Giving the Past a Future

Essays in Archaeology and Rock Art Studies in Honour of

Dr. Phil. h.c. Gerhard Milstreu

Edited by

James Dodd & Ellen Meijer

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Giving the Past a Future

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Dr. Phil. h.c. Gerhard Milstreu

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Dedication

In honour of our dear friend, teacher and colleague - Gerhard.
Thank you for making so much possible.
This is for you.

Access Archaeology

Archaeopress Access Archaeology

Archaeopress Publishing Ltd
Gordon House
276 Banbury Road
Oxford OX2 7ED

www.archaeopress.com

ISBN 978 1 78491 XXX X
ISBN 978 1 78491 XXX X (e-Pdf)

Published with generous support from the Lennart J. Hägglunds Stiftelse för Arkeologisk Forskning och Utbildning.

Grateful thanks are also extended to The Department of Historical Studies, University of Gothenburg & The Department of Archaeology and Heritage Studies, Aarhus University, for supporting the Adobe Creative Cloud subscriptions of the editors used for typesetting.

Cover illustration: Part of the panel from Bro Utmark (Tanum 192:1). Photo: Tanums Hällristningsmuseum Underslös

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Giving the past a future.

Essays in Archaeology and Rock Art Studies in honour of Phil. Dr. h.c. Gerhard Milstreu

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Saturday 28 July 2018 should be Friday 27 July 2018

Page 7
There is a full stop missing end of 1st paragraph.

Page 194
Conclusions heading should be in 11pt

Editors Preface

This collection of works celebrates the work of Dr. fil. h.c. Gerhard Milstreu in connection with his 40th year as director of Tanum Museum of Rock Carving and Rock Art Research Centre, Underslös, Sweden. In 1978, Gerhard took over the directorship of Tanum Museum of Rock Art, Underslös and the associated Bohuslän Rock Art Research Archive from the Danish Artist, Fred Gudnitz, whom Gerhard has already worked with over many years following his education in Visual Arts at The Royal Danish Academy of Fine Arts.

Dr. Phil h.c. Gerhard Milstreu. Photo Henning Prøhl

Under Gerhard's leadership, the role of prehistoric art and rock art within the spheres of both the academic world, and that of the general public, have been significantly advanced through the integration of this unique visual information in archaeological discourse. Gerhard started the annual working seminar and transformed the museum's dedicated journal on prehistoric art, Adoranten (which was initiated by Gudnitz). At the working seminar, archaeologists and members of the general public alike from around the world, can come to learn the ins and outs of rock art documentation. The seminar, which began in 1978, was the first of its kind in the world, and has established the framework that has been applied in many countries around the world. The workflow developed by Gerhard and the museum is now also becoming incorporated into archaeological teaching practices at both Masters and Undergraduate level in Sweden and Denmark. Adoranten has blossomed to become an internationally acclaimed, peer reviewed journal, distributed to museums, universities and rock art experts in 26 countries.

Collaboration and dialogue at a local, national and international level has also been a keystone of Gerhard's strategy for the Museum. Time and again he has brought people and groups together, to share knowledge and encourage understanding, thereby assisting in the achievement of results that are far greater than the sum of their constituent parts. Perhaps key to this is his sense of the importance of inclusivity, his ability to listen and his respect for other people and their views.

A sign of the success of these attributes can partly be gauged by the level and amount of Underlsös Museum's activities on an international level. The Museum and Gerhard have been part of several major national and international collaborations, including several major projects part financed by The European Union. Partly because, and as a result of these efforts, Gerhard's network is enormous. Those that have been asked by the editors to contribute here represent merely the common nodes within our networks. Therefore, as the editors, we apologize to anyone not included in advance!

We believe that all the above-mentioned achievements are the direct result of 40 years of inspiration, dedication, hard work, love and engagement from Gerhard. All these achievements are especially noteworthy considering that everything at the museum is done completely voluntarily.

Here, a feast of scholarly contributions from across Europe, at all levels of study have been collected. Each and every one of the following works addresses aspects connected to the work Gerhard has done over the last 40 years. Through their words and images, these pay respect to and acknowledge Gerhard's achievements in the fields of rock art documentation, research, international collaboration and outreach.

Lastly, it is pertinent to give the reader an explanation of our choice of title for the volume. One of Gerhard's slogans, as well as the title of a project to document the rock art on the island of Møn, Denmark, is "give your past a future". To understand this saying, is to, at least partly, understand the philosophy and rationale behind Gerhard's life work. The images have a timeless, artistic quality. They are a unique and, thanks to natural and human degradation processes, disappearing source material. The knowledge thereof and the skills employed in the study of these representations from the past is not solely about the present. It is about the future. One aspect is what we leave behind for future generations to behold in the records. The other, as important, if not more important, is about involving and motivating the next generation to continue. Gerhard has given, and is still giving the youth the possibility and the means to preserve the past: both for the present and the future. Therefore, we entitle this work in his honour 'Giving The Past A Future'.

James Dodd & Ellen Meijer, Editors

Tanums Hällristningsmuseum Underslös

The Annual Celebration Friday 27 July 2018

Tabula Gratulatoria

There is only a small Tabula Gratulatoria in this book. Gerhard's network is so vast with so many colleagues and friends all over the world, that it was impossible for us to contact them all. Moreover, where do we draw the line? The connections are varied, from: colleagues to artists; to students; participants to the annual international workweeks and so on. We have therefore decided to concentrate on the actual content to produce a worthy tribute honouring Gerhard for decades of hard work. He has been, and hopefully will be for a long time to come, a pioneer and ambassador for the rock carvings, not just in Sweden, but worldwide.

This book comes with a heartfelt gratitude, admiration and best wishes from the board and all members of the Scandinavian Society for Prehistoric Art, friends, colleagues, students and all individuals that have enjoyed and / or supported the important work done by Gerhard from 1964 onwards to protect, document and promote the beauty of the images.

Henning Prøhl, Humlebæk
James Dodd, Aarhus
Inger Marie Aicher Olsrud, Moss
Marijke Houwink, Sandhem
Ann-Zofie Duvander, Stockholm
Mette Johansen Rabitz, Copenhagen
Stefan Nilsson, Malmö
Ellen Meijer, Maassluis
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Peter Skoglund, Kalmar
Kalle Sognnes, Trondheim
Magnus Tangen, Fredrikstad
Alberto Marretta & Sara Rinetti, Capo di Ponte
Umberto Sansoni, Capo di Ponte
Elena Man-Estier, Paris
George Nash, Macao, Portugal

Chapter 17

What we see is what we get - Seeing Sandhalsan with new «eyes»

Jan Magne Gjerde & Heidrun Stebergløkken

Abstract

The rock art at Sandhalsan, in Åfjord municipality, has been known since 1931 and has been an important subject for researchers through the years since discovery. Different methods for documentation, different light, different weather conditions and different researchers with different perception and experience, are all factors that have led to new discoveries through these years. Our paper can be seen as an addition to this, but we also wish to summarize the different documentation to show how our knowledge has evolved with the research and documentation of this interesting site.

Introduction

Late May in 2017, we were able to gather representations representing different levels of cultural resource management institutions at Fosen, in Trøndelag. This was a project financed by Riksantikvaren and was a collaboration between NTNU University Museum, The Arctic University of Norway and Trøndelag County Council. The aim was to investigate the potential and the application of new digital documentation methods at eight selected rock painting sites. Representations from Bjugn municipality and third sector organizations also participated in the fieldwork. A secondary aim was the dissemination and a photo exhibition at the participating local museum Bjugn Bygdatun, Mølnargården. In this paper we wish to focus on one of the sites, namely Sandhalsen at Åfjord municipality (see Figure 1. Map of rock art in Fennoscandia with Sandhalsen marked. Reworked from Gjerde (2010: figure 1). and Figure 2. Photo of the Sandhalsen cliff. Photo J.M. Gjerde). This site was discovered in 1931 and was documented by Theodor Petersen the same year. Since its discovery, this site has been an important subject for research. Several re-documentations have revealed new images and details. Our project marks the first time the rock art site has been documented in full scale using photogrammetry and decorrelation stretch (DStretch), an image enhancement technique. In this paper, we present some of the preliminary results of this project.

Background

The rock art at Sandhalsan is located at the northern side of Lake Stordalsvatnet in the municipality of Åfjord, on the Fosen Peninsula, North West of Trondheim. The site is actually two inter-connected rock-shelters that are registered as two different panels. The site is located approx. 35 m.a.s.l., which roughly gives a maximum shoreline dating of 5700 BP (Stebergløkken 2016). The surface of the lake is approx. 20 masl, which means that the lake was isolated from the sea around 4000 BP (Sognnes 2014: 45).

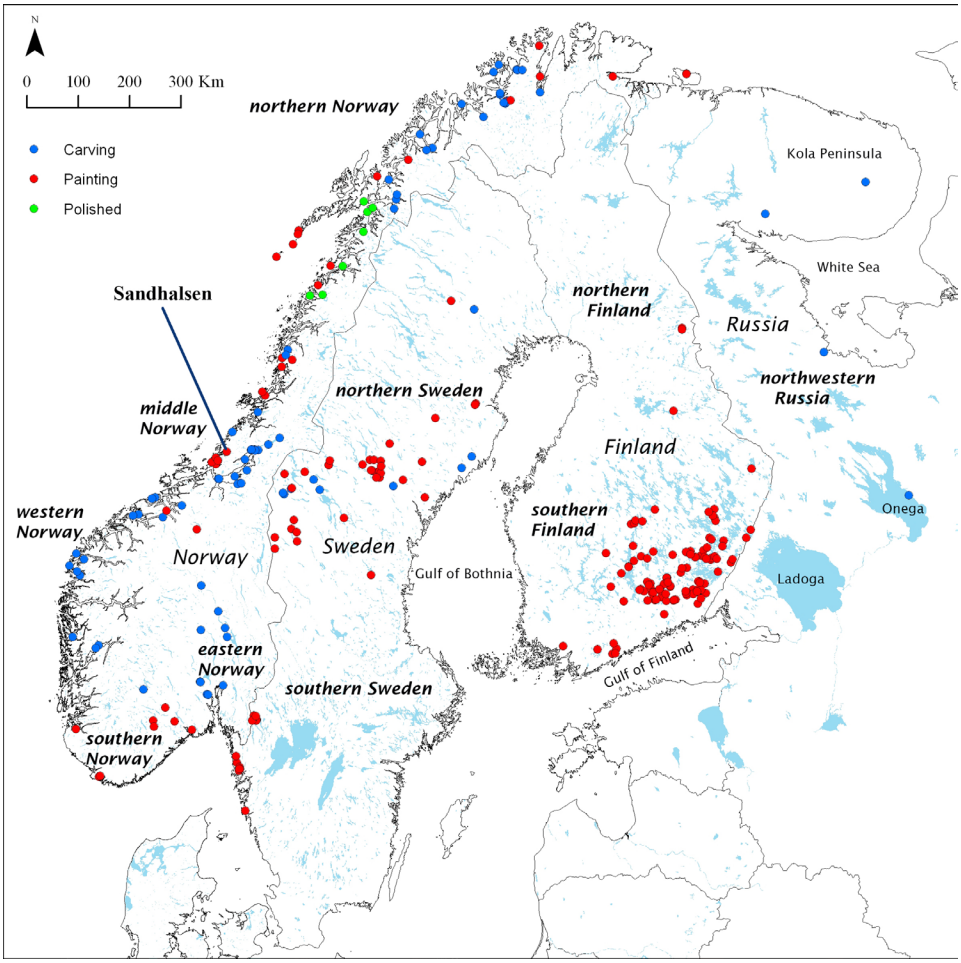

FIGURE 1. MAP OF ROCK ART IN FENNOSCANDIA WITH SANDHALSEN MARKED. REWORKED FROM GJERDE (2010: FIGURE 1).

FIGURE 2. PHOTO OF THE SANDHALSEN CLIFF. PHOTO J.M. GJERDE

Theodor Petersen documented Sandhalsan in 1931 with photos and tracings (see Figure 3. Tracing by Petersen (1931). (Gjessing 1936: Pl.LXXI)). He also conducted a minor excavation of the shelter floor and identified a 70 cm thick layer of cultural deposits. This consisted of charcoal, fire-cracked rocks and small traces of burnt bone material. However, no artefacts were found (Petersen 1932: 3).

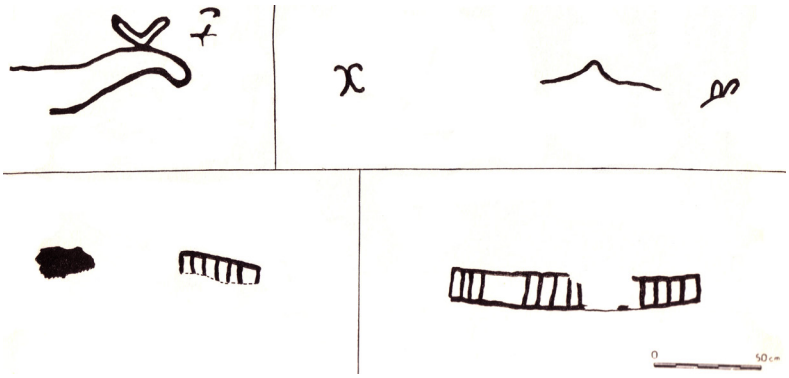

Figure 3. Tracing by Petersen (1931). (Gjessing 1936: Pl.LXXI)

All the figures above, except the frame/boat figure bottom right, are from Panel One. The last figure is from panel two, and has been interpreted as a frame figure or a boat representation.

Since, Petersen's discoveries, several researchers have visited the site, and new discoveries have been made. In 1993, Kalle Sognnes revisited the site where the main aim was to obtain radiocarbon dates. Samples were taken from the upper and the bottom cultural layer. The result from the upper layer was dated to AD 720-980 cal. (T-11131 – 1180±95 uncalibrated). The oldest sample from the bottom of the cultural layer was dated to BC 1680-1510 cal. (TUa-937 - 3315±75 uncalibrated) (Sognnes 1999:470). According to this, the oldest activity from this shelter is from Early Bronze Age (EBA), but we cannot be certain that this corresponds with the initial making and use-phase of the rock art. However, the radiocarbon dates tells us that this shelter may have been known to people in the area, who revisited this place for decades in prehistory.

Figure 4. Sandhalsan, Panel 1. Photo: H. Stebergløkken, NTNU University Museum.

During the excavation, Geir Grønnesby also made a new discovery at the rock art panel; a boat figure to the left of the painted elk. In the bow, a human figure can be seen holding a spear (Sognnes 1999:471, Myrholt 2007:52). However, these figures are not painted, but pecked. Similar boat figures are found throughout the material from Trøndelag, especially from Evenhus at Frosta and Hammer in Steinkjer (Gjessing 1936; Sognnes 1999; Stebergløkken 2016). The coexistence of both painted and pecked rock art is unique within central Norway, and there are not many examples of it across the whole of Norway. At Honnhammer, Tingvoll, in Møre og Romsdal County

we find another example of different techniques coexisting. B. E. Bendixen (1879:41) was the first to describe the paintings here, but he did not know that the paintings were prehistoric. Gustaf Hallström first recognized this in 1909, but it was not until 1994 that Kalle Sognnes traced his new discovery. Two to three boat figures superimpose the previously known painted cervids at Sandhalsen 1. The boats are made with a technique not known from any other site. The boats are not pecked, but chiselled or polished. The lines seem to have been made by using a sharp tool to scrape off the red paint of the cervids (Sognnes 1999:466-470). Looking at the tracing by Eva Lindgaard and Daniela Pawel in 2006 (see Figure 5. Tracing made by E. Lindgaard and D. Pawel, NTNU University Museum 2007 (Lindgaard 2009:45)), we can see three people inside the boat and another part of figure to the left of this (Lindgaard 2009:45).

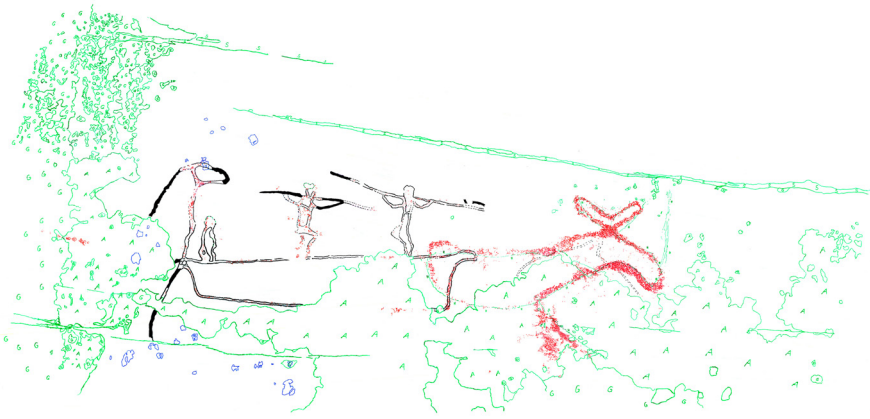

Figure 5. Tracing made by E. Lindgaard and D. Pawel, NTNU University Museum 2007 (Lindgaard 2009:45)

Terje Norsted also documented the paintings at Sandhalsan in 2010. He describes new details of several of the figures, including the boat mentioned above. He saw traces of pigments at the front end of the boat, which could be one of the few observations in Norway of actual traces of pigment combined with pecked lines. He also observed pigments on the rock shelf above the famous boat and elk figure. He describes several tilted lines forming some sort of pattern (fish bone) with a diamond shape. However, because of the weather conditions, he was not able to photograph or trace the figure (Norsted 2010:21). Norsted did not make use of digital documentation methods. Thereby, he lacked methods to document his observations and, not least, to amplify the pigments.

Methodical approach – image enhancement technique

Weather conditions are a known challenge with traditional tracings, and the rock surface needs to be completely dry. However, the most negative aspect with traditional tracings is that you work on top of the paintings, which are often very fragile. Photography is the preferred method, but light and shadow can be problematic and direct sunlight can affect the visibility of the figures.

Combining photos with photogrammetry opens up the possibilities to make 3D models of the rock surface with the figures. Digital photogrammetry is a method of reproducing a scene or object in 3D, which in recent years has become one of the most used methods in general in archaeological documentation. The underlying principle is referred to as Structure From Motion (SfM), which is an Image Based Modelling technique *(see Meijer & Dodd: this volume)*. Based on a series of two-dimensional images taken with a camera moving around a subject, it is possible to reconstruct the subject's three-dimensional geometry and camera's exact position while capturing the images. PhotoScan processing software, provided by Agisoft, is a powerful package that enables digital photogrammetry and three-dimensional reconstruction using SfM. The program has automated steps and requires a minimum of manual processing of the images. Since photogrammetry is based on photos, it is crucial to have images with good resolution as a basis for

the models. There are basically no restrictions on which camera you can use, but it is recommended to use a good camera with a good lens that takes sharp pictures (Harman 2008; Sauvage and Stebergløkken 2017: 18). Testing has shown that SfM has a low margin of errors. The average error of the digital observed value compared with measurement taken manually with a ruler, is only 0.95%. This means that very precise measurement can be taken from the digital models, and touching the rock surface can be avoided (Meijer 2015; Jalandoni; Domingo & Taçon 2018:609-611).

Colour enhancement to see rock paintings have been applied for decades to make rock art more visible (e.g. the use of Adobe Photoshop). In recent years, digital enhancement software has become more available. Several software programs have been applied as a digital tool to enhance the visibility of pigment on the rock surface. These have recently become an important tool in the rock art documenters toolbox. Decorrelation Dtretch (DStretch), an piece of image enhancement software, is specifically designed to manipulate colour pigments by emphasizing and contrasting colours. There has been a lot of exciting method testing of this software, both internationally, but also nationally (Harman 2008; Dodd 2013; Jalandoni, Domingo & Taçon 2018; Linge 2014; Sauvage & Lindgaard 2015; Sauvage & Stebergløkken 2017; Stebergløkken & Gjerde 2017). The method used on this project, involved taking photos in the field that were processed later on a PC. The new addition to DStretch in 2016, was the launch of an app for smartphones (iDStretch and AndroidDStretch), which allows instant image manipulation using your smartphone camera (Harman 2016: 236-238). This opens up new opportunities in fieldwork. By having such an app available on a phone, you can verify or debunk rock paintings standing in front of the rock art panels. The app is hence a useful field tool, which easily detects areas on the rock surface that require more investigation. Single colour filters are applied only with a touch of your smartphone including four filters for red pigments to switch between.

Preliminary results from the documentation

Panel One

Returning to Sandhalsen, we will now present some of the result from our project at Fosen. Returning to Sandhalsen, we will now present some of the result from our project at Fosen. Figure 6 shows the famous painted elk and pecked boat figure with two human figures holding spears. It also shows the exfoliation damage at the site that threatens the rock art. However, this damage is not a new problem. Parts of the boat are missing because of the exfoliation, but the elk's abdomen was painted after this damage occurred of the rock surface. This provides us with a relative chronology, which indicates that the pecked figures are older than the painted ones. At very least, this boat figure is older than the elk figure, but we cannot exclude that some of the other painted figures could be older than the pecked figures. shows the famous painted elk and pecked boat figure with two human figures holding spears. It also shows the exfoliation damage at the site that threatens the rock art. However, this damage is not a new problem. Parts of the boat are missing because of the exfoliation, but the elk's abdomen was painted after this damage occurred of the rock surface. This provides us with a relative chronology, which indicates that the pecked figures are older than the painted ones. At very least, this boat figure is older than the elk figure, but we cannot exclude that some of the other painted figures could be older than the pecked figures.

Using DStretch, you can clearly see the details of the elk figure, and you can also see a small figure beneath the elk's abdomen. This is interpreted as the backline and head of an elk calf. We can also see traces of pigments on the boat to the left of the elk, as previously noted (Norsted 2010: 6, Lindgaard 2009: 46).

To the right of the elk figure is a human figure (see Figure 7), which has been observed since Petersen's tracings in 1931, but not in such detail. It is also fainter than the elk figure, indicating that the figures were not made at the same time.

Norsted observed pigments on the rock shelf above the famous boat and elk figure; some sort of pattern (fish bone), with a diamond shape. Using DStretch on the same area, this pattern became very clear to us (see Figure 8, Figure 6. The famous painted elk, and the pecked boat figure to the left with two human figures holding spears. Traces of a pecked whale figure underneath the elk can be seen just above the exfoliation damage. The elk is superimposing both the boat and whale figure. Photo: H. Stebergløkken, NTNU University Museum and Figure 10. A close-up of the newly documented diamond figure using DStretch filter YRE. Photo: H. Stebergløkken, NTNU University Museum.).

Figure 6. The famous painted elk, and the pecked boat figure to the left with two human figures holding spears. Traces of a pecked whale figure underneath the elk can be seen just above the exfoliation damage. The elk is superimposing both the boat and whale figure. Photo: H. Stebergløkken, NTNU University Museum

Figure 7. Human figure to the right of the elk, DStretch filter CRGB. Photo: H. Stebergløkken, NTNU University Museum

Figure 8. The rock shelf above the famous boat and elk figure. Photo: J. M. Gjerde, UiT

Figure 9. A diamond shape visible using DStretch filter YRE. Photo: J. M. Gjerde, UiT.

Figure 10. A close-up of the newly documented diamond figure using DStretch filter YRE. Photo: H. Stebergløkken, NTNU University Museum.

Figure 11. A very fragmentary figure (original photo to the left) shows new details with DStretch (filter YRE). Photo: H. Stebergløkken, NTNU University Museum.

To the right of the famous boat and elk figure (Figure 5. Tracing made by E. Lindgaard and D. Pawel, NTNU University Museum 2007 (Lindgaard 2009:45)), there have been observed some pigments that forms an "x-figure", as shown in Petersen's tracing (Figure 3. Tracing by Petersen (1931). (Gjessing 1936: Pl.LXXI)). Norsted also refer to this x-figure and describes them as short fragmentary transverse lines. Applying DStretch, more details are revealed. This can hardly be interpreted as a x-figure, and the image enhancement reveals two sets of "ovals" that are interpreted as two pairs of ears (see Figure 11. A very fragmentary figure (original photo to the left) shows new details with DStretch (filter YRE). Photo: H. Stebergløkken, NTNU University Museum.). Exfoliation has unfortunately damaged vast parts of the figure, but using this method provides us with more information to identify the figures and motifs, hence a better vantage point for the interpretation of rock art.

Figure 12. Whale and elf figure (original photo to the left and DStretch YRE to the right). Photo: Heidrun Stebergløkken, NTNU University Museum.

Moving further to the right on the panel, the whale figure and the elk head are visible in the original photo (Figure 12. Whale and elf figure (original photo to the left and DStretch YRE to the right). Photo: Heidrun Stebergløkken, NTNU University Museum.). Applying the YRE filter in DStretch clarifies the image. To the right of the elk figure (Figure 13. A boat with a human figure? DStretch filter YRE. Photo: H. Stebergløkken, NTNU University Museum.), there are pigments also mentioned by Norsted. However, he could not interpret a specific figure. Using YRE filter, we can clearly see a human figure with elongated arms, which could indicate the human holding a spear. Beneath the human figure, a rectangular figure can be spotted, maybe with transverse line (division of bulkheads?). We find it plausible that this illustrates at human figure in a boat holding a spear. This image then mirrors the pecked boat and human figure to the left side of the panel.

Figure 13. A boat with a human figure? DStretch filter YRE. Photo: H. Stebergløkken, NTNU University Museum.

Figure 14. Elk and boat figure. DStretch filter YRE. Photo: H. Stebergløkken, NTNU University Museum.

Furthest to the right of Panel One, there is a rectangular figure previously interpreted as a frame figure or a boat. We find it plausible that this is a boat image, comparable with the pecked boat images in Trøndelag (Sognnes 2017; Stebergløkken 2016). An area with pigments to the left of the boat was documented by Petersen in 1931. Norsted rejected these pigments as natural iron precipitations (Norsted 2010:17). Using the YRE filter in DStretch, this colour stain appears to be an elk figure. You see a backline and ears of the elk's head facing the boat figure. The colour pigmentation matches the colour of the boat figure, and the elk and boat standing side by side is a recurring theme.

Panel Two

Prior to our fieldwork, only one figure was known at panel two: a boat figure. The boat is longer but similar to the one at panel one, seen in Figure 14. Elk and boat figure. DStretch filter YRE. Photo: H. Stebergløkken, NTNU University Museum.. There is some disagreement if it should be interpreted as a boat or a frame figure. The vertical lines can be interpreted as divisions of bulkheads. Another viable interpretation, is that these figures could represent guiding fences, as presented by Gjerde based upon comparison to similar figures at Evenhus (Trøndelag, Central Norway) see Figure 15. Guiding fence at Evenhus, middle Norway. Tracing after Gjessing (1936). Illustration after Gjerde (2010: Figure 309). and Sporanes (Telemark, Eastern Norway) (Gjerde 2010: 433-435). More elaborate guiding fences or reindeer corrals with similar traits are found in the rock art of Alta, Nortern Norway (Gjerde 2010: 276).

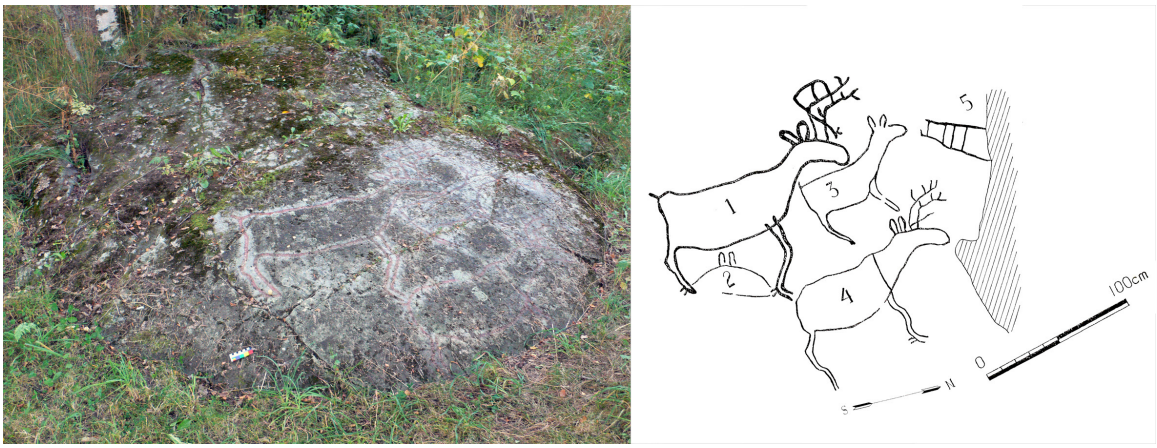

Figure 15. Guiding fence at Evenhus, middle Norway. Tracing after Gjessing (1936). Illustration after Gjerde (2010: Figure 309).

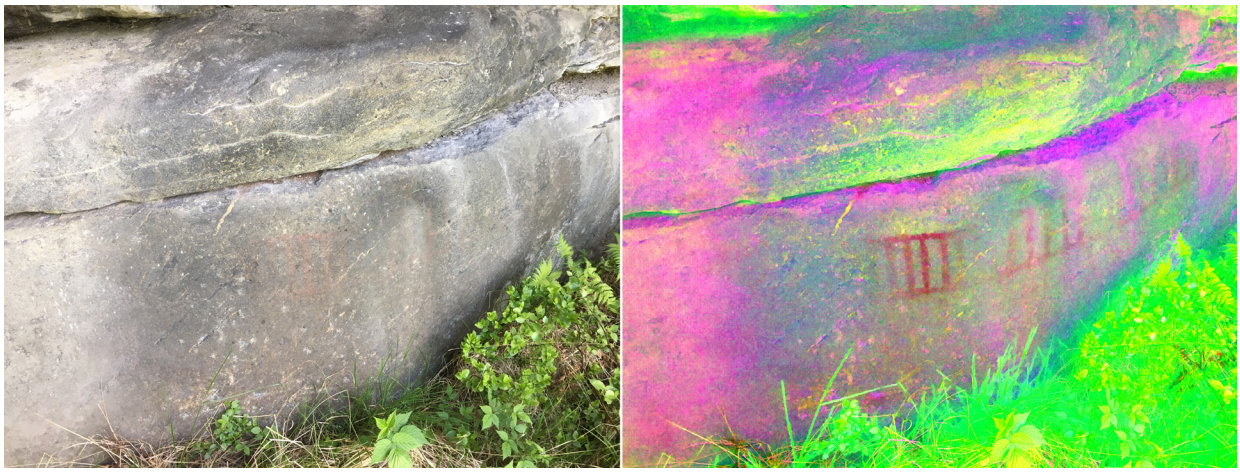

Figure 16. The boat figure at panel two, original photo to the left, and DStretch filter CRGB to the right. Photo: H. Stebergløkken, NTNU University Museum.

When studying the panel to the left of this boat figure (Figure 17 Almost invisible pigments to the left (original photo) and DStretch filter CRGB to the right. Photo: H. Stebergløkken, NTNU University Museum.) we could see some red pigments. They were very diffuse, and the strong sunlight made it almost impossible to see. In fact, the pigments were so fragmentary that we had to try iDStretch many times before we saw anything that looked like a pattern. In fact, we could only get a photo of the image using our mobile phones. When analysing the photos from our cameras using the software for PC, DStretch could not reveal any pigments. This source of error could have something to do with the distance from the camera to the rock art panel. The more detail you wish to capture, the closer you need to get.

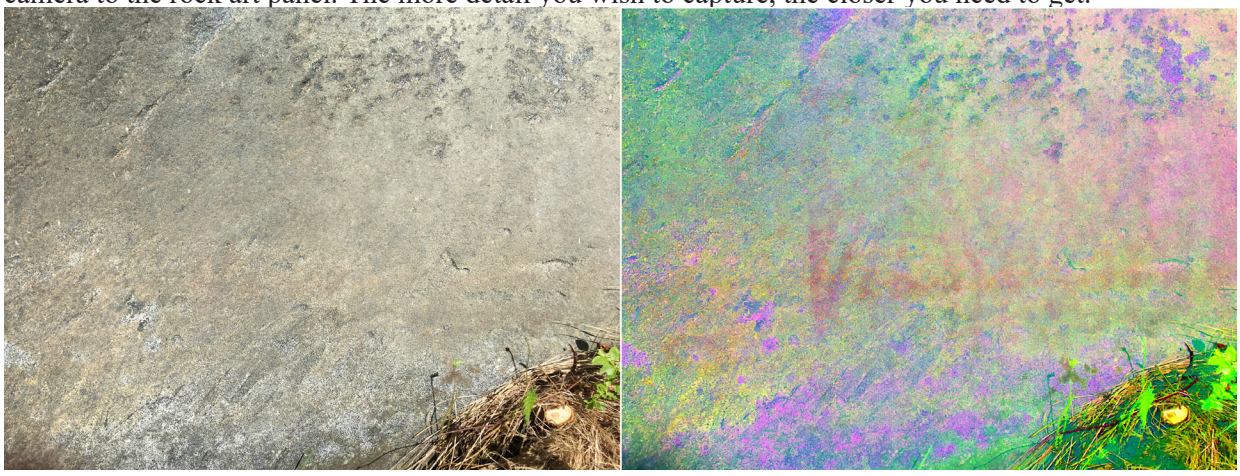

Figure 17 Almost invisible pigments to the left (original photo) and DStretch filter CRGB to the right. Photo: H. Stebergløkken, NTNU University Museum.

Concluding remarks

In this paper, we wanted to share our results from the experiments with DStretch at Sandhalsan in Åfjord, central Norway. The site has also been documented using SfM, but these results are not presented in this paper. These data is stored and is an important and new standard of documenting rock art sites. A 3D-model of the sites, will give a more precise way of documenting how the figures relate to one another and the different topographic elements of the rock surface, which 2D-documentation such as tracings will not illustrate. We have focused here on the application of Decorrelation Stretch (DStretch), and how

this method sheds new light on painted rock art. Therefore, we have focused on the different figures documented throughout the research of this site. Most of the figures have been known since Petersen documented the site in 1931, but we have also discovered new ones and more details of known figures.

Kalle Sognnes (1999: 472-473; 2001: 79-81) has previously questioned why new elements or figures have been discovered at this site almost every time new researchers have visited the place. Nobody expected to find pecked figures at this site, maybe this is partly the reason why nobody saw them before Grønnesby in 1993 (Sognnes 1999: 471). The light conditions, moist or dry weather, different researchers, expectations and perception will affect how we interpret the rock art. That individual factors of expectation and perception may be important factors, and that is also why researchers never should document alone. We need to discuss our observations and explain each other what we see.

As these experiments show, we have a digital tool in our documentation toolbox that is in many ways superior to traditional documentation methods and techniques. This can be summed up by comparing the different stages of documentation at Sandhalsen as presented in Figure 18. Compilation of documentations of the rock art at Sandhalsen. A: Tracing by Petersen (1931). (Gjessing 1936: Pl.LXXI). B:Tracing after Sognnes and Haug (1994). C: Tracing after Lindgaard (2009). D: Marking the remains of the whale figure on tracing after Lindgaard (2009). E: Photo of Sandhalsen. F. DStretch modification of Sandhalsen. G: The grid-figure at Sandhalsen marked. Photos and illustration : J.M. Gjerde – UiT.. Aware of the fact that DStretch aids us to see the panel with new "eyes", we must also be aware of the pitfalls. How much can we rely on this method? How can this method increase our understanding of the site? What kind of interpretation challenges does it hold? And what other benefits can this digital method provide us. Overall, we believe that this method reveals more of the panel, and a whole other level of details and new figures that have previously been "invisible", as shown by the examples above. What our study has shown, is that this interpretation needs to be done on site, like all other documentation. The DStretch-app was, in this case, very important, as shown with Figure 17 Almost invisible pigments to the left (original photo) and DStretch filter CRGB to the right. Photo: H. Steberg løkken, NTNU University Museum.; this figure was not visible when using DStretch on the photos taken without mobile. This is a weakness, and you need to be close to the panel to get the details when figures are so fragmentary and faint. Our experience is also that the panel needs to be very clean and free of micro vegetation. This is not a problem at Sandhalsan, but at other sites where moss and lichen dominate the rock surface, DStretch can be challenging. However, there are examples of pigments being visible by DStretch through thin layers of lichen (Gjerde 2012). The thicker this layer of natural algaes/moss/lichen is, the harder the conditions for interpretations get. Even under good conditions with clean rock surfaces we still need to interpret the images: DStretched photos do not in any way give us a facit or blueprint of how we should interpret the panel.

As a method, it gives us numerous benefits both when it comes to rock art research, CRM (cultural resource management) and dissemination. Most important, to researchers eyes, is that we can see more and document more of the actual rock art. More figures are found and, not least, details of the figures appear that may be vital to the interpretation of the rock art. The natural iron precipitations and biomasses on the rock surface can also at times be discerned from the figures and discarded as, even though some caution must be addressed when it comes to this. From a surveyor's perspective, new sites and new figures can be found, In other words: a new tool to find new rock art. Due to its digital advantage, the time from fieldwork to publication is reduced, arguing for the cost-effectiveness of the method. Fieldwork is, however, weather dependent, although this is also the case for traditional fieldwork. From a CRM (conservation / protection) view, we can document the rock paintings without touching the panel. The method can also be applied to see and document damages to the rock and follow them through time to observe whether the condition of the rock art is further deteriorating.

Another important element is dissemination. We can publish a 3D-model with a DStretch photo layer, or only the photos with DStretch to people who wish to study the images. Several of the sites does not have

visible figures and the dissemination value is low. Being on a site where the figures are faint and almost invisible is challenging to show people for obvious reasons. To use DStretch to enhance and manipulate the images gives us some advantages in communicating these sites to people that wish to learn more about them. It also gives us an opportunity to show fragile rock art that is unavailable for most people. In this

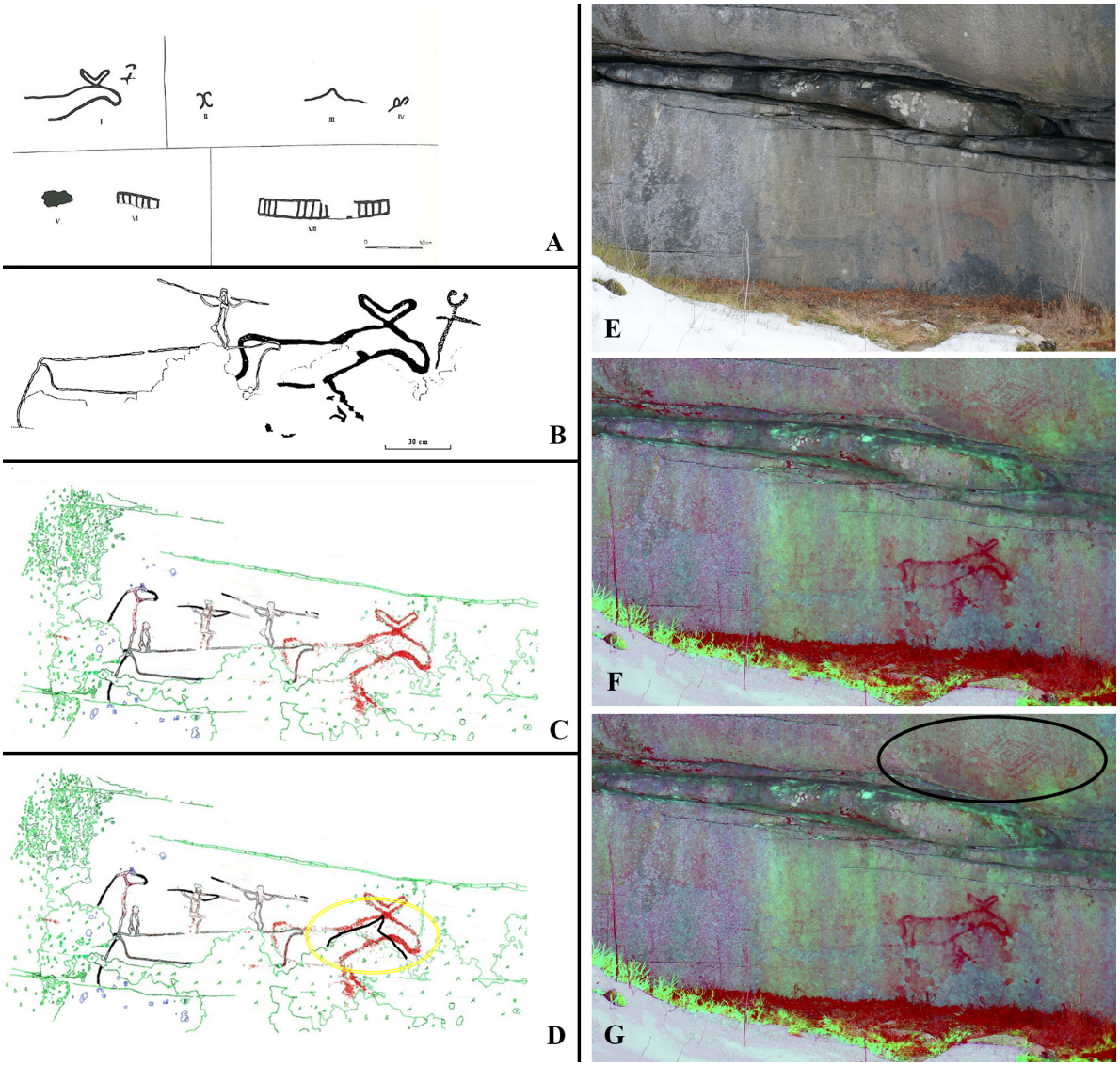

Figure 18. Compilation of documentations of the rock art at Sandhalsen. A: Tracing by Petersen (1931). (Gjessing 1936: Pl.LXXI). B:Tracing after Sognnes and Haug (1994). C: Tracing after Lindgaard (2009). D: Marking the remains of the whale figure on tracing after Lindgaard (2009). E: Photo of Sandhalsen. F. DStretch modification of Sandhalsen. G: The grid-figure at Sandhalsen marked. Photos and illustration : J.M. Gjerde – UiT.

way, the method opens up new possibilities. However, researchers will still be affected by elements like the light conditions, moist or dry weather, different researchers with expectations and different perception. This is why rock art is so exiting: our interaction with the panel and seeing the rock art as part of the overall archaeological context it belongs to. DStretch has clearly given us a better vantage point for documenting and studying rock art and rock art sites.

Acknowledgements

Thanks to Gerhard Milstreu for his lifelong investment as a role model in documenting and safeguarding rock art. Through his coursework and passion for rock art he has given future generations the opportunity to pass on his knowledge.

Thanks to the editors of this book for their patience and James Dodd for proofreading the English. Any errors are later additions.

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