. Topgroundlayer (broken white layer),
Lead white with Chalk addition of Charcoal
and less addition of an Iron oxide pigment.
4. Bottomgroundlayer (rödbrown layer),
natural Iron oxide pigment



fig. 34 A. Roslin. Portrait of G. P. Creutz c. 1764 (inv. nr. 292 GKM)

2.7

11.9
9.5

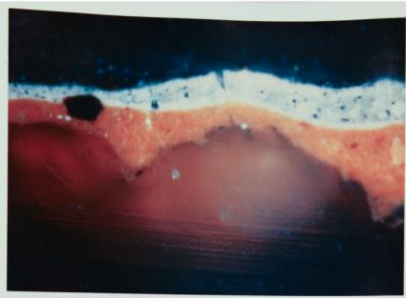


fig. 35

4.2



fig. 36

4.2



fig. 37

9.5 UV



fig. 38

4.2
UV

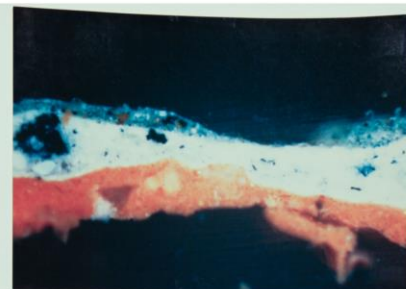


fig. 39

2.7

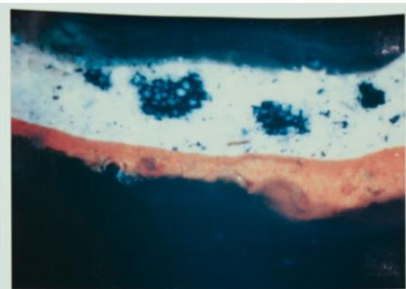


fig. 40

11.9



fig. 41

2.7
UV



fig. 42

11.9
UV

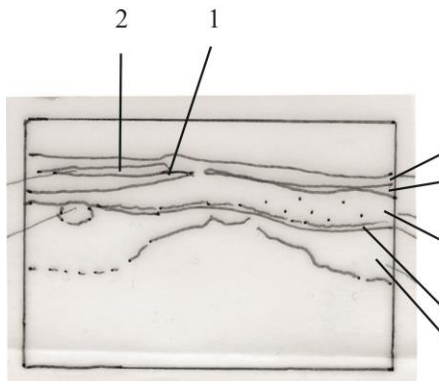


fig. 45

- 9.5 Black part, hat
 1. Varnish layer
 2. Black pigment due to absence of Ph and Ca most likely Charcoal black.
 3. Groundlayer, broken white layer, Lead white and chalk with addition of Charcoal and a hint of Ironoxide
 4. Thin white layer of pure Lead white
 5. Groundlayer, redbrown Ironoxide.

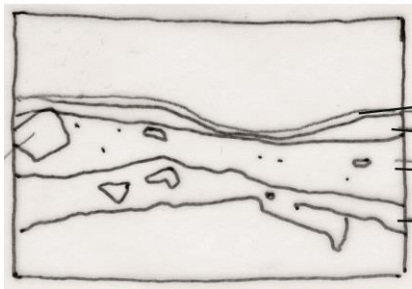


fig.46

- 2.7 Greenbrown part, background
 1. Varnish
 2. Greenbrown layer, Natural Iron oxide
 3. Groundlayer, broken white layer, Lead white and chalk with addition of Charcoal and a hint of Ironoxide
 4. Groundlayer, redbrown Ironoxide.

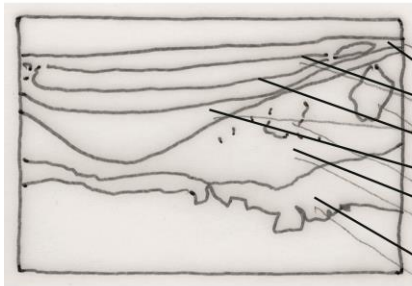


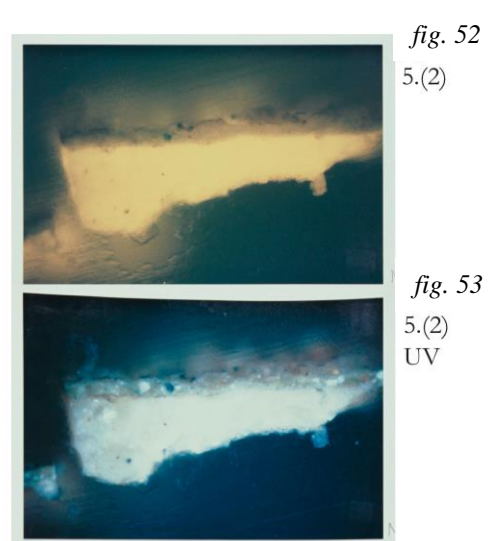
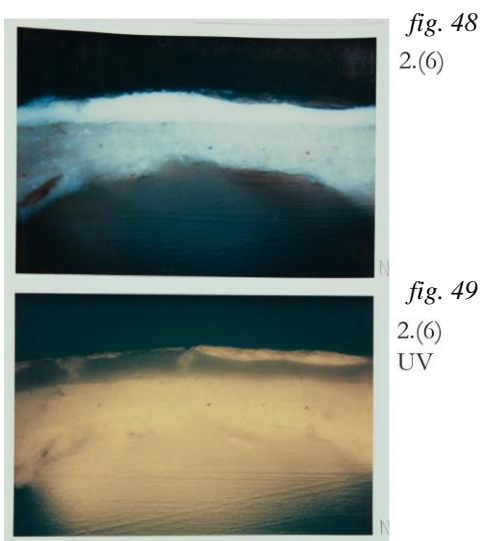
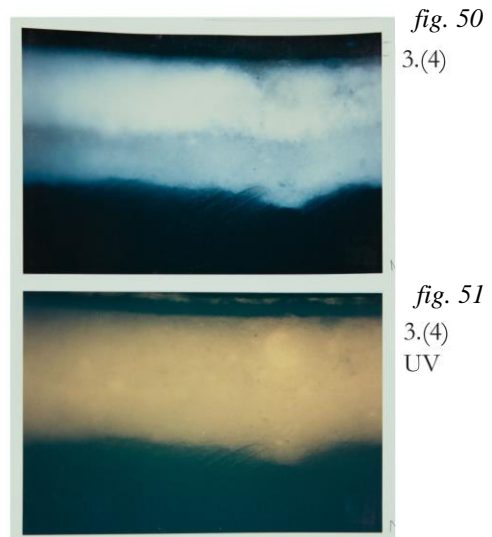
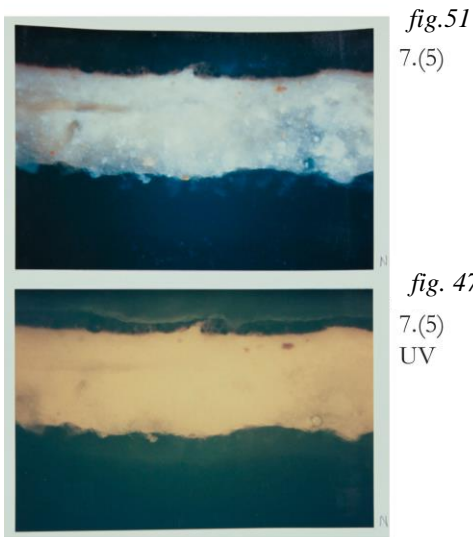
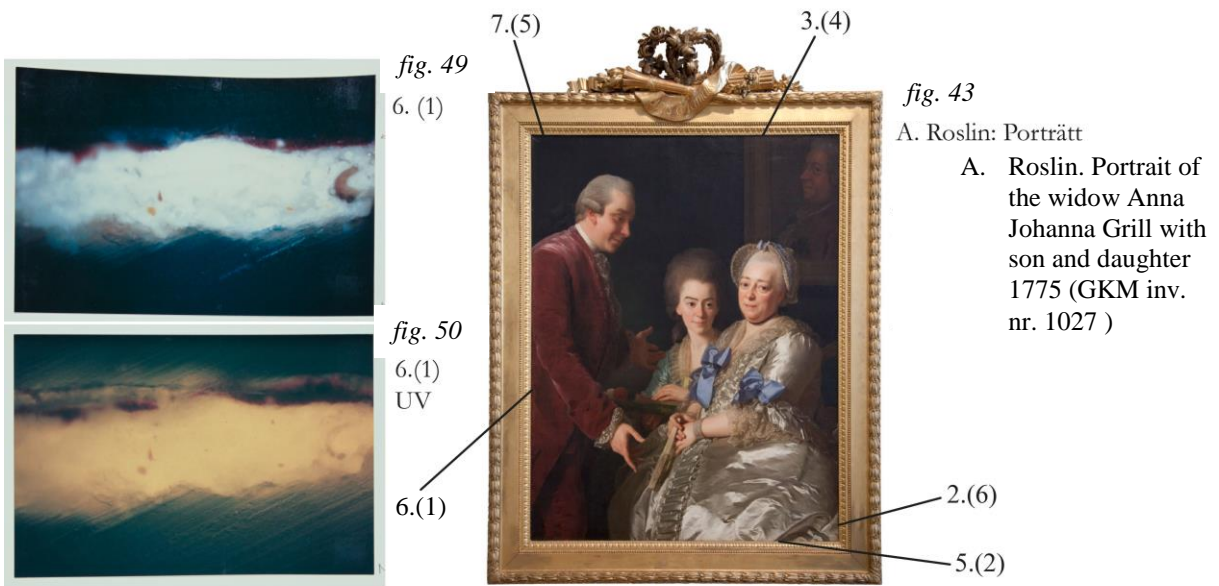
fig. 47

- 4.2 Blue part, dress (see also 3.3.3.2 Bouvier)
 1. Varnish layer
 2. Natural Ultramarin
 3. Varnish layer with Natural Ultramarin
 4. Prussian blue
 5. Groundlayer, broken white layer, Lead white and chalk with addition of Charcoal and a hint of Ironoxide
 6. Groundlayer, redbrown Ironoxide



fig.48

- 11.9 Green brown part
 1. Varnish layer
 2. Green brown layer, Natural Iron oxide
 3. Groundlayer, broken white layer, Lead white and chalk with addition of Charcoal and a hint of Ironoxide
 4. Groundlayer, redbrown Ironoxide



2A

glazinglayer

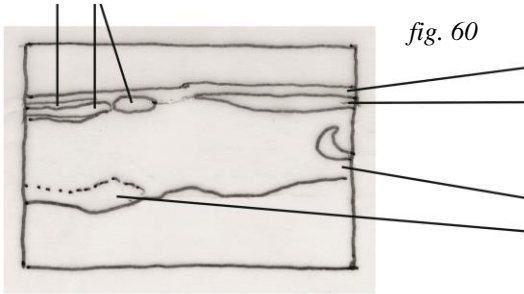


fig. 60

6.(1) Red part. red dress

1. Varnish layer
2. Very thin layer of a Red lake, most likely Carmine (high Kalium content) followed by a thicker layer laid wet on wet.
3. Ground layer of Chalk and a Animal glue.
4. Pre sizing of the canvas by Animal glue.

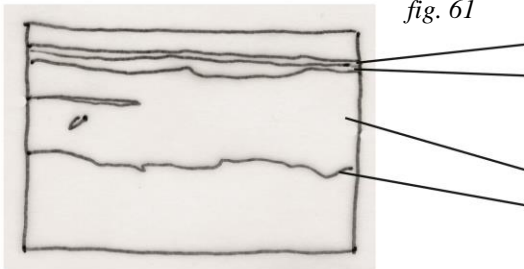


fig. 61

7. (5) Black brown layer, background

1. Varnish layer
2. Beige layer with black brown lumps/particles, most likely a Bitumenous pigment such as Casselbrown
3. Ground layer of Chalk and a Animal glue.
4. Pre sizing of the canvas by Animal glue.

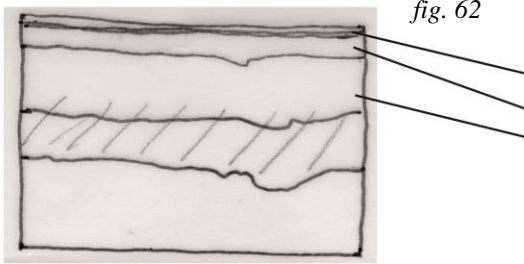


fig. 62

3. (4) Brown layer, depicted frame background

1. Varnish layer
2. Brown beige layer, Natural iron oxide
3. Ground layer of Chalk and a Animal glue.

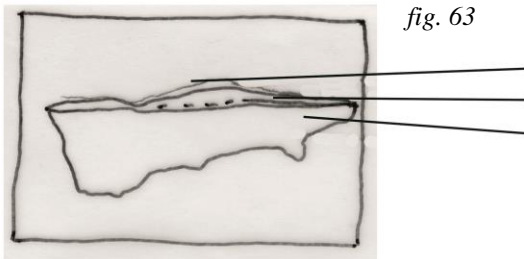


fig. 63

5.(2) Green beige part, Satin dress

1. Varnish layer
2. Green brown layer Natural iron oxide
3. Ground layer of Chalk and a Animal glue

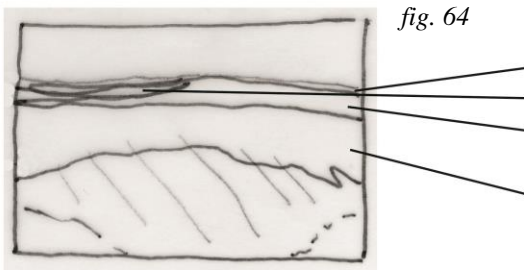


fig. 64

2.(6) White part, Satin dress

1. Varnish layer
2. Green brown layer, Natural iron oxide
3. White layer, Lead white, possibly two layers painted wet on wet
4. Ground layer of Chalk and a Animal glue

12.2 Bitumenous materials and Impasto technique

fig.65. Opposite page

Roslin, the Portait of Anna Johanna Grill with son and daughter 1775, detail, upper left part, centersection. The photo is taken (freehand) slightly angled in assymetrical light to illustrate the craquelurepatterns. The depicted black wigbow has a very sparingly amounts of craquelures to the background, that is judged to have a in part bitumenous contence, type Casselbrown or similar.

Aging and deterioration amongst bitumenous materials can vary greatly, due to contence/origin, methods for fabrication and choice of binding media.

Historical sources sometimes mention a compositesolution with this type of material together with Venetian turpentine that claims to improve state and condition¹⁴³

fig.66 Opposite page

Roslin, the Portait of Anna Johanna Grill with son and daughter 1775, detail, lower right part against the frame,Atlas silk frock with background. Note differences in craquelerpatters on the different colorparts. The craqueleur patterns in the brown part is of the type common in conjunction with use of to much binding media (drying oil). It can also been due to that Roslin had isolated the (very absorbing) chalkground in a exagerrated way. Of course also other oppurtunities exist such as use/mishandling of to strong solvents in conjunction with varnishremoval. The dark brownblack surface that is judged to have a at least partly bitumenous content such as Cassel brown is here depicted in a coloristically more truthful way than the picture above.

fig.67

The Doubleportrait1754, detail, centerpart of the painting, example of the impastotechnique on the painting.¹⁴⁴



¹⁴³ One example is Dossie (GKM 1027),p.

¹⁴⁴ Se also fotobilaga, Andersson (1995), s.



fig.65



fig.66

13 Photo documentation
Alexander Roslin, Selfportrait 1790
(MKM 891)

(see 5.1,p. 31 ff)



fig.68 Frontside of the painting.



fig.69 Backside of the painting.

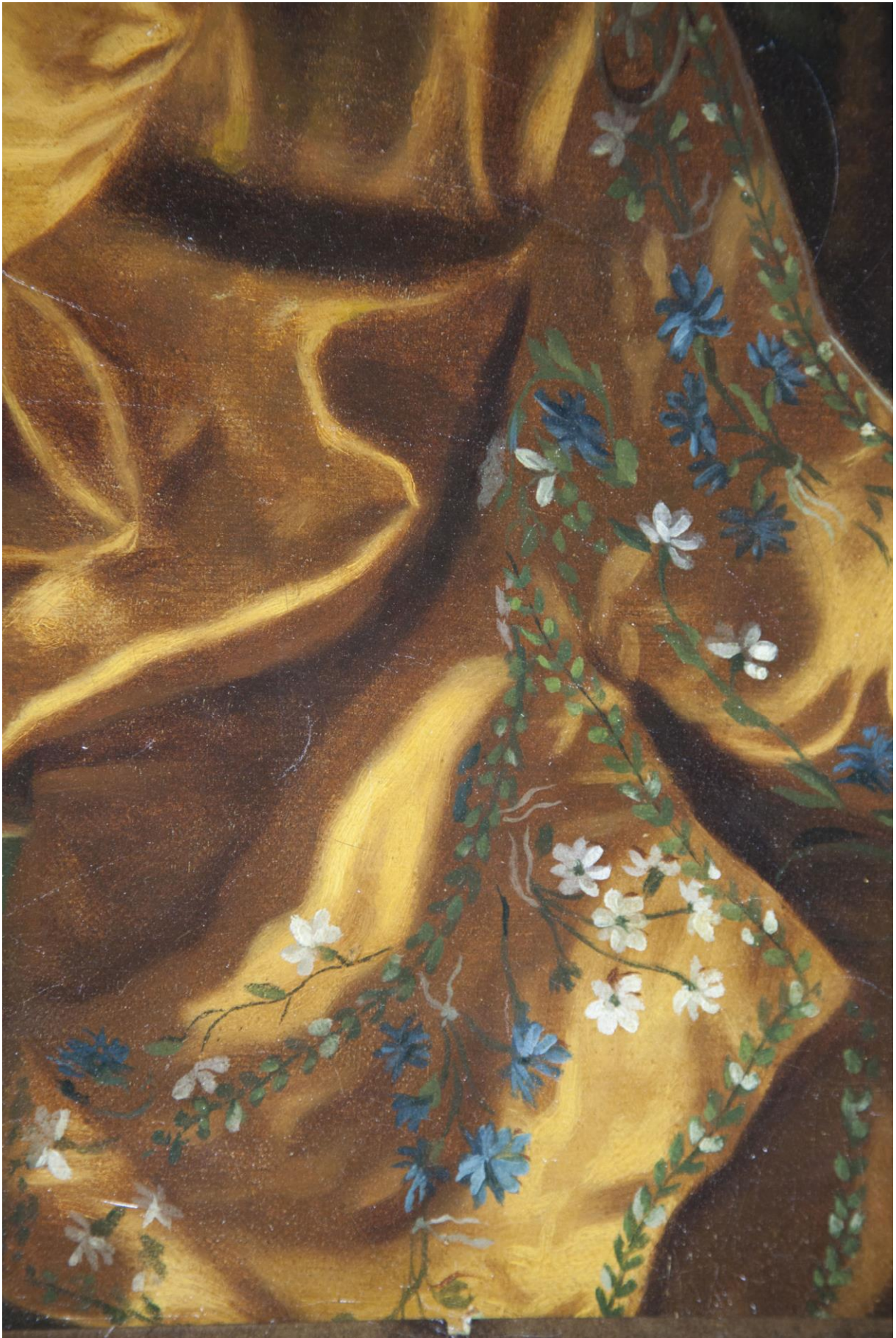


fig.70 The lower leftpart of the painting, detail, silkfabric.

fig.71 Opposite page: The upper left part of the painting, detail, the right half of Roslins face:

At the creation of the Selfportrait 1790, Roslin was about 72 years old and had according to the historical source material at this point, since a longer time back, except a weakening health also got a deteriorating eyesight.

That the artist by this point should have managed on the face in the painting to apply such as the tearchannels and eyereflexes with the precision it's done-without some form of aid from optical tools, have to be considered outmost improbable.

Note also the subtle play among warm colors/hues performed in *Alla prima*, Scumbling, glazings and Frottis.

The relative absence of craqueleures, can most likely be linked to the rich amounts of Leadwhite in a drying oil media/medium. Lead white in a drying oil medium becomes both hard and stiff in conjunction with the drying process and is a prime material to counteract craqueleures.

The good state and condition is also linked to the (traditionally) rather compact and stepwise buildup of the carnationparts.

At close range the brush techniques are clearly visible in how Roslin have followed and modelled up the forms. The reflexes in the eye most likely have been applied on a dry surface which of course allowed for corrections on this very precise made part. Several accents and enhancements such as the virtuous applications of the brown color tones above the eyelid and parts around the mouth have partly been treated with Frottis (a refined displacement technique).

The obvious work method fits well with the so called Three step process where the Retouching step contained this type of working steps.

Above the upper lip are clearly shown a type of micro scratches in the varnish that occur over the whole painting in various degrees.

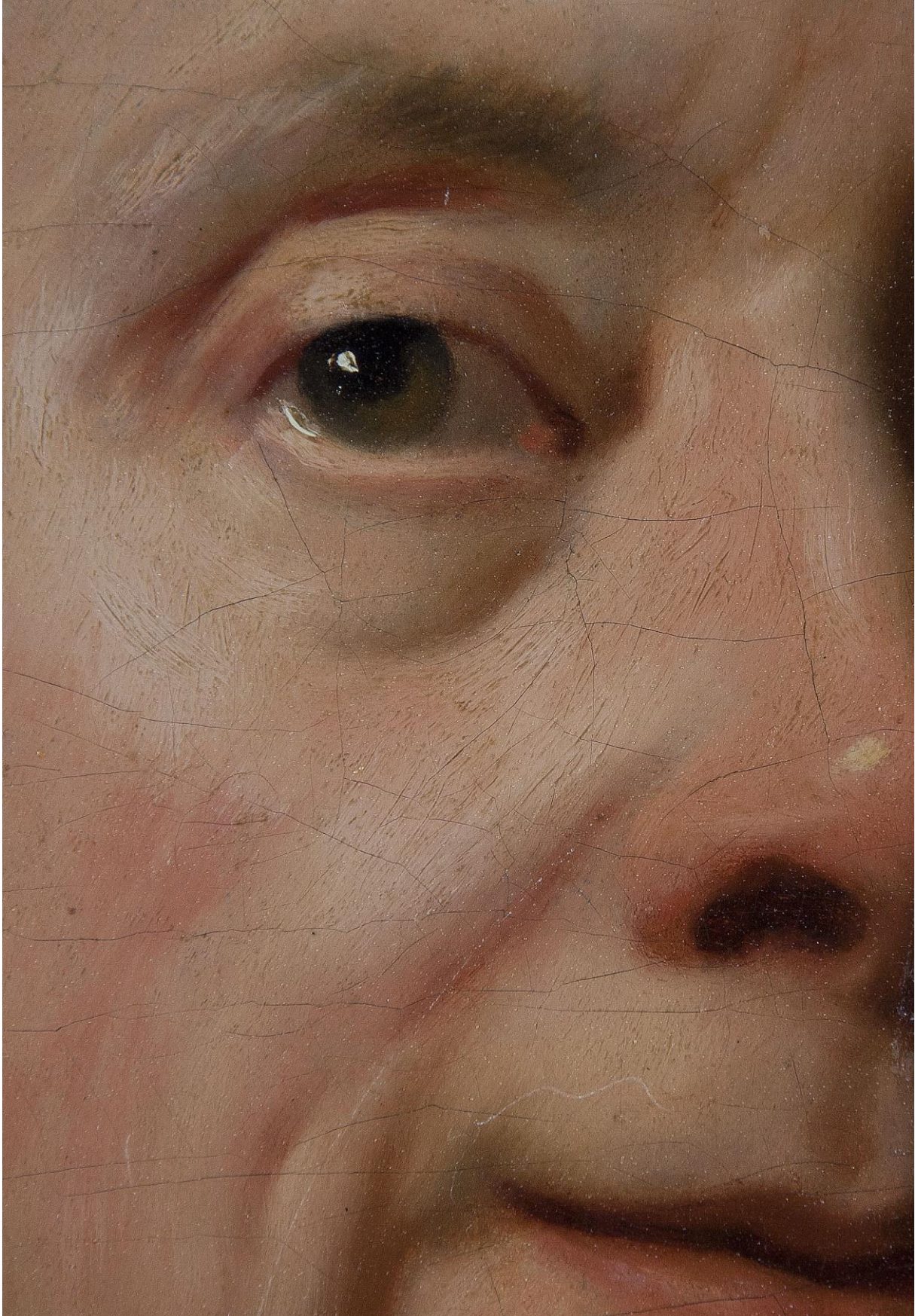


fig.71 The upper left part of the painting, detail, the right half of Roslins face.



fig.72. Top left centerpart of the painting, detail, silkfabric,right arm.

fig.74 Opposite page: The upper right centerpart of the painting,detail, Gustav III.

It is a reasonable assumption that Roslin work out the Ebaucher (underpainting) step to about this level, manifesting volumes, light/shadow relations as impeccable as done on the depicted portrait.

viewing this portrait with one eye semi closed, it appears clearly with what precision Roslin worked even at this stage of the pictorial build up. Even the Peindre a ´fond (overpainting) step would with the same type of working methods demanded a considerable amount of workefforts. The impeccable techniques of working, seems to have been one of the trademarks of the artist. Compare also with the linedrawing (see IR-documentation).



fig.74 The upper right centerpart of the painting,detail, Gustav III.

14 Raking light documentation

(see 5.2, p.31 and 6.1, p.37)



fig.75 Raking light documentation.

fig.75 Previous page: Raking light documentation

As shown from the raking light documentation, the painting is extremely smooth without mentionable impasto.

The pronounced structure from the weave, are most likely to the largest (or in full ?) part dependable on the wax/waxresin lamination intervention that the painting once suffered.



fig. 76 Raking light, detail, centerpart of the painting.

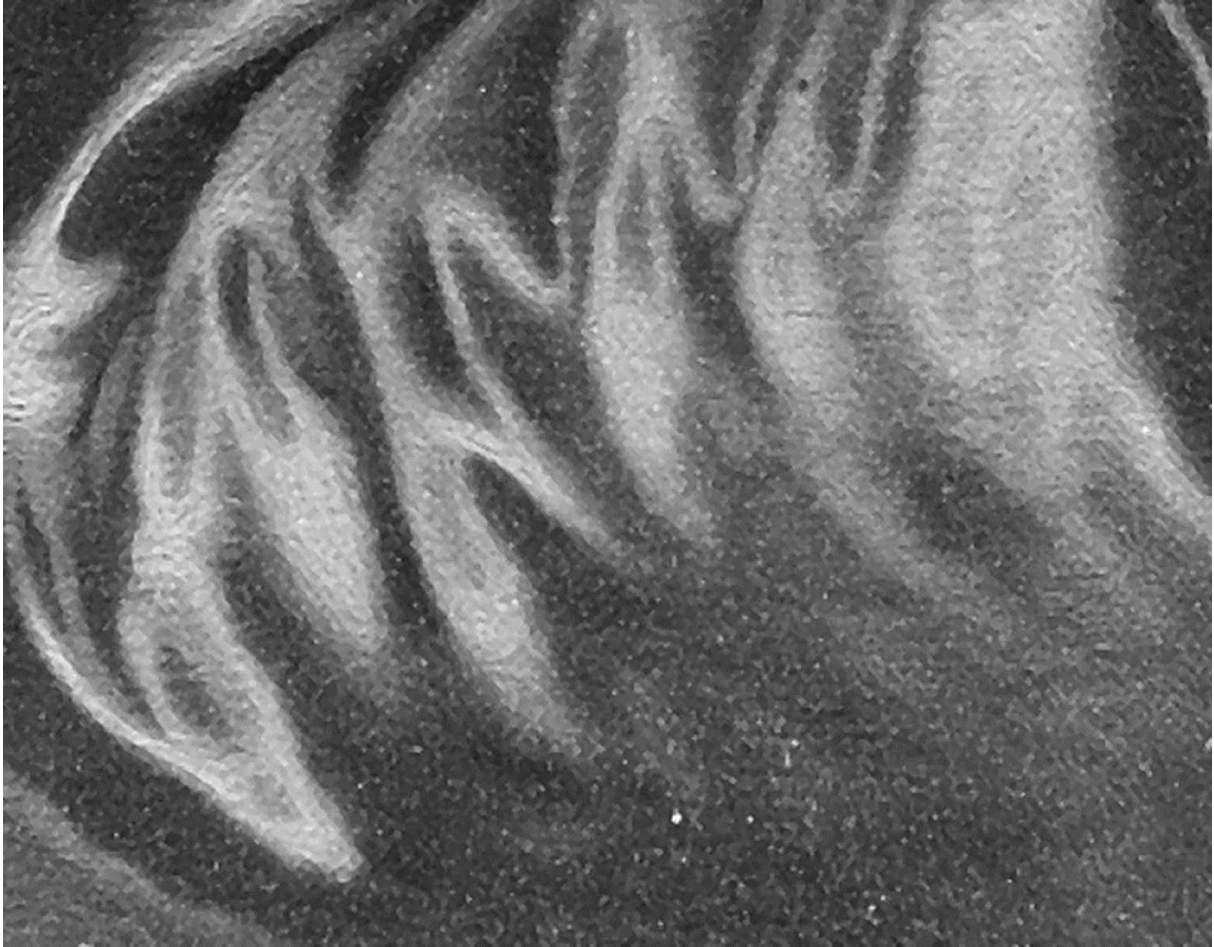


fig.77 Left centerpart of the painting, detail, Roslins right shoulderpart.

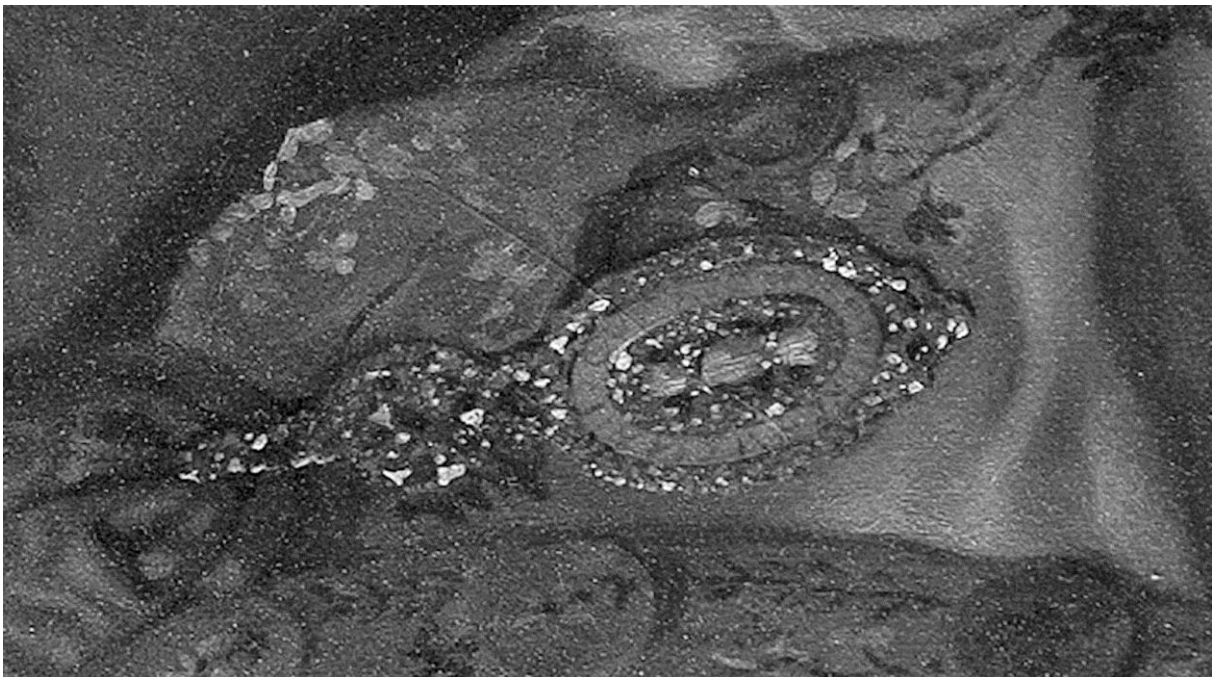


fig.78 Centerpart of the painting, detail, the medal of Vasa. Not even this detail on the painting contains any mentionable impasto, see also macro/microdocumentation p. 145.



fig.79 Raking light, details, centerpart of the painting, hands.

15 IR-documentation

(see 5.3, p.31 ff and 6.2,p.37ff)

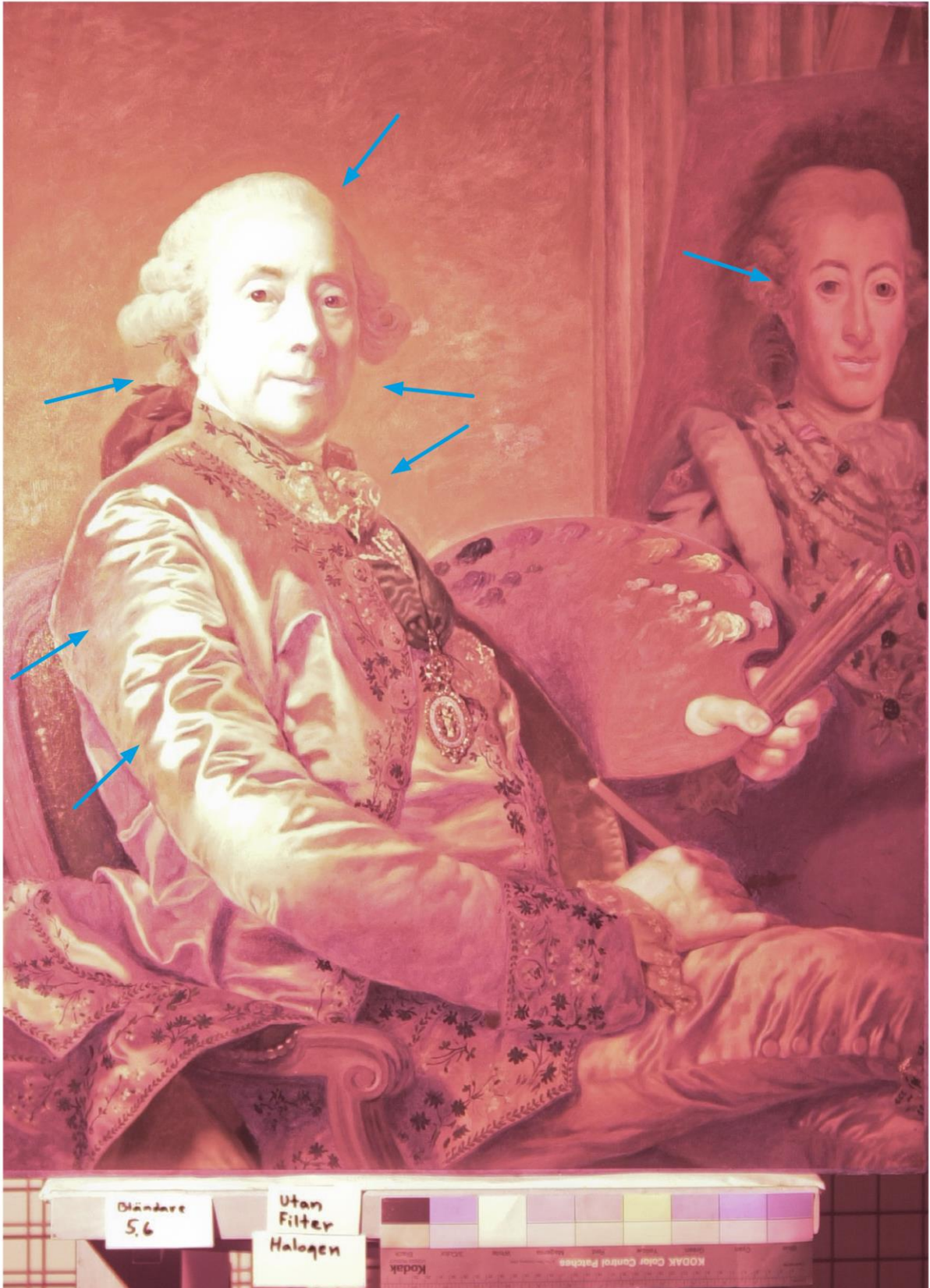


fig.80 IR-flourescense, full picture with shown parts of an underlying drawing. The documentation with a IR-modified Nikon D1 without added filters produced superior results in this respect. of the different methods used .



fig.81 IR-flouescense, right half of the painting, assymetrical lighthening from the left. IR-72 filter with a IR - modified Nikon D1 camera.

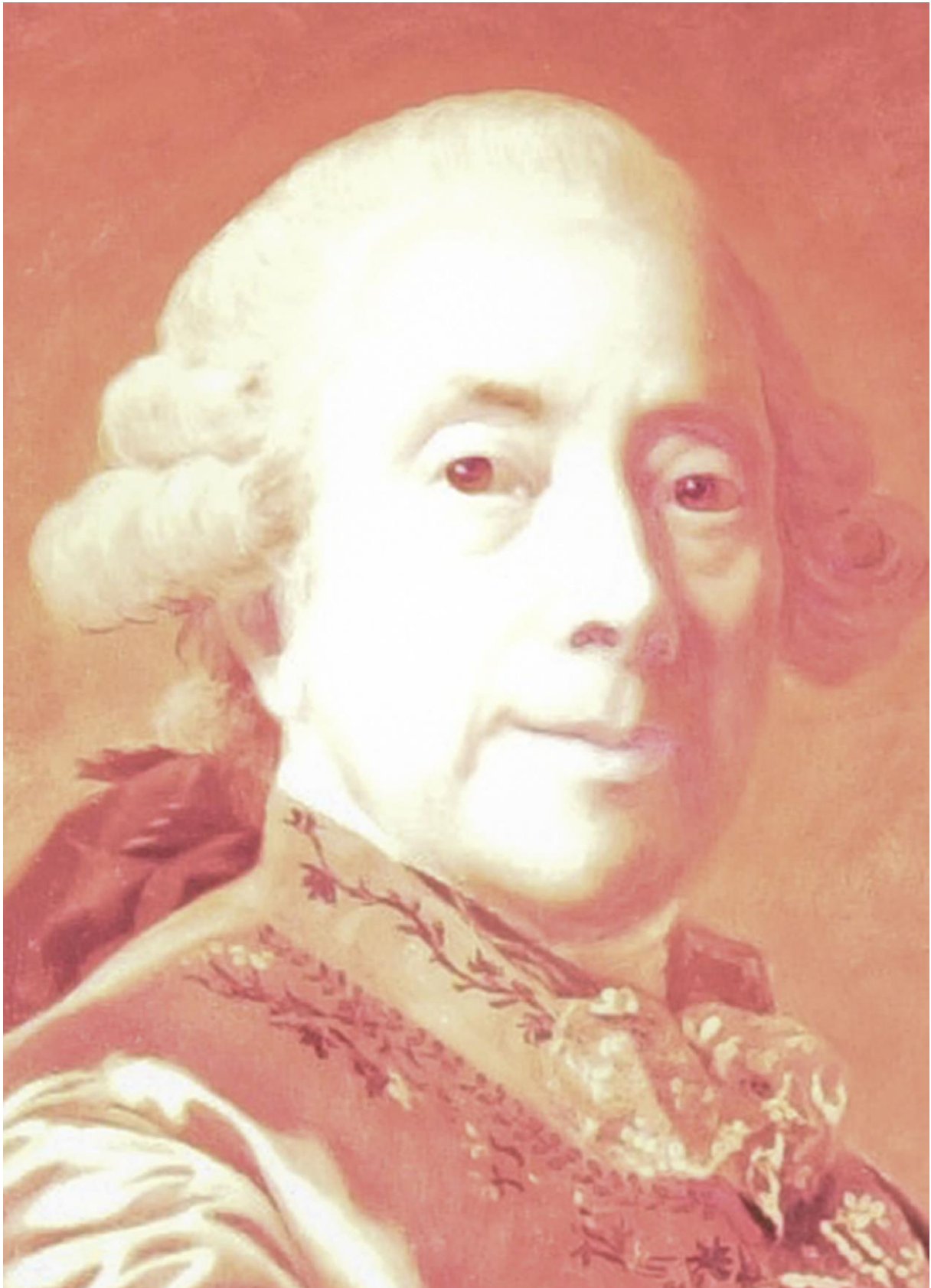


fig.82 IR-flouescense, detail, the facial part of the paitning. Documentation with a IR-modifie Nikon D1 camera without added filters. Parts of the underlying drawing is clearly visible. See also opposite page. .



fig.83 IR-flourescensedocumentation, with reminisenses, securedly verified, enhanced with blue lines. The drawing material might be black shale. Possible but not verified traces of smaller adjustments occur on some parts, such as at the shadowparts around the nose.



fig.84 IR-flouescense, middlepart of the painting, detail, Roslins right shoulder part with traces of an underdrawing. See also fig 85.



fig.85 IR-flourescense, with enhanced securidly verified linedrawing with blue lines. Roslin appear to have been slightly freer in following the linedrawing on this part regarding color application, compared to the applications on the face.



fig.86 IR- fluorescence. Wrattén IR 89B filter with a IR-modified Nikon D1.



fig.87 IR-flouescense. Double polarisationfilters with a IR-modified Nikon D1.



fig 88 IR-flouescense, upper part of the painting. IR-modified Nikon D1. Enhancement of contrast showing brushtechique (Photoshop CS5 software).



fig.89. IR-reflectography, upper left part of the painting, detail, the face of the artist. The underdrawing is clearly visible even using this type of technique (Hamamatsu high performance vidiconcamera (C2400 - 03)).



fig 90 IR-reflectography, detail, part of the face of the artist. Some of the documented parts out over the linedrawing, could be traces of charcoal/ corrections. However no secure conclusions could be drawn (the picture is partially overexposed aiming at enhancing other here relevant parts) (Hamamatsu high performance vidicon camera C 2400-03)

Parts of what is registered might be traces from an underdrawing, such as lines/shadows around the parts of the eyes. For a more secure verification, a more in depth investigation is needed than was possible at the time (the picture is partially overexposed aiming at enhancing other here relevant parts) (Hamamatsu high performance vidiconcamera C2400-03).

fig 91 IR-reflectography, upper rightpart of the painting, detail, Gustav III.

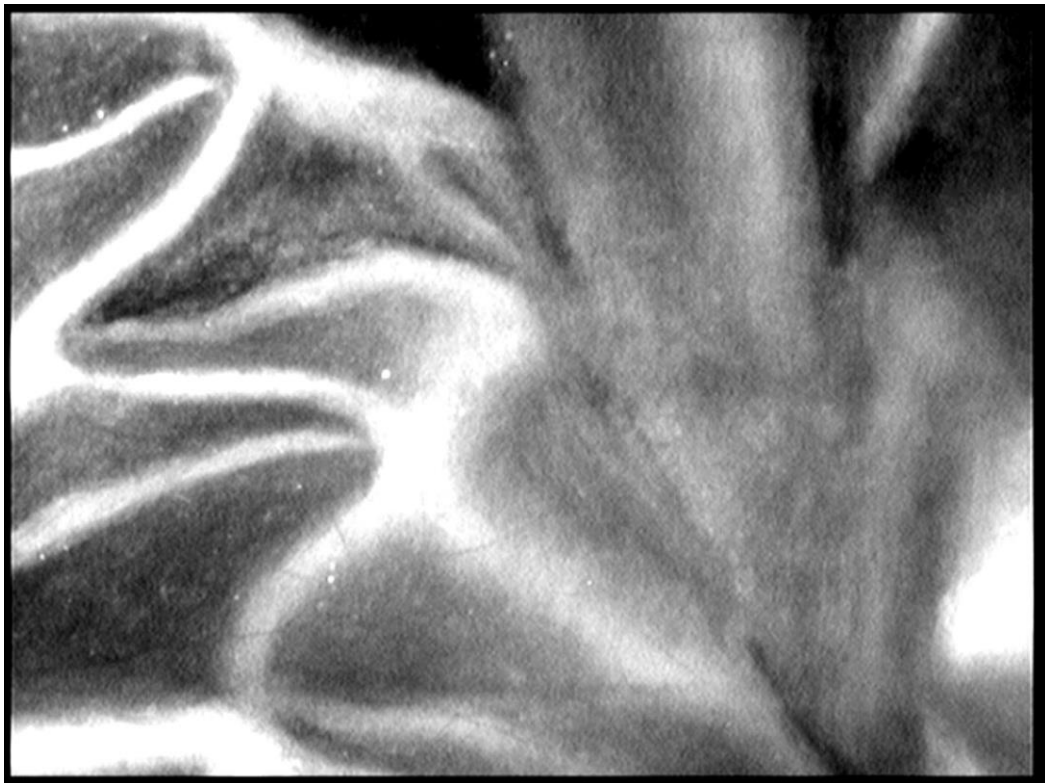


fig.92 IR-reflektographe, left centerpart of the painting, detail, Roslins upper right right shoulderpart against the

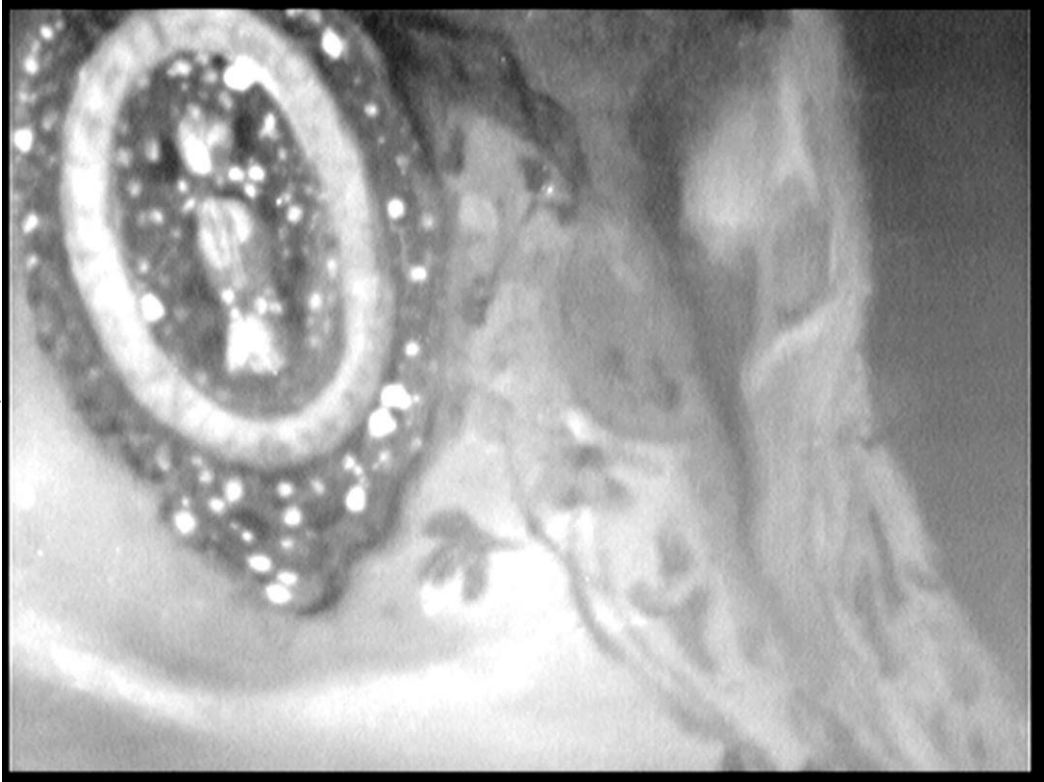


fig.93 IR-reflektography, centerpart of the painting, detail, medal of the Vasaorder
No clearly verifiable traces of an underdrawing such as helpines emerged on this part at the analysis (Hamamatsu high performance vidicon camera C2400-03).

16 UV - documentation

(see 5.4, p.33 ff and 6.3, p.38 ff)



fig.94. UV- induced fluorescence, documented without filters. Note damages such as at the two depicted faces and compare i:e with 18 X-ray documentation, see p.150 ff.



fig.95 UV- induced fluorescence, B+W 77 KR 1,5 Filter, (Skylight 1.1X).



fig 96 UV-induced fluorescence, B+W 77 0.22 2 X (Yellow filter).



fig 97 UV- reflektography, IR-UV-cutfilter.



fig 98 UV-induced fluorescence, lower part of the painting, detail, without added filters.

fig 98 Previouspage UV-induced fluorescence, lower part of the painting, detail without added filters:

Varnishlayers:

The documentation illustrates several layers of varnish. Partial removal of varnishlayers have occurred on several layers in the technical build up.

More recent handling of the varnishlayers have obviously taken place in a more professional way, with the ambition of trying to avoid contact with the original paintlayers. Unfortunately the same working procedures can not have been used for granted regarding older treatments of the painting.

It is a clear opportunity that the Selfportrait 1790 with all its subtle color nuance's have been once damaged in the process of varnishremoval (-s). The working methods of the past was much more heavy handed compare to today.

Especially regarding solvent sensitive types of pigments (such as bitumenous) used in the final steps of the pictorial build up. Brown hues was much in use, a type of color that easy could be mistaken to be a part of deteriorated (brown/yellow brown) types of varnish.¹⁴⁵

The question of potential damages is an open question due to that we do not know the original appearance of the painting.

¹⁴⁵ For the use and value of using brown color tones, in the technical build up se: Andersson (2011a)

17 Macro/micro and detail photo documentation

(see 5.6, p.35 ff and 6.6, p.45 ff)



fig 99 Macro/ micro documentation, centerpart of the painting, detail, medal of the Vasa order.

Previous page

fig 99 Try to observe the brushhandling and treatment of colors by switching from regular viewing with one eye semi closed, to easier comprehend the virtousity with which Roslin have constructed this part of the painting. From an ocular viewpoint, Carmine pigment appear to be a part of the red sections of the colorparts.



fig 100 Macro/ micro photo documentation, upper right part of the painting, detail, Gustav III. Already in this phase of the technical build up of a picture, Roslin shows his subtle ways of building up form and volumes, not the least using warm and cold colorshades.



fig 101 Macro/ micro photo documentation, upper center part of the painting, detail, example of the background. The background is built up using several paintlayers. Close up shows wear of the surface. The amount of Pentimenti (transparency of colorlayers by time due to chemical changes) is hard to evaluate. The reconstruction study (see p. 59) indicated small additions of Prussian blue pigment.



fig 102 Lower centerpart of the painting, detail, silkdress and hands

What is most affecting the colors in the shadow parts on a painting, are the colors from secondary lights. The part on Roslins righthand resting on his leg, is a good example on this function. The arrow marked part is (despite some other pictorial "effects") judged to be made intently by Roslin. This type of knowledge are one of many skills the artists excel in on the painting. Knowledge common among many old masters such as Rubens as just one example, admired by the artist himself.



fig 103 The lower right part of the painting, detail, silkdress, legs. It is a sad fact that many subtle nuances of the painting in close up have been lost due to the lamination process and structure of the weave. It is particularly noticeable in many of the shadow parts of the painting. It can never be totally ruled out that the artist on parts of the painting would have used the grain of the canvas as an artistic effect, but it is hard to see any gain from a colorpoint of view in this case. The conclusion is rather that the state is a result from the lamination procedures combined with abrasion connected with varnish removal (-s), accentuated by time by darkening of some materials (varnishes) occurring on the object. Older renovation methods of the type that have occurred, inevitably led to damages especially on the pictorial part. This statement concerns a close up view. On a more "normal" type of examination, the damages are however more visually acceptable, mainly due to evenness with coverage of practically the whole pictorial part that makes the damages less disturbing.

18 X-ray documentation

(see 5.7, p.36 ff and 6.7, p.45 ff)

The X-ray documentation was performed by
Physician, Docent, Region physician -Bild och
funktionsmedicin, Associate professor Peter Leander



fig 104 X-ray documentation, mosaic montage. The digital X-ray documentation appeared to be slightly lighter than its former equivalent with analogue documentation. Worth noticing are the serious damages caused to the canvas, circumstances that probably supported the decision to laminate the painting.



fig 105 X-ray documentation, upper left centerpart of the painting, detail, facial part.
An ocular judgement indicates a larger amount of Lead white than is clearly visible from the X-ray documentation.

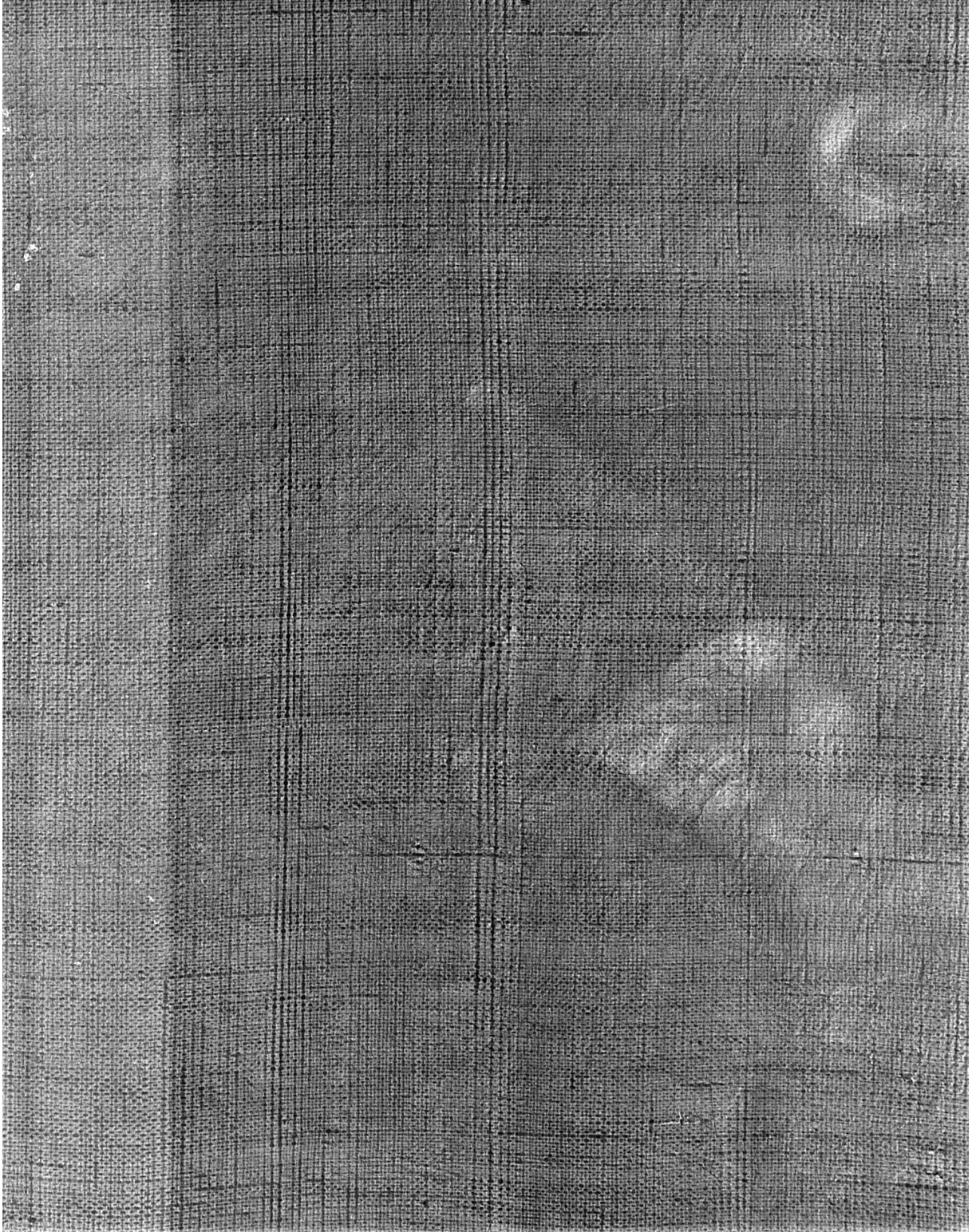


fig 111 X-ray documentation, right centerpart of the painting, detail, the artists right hand.

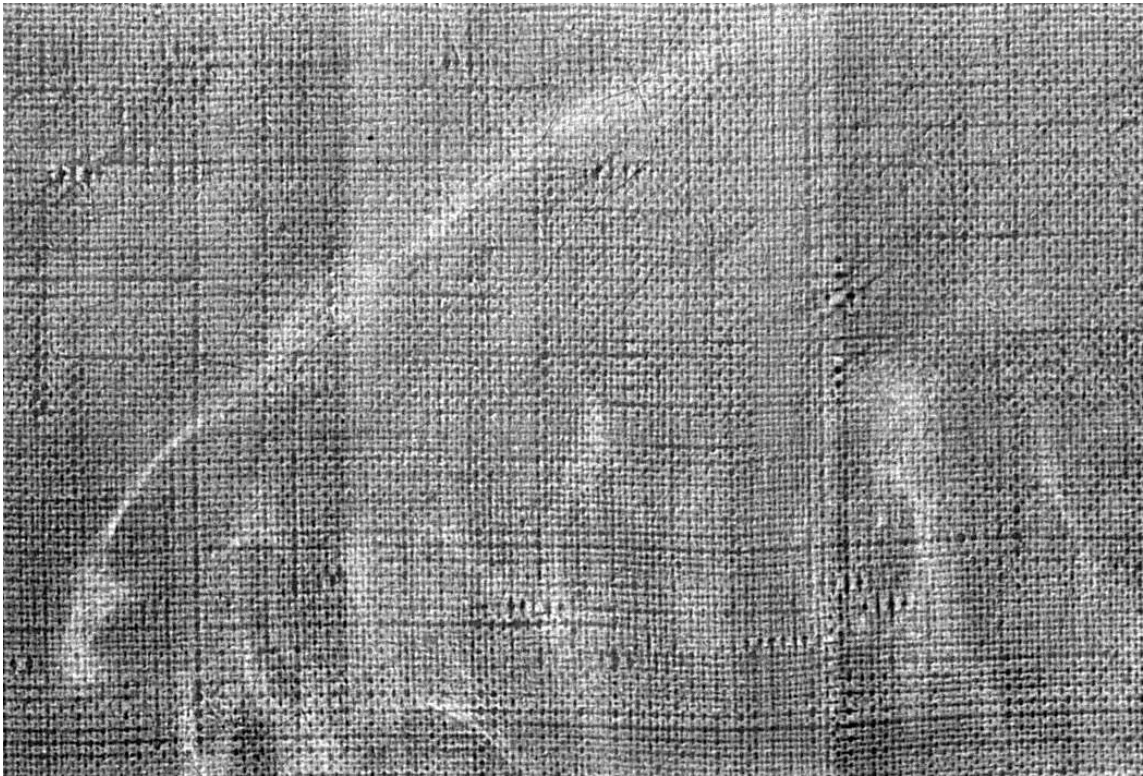


fig 112 X-ray documentation, left centerpart of the painting, detail, Roslins right shoulder.

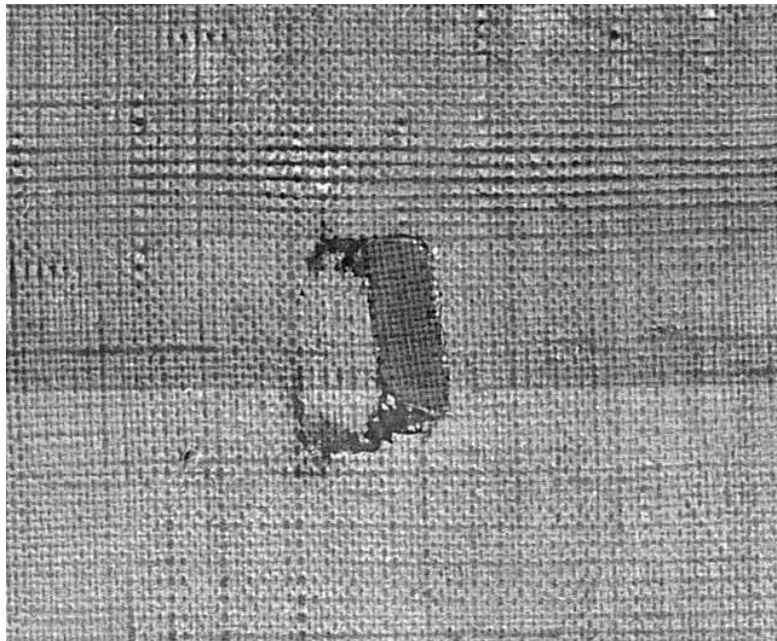


fig 113

X-ray documentation, upper centerpart of the painting, detail, repair.

A less elegant reparation of the canvas, that is not "wielded" and performed with the canvastexture assymetric against origininalcanvas. Obviously done after lamination treatment. Due to the size of the damage and enhancement of weavestructure with old lamination techniques probably motivated the insert. Most likely the original painting lacked this type of surface structure as is the case with the Grillpainting 1775 (see 3.3.4, p.24).

Notable is also that this damage is not clearly verified with other used analysis techniques.

19 Technical equipment used for the investigation:

19.1: Traditional photographic documentation:

Middleformat:

Hasselblad 501C, PME 51, Zeiss Sonnar CF 150mm f/ 4,0 , Zeiss Sonnar CF 80mm f/ 2,8, Voigtländer VC meter Phase one HP 20 digitalback 16mp

Smallformat:

Canon D5 mark II, Canon 24-105 f / 4 LIS UVM

Lumination:

Rekoma daylight 2 X 150 W

Software: Capture one, Photoshop CS5, Canon Digital Professional

19.2: Raking light:

Photo equipment, see 12.1,

Lumination:

Raking light box- 6 X 75 W lamps supported with a foliereflector

Software, see 19,1,

19.3: Macro/micro photo documentation:

Middle format:

Hasselblad bellow 40517, with a Zeiss Sonnar CF 135mm f/ 5,6

Smallformat:

Canon D5 markII, Nikon bellow PB 4 with a Leitz Focotar lens f / -5 cm 1: 4,5

Lumination:

Schott KL 1500 microscope cold light lumination.

UV- lumination: Deffner & Johann Handlampe 5555

Software: Capture one, Canon Utility, Canon Digital Professional, Photoshop CS 5

19.4: IR-reflektography:

Hamamatsu High Performance Vidiconcamera, Interface C2400 -03

Nikkor 55 mm f / 2,8

IR-filter: Heliopan Infrarot 715, ES 52

Luminance:

Halogen - Speedlight Universal,, 2 X 150 W,

Software:

HOKAWO 2,1, pf01, GrabBee,

Canon Digital Professional, Photoshop CS5

19.5 IR-flouescense:

Nikon D1 (IR-modified),

Canon D5 mark II, Canon 24 -105mm/ f / 4 LIS USM

IR-filter 720 (Photax)

Kodak IR Wratten 89B

B+W (double) Polarisationsfilters

Luminance:

See 19.1

Software:

Canon Digital Professional, Photoshop CS5

19.6 IRFC-(IR-False Colours):

Nikon D1 (IR-modified) Nikkor 35 mm f / 2,8

Canon D5 mark II, Canon 24-105 f / 4 LIS UVM

Filter: Kodak IR Wratten 89B (this filter was used for publication)

B+W (double) Polarisationsfilters

IR-72 (Photax, no name product)

19.7. IRCCD:

Leica Digilux II, Vario - Summicron 1:2,0 - 2,4 / 7 -22.5 ASPH

Canon D5 mark II, Canon 24-105 f / 4 LIS UVM

19.8. UV-flouescense:

Canon D5 mark II, Canon 24-105 f / 4 LIS UVM

Filter: B+W 77 KR - 1,5 Skylight 1,1X

B+W 77 415 Ultraviolet cut

B+W 77 420 Ultraviolet

B+W 77 Yellow filter 0,22 2X

Luminance:

” Blacklight” UVA light stack 6 X 36 W (no name product)

19.9: UV-reflektography:

Filter: B+W 77 403 Ultraviolet

Luminance:

See 19.8.

19.10 IR-flouescense:

Nikon D1 (IR-modified),

Canon D5 mark II, Canon 24 -105mm/ f / 4 LIS USM

IR-filter 720 (Photax)

Kodak IR Wratten 89B

B+W (double) Polarisationsfilters

Luminance:

See 19.1

Software:

Canon Digital Professional, Photoshop CS5

19.11 IRFC-(IR-False Colours):

Nikon D1 (IR-modified) Nikkor 35 mm f / 2,8

Canon D5 mark II, Canon 24-105 f / 4 LIS UVM

Filter: Kodak IR Wratten 89B (this filter was used for the publication)

B+W (double) Polarisationsfilters

IR-72 (Photax, no name product)

19.12 IRCCD:

Leica Digilux II, Vario - Summicron 1:2,0 - 2,4 / 7 -22.5 ASPH

Canon D5 mark II, Canon 24-105 f / 4 LIS UVM

19.13 UV-flourecense:

Canon D5 mark II, Canon 24-105 f / 4 LIS UVM

Filter: B+W 77 KR - 1,5 Skylight 1,1X

B+W 77 415 Ultraviolet cut

B+W 77 420 Ultraviolet

B+W 77 Yellow filter 0,22 2X

Lumination:

” Blacklight” UVA lysrör 6 X 36 W (no name product)

19.14 UV-reflektography:

See 19.13 above

Filter: B+W 77 403 Ultraviolet

Lumination:

See 12.13 .

19.15 UVFC (UV-False Colours):

Canon D5 mark II, Canon 24-105 f / 4 LIS UVM

Filter:

B+W 77 KR - 1,5 Skylight 1,1X

Lumination:

” Blacklight” UVA lysrör 6 X 36 W (no name product).

19.16 X-ray equipment:

Multidiagnost Eleva / Philips Health Care, Sweden

Used software for the image production: ImageJ

19.17 FT-RAMAN PROBE:

Bruker optics Multiram

Software: Opus

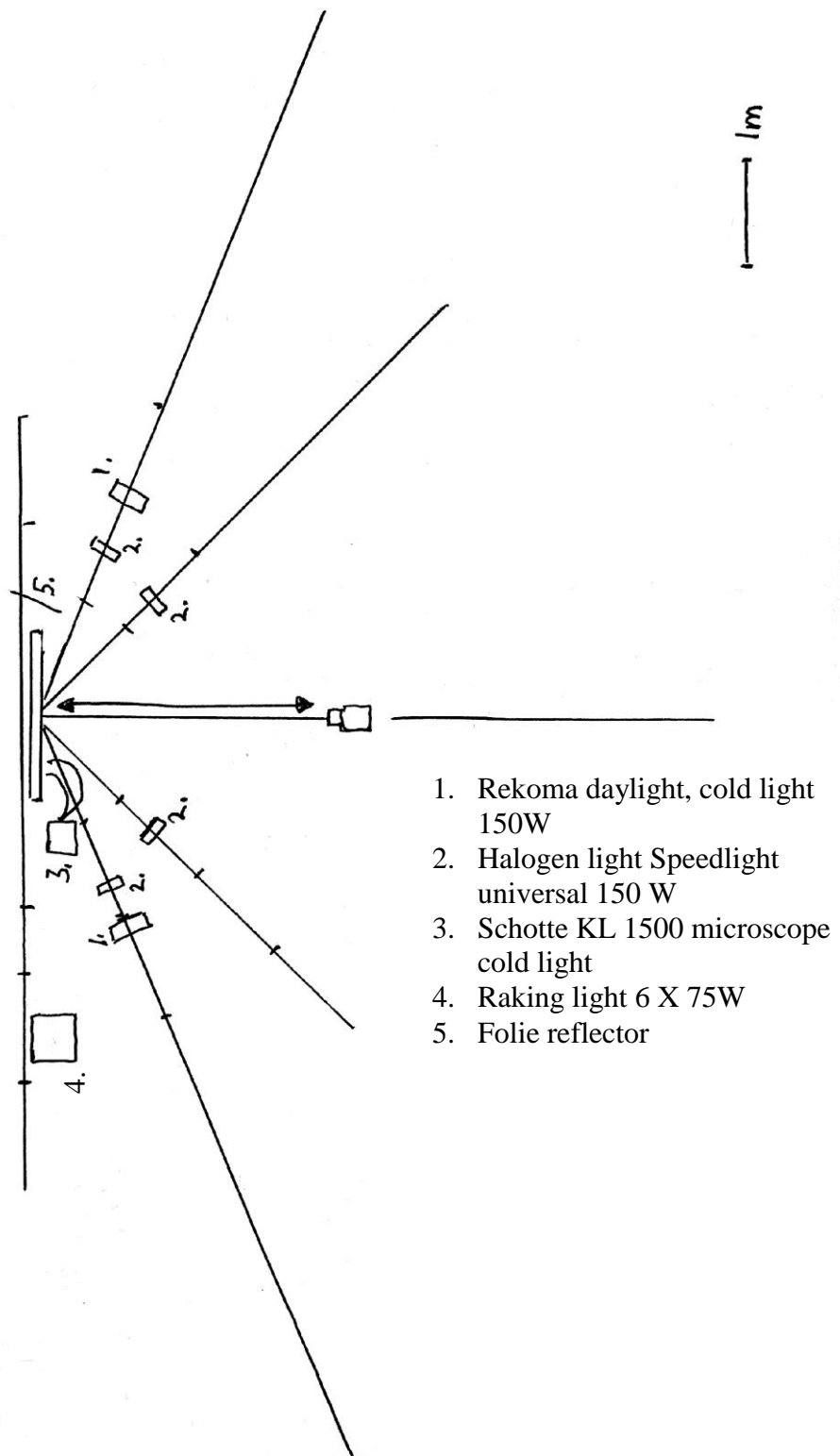


fig.109 Technical illustration over photo documentation.