HÁSKÓLI ÍSLANDS
Hugvísindadeild

Facsimiles of Medieval Icelandic Manuscripts

Ritgerð til M.A.-prófs

Natalie Julia Colceriu

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Introduction

Icelandic manuscripts, particularly the medieval manuscripts housed at the Árni Magnússon Institutes and the history of their duplication through facsimile-making processes will be the focus of this paper. A vast amount of research had to be undertaken, collecting various sources in English and Icelandic, to compile the history of facsimile productions. To my knowledge, no compilation of the history of medieval Icelandic facsimile production has written before, especially not to this breadth and depth or in English.

The first chapter will provide an overview of the history of facsimile reproduction divided into sections according to facsimile medium. The definition of 'facsimile' means a copy or reproduction of an original and comes from the Latin *fac simile* translated as "make similar." For our purposes it will be specifically a copy of a manuscript produced photographically. Facsimile creators strive to replicate the manuscript as accurately as possible so that scholars can rely upon the facsimile. In Iceland and in Denmark, several graphic techniques have created facsimiles—copperplate press, lithography, and various photographic processes from traditional to digital. These processes, their histories and results, will be chronicled regarding Icelandic manuscripts.

The second chapter isolates the primary reason for facsimile creation, which is access. What were and are the incentives and goals of the manuscript institutions? How accessible are the original manuscripts? The answers to these questions further illustrate the importance of access and facsimiles.

Finally, the third chapter highlights issues surrounding the different facsimiles formats. First the benefits of using the original manuscript are listed as a means of showing some of the disadvantages associated with the other formats. Then issues surrounding print facsimiles will be discussed. Next is the section on issues surrounding photographs and microfilm, which is followed by the final section, issues surrounding the digital format.

Chapter 1: History of facsimile production by format

Chapter 1 organizes the history of production by format type. Within the format type, the history of production of facsimiles is chronicled. The first facsimiles of Icelandic manuscripts to be created were print facsimiles using the early method of the copper plate technique and thus, the "Print Facsimile Series" section comes first. It enumerates the different series created and the methods used up through modern photography, when the "Photographs and Microfilm" section begins. It discusses the techniques used to create photographs and the other duties of the photography department of the Arnamagnæan Institute. The "Photographs and Microfilm" section follows the techniques through digital technology, from where the "Digital Facsimile Edition" section begins and is followed by the "Digital Manuscripts" section, which ends the chapter discussing the most current facsimile projects.

1.1 Print facsimile series

A facsimile edition contains a photographic replica of a manuscript preceded by a scholarly introduction. Important or characteristic features of the manuscript and its literature are highlighted in the scholarly introduction. Usual contents for an introduction are description of the manuscript, history, paleography, orthography, localization, marginalia, codicology and a bibliography. Introductions can have multiple authors, each with their own specialization or can have one author covering all the unique characteristics of the manuscript.

Facsimile editions have been produced by the Arnamagnæan institutes to fulfill their important task of publishing,[1] thereby supporting further research and disseminating Nordic culture. Earlier facsimile series sought to publish the most important and aesthetically pleasing manuscripts or to "make material which hitherto has been but little noticed, accessible to the public."[2] Since producing facsimiles is expensive, priority has been given to "large and impressive" manuscripts.[3] The word "impressive" alludes to aesthetics, especially illuminations. Several other reasons for

[1] Arnamagnæan Institute. 1964. *Bulletin 1963-1964*. Copenhagen: Fr. Bagges Kgl. Hofbogtrykkeri.
[2] Halldór Hermannsson. 1935. *Icelandic illuminated manuscripts of the middle ages.* Kobenhavn: Levin og Munksgaard, 28.
[3] Fornaldarsagas and late medieval romances. 1977. *Early Icelandic manuscripts in facsimile, vol 11*. Copenhagen: Rosenkilde og Bagger, 7.

publishing facsimile editions exist such as celebrating anniversaries, educating and making a manuscript better known. For example, the first volume of *Íslensk miðaldahandrit-Manuscripta Islandica Medii Aevi, Skarðsbók*, was published to celebrate the ten year anniversary of its transfer from the Arnamagnæan Collection in Denmark back to Iceland.[4] When creating a facsimile of *Möðruvallabók*, there was no diplomatic edition; thus, the creation of a facsimile was seen as practical. Not to mention that *Möðruvallabók* is considered as one of the most important Icelandic medieval manuscripts, this is one of the main reasons for publishing a facsimile.[5] An example of a facsimile created with the intention to educate is the second volume of *Íslensk Handrit, Early Icelandic Script as Illustrated in Vernacular Texts from the Twelfth and Thirteenth Centuries* by Hreinn Benediktsson. It provides material for the study of Old Icelandic paleography

History of facsimile series production

The crossing over point from pure printed text into the facsimile era occurred in the 1770s for the Arnamagnæan Commission. This was a gradual development. First, copper plate engravings of scribal hands were created and incorporated into text editions. Copper plate techniques were eclipses by lithography around the beginning of the nineteenth century. Both methods required that a hand-drawn copy be made of the original. Since hand drawings are not accurate then neither were the methods of copper plates or lithography. Lithography required the drawing to be traced in reverse on a slab of stone which would be pressed. Eventually the stone was replaced with more flexible metal plates which print by being pressed on paper.[6]

Over the next century photographic methods were improved. Photolithography began to be used to produce facsimiles by the end of the nineteenth century and this technique continues to be the preferred method for creating high-quality reproductions.[7] In 1869 the first two complete manuscripts were reproduced in color with photolithography by the Arnamagnæan Commission, which aimed to produce

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[4] Skarðsbók. Codex Scardensis: AM 350 fol. 1981. *Íslenskt miðaldahandrit—Manuscripta Islandica Medii Aevi, vol. 1*. Reykjavík: Lögberg, 1.
[5] *Möðruvallabók*. 1933. Preface. *Corpus codicum Islandicorum medii aevi*, Ejnar Munksgaard, ed, vol 5. Copenhagen: Munksgaard, 9.
[6] Medieval Institute Library. *Medieval manuscripts in facsimile: Introduction*. Notre Dame University. http://library.nd.edu/medieval_library/facsimiles/index.html (accessed June 21, 2008) par. 5.
[7] Ibid.

facsimiles of their collection's "most important and most attractive Danish, Icelandic and Norwegian manuscripts."[8] The first color reproduction in 1869 was *Valdimar's Law* (AM 24 4to), a Danish manuscript.[9] The second reproduction in 1869 was the Icelandic *Elucidarius* (AM 674 4to) in the care of Konráð Gíslason.[10] Both of these facsimile editions have short introductions preceding the facsimile pages. These pioneer reproductions would stand alone for eight years, until another facsimile would be produced in 1877 of a runic manuscript, *Skane's Law* codex in AM 28 8vo. It too had a short introduction before the facsimile section. Eventually in 1891, fourteen years later, the usual facsimile format was combined with a transcription. One page with a diplomatic transcription of the *Elder Edda* would be juxtaposed to the matching facsimile page. This was published by the Samfund til Udgivelse af Gammel Nordisk Litteratur.[11]

In 1906 the Royal Library in Copenhagen setup a photography studio in their new building. This stimulated more interest in producing facsimile editions and soon publishers began creating facsimile edition series. The first to establish a series was Ejnar Munksgaard, publisher and editor, in 1930. Ejnar Munksgaard's series is called *Corpus Codicum Islandicorum Medii Ævi*. Over the next twenty-six years (1930-1956), his series would fruitfully produce twenty facsimiles of Icelandic manuscripts,[12] although initial plans were to create almost a hundred volumes.[13] The last volume of the series states, "with the publication of these volumes, some of the greatest and most important Icelandic codices from the period c. 1200 to c. 1550 have been made available to scholars who have not the opportunity of studying the originals themselves."[14] With this intent, *Flateyjarbók* (GKS 1005 fol.) was the first in the series because it was deemed the largest and most important manuscript. All the facsimiles in the series followed the traditional format of having an introduction describing the history and unique qualities. Not as standard was the paper on which

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[8] Springborg, Peter. 2000. Foreword. In, Tales of Knights: Perg. fol. nr. 7 in the Royal Library, Stockholm (AM 567 VI β 4to, NKS 1265 IIc fol.), Christopher Sanders, ed. *Manuscripta Nordica, vol. 1*. Copenhagen: Reitzel

[9] Ibid.

[10] Stofnun Árna Magnússonar á Íslandi. Forsíða: *Bókasafn, Um fyrstu prentuðu útgáfur fornrita.* http://am.hi.is/bokasafn/umFyrstuPrentuduUtgafurFornrita.php?fl=7 (accessed June 20, 2008).

[11] Ibid.

[12] Ibid.

[13] Springborg, 2000, Foreword.

[14] Stjórn. 1956. *Corpus codicum Islandicorum medii aevi, vol. 20*. Copenhagen: Levin & Munksgaard, 5.

the facsimiles were printed; it was incredibly thick, causing many of the facsimile editions to be very heavy as a result.[15]

In 1954, two years before the finalization of the *Corpus Codicum Islandicorum Medii Ævi*, its editor, Ejnar Munksgaard began another series named *Manuscripta Islandica* edited by Jón Helgason. The series produced seven volumes and ran from 1954 until 1966. Reasons for creating this series were "meeting a great need, a belief confirmed by the fact that the majority of the volumes in the well-known series *Corpus Codicum Islandicorum Medii Ævi* have long been out of print and in great demand."[16] Unlike the previous series, though, this one would not use the incredibly thick, cardboard-like paper; the books would be thinner and lighter. This series focused on producing Icelandic quarto manuscripts in their original size. The exact measurements of the facsimile editions was planned to be 33.5 x 25 cm. Munksgaard learned much from his first series and applied it to the second series. Also, he was eager to try out a new technology, ultraviolet photography in order to produce more legible facsimiles. If the ultraviolet technique did not work sufficiently, anything illegible was also provided as a transcription.[17]

During the same time that Jón Helgason was the editor of *Manuscripta Islandica*, he was the general editor of a series by the publisher Rosenkilde & Bagger called *Early Icelandic Manuscripts in Facsimile*. This series ran from 1958 until 1993 and during those thirty-five years, twenty volumes were produced using the collotype photographic process.[18] This series' book design, "was inherited from Ejnar Munksgaard, even though the volumes are less bulky."[19] By "book design" it is meant that the introductions, written by highly skilled specialists, are very thorough on the topics of the manuscript's history, paleography and orthography.

Since the Arnamagnæan Institute in Copenhagen had been established in 1956, it had a photographic studio. Initially it had police photographers such as Detective-Sergeant Johan A. Jensen. He adapted his photographic knowledge to manuscripts and experimented with techniques to create good facsimiles. For the first volume of

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[15] Springborg, 2000, Foreword.
[16] Manuscripta Islandica. *Manuscripta Islandica* [informational pamphlet and order form circa 1954]. Coopenhagen: Munksgaard.
[17] Ibid.
[18] Ibid. and Rosenkilde & Bagger, Early Icelandic Manuscripts in Facsimile, http://www.rosenkilde-bagger.dk/Early%20Icelandic%20Manuscripts.htm (accessed August 5, 2008).
[19] Springborg, 2000, Foreword.

the *Early Icelandic Manuscripts in Facsimile* series, he used ultraviolet light to make the parchment fluorescent, thus, causing the text to be more defined. At that time sensitive plates were used to produce a negative which is transferred to the glass-plate of the photo printing machine.[20]

All the above named series have all stemmed from the Copenhagen institute. The Reykjavík institute has created two series of its own. One, *Íslenzk handrit*, began in 1956, around the same time as *Manuscripta Islandica* and *Early Icelandic Manuscripts in Facsimile*. *Íslenzk handrit* has eight volumes in its series so far. Three are in folio. These are *Íslendingabók Ara fróða* (AM 113a and 113b fol.) printed in 1956, *Early Icelandic Script as Illustrated in Vernacular Texts from the Twelfth and Thirteenth Centuries* printed in 1965 and *Landnámabók* printed in 1974. Three are in quarto. These are *Kvæði* printed in 1965, the *Icelandic Homily Book* (Perg. 15 4to) printed in 1993 and *Kollsbók* printed in 1968. The final two are in octavo, *Sigilla Islandica* vol. I and vol. II. Unlike the Copenhagen series, which primarily have introductions in English, the Reykjavík series have introductions in Icelandic and English.[21]

The second series from Reykjavík is the *Íslensk miðaldahandrit—Manuscripta Islandica medii Ævi*. Stofnun Árna Magnússonar partnered with Lögberg-Bókaforlag to create this series. Only two volumes were produced, one in 1981 of *Skarðsbók* (AM 350 fol.) and the other a year later, 1982, of *Helgastaðabók* (Perg. 4to. nr. 16).[22]

All of these series began and were active primarily during a time before easy accessibility to home computers with CD-Roms and thus are in print form. Technological advances stimulated the creation of a hybrid facsimile—print introduction and digital images on a CD-Rom. The Arnamagnæan Institute has created a digital facsimile series called *Manuscripta Nordica*, which is discussed in one of the following sections.

The next section "Photographs and Microfilm" overlaps with this section in technique and timeframe, but highlights image creation over series creation. The

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[20] Sturlunga saga: Manuscript no. 122. 1958. *Early Icelandic manuscripts in facsimile, ed. Jakob Benediktsson, vol. 1.* Copenhagen: Rosenkilde og Bagger, 18.
[21] Stofnun Árna Magnússonar á Íslandi. Forsíða: *Bókasafn, Um fyrstu prentuðu útgáfur fornrita.* and Stofnun Árna Magnússonar á Íslandi. Útgáfubækur. http://www.hi.is/pub/sam/utgafa.html (accessed June 19, 2008).
[22] Ibid.

techniques described in the next section were used for the creation of images that would then possibly become part of a facsimile edition.

1.2 Photographs and microfilm of manuscripts

Both Árni Magnússon institutes have a photographic studio and collections. They both have similar roles. Photographs are taken of manuscripts and other items in their collections either for their own use, production of facsimile series, preservation or to fill an order made by another institution or individual. They also seek to borrow and photograph manuscripts from abroad, adding the photographs to their own collection.[23] The photographic collections and microfilms also have to be maintained. New techniques have to be experimented with, especially since new technologies appear so rapidly. On top of the normal, long-standing duties of the photographic departments, various other tasks may come up, depending on the needs of the institutes and other users.[24]

The Arnamagnæan Institute's Photographic Department, specifically, has had a photographic studio since its foundation in 1956. Initially the photographers had the technical skills of police photographers, but over the years a lot of manuscript specific knowledge was gained.[25] The Arnamagnæan Institute has had the usual duties plus a large transfer project and then a second project of creating archival images. As a result of those projects, they have a very large collection of exposures dating from as early as the 1950s. As a result the Copenhagen institute has a much larger collection of manuscript photographs than the Reykjavik institute. The exposures are in several formats: microfilms (35 and 70 mm), glass plates, sheet film, black-and-white prints and color exposures (a minority of the collection).[26] The contents of the collection are primarily images of Icelandic manuscripts from the AM collection and other countries.

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[23] Árni Magnússon Institute. Manuscript Studies: Photographic Collection, http://www.arnastofnun.is/page/a_manu_photographic_collection, (accessed June20, 2008).
[24] Arnamagnæan Institute. 1998. *Bulletin 21: 1996-1997*, 20.
[25] Overgaard, Mariane. 1997. The organisation of the photography and restoration of manuscripts prior to their transfer to Iceland 1971-1996. In *Care and conservation of manuscripts 3: Proceedings of the third international seminar held at the University of Copenhagen 14th-15th October 1996* ed. Gillian Fellows-Jensen & Peter Springborg, 2-27. Copenhagen: The Royal Library, 4.
[26] Ibid and Pedersen, Elin Lindhardt and Niels Borring. 1997. Strategies for the conservation and storage of the photographic material in Arnarmagnæan Institute. In *Care and conservation of manuscripts 3: Proceedings of the third international seminar held at the University of Copenhagen 14th-15th October 1996* ed. Gillian Fellows-Jensen & Peter Springborg, 28-43. Copenhagen: The Royal Library, 29.

Many of the older photos were created under different technological and codicological conditions and are not as high quality or do not show pictures of things such as bindings.[27] Bindings were not photographed during the 1950s and 60s if they were young or cheap paper bindings.[28]

Microfilm began being used at the Arnamagnæan Institute in the late 1950s for the preservation of the manuscripts. At that time there were not many photographs or microfilms of the manuscripts and within that small collection, the quality ranged. Scholars much preferred to work with the manuscripts and were averse to working with microfilm or photographs. As time passed, conservation efforts intensified and facsimiles in photographic and microfilm form were created to save the manuscripts from unnecessary use. [29]

Photographic surrogates created before the transfer of manuscripts to Iceland

One of the largest, if not largest, projects undertaken by the photographers at the Arnamagnæan Institute in Copenhagen has been photographing all the manuscripts to be transferred back to Iceland. The process lasted over twenty-five years. In 1971 photographs started being taken according to preapproved lists of manuscripts to be returned to Iceland. In total 1666 manuscripts, 1285 charters and 74 fascicles (6039 items) were photographed and transferred from the Arnamagnæan Collection and 141 manuscripts from the Royal Library. On June 19th of 1997 a ceremony was held celebrating the return of the final two manuscripts. Luckily none of the manuscripts were damaged or lost in the transfer process. [30]

During the 25 year transfer period The Photographic Department was incredibly busy producing photographic facsimiles or surrogates of the manuscripts being transferred back. The purpose of the photography was "twofold: to produce photographs and microfilms for scholarly use, and to provide a lasting record of the collection."[31] The collection being transferred would no longer be available to the scholars in Copenhagen, so the photographs resulting from this project would have to be precise and extremely high-quality surrogates. Staff at the Arnamagnæan Institute described the change in philosophy of their photo collection saying, "the status of the

[27] Arnamagnæan Institute, 2000. *Bulletin 22: 1998-99,* 22.
[28] Overgaard, 1997, 13-14.
[29] Pedersen and Borring, 1997, 28-29.
[30] Arnamagnæan Institute, 1998. *Bulletin 21: 1996-199,*. 3, 16-17.
[31] Arnamagnæan Institute. 1975. *Bulletin 10: 1973-75*, 12-13.

photographic collection has changed—from originally being an aid to research—to becoming Denmark's originals."[32] This change in philosophy directly affected the quality level of photographic reproduction.

Additionally, any manuscripts needing restoration were photographed before, during and after the restoration, keeping a good record of the changes—textually and graphically. Textually, everything done to the manuscript was noted on cards. The comprehensive record would be transferred from the cards into a database and kept in each manuscript's journal.[33] The history of the manuscript includes this process and users require that this information be available.[34] Before being transferred, each manuscript was checked by two Arnamagnæan staff members. If the quality was good enough, then it would be sent by ship, if not, then the manuscripts would be restored and conserved and possibly rebound.

Photographic projects after the transfer

Another large scale photography project began soon after the end of the other. After the end of the transfer in 1997, the Ministry of Education in Denmark provided funds for the photographing and conservation of the rest of the collection for the Danish section of the Arnamagnæan Collection. So, archival copies would be made, registered and securely stored offsite.[35] Supplementing the archival copies are the black-and-white copies to be made readily available in the reading room; these will serve as surrogates to the manuscripts, decreasing usage and increasing preservation.[36]

Photographic techniques of reproduction at the Arnamagnæan Institute

During and prior to the 1960s it was the norm to use manuscripts for research, not facsimiles. Also before and during the 1960s, ultraviolet light was used to create photographs with more defined text. Eventually in the 1970s, conservationists realized that ultraviolet light, with its heat and long light exposure, was harmful and stopped using it.[37] During the transfer project, standards had risen and with them new techniques of reproduction were introduced. Around 1973 to 1975 the old

[32] Pedersen and Borring, 1997, 29.
[33] Arnamagnæan Institute & Dictionary. 1996. *Bulletin 20: 1994-1995*, 12-13.
[34] Ibid., 14-15.
[35] Arnamagnæan Institute, 1998, *Bulletin 21: 1996-1997*, 19-20 and Arnamagnæan Institute, 2000, *Bulletin 22: 1998-99*, 21.
[36] Arnamagnæan Institute. 2004. *Bulletin 24: 2002-2003*, 2002, 21.
[37] Overgaard. 1997, 19.

photographic paper which had been used before was replaced with plastic-coated paper. Two reasons were cited; the plastic-coated paper only takes five minutes to dry, in comparison to the several hours of the old photographic paper and the plastic-coated paper lasts longer.[38]

Over time standards change and as time progresses, better results can be more easily achieved. Pictures taken at the beginning of the transfer project could be lower quality because of the equipment available at the time. Photographs sometimes had to be retaken for this reason.[39] Settings such as lighting and filters had to be changed and pictures taken repetitively before achieving ideal results. Vellum manuscripts are difficult to capture. Since vellum manuscripts have such a color range, multiple exposures using different filters had to be taken. Ultraviolet photography and quartz lamps would be used for darkened manuscripts.[40]

Within the first six years of the transfer project, a new photographic studio with new equipment was created. New techniques and experimentation resulted from the purchase. This new technique called the positive to positive method, which is direct copying from a positive transparency (diapositive) to plastic paper started to be used and computerized. With the new techniques came more accuracy in reproduction, less image loss during transfer and an increase in color photographs produced. The Photographic Department hoped to create more color photos over the years, but at that time black-and-white photographs were still the norm. Just a few manuscripts, such as the highly illuminated ones, were reproduced in color.[41] A few selected leaves were photographed in color every year from around 1976 to 1983. In 1983, though, entire vellum manuscripts were being photographed in color on microfilm and manually processed.[42] Prior to this, experiments using color microfilm had been going on since 1981.[43] Superior methods by which to preserve and represent photos, such as microfilm, were always sought after and experimented. Complications related to microfilm occurred in the 1990s. In November of 1993 new equipment was purchased because a year earlier the microfilm camera had broken and was replaced with a Hasselbad camera, a Sinar camera and a black-and-white and a

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[38] Arnamagnæan Institute. 1975. *Bulletin 10: 1973-75, 13.*
[39] Ibid, 12-13.
[40] Ibid.
[41] Ibid.
[42] Arnamagnæan Institute. 1986. *Bulletin 15: 1983-85*, 13.
[43] Arnamagnæan Institute. 1983. *Bulletin 14: 1981-83*, 9.

color developing machine.[44] In addition, in 1998, microfilms were so badly scratched from use that only photographers could access them. The damage restricts the making of prints from the microfilm; thus, manuscripts had to be photographed again.[45]

From 1993 to 2000, no major equipment was purchased. Then a developing machine was purchased[46] and in 2003, the institute purchased a digital camera. Unfortunately the specific camera purchased did not meet the standards needed, so plans were made to purchase a digital backpiece for the Hasselbad and Sinar, the high-quality cameras they had attained over a decade before. Purchasing the backpiece a year later allowed the manuscripts to be photographed digitally. Some benefits of this digital technology were creating color photos and onsite developing of color photographs, which had previously done in a color laboratory far away for analogue formats.[47]

All of the photographs created over the last fifty years are very valuable and need to be given special care. For this reason they have been placed in a preservation system. The system places the original films, positive copies or a direct duplicate negative film in the passive archive. The passive archive has limited access and is stored in a disaster-proof room. Other than the passive archive, there is the active collection, in which the negative copies of positive films or direct duplicate negative films are accessible and usable.[48]

While this section touched on the switch from analogue to digital and the benefits that came with this new technology, the next section will discuss one of the products of digital photography—Digital facsimile series.

1.3 Digital facsimile edition

The digital facsimile series, *Manuscripta Nordica*

Manuscripta Nordica is digital facsimile series which is replacing the print facsimile edition series by Ejnar Munksgaard and Rosenkilde & Bagger. These print

[44] Arnamagnæan Institute. 1994. *Bulletin 19: 1992-93*, 10.
[45] Arnamagnæan Institute. 2000. *Bulletin 22: 1998-99*, 13.
[46] Arnamagnæan Institute. 2002. *Bulletin 23: 2000-2001*, 21.
[47] Arnamagnæan Institute. 2006. *Bulletin 25: 2004-2005*, 29.
[48] Pedersen and Borring, 1997, 30-36.

facsimiles were discussed in an earlier section. Ejnar Munksgaard published *Corpus Codicum Islandicorum Medii Ævii* and *Manuscripta Islandica*. Rosenkilde & Bagger published *Early Icelandic Manuscripts in Facsimile* which was already discontinued in 1993 after publishing its twentieth volume.[49] Now the publisher C.A. Reitzel (Copenhagen) and the Arnamagnæan Institute will collaborate to publish the new series, *Manuscripta Nordica*. In 2000 the first volume was published; it is the *Tales of Knights* (Stockholm Perg fol. nr. 7) edited by Christopher Sanders. The upcoming volumes are planned to be *Volsunga saga* (NKS 1824b 4to) edited by Hubert Seelow, *Codex Wormianus* edited by Karl Johansson and *Alexanders saga* (AM 519 4to) edited by Andrea de Leeuw van Weenan.[50]

Just as the print series had published facsimiles of medieval Icelandic manuscripts, so too will this digital series, but in a different format. The new digital capabilities of the series allow for more interactivity, ease, and options. The familiar print format is still incorporated. In the case of the first volume, the introduction to the facsimile edition is in print and digital. In the future this may change, providing everything digitally. The benefits of digital images are well known—enlarging/zooming in, reducing, cropping, and moving. Digital images in the new series are much better quality than print facsimiles could provide. Future volumes may incorporate digital transcriptions that are searchable and synoptically linked to the matching manuscript images. Digitalization of facsimile editions, indeed, has many benefits over the old print format and is now replacing it.

***Manuscripta Nordica,* volume 1 (2000).**

Tales of Knights: Perg. fol. nr. 7 in the Royal Library, Stockholm (AM 567 VI β 4to, NKS 1265 IIc fol.) Edited by Christopher Sanders.

At the time of writing there has only been one published volume of this series.[51] More thoroughly describing the characteristics of the present volume may illustrate what future volumes will include and provide a comparison with print

[49] Arnamagnæan Institute. 2002. *Bulletin 23: 2000-2001*, 10-11. and Stofnun Árna Magnússonar á Íslandi. Forsíða: *Bókasafn, Um fyrstu prentuðu útgáfur fornrita*. http://am.hi.is/bokasafn/umFyrstuPrentuduUtgafurFornrita.php?fl=7 (accessed June 10, 2008).
[50] Arnamagnæan Institute. 2002. *Bulletin 23: 2000-2001*, 10-11.
[51] The Arnamagnæan Institute. Publications: Manuscripta Nordica, http://english.arnamagnaeansk.ku.dk/publications/manuscripta_nordica/ (accessed June 10, 2008).

facsimiles. *Tales of Knights*, at first sight, appears to be another printed facsimile edition because of its soft cover monograph. The monograph's contents are a preface, an introduction, bibliography of short titles, list of manuscripts and diplomas referred to, acknowledgements, some printed facsimiles, an appendix and a guide to using the CD-Rom. The print version also has underlined text to indicate that the same text in the digital version is linked to more information or a digital image. Otherwise, the two versions are the same, except the print version only provides a few facsimile images. The images provided in the print version only are those that represent all the scribal hands, one picture of the binding and appendix images. The appendix images are sample images from manuscripts and diplomas associated with Stockholm perg. fol. nr. 7. All in all the print version contains twenty facsimile pages in total.

The CD-Rom contains everything the print version does and more. The order of the contents is different. The "guide to using the CD-Rom" was moved from the end of the introduction in the print to the beginning of the digital. All the text is searchable. The CD-Rom contains many more images than the print version. The images were taken in cold light with an electronic camera.[52] The main images are of the 68 folios of Per. fol. nr. 7. Dark pages often have links at the bottom of the page to an ultraviolet image of the same page. There are 60 black-and-white ultraviolet facsimiles. The ultraviolet process digitally lightens the pages darkened by age and use.[53] Other than the ultraviolet pictures, several other images were electronically manipulated to sharpen the outlines of letters. A list of these is provided before the facsimile section.[54] Further images exist in an "Extras" folder containing seven pictures of the binding, a note, concealed text and others. The images can be enlarged up to 800% but the resolution truly only allows for 200%; more than that causes the image to look too pixilated. Other functions available with the Adobe Reader software that comes available on the CD-Rom are moving photos, zooming, copying, cropping, rotating, and saving to your computer. It would be possible to open two images or more at once side-by-side or cropping sections and saving in another document for later reference. Copying images and organizing them as needed eases researching or

[52] Sanders, Christopher, ed. 2000. Tales of Knights: Perg. fol. nr. 7 in the Royal Library, Stockholm (AM 567 VI β 4to, NKS 1265 IIc fol.). *Manuscripta Nordica, vol. 1*. Copenhagen: Reitzel, 61.
[53] Arnamagnæan Institute. 2002. *Bulletin 23: 2000-2001*. Copenhagen: P.J. Schmidt A/S, Vojens, 11.
[54] Sanders, 2000, Tales of Knights, 61.

writing. Furthermore, files can be emailed, allowing scholars to discuss specific aspects virtually with visual accompaniment.

Electronic *Konungsbók Eddukvæða*

In 2005 a project aiming to electronically publish *Konungsbók Eddukvæða* began at the Stofnun Árna Magnússonar with Vésteinn Ólason as project manager. Various other staff members and scholars participated in the project and funding for the project, 3.2 million kronur, came from RANNÍS. Similar to volume 1 of Manuscripta Nordica, this project will create a CD-Rom filled with images—both high resolution color photos and those taken in ultraviolet light. Then the text will be printed in three variations. Extra information will be included on the making of the manuscript—vellum type, binding, collation, writing block, and rubrication. The package will also include a dictionary that provides an index of terms along with terms in context.[55]

Once this project is complete, it will be published on a CD-Rom and partially online. Due to the goal of partially publishing online, the contents were marked up with XML in accordance to the TEI standard and methods developed by the Medieval Nordic Text Archive (MENOTA).[56] MENOTA is a large digitization project that deals with marking up text transcriptions and providing them online.[57] Progressively, more and more options are available to users in digital form thanks to the ongoing efforts of these institutes to stay up-to-date technologically or as much as financially feasible.

1.4 Digital facsimiles

The current state of digitization for Icelandic manuscripts has its beginnings around 1980, when the Arnamagnæan Institute paired with the Association for Literary and Linguistic Computing. Together they held a symposium called "The

[55] Stofnun Árna Magnússonar á Íslandi. 2006 . *Ársskýrsla: 2005*, 14.
[56] Ibid, 14.
[57] MENOTA will not be discussed in this paper because it is out of the range of discussion. MENOTA deals with transcriptions, not facsimiles. For further information, though, see Driscoll, Matthew J. 2004b. The view from the north: some Scandinavian digitisation projects, *Преглед Националног центра за дигитализацију*/*Review of the National Center for Digitization*, 4, 22-30.

Editing of Old Norse Texts and the Computer."[58] This is when they would start thinking about combining the digital world with their old, traditional manuscripts. Around the same time the Arnamagnæan Institute created another partnership with Copenhagen University's Computer Centre (RECKU)[59] to undertake a project called the Comptuer Tape Bank. The project hoped to provide electronic access to a collection of data-processed transcriptions of manuscripts or diplomatic editions. This was the first electronic project with Icelandic manuscripts which hoped to provide access to anyone and increase access, in sync with the goals of today's projects. Access was the central issue for that project and for almost all of the current digitalization projects.

The Computer Tape Bank project was an early attempt by the Arnamagnæan Institute to provide manuscripts digitally. The technology at the time was more suited to providing transcriptions and not suitable for providing digital facsimiles of the manuscript pages. During the final phases of the project, digital camera models were evolving into more usable, efficient, and affordable models. The rapid development of technologies, although one of the downfalls for the Computer Tape Bank, also would soon lead to new, more innovative projects providing digital facsimiles online. The first of these was Sagnanet, a large digitization project involving not only the Arnamagnæan Collection but also another in Iceland and one in the United States.

The digital facsimile projects

Sagnanet. Available at http://sagnanet.is

Starting in 1997, four years after the closure of The Computer Tape Bank, Sagnanet had its nascence under the partnership of the National and University Library of Iceland, The Fiske Collection at Cornell University and the Stofnun Árna Magnússonar.

The partnership stemmed from communications two years earlier. Specifically, around 1995 the Fiske Collection Cornell was microfilming its collection of Icelandic texts, then the National and University of Library at Iceland contacted

[58] Arnamagnæan Institute. 1981. *Bulletin 13: 1979-81*, 11.
[59] RECKU would become UNI-C (Denmark's Computer Centre for Research and Education) five years later. See, Arnamagnæan Institute. 1988. *Bulletin 16: 1985-87*, 11.

them, expressing interest in doing the same. Cornell, instead, suggested that the National and University Library of Iceland digitize, not microfilm and focus on the Family Sagas.[60] The choice of microfilming versus digitizing brings up issues of traditional versus modern, preservation, and access. Digital collections have a grossly larger access potential and a modern format and more flexibility. Large digitization projects require a large budget, though.

In November of 1995 the National and University Library contacted the Andrew W. Mellon Foundation hoping for a grant to help them in their preservation efforts, since many items in their collections were fragile, worn, or ageing poorly. The Mellon Foundation wanted to support a project that would provide digital access to "collection of record," meaning a collection composed of all of one library's material falling within one subject, which would be of great cultural and literary interest to people around the world.[61] The Mellon Foundation also wanted a user evaluation and an economic study attached to the project. The user evaluation would discern the pros and cons to only having online access to the digitized material and the economic study would try to determine whether the benefits of access and online tools outweighed the costs of the project.[62] The Icelandic collection of manuscripts and printed books would be a good "collection of record," filling part of the criteria for the grant. For the technical aspects of the project, they would need some guidance and sought it from a partnership with Cornell University, holding the Fiske Icelandic Collection. Cornell University had undertaken previous digitization projects and thus had the trained professionals, software, IT help, and knowledge needed.

Their joint desire to provide online access to sagas and other rare Icelandic texts led to their collaboration on the Sagnanet.is project. Likewise, the project's goals are preservation and encouraging research through increased access.[63] Preservation is achieved by creating high-resolution digital images; these facsimiles of the originals must adequately serve scholars so as they will not want for the originals.

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[60] Driscoll, 2004b, 1.
[61] Sagnanet.is, Information about the project: Goals, par. 4-6.
[62] Ibid., par. 12-13.
[63] Sveinn Agnarsson. 2001.Open access to a cultural heritage: An economic analysis of the SagaNet Project. University of Iceland: Institute of Economic Studies, sagnanet.is (accessed August 7, 2008), 2.

The high-resolution original digital images are stored on tape. A lower resolution photo is then uploaded for display on Sagnanet.is.[64] Substitutes allow the originals to remain in their heat and humidity regularized chambers, away from human touch and possible accidents. The second main objective is achieved through online catalogues and images. The image itself carries all the information available from the content of the manuscript. Then the images are linked together and to more information—the catalogue entry. The online catalogue entry can be searched, leading scholars to sought-after or extra sources and hopefully, stimulating interest and research.

In July 1997 the project started after the proposal for funding was granted by the Andrew W. Mellon Foundation, giving them 600,000 dollars (US) and then that sum was doubled when they received an equivalent grant in Iceland, including a grant from Rannís.[65] Their aim was to digitize Icelandic medieval literature from the 12th century to the 14th century. Since the original goal was too ambitious, it was later limited to every manuscript that includes a Saga of Icelanders; the entire manuscript containing a Saga of Icelanders was digitized, not purely the saga it contained. As a result various other literary genres are available on Sagnanet, not just the Sagas of Icelanders. These include the Eddas, history of Norwegian kings, contemporary sagas, tales of chivalry and rímur. The project also included printed editions, saga translations and critical studies published before 1900.[66]

These sagas and other genres are viewable at Sagnanet as digital facsimiles of 240,000 pages of vellum and paper manuscripts and 153,000 printed pages. Catalogue entries were created by the National and University Library of Iceland for 197,000 pages and the Fiske Icelandic Collection and Árni Magnússon Institute updated their catalogues. MARC standards, Machine Readable Cataloging, were used for the catalogue, named Gelmir. The MARC standard defines bibliographic information and allows for it to be read by a computer. By 2000, Gelmir had been filled with 408 records, describing all the manuscripts of Íslendingasögur, *Íslendingabók*, *Landnámabók*, *Snorra Edda* and *Eddukvæði*.[67] By the end date for the

[64] Stofnun Árna Magnússonar á Íslandi. 2001. *Ársskýrsla: 2000*, 11.
[65] Driscoll, 2004b, 1 and Stofnun Árna Magnússonar á Íslandi. 2001. *Ársskýrsla: 2000*, 11.
[66] Sagnanet.is, Information about the project: Scope, par. 1-2
[67] Stofnun Árna Magnússonar á Íslandi. 2001. *Ársskýrsla: 2000*, 11.

project, July 2001, there were 523 manuscripts registered.[68] A high standard was applied to this cataloging process. The entry of data in MARC format was time consuming enough, but the information was also compared to the manuscripts and corrected by scholars. All this had been accomplished by 2001.[69]

Overall this longitudinal project accomplished much. Unlike previous facsimile creating projects, it was providing access to anyone at anytime and without charge. As mentioned earlier, the accessibility potential for the facsimiles available through Sagnanet is very high. How many users do, indeed, use the site? How many of these are scholars, students or casual browsers? Luckily these questions were answered because of a mandate to track use and the capabilities of the system to collect data on usage.

The Mellon Foundation grant attained by Sagnanet mandated that a usability and access study be produced. The study was conducted from January 25th to June 17th, 2001. From the study it was discerned that access to the materials increased. Close to three-hundred computers accessed the site, of those, 107 registered with the site. These hits represented users from 18 countries, primarily from Iceland (75 visitors), the United States (65), Germany (26), Norway (23), Sweden (16), Australia (14), and Denmark (12).[70] Two-thirds of the visitors to the site looked at more than ten sources. Forty visitors looked at more than thirty sources. Twenty-six visitors looked at more than fifty sources. Over a hundred-and-fifty sources were looked at by eleven users.[71] These statistics represent a number of rare manuscripts being accessible to hundreds more people, especially the geographically distant, than would normally have access to them. Many of the Iceland-based users could probably easily go to either the National library or the Árni Magnússon Institute, but are still choosing to access the manuscripts via the web. Even they view this digital option as a viable and desirable choice. For the others, not within the proximity of these collections, the digital option must be even more desirable, accessible, simple and beneficial.

The usability and access study compared the acquisition of manuscripts online versus in-library. All three libraries involved were surveyed and asked for manuscript loan statistics, but only manuscripts within the similar scope of the Sagnanet

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[68] Stofnun Árna Magnússonar á Íslandi. 2002. *Ársskýrsla: 2001*, 8-9.
[69] Sagnanet.is, Information about the project, par. 1.
[70] Gunnarsdóttir, Kristrún. 2003, 7.
[71] Ibid., 4.

Collection were considered. By limiting the scope of materials, the comparison between online and in-library was fairer. Approximately 240 items were requested at the National and University Library of Iceland that year.[72] Stofnun Árna Magnússonar had 43 visitors accessing manuscripts in their collection over the course of the year. For the third library, the Fiske Icelandic Collection, the estimate is that sixty books were borrowed that belonged to the parameters of the Sagnanet collection. The sum of these is 343 accessed items over the span of a year, not 4 months and three weeks (span of the usability and access study). The access provided online by Sagnanet.is was 512 manuscripts and books in a little more than a third of a year. Thus, the online collection, indeed, is much more accessible.[73] Although, these calculations are not completely unflawed and exact, it provides an idea of the accessibility brought about this new technology. Perhaps not anyone would be allowed to personally borrow a manuscript in-house—these restrictions are not manifested in the online world.

Increasing access to digital facsimiles with an online catalogue

The sections below describe the important steps chronologically taken by the institutes, specifically the Arnamagnæan Institute in creating a catalogue for the digitized manuscripts. Digital facsimiles on the web alone are not at all as beneficial to scholars, students or other users without the extra linked information. Also catalogues are a finding aid to digital facsimiles; in other words, the catalogue further insures access to the facsimiles. Furthermore, the catalogue becomes an extension of the facsimiles. Thus, it is equally important to describe the catalogue projects as it is the pure digitizing efforts.

The Arnamagnæan Digitization Workshops

A year after the start of the Sagnanet project, 1998, the sister Arnamagnæan Institutes further delved into the topic of digitization. The institutes joined Oxford University and the Bodleian Library in organizing and holding three workshops—one

[72] Ibid., 16.
[73] Gunnarsdóttir, Kristrún. 2003, 16-17.

in Oxford, the second in Reykjavik and the third in Copenhagen. Each of the three workshops was on a different topic and months apart. [74]

The first workshop discussed creating full electronic catalogue records for manuscripts. At that time there was no standard for creating electronic catalog records for manuscripts; thus, the Sagnanet project was just using a conventional electronic library catalog standard, MARC. Since MARC was not suitable for cataloging manuscripts and sharing information cross-institutionally, other standards were being created in North America and Europe. The Electronic Access to Medieval Manuscripts (EAMMS) was being created in North America while the European Union was funding a project called Manuscript Access through Standards for Electronic Records (MASTER).[75]

Text-encoding was the topic of the second workshop. The attendees specifically looked at using the Text Encoding Initiative, a standard in the humanities for encoding of electronic texts, and its possibilities in marking-up medieval texts. While this standard is used across the humanities, marking up medieval Old Norse-Icelandic texts is more specific and they discussed problems related to this. [76]

The third and final workshop of that series dealt with creating digital images. This was a familiar topic for the Icelandic manuscript institutes which had already begun the Sagnanet project, having acquired some knowledge already. The issues discussed at the workshop were along the lines of best resolutions, download times, and file sizes of the images.[77]

The institutes' central involvement in these workshops shows serious initiative into gaining more information about digitization. Their interest in digital access to manuscripts would continue and intensify. The electronic cataloging workshop occurred in Reykjavik in March of 1998 and already in January of 1999[78] the Arnamagnæan Institute joined the MASTER project.

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[74] Arnamagnæan Institute. 2000. *Bulletin 22: 1998-99*, 11.
[75] Ibid, 11-12.
[76] Ibid, 12.
[77] Ibid, 12-13.
[78] Ibid., 19.

MASTER (Manuscript Access through Standards for Electronic Records).

MASTER is a standard for the description of manuscripts. It uses the markup languages called SGML (Standard Generalized Markup Language) and XML (Extensible Markup Language). Markup languages divide catalogue records into elements, which are marked with machine-readable tags. The elements designated by MASTER resulted from collaborations of manuscript scholars, librarians, archivists and computer scientists.[79] With such a specialized standard, the elements can be very specific and accommodate various types of works including composite manuscripts.

The Arnamagnæan Institute, interested in creating an online catalogue, joined the MASTER project which would take thirty months to create a standard. The Arnamagnæan Institute joined a section of the project dealing with the implementation of standards and their evaluation at the beginning of 1999[80] and already by January 2001, MASTER was ready to be implemented in institutes across Europe. All that lacked was training and consequently two-day workshops were organized across Europe, including in Copenhagen.[81] Before the workshops, though, both the Copenhagen and Reykjavik institute had begun cataloging. Reykjavik began in 2000 and Copenhagen before them.

MASTER facilitated the goal of the Arnamagnæan Institute and Stofnun Árna Magnússonar in providing a digital catalogue to the medieval manuscripts, which were catalogued first along with special post-medieval manuscripts[82]. The *Katalog over Den Arnamagnæanske Handskriftsamling* by Kristian Kalund dated 1888-1894 was the foundation for the online catalog. Kalund´s catalog is in Danish. During the creation of the electronic catalog, the entries were translated to Icelandic. Upon the foundation (Kalund's catalogue) could come layers of recent scholarship, information, notes by Árni Magnússonar and possibly images of scribe's handwriting. The <person> element will include scribes, previous owners, and authors; even variant spellings will be included. Digitizing these catalogue entries will give the catalogue a new use; unlike the print version, the digital version will be searchable, acting as a database of information. For instance, the people listed on the <person> element can

[79] MASTER. *MASTER: A gentle introduction*. http://xml.coverpages.org/masterGentintr.html (Accessed August 26, 2008).
[80] Ibid., 19.
[81] Arnamagnæan Institute. 2002. *Bulletin 23: 2000-2001*, 18.
[82] Driscoll, 2004a, The Experience of the Arnamagnæan Institute, Copenhagen. International Journal of Information Theories and Applications, vol 11(3), 222.

be searched and it can act as a biographical database; this includes scribes for which an image of their handwriting can be added. Other than primary information, the catalogue may include bibliographical such as various types of editions related to the manuscript. With all this primary and secondary information available online and searchable, the information will be easily accessible and more importantly, researching will take much less time and may produce unexpected, helpful resources.[83]

At Árnastofnun, two full-time employees carried out the work during the initial phase.[84] Five-hundred electronic manuscript descriptions were created by both the Arnamagnæan and Stofnun Árna Magnússonar institutes and nine-hundred were uploaded into the MASTER database before 2002.[85] Not all of these entries were full, using all the elements listed above. A majority, in fact, were minimal.[86] Some 1500 titles were included in the bibliography and 2000 biographies were added to the catalogue by 2002.

Additional funding from the Nordunet2 Research Programme allowed the project to apply semantic web technologies to its MASTER manuscript descriptions. The Icelandic software company Raqoon (now Íslenska verkfræðistofan ehf) joined the project to design markup languages and create a search feature for the MASTER database.[87] One is called MIML, Manuscript Image Markup Language and the other MSML, Manuscript Semantics Markup Language. The former, MIML, is meant to register more codicological aspects such as the size, condition, writing block size, margin decorations, script/font, lighting and so forth.[88] It will also facilitate the creation of an advanced user interface. Then, the latter, MSML, is XML metadata which links all the manuscript related information with other information sources and describes the semantics of the collection as a whole.[89] MIML and MSML were used

[83] Driscoll, 2000, 9-17.
[84] Driscoll, 2004a, 222.
[85] Ibid and Stofnun Árna Magnússonar. 2002. *Ársskýrsla: 2001,* 8-9.
[86] Driscoll, 2004a, 222.
[87] Stofnun Árna Magnússonar. 2002. *Ársskýrsla: 2001,* 8-9.
[88] Ibid.
[89] Garðar Guðgeirsson. 2002. *Applying the semantic web to the Arnamagnæan manuscript collection.* Presented at the 20th NORDUnet Networking Conference, 15-17 April 2002, Bella Center, Copenhagen. www.nordunet2002.dk/powerpoint/b_garder.pdf (accessed September 7, 2008).

to create one entry for the *Flateyjarbók* and then this entry was posted on its own website called *Flateyjarbók í farteskinu*.[90]

The 2002 annual Arnamagnæan Bulletin hoped to finish cataloging the entire collection by 2007, but realized that additional funding would be needed.[91] Unfortunately, funding has not been adequate for the past several years, but in spite of that, minimal records for the remainder of the collection had been added before October 2002. Minimal records meaning that most contained information limited to shelfmark, date, originating place, and contents. All-in-all, all the records have been created before the hoped date of 2007, even if they are not robust. Now work continues on filling the records with more complete descriptions of the manuscripts contents and appearance.[92] This stage, a stage of creating fuller records, is most likely an ongoing one.

The discussion of creating a catalogue of digital manuscript facsimiles will continue later in this paper in the section discussing Handrit.is.

Stafrænt Handritasafn, http://www.am.hi.is/WebView/

Concurrent to the creation of Sagnanet, the Stofnun Árna Magnussonar assembled a digital facsimile collection of their in-house manuscripts, which is located on their personal website and called Stafrænt Handritasafn. The number of in-house manuscripts is 467 vellum, plus 1890 paper, totaling 2357 manuscripts which they hope to digitize. These numbers translate into 30,560 images of just vellum manuscripts, of which only 15,280 are manuscript pages because the others are digital images of separators and extra pages. Including print manuscripts the grand total of digital images created will be around 355,000.

By 2001 they had accumulated digital copies of at least 15 vellum manuscripts and fragments for the Stafrænt Handritasafn, while 57 vellum manuscripts from their collection had already been digitized for Sagnanet.[93] Then by 2003 there were 40 vellum manuscripts on their website even though the project was lacking funds and

[90] The link for Flateyjarbók í Farteskinu website exists on some of the Stofnun Árna Magnússonar´s websites but no longer functions. Here is the web address for the Flateyjarbók í Farteskinu: http://tgapc18.rhi.hi.is/handritasafn/miml/index-syning.htm.
[91] Arnamagnæan Institute. 2002. *Bulletin 23: 2000-2001*, 18-19.
[92] Driscoll, 2004a, 222.
[93] Stofnun Árna Magnússonar. 2001. *Ársskýrsla: 2000*, 11.

manpower, since the employees were multitasking and working on other projects.[94] Under the same conditions, the institute was able to place 69 manuscripts and fragments in their digital collection the next year.[95] Other than lacking funds and manpower, the digital equipment malfunctioned in 2005 causing months of inactivity.[96] At this time (September 2008) there are 74 manuscripts in digital facsimile on the website, which is five more than there were four years ago. From those statistics and lack of information published in the annual reports, it seems the project has greatly decreased activity or ceased for the time-being.

A very simple design and interface frame the digital images. No information can be found from the interface on how to use the site, about the project, or the manuscripts. Simply, there is a list of manuscripts and a simple link named "skoða [view]" that opens up to a list of verso and recto pages, each with their own "skoða" buttons. This is purely a staging place for the digital facsimiles of manuscripts.

Manuscriptorium and the ENRICH Project, http://enrich.manuscriptorium.com

Manuscriptorium is a digital library for manuscripts, incunabula, old printed books and historical documents, each with a catalogue record linked to digital images. Two Czech institutions began the Manuscriptorium as part of the UNESCO Memory of the World project in 1992 and now it is the largest European digital manuscript library with more than one million digitized pages collected from 46 libraries.

Its initial goals were to create an "electronic research environment for the sphere of historical book resources" with "long term viability."[97] With these goals in mind standard markup languages were used to create the catalogue records and a safe digital data storage system. Specifically the Open Catalogue of Historical Book Resources (OCHBR) stores catalogue records created with the MASTER standard.[98] The OCHBR is a union catalogue or a one-stop-shop for many manuscript scholars and students and will even more so in the future, especially since so many more

[94] Stofnun Árna Magnússonar. 2003. *Ársskýrsla: 2002*, 8-9.
[95] Stofnun Árna Magnússonar. 2004. *Ársskýrsla: 2003*, 8-9.
[96] Stofnun Árna Magnússonar. 2006. *Ársskýrsla: 2005*, 6-7.
[97] Manuscriptorium. About the Project. http://www.manuscriptorium.com/Site/ENG/about_the_project.asp (accessed June 28, 2008), par. 4.
[98] Árni Magnússon Institute. "About the institute: Research and Other Projects--ENRICH," http://www.arnastofnun.is/page/a_research_enrich (accessed June 28, 2008) par. 7.

European libraries are joining the ENRICH program, which is looking to expand the Manuscriptorium.

ENRICH (European Networking Resources and Information Concerning Cultural Heritage) is a consortium of at least 18 European partner institutions or libraries aiming to contribute to and expand Manuscriptorium, creating a greater collection of searchable records in one location and a online research environment. The project anticipates making available at least five million digitized pages. The ENRICH project participants together hold 85% or more of the digitized manuscripts owned by the European national libraries.[99]

Due to the efforts of the MASTER project, libraries around Europe have created manuscript descriptions using their standard. This facilitated collaborative efforts, especially for the Manuscriptorium and its partners, of which are the Árni Magnússon Institute, the Arnamagnæan Collection in Copenhagen and the National and University Library of Iceland. Migration of the Icelandic medieval manuscripts' records into Manuscriptorium's OCHBR catalogue should be relatively easy since they both follow an XML schema.

As of April 2008, Icelandic libraries had not done much regarding the ENRICH program. Preparations and processing are underway and data is being gathered and organized. Assessments are still being made of the ENRICH project, including testing the web interface and users' behavior.[100] A twenty-three question survey called the "Digital library readers' demands/needs survey" has been created and answers being compiled.[101] The Icelandic constituents distributed handouts at the Árni Magnússon Institute and the Manuscript Department of the National library, targeting manuscript scholars. These handouts urged cooperation in the ENRICH survey so that they could receive feedback from users of Icelandic manuscripts. Compiling user feedback is crucial before delving into a lengthy project. The desires of the users and the creators should be met.

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[99] Ibid, par. 5.
[100] Örn Hrafnkelsson. 2008. ENRICH: Evrópskar net- og upplýsingaveitur um menningararfleifð [European Networking Resources and Information concerning Cultural Heritage], Kynningar á Evrópuverkefnum í Landsbókasafni þann 22. apríl 2008, Powerpoint at http://www.bok.hi.is/solofile/1013436 (accessed August 27, 2008).
[101] ENRICH. ENRICH Project: Digital library readers´demands/needs survey. http://dlibra.psnc.pl/enrich/survey.php?country=en (accessed July 25, 2008).

The desired outcomes of joining the ENRICH program for the Arnamagnæan sister institutes and the National and University Library are many. They hoped to join ENRICH in their goals of making cultural heritage accessible through one databank containing descriptive information on images. The National and University Library joined for the extra incentive of reorganizing and rebuilding Sagnanet and the online catalogue.[102] An extension of this desire could likely be the new Handrit.org website.

Handrit.is / Handrit.org

At this time the Handrit website is still being developed and is a beta version. It is similar to the Stafrænt Handritasafn in its simple design; however, it serves a different purpose. At this time Handrit only provides detailed catalogue records for 81 manuscripts. Stafrænt Handritasafn, on the other hand, displayed digital facsimiles of 74 manuscripts and fragments. These two websites are complementary, one providing replicas and the other providing detailed textual information.

The homepage of Handrit only states the three involved parties—the usuals—Arnamagnæan Collection, the Stofnun Árna Magnússonar and the National and University Library. These three have created a union catalogue which is housed on the Handrit website. The languages representing each involved country—Icelandic and Danish—are two of the three languages available for navigating the site. The third language is English. Users can choose through which language they want to access the digital collection. At this time only the "Browse" option is available, but the "Search" function is under development. Browsing entails looking through a list of manuscripts in order of shelfmark. The shelfmark information is in tabular form and juxtaposed to the "Title and details" column.

Various metadata elements fill the manuscript descriptions. The major elements describe the contents, physical description, history and bibliography. Sub-elements of contents include section titles, page numbers, incipit, explicit, and rubric. Sub-elements of physical description include support, number of leaves, foliation, collation, condition, layout, script, decoration, additions, binding, and accompanying material. The history element has the sub-elements of origin, provenance and acquisition. A majority of this metadata is available for each record in the Handrit

[102] Örn Hrafnkelsson. 2008, Powerpoint slides 2, 12-13.

catalogue's 81 holdings and should be very helpful, simple and extremely accessible to scholars.

Conclusion

The history of medieval Icelandic manuscripts in facsimile enumerates the various projects undertaken in order to produce usable surrogates. From around the 1930s through the 1990s there was a pretty steady production of print facsimile editions. Simultaneously there was the simple production of photographs and microfilms. These two formats differ in that the facsimile editions contain scholarly introductions and the photographs and microfilms are purely graphical and not packaged with a textual component that further illuminates past and present research. Both provide access, but the photographic technique is more egalitarian, probably because of its aim and its cost. Since the photographic technique aims to have a copy of all the manuscripts, it does not limit itself to just the most important and aesthetically pleasing manuscripts, as did the facsimile edition technique. Photographic collections continue to be created; they are traditional, trusted and archival. Again, the facsimiles were only duplicating the most important and aesthetically pleasing manuscripts because of high costs. For this reason and the evolution of technology, print facsimile production died down during the 1990s and eventually was replaced with the less costly digital facsimiles; the first digital facsimile edition being produced in 2000.

Over the last eight years, only one digital facsimile edition has been completed and distributed, although another is on the way. This complex and scholarly medium produces not nearly as much as the other digital projects, which have been replicating hundreds of digital facsimiles and publishing them freely online. Production of digital facsimiles for public access first began with the massive Sagnanet project in 1997. These were not publicly online until 2001, though. At that time there were fewer standards for online cultural heritage collections, so the catalogue was created using the MARC standard instead of the MASTER standard, which would be incorporated later. The ability for the metadata attached to the digital facsimiles to be machine-readable and shared internationally is a trend that will become a norm in the future. These standards and benefits exponentially increase access and utilitarianism.

Appreciating this, digital facsimile and catalogue projects continue to increase access through one portal. For example, the newest projects dealing with Icelandic manuscript facsimiles—Manuscriptorium/ENRICH and Handrit—both increased its possible user audience and access.

The climate now and most likely into the future is that of international efforts and access to all. Mingling technologies with the humanities has led to an escalating interest and expectation from users to have cultural treasures easily available. This is certainly the case in Iceland. Libraries in Iceland are thinking nationally and internationally.[103] With this in mind the National and University Library of Iceland is focusing on publishing their cultural treasures on the web. They are also thinking about international collaboration and possible future international projects. This is specifically stated in their "Digitisation policy" under the Procedures section saying, "the OAI/PMH (Open Archives Initiative/ Protocol for Metadata Harvesting) methods will be used to facilitate federated search in all the Library's digital collections irrespective of cataloguing methods, and to enable the Library to exchange metadata with its co-operation partners like The European Library (TEL) and Europeana." [104] The intention of the library is to follow international standards in order to facilitate cooperation and metadata pooling, including catalogue records.

International cooperation and national heritage is also well balanced at the Arnamagnæan Institute in Copenhagen. In 2006 the institute explored the use of open-source software and international standards in creating a database application for their manuscript descriptions/catalogue (MASTER project). This system provided a more suitable way to search and browse for manuscript records. Executing this system gave the institute insight into the possibilities of the combination open-source software and encoding standards. If other collections were encoded in compatible standards, a large and international union catalogue can be created incorporating manuscript descriptions from other repositories.[105] Union catalogues and federated searching are becoming more prevalent just as much as one-stop-shopping; it makes perfect sense—more options/records in one place, in one search.

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[103] Driscoll, 2000, 58.
[104] National and University Library of Iceland. *About the Library: Digitisation policy.* http://bok.hi.is/id/1020710 (accessed August 25, 2008).
[105] Haswell, Eric and Matthew Driscoll. 2006. Towards a Union Catalogue of Encoded Manuscript Descriptions. Proceedings of the ELPUB 2006 Conference on Electronic Publishing. Bansko, Bulgaria. June 2006.

The efforts of these manuscript institutions also keep with the ever-prevalent Semantic Web philosophy developed by the World Wide Web Consortium (W3C). The Semantic Web initiative works towards creating universal specifications. The specifications serve as a medium through which the information on the web can be globally shared and processed through automation, but still human readable.[106]

All in all, these current projects, future projects and past projects all have had and will have in common is the desire to maximize access to their cultural treasures. The next chapter will discuss the focal issue of access further.

[106] W3C. *Technology and Society domain: Activity*. www.w3.org/2001/sw/Activity (accessed September 7, 2008).

Chapter 2: The primary role of facsimiles—Access

Access has been very limited to manuscripts over the past centuries. Primarily only the privileged and clergy had access. Later on manuscripts in many libraries were stored in chests or cupboards or even chained to desks. Even now library staff can deny access if the manuscripts are particularly old, fragile or precious. However, research does not have to be confined to a monastery, library, archive, etc. Manuscripts have been produced in print and electronic form and scholars can access facsimiles of manuscripts more easily.

Over the last 30 years the study of manuscripts has greatly increased and happens to be the most popular and active area within medieval studies. Not only are medievalists and other historians dependent upon manuscripts as primary evidence, but so too are art historians, literary scholars and others.[107] One of the main reasons for the increase in the study of manuscripts is the dissemination of facsimile editions and this effect is continued through the creation of facsimiles produced in CD and digital form.[108]

The user base for Icelandic manuscripts, too, has grown and with it the need for access to the manuscripts and their facsimiles, whether printed or digital. Users requiring access number at least 595 scholars world-wide, according to the Sigurður Nordal Institute's Inventory of Scholars.[109] The number grows when adding students of medieval Icelandic literature, Old Norse, Scandinavian or Icelandic history, and paleography. With the advent of digital heritage collections online, more and more laymen have become interested in casually browsing such manuscripts. With the number of possible users wanting to see the manuscripts, facsimiles must be created as a surrogate, in order to preserve them from hundreds or thousands of hands, lighting, temperature changes and so forth.

For users interested in accessing the original Icelandic manuscripts, the largest collections are at the institutes created by the Arnamagnæan Foundation and the National and University Library of Iceland. These establishments strive to uphold the issue of access, which is part of their central roles. The largest collection of medieval

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[107] Pearsall, 2000, xi.
[108] Doyle, 2000, 14.
[109] Sigruður Nordal Institute, http://www.hi.is/Apps/WebObjects/HI.woa/wa/dp?id=1011064

Icelandic manuscripts was formed through the hard work of Árni Magnússon, who died in 1730, leaving the collection to the University of Copenhagen. The Arnamagnæan Bequest also requested that one or two Icelandic students be hired annually to work with the collection, primarily to increase dissemination, access and awareness of the texts.[110] A charter was created and dictated how the Arnamagnæan aim was to be carried out with publishing. The charter describes which manuscripts to choose for printing: "as the basis for publication first pick the most trustworthy, best and most useful texts, thereafter ones of lesser value, . . . from which one can take the bits that have some general worth and can throw some light on the old laws, practices, rituals and customs. . . "[111] The charter was created with text printing in mind, not facsimiles, since the technology was not ideal for that yet. However, the aim to publish was central to the Arnamagnæan Bequest. From the Bequest eventually would spring the two Arnamagnæan Institutes, which would carry on the wishes of Árni Magnússon.

Access is also upheld by the roles of the Árni Magnússon Institute. Its three principal roles are "1. Conduct research on Icelandic Studies and related scholarly topics, especially in the field of Icelandic language and literature. 2. Disseminate knowledge in these fields. 3. Preserve and augment the collections within its care."[112] The dissemination of information, which is the institute's goal number 2—"disseminate knowledge in these fields" is synonymous with 'access.' The institute accomplishes the goal of dissemination through publishing comprehensive critical editions of the manuscripts (transcriptions), online digital manuscripts, facsimile editions of manuscripts, a monographic series (*Rit Stofnunar Árna Magnússonar*), doctoral dissertations, dictionaries, handbooks on the Icelandic language, name catalogues, books, journals, an annual newsletter (*Ársskýrsla*), research papers and articles in the field of Icelandic language and literature.[113] Goal number 1—"conduct research on Icelandic studies and related scholarly topics"—provides the vessel which

[110] Ragnheiður Mósesdóttir. 2006. Publish or perish: Early Arnamganæan editions as a means to the care and conservation of manuscripts. In *Care and Conservation of Manuscripts, preceedings of the 8th international seminar*. Copenhagen: Museum Tusculanum Press, 23.
[111] Ibid, 23-24.
[112] Árni Magnússon Institute. "About the institute," http://www.arnastofnun.is/page/a_about (accessed June 15, 2008).
[113] Árni Magnússon Institute. "About the institute: Publications," http://www.arnastofnun.is/page/a_publications (accessed June 15, 2008).

is disseminated by goal 2 and cyclically also stimulates more research. Goal 3 is achieved sometimes by goal 2, specifically in the case of publishing facsimile editions, microfilms, online digital images of manuscripts and so forth. All these goals are closely interconnected and vital to one another and the various fields of Icelandic and Nordic studies. One could also argue that access/dissemination is more important than the other two roles, because without access/dissemination there would be very little to no scholarly research. Without dissemination/access the manuscripts would be relied on solely and thus preservation would greatly suffer.

Another institution with a great deal of Icelandic manuscripts is The National and University Library of Iceland, which has the roles of preserving and providing the best possible access to Icelandic literature. Under the National and University Library's Statues, it is clear that collection, access and preservation of Icelandic materials are their main goals.[114]

Here are listed the Statues regarding preservation, conservation, and access under Chapter 2, Article 7, number 3-6:

> *"3. To preserve the manuscript collections which already exist, in accordance with Article 14, paragraph 2, and to promote further collection of and research concerning Icelandic manuscripts and similar materials in more modern media.*
> *4. To ensure the preservation and conservation of the library holdings as best possible.*
> *5. To maintain a rare-book collection.*
> *6. To make catalogues of all Icelandic books, manuscripts, and recordings, including subject catalogues as necessary."*[115]

Within the National and University Library of Iceland's possession are many manuscripts and printed texts that are in need of preservation because of their age or damage.[116] Hence they have taken up projects, specifically digitizing projects, to preserve these items. The National and University Library has created a two part digitization policy; one part is the retroactive digitization and the second part is the creation of the Icelandic National Digital Library. The "Policy for the retroactive digitization and preservation of digital objects" aims to provide better access "to Icelandic collections owned by the Library by: systematic retroactive digitization,

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[114] National and University Library of Iceland. About the library: Statues, Chapter 2, Article 7, numbers 3-6, http://www.bok.hi.is/id/1011638 (accessed August 25, 2008).
[115] Ibid.
[116] Sagnanet.is, Information about the project, Goals, par. 1.

collecting and receiving published digital material, preserving digital material for the future, and making the digital collections available through the Web."[117] The goals filled by this policy are 1. dissemination of Icelandic cultural heritage "to the fullest extent possible by making it available beyond the walls of the Library. 2. Preservation and 3. "Service to the users wherever they are at *all hours*. . ."[118] Also noteworthy is that two preservation copies are made and one is stored with a certified offsite company to separate the copies geographically in case of localized disaster.[119] The goals, statues, and policies accordingly all support the facsimile creation of manuscripts for several reasons, but especially for preservation, access, dissemination and stimulation of further research.

The institutes aim to provide access to the manuscripts. This includes physical access. How easy is it to gain physical access to the manuscripts?

To physically access the collection at the original Arnamagnæan Institute one must travel to the University of Copenhagen, where the manuscripts are safely preserved in a vault. Around one hundred scholars a year visit the institute to research, many using the manuscripts, reading room and reference library.[120] Scholars must contact the institute before arriving and once there, the manuscript collection is only accessible Monday, Tuesday and Thursday from 10:00 to 16:00 or by arrangement.[121] If facsimiles are adequate for the research at hand, facsimile editions are available in the research library. On the upper level of the library, scholars can access the photographic collection[122], which contains pictures of Icelandic manuscripts in the Árni Magnússon collection as well as other libraries—The Royal Library in Stockholm, Uppsala University, The British Library and the National Library of Iceland.[123]

Physical access to the manuscripts in Iceland is open to all visitors over the age of 18 at The Manuscript Department of the National and University Library in

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[117] National and University Library of Iceland. *About the Library: Digitisation policy.* http://bok.hi.is/id/1020710 (accessed August 25, 2008).
[118] Ibid.
[119] Ibid.
[120] Arnamagnæan Institute. *About the department,* http://english.arnamagnaeansk.ku.dk/about/ (accessed September 12, 2008).
[121] Arnamagnæan Institute. *Contact us: Opening hours*, http://english.arnamagnaeansk.ku.dk/contact/opening_hours/ (accessed September 12, 2008).
[122] Arnamagnæan Institute. 2004. *Bulletin 24: 2002-2003*. Copenhagen: P.J. Schmidt A/S, Vojens, 23.
[123] Arnamagnæan Institute. *Research and function*, http://english.arnamagnaeansk.ku.dk/research/ (accessed September 12, 2008).

Iceland. In the Winter and Summer the department is open Monday through Friday from 09:00 to 17:00. Additionally, the department is open Saturdays from 10:00 to 17:00. One must approach the staff, submitting a request for a book or manuscript or calling ahead. Most of the time, the patron is allowed to access the desired manuscript and the statistics in 1999 were that an average of 11 manuscripts were borrowed per day by an average of 6-9 users a day.[124] For preservation purposes the staff may suggest that the user look at photographs, microfilms or facsimile editions instead, if these exist for that particular manuscript. If not, then the original will be sought. The vault for the manuscripts, which regulates heat and humidity, is opened twice a day. During that time requested manuscripts are collected and delivered to the patron in a special reading room, which is monitored by the staff and security cameras. Manuscripts, although mainly relegated to the Manuscript Department, are loaned to the Árni Magnússon Institute, also located on the University of Iceland campus and other Icelandic archives on occasion.

Access to manuscripts at the Árni Magnússon Institute is stricter than the National and University Library. At this time the manuscripts are housed on campus in the Árnagarður building, although it is tentatively planned that another manuscript institute to be built by 2011. Physical access is limited to those who ring the doorbell, sign the guest book, and get admittance from the secretary. Theoretically anyone interested in research related to the institute is welcome; however, the institute mostly serves scholars. It is stressed on the website that the "library is intended for use by the Institute's scholars and others who pursue research activities or have an interest in this field of studies."[125] Continuing to stress the use of manuscripts by scholars or the institute's members is the "Manuscript Research" page which mentions nothing about outside visitors and their access to the manuscripts.[126]

In order for a scholar to attain a manuscript, a staff member must attain access to the vault. Unlike the National library, it is done on demand. Similar to the

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[124] Sjöfn Kristjánsdóttir. 1999. How to reach an acceptable compromise between the user and the conservator. In Care and conservation of manuscripts 4: Proceedings of the fourth international seminar held at the University of Copenhagen 13th-14th October 1997 ed. Gillian Fellows-Jensen & Peter Springborg, 45-53. Copenhagen: Royal Library, 51.

[125] Árni Magnússon Institute. "Library," http://www.arnastofnun.is/page/a_library (accessed June 15, 2008).

[126] Árni Magnússon Institute. "Manuscript Studies: Manuscript Research," http://www.arnastofnun.is/page/a_manuscript_research, (accessed June 15, 2008).

National library, the manuscripts must stay in the reading room and then must be returned to the vault by the end of the day. Guests are given guidelines on handling the manuscripts with special protocols that have to be taken before use.

Physically viewing the valuable manuscripts and their photographic surrogate collections at these libraries is a gracious option. However, these options have limits and these limits may impede many potential users from accessing the manuscripts. Potential and current users living in the capital area of Iceland will no doubt find physical access an enticing option. Those living in Copenhagen might also. However, most others will be limited by the high cost of travel to these locations. Further restrictions are imposed by the restricted visiting hours and possibly to users who are not scholars or conducting scholarly research. All of these limits are non-existent in cyberspace when visiting the digital collections.

Access digitally is much more convenient for most. For technologically advanced countries, high speed internet is readily available, except in some more rural areas. All in all, it is easier for most to get to a computer with internet access than to the manuscript institutes or departments in Reykjavik. Unlike those institutes, the digital access is available 24 hours a day. More and more in our society, services that are not dependent upon on time or place are the norm and demanded. Libraries should provide these modern services in order to stay in the favor of its patrons.

The digital realm also provides another dimension of access through online catalogues. Less sophisticated searchers will most likely find it easier to find some relevant information via online catalogues, where more information can be provided in one easily searchable location. Catalogues have been improved. Information contained in the record could be incredibly complex and informative. A range of information could be available from codicological to paleographical or historical information. Examples are information on dimensions (the leaf, the writing block, etc.), changes in hand, types of script, collation of quiring, number of separable sections, number of lines, beginning and endings of texts, list of illustrations or decorations, dicta probatoria, inscriptions of ownership, authors and a bibliography of editions.[127]

[127] Doyle, A.I. 2000. Recent directions in Medieval manuscript study. In *New directions in later Medieval manuscript studies*, ed. Derek Pearsall, 1-14. York, UK: York Medieval Press, 13.

Digital options provide ultimate access, but the other printed options also allow users to explore the manuscripts. Printed facsimile series had limited printings and many are out of print. Furthermore, they are and were rather pricey and often had to be purchased as subscriptions to the whole series. Overall, accessing printed facsimile series is much more difficult than accessing digital collections, which are free and easily available to those with internet access.

Sometimes, no matter, what options a scholar has, or what limits of access he/she faces, the original manuscript will be most sought after. The next chapter will discuss the benefits of the original manuscript and then the other issues surrounding facsimiles.

Chapter 3: The issues related to each facsimile format

This chapter intends on covering various important issues related to each format, including the original manuscript. The benefits of using the original manuscript will illuminate various downfalls of the other facsimile formats. First the benefits of the original manuscript will be enumerated followed by a discussion of issues surrounding print facsimiles and then issues surrounding digital facsimiles.

3.1 Issues surrounding the original manuscript

One of the main arguments for the superiority of working with the original manuscript is that the facsimiles do not have the same material features. The written work does not only produce meaning through its text, but also through its history, physical body, illustrations, script/type used, design, layout, binding, aging, quiring, watermarks, hair, possible damage and so forth.[128] These features add value and information to the text, although, it may also add confusion and conflicting information through which a scholar has to work through.

On the other hand, a modern critical edition "separates the reader from any messy reality of its origins. . .facsimiles restore reality"[129] Damage, age, difficult script or other factors are often the "messy reality" in which the text lies. These may be factors that are important in providing the physical item with an origin and history. While a facsimile provides so much more depth to a page of text than the simple critical edition, even more so does one profit from seeing the original manuscript instead of a typed text edition from which scholars may not be able to discern the scribal idiosyncrasies of abbreviation marks, letter and word spacing, letter-formation and relative letter-size.[130]

While a facsimile should suffice for most studies, since it, Greetham says, "fulfils a valid purpose (esthetic, historical, even scholarly) but it is no substitute for the examination of the manuscript itself, especially where this manuscript is to be the chosen copy-text for a scholarly edition." By this Greetham explains the flawed logic of thinking a photocopy can serve as a true surrogate, fulfilling all the scholars'

[128] Bornstein, George and Theresa Tinkle, ed. 1998. *The iconic page in manuscript, print and digital culture*. University of Michigan Press: Ann Arbor, p. 1-7.
[129] Pearsall, 2000, xiv
[130] Greetham, 1994, *Textual Scholarship: An Introduction*, Routledge: London, p. 349.

research needs. Originals are still needed because a manuscript is multi-dimensional, unlike a facsimile. A manuscript is layered with three dimensions—textual (paleographic), graphic (ornamental) and physical (materials, binding, etc). The combination of these three dimensions can possibly illuminate the reasons the manuscript was created, by whom, for whom, when and where.[131] For this reason and others, reading the surrogate is not the same as reading the original manuscript "for reader or editor, who must be able to observe such features as hair-line abbreviation marks often invisible in facsimile, and must sometimes use the evidence of the bibliographical materials of the manuscript (parchment, paper, ink, binding, etc) in making textual decisions."[132] Additionally, no matter what, facsimile editions will not be able to replicate the feel of the animal skin used or whether a certain page has the hair-side or smooth side facing up.

For other types of studies it is important to see the manuscript in its entirety. Depending on the needs of the user, some formats may be more useful than others. The facsimile editions sometime have a picture of the binding. Most of the facsimiles are in black and white. This may suffice for literary or paleographical studies. On the visible page one can see the layout, format of the page, illustrations, marginal annotations and choice of script. The physical aspects of a manuscript include the materials chosen or available to make the manuscript. Worm holes can help identify the order of fragments.

For these various reasons, the illusion that facsimiles can be surrogates, in the true sense of the word, is merely that, an illusion. Facsimiles can be "made similar" but cannot allow that a manuscript be relegated to their secure vaults indefinitely for preservation reasons. The issues of preservation and access have to be balanced.

Other than those reasons, there are other benefits of using the original manuscripts in the Arnamagnæan Institutes or the National and University of Iceland manuscript departments. For example, one benefit is having the availability of the professional staff and specialists. Not to mention the various other resources—books, extra catalogues, journals, tools, etc.

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[131] Doyle, 2000, 1
[132] Greetham 1994, *Textual scholarship*, 350.

3.2 Issues surrounding facsimile editions

Print facsimiles have various benefits that have not been listed above. One being that print, since it is traditional, gives people a sense of a more secure, familiar format. Print facsimiles may survive longer than some digital formats because of transitory websites, migration of data, or file corruption. In the case of print facsimile editions, which have long, complex introductions to the facsimiles, most people would prefer to read the introductions in a print format. Studies conducted on the inherent strengths and weaknesses of print, illustrate strongly that people prefer to read long, detailed arguments on paper; if it is available digitally, many people will print it onto paper.[133] People would prefer to read or spend a long time examining a print version rather than staring at a computer screen. Proof for this was discovered by Daniel Paul O'Donnell while producing a digital edition of *Cædmon's Hymn* for publication in 2005. The original intent of the editors was to only publish it digitally on a CD-Rom. The CD-Rom would contain a long introduction, multiple texts, archive of witnesses, and color facsimiles. Once drafts of the introduction were sent out to some scholars in CD-Rom and others in print form, the unplanned experiment began. Interestingly, O'Donnell found that those with an electronic copy of the introduction were accidentally skipping or missing parts, even whole chapters, of his introduction and then criticizing him for not including them. In contrast, those who had received print versions did a much better job reading the introduction, which O'Donnell says has nothing to do with the quality or attentive qualities of the scholars. As a result, he and his editors published the edition as a book and CD-Rom package, with the introduction printed and facsimiles on the CD-Rom, since color facsimiles are too expensive to print. The results pleased O'Donnell and his editors, who feel the usability was increased by this decision. A casual survey after distribution uncovered that indeed most scholars had primarily, if not solely, used the book. Some had looked at the facsimiles on the CD-Rom, but no one had preferred the digital over the print when reading text.[134]

This study is important in proving a benefit of print facsimiles and the print version of the introduction incorporated in *Manuscripta Nordica's* first volume. This

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[133] Nielsen, Jakob. 1999. *Designing web usability: The practice of simplicity*. Indianapolis: New Riders.
[134] O'Donnell, Daniel P. 1998. Resisting the tyranny of the screen, or, must a digital edition be electronic*? The Heroic Age*, no. 11 (May 2008), http://www.heroicage.org/issues/11/toc.php (accessed July 2, 2008) par. 15-19.

may not only pertain to the introductory texts, but also to reading the manuscript text. Lengthy research can be straining when done at a computer and much more enjoyable when done on a print facsimile.

3.3 Issues surrounding photographs and microfilm

Like print facsimiles, photographs and microfilm are also traditional formats with which people are comfortable. Photographs and microfilm are often used as archival copies. Microfilm is especially good for preservation because it survives for a several hundred years with proper care. It is simple, compact and technologically easy. Compared to digital, though, microfilm does not provide as good quality when looking at manuscripts, but can be adequate when looking at facsimiles of black-and-white printed books. Digital images stored on an online database and available through searching or browsing are more easily obtained and used than microfilm. Perhaps this is why digitization is not as popular yet as microfilming for providing long-term protection for manuscripts, according to Czeslaw Jan Grycz's recent (2006) article in *Digital Heritage: Applying Digital Imaging to Cultural Heritage*.[135]

Photographs are continuously being made at the Arnamagnæan institutes. Yearly the Arnamagnæan Bulletin reports the number of manuscripts photographed, detailing the type and whether it was in black-and-white or if special methods were used. Although the advent of digital photography had occurred years before, in 2003 the Arnamagnæan Institute reported that its goal is to "produce analogue [formats prior to digital] photographs of all the manuscripts in the collection, but it is also necessary today to be able to utilise digital technology."[136] This emphasis to have a complete collection of backup analogue photographs, illustrates the Institute's trust in the format. Perhaps they trust the longevity of the acid-free photographs and microfilms more than they trust the new digital files.

Another reason photographs and microfilm are preferred when serving as surrogates is that they often are of a higher resolution than the images digitally available to the public online. The digital images are of lower resolution because of the limits of internet connections, cost of production and cost of storage on servers.

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[135] Czeslaw Grycz. 2006. Digitising rare books and manuscripts. In *Digital heritage: Applying digital imaging to cultural heritage*, ed. Lindsay MacDonald, 3-68. London: Elsevier, 4.
[136] Arnamagnæan Institute. 2004. *Bulletin 24: 2002-2003*, 40.

Hopefully these preservation copies remain just that, because although photographs are made as preservation copies, they do not replicate the manuscripts accurately enough. Indeed, photographs and microfilm may not be adequate for many types of research. Depending on the age and quality, the photographs and microfilms may not accurately represent the manuscript page. The original quiring cannot be examined on a photograph. Many things are not visible on these facsimiles, such as worm holes or a variation in the ink color. Worm holes extending through several pages can help identify loose folios. The change in the ink color can be a sign of a pause in writing, which in turn could indicate a change in scribes.

A good example of the inadequacies of photographs is the creation of a facsimile of *Möðruvallabók*. The photographic reproduction of the worn pages was "next to impossible." Other worn pages can be read with the use of diagonal rays of light, but to photograph in this condition proved too difficult. A third difficulty was photographically reproducing the rubrication, which had to be drawn on the facsimiles. Granted, this occurred in 1933 and with the advances of photography, this may no longer be the case.[137]

In conclusion, photographs and microfilms are good preservation copies, but do not adequately represent the manuscript. Although the art of photography has evolved greatly over the lifespan of the Arnamagnæan Collection, photographs still do not embody all that the manuscripts do. The same is true for digital facsimiles.

3.4 Issues surrounding digital facsimiles

The praises of the digital format are pretty well-known. Flexibility is one of the benefits. If needed, a user can alter the surrogates or facsimiles created with software, improving the images or making the script more easily read. There are various tools that can make help the user in case the manuscript is hard to read because of small or difficult script or damaged (dirt, mold, other stains). In the event of a manuscript having unfamiliar characters, a special function can be created to help identify the character and give further information.[138] They can be electronically magnified, reduced, printed cheaply, and cropped. Multiplicity is another benefit of

[137] Möðruvallabók. 1933. Preface. Corpus codicum Islandicorum medii aevi, Ejnar Munksgaard, ed, vol 5. Copenhagen: Munksgaard.
[138] Sagnanet.is, Information about the project, Technology, par. 19.

the digital format. The number of times the data file is reproduced does not affect the quality of output.[139] Also, it is much more easily done than trying to reproduce microfilm, for instance.

The digital image can have data attached to it; this data is called metadata or data about data. While there are cross-institutional standards for metadata, digitizing projects do not have to comply; however, data attached to the image can include technical details of the image's capture—camera type, date, resolution, color depth, exposure speed and aperture setting—so, ideally, the viewer can view the image in a state closely imitating the original work.[140] Bibliographic data is also important metadata as well as other descriptive information or other secondary commentary. Perhaps metadata could be created to make-up for some of the facsimiles' shortfalls. For example, while a person cannot examine what animal skin was used, it can be added to the metadata or catalogue. Adding metadata is very important, but a project manager must decide how much metadata is really needed, since metadata creation can be very time consuming.

The metadata is packaged with the image. The images are then linked to a catalogue entry, the other images in the database, explanatory texts, transcriptions, editions, stemmas, spelling databases, linked variants, annotations, etc. All this can be searchable or browseable. Different interfaces can suit different users' needs. An interface can be created to have the facsimile side-by-side with a transcription or a guide, highlighting unique features of the page—special abbreviations, script, etc.

A further well-known benefit of the digital format is the ability to easily transmit it anywhere electronically. By doing this, scholars working together can share the same digital images with one another and work together. Software or collaborative web pages can host the scholars and allow them to interact with the texts and one another. In this digital area the scholars can interact by commenting, tagging, sharing information, or using drawing tools to highlight the text.

Another advantage of digital data is the little space it takes compared to print formats. Burgeoning libraries are often seeking ways to save space. Digital archives save space in comparison to large photo libraries, microfilm collections or print facsimile editions, especially if the digital information is securely stored off-site

[139] Czeslaw Grycz. 2006, 3.
[140] Ibid, 47.

server. A second and crucial benefit of storing surrogates off-site is that it insures that a copy would survive, even if a disaster destroyed the site at which the originals were stored.

While there are many benefits, there are also disadvantages. An electronic copy should be faithful to the original; scholars need to trust the surrogates' accuracy or they may revert to using the original, defeating preservation attempts. None of the facsimiles can definitely insure that they are the same scale, format, colors as the original. With digital images it would be difficult, if not impossible, to insure the user sees the same colors, format, and scale as the original. Even if the photographer meticulously replicates the original page, the user's browser or computer settings may alter it. The same is true for the scale. Even though metadata could indicate the original dimensions, the viewable page on the computer screen will most likely not accurately replicate those dimensions. Screens are different sizes, browsers have different settings, so forth. Some studies in codicology or art history could not use facsimiles.

A commonly known and experienced disadvantage is that technology is not always dependable. A virus can bring down the system. Web access can be unreliable. Sites are transitory.[141] An Icelandic example is the *Flateyjarbók í Farteskinu* website, which could not be accessed at the time of writing this thesis.[142] The costs of upkeep and migration of the digital data will keep incurring into the future. Within five years (1997-2002) the National and University Library of Iceland had had to migrate information on several occasions. The manuscript descriptions placed in catalogue Gelmir were migrated to MASTER and then into the Libertas computer system which then was transferred to the Aleph system.

Other than technological disadvantages, there can be social and financial disadvantages. For example, a possible con for digital technology is that it may diminish the community of users that go into the institutes or the libraries. The libraries may attain their funding by the number of patrons that visit a library, thus decreasing funding. However, this is unlikely, because the digital versions seem only

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[141] Driscoll, 2000, 54.

[142] [142] The link for Flateyjarbók í Farteskinu website exists on some of the Stofnun Árna Magnússonar´s websites but no longer functions. Here is the web address for the Flateyjarbók í Farteskinu: http://tgapc18.rhi.hi.is/handritasafn/miml/index-syning.htm. (Could not be accessed on September 9, 2008).

to complement the library's collections and not replace. The patrons will still continue to use the library collections. The digital collections may stimulate new research and attract new users who will then use online and physical collections. Also, the library may benefit from the project in the future as to lower costs. Perhaps costs for manuscript loans will be lowered in the future, with many of the manuscripts online. By not having to loan manuscripts, the library will save on insurance and transport costs.[143]

Conclusion

With these various pros and cons in mind, one must decide what facsimile format best fits each situation or need. To recap, the original manuscript will be preferred by many scholars because of its multidimensionality. Unlike facsimiles, it is three-dimensional, possessing valuable markers of its history, creation, and even its damage or ageing. Manuscripts provide extra important codicological information, which may not be secured by using a facsimile. Print facsimiles are advantageous to the user who prefers to read and study paper rather than a screen. Photographs and microfilm are ideal for creating archival copies, because microfilm, in particular, will last hundreds of years under the right conditions. Finally, the digital format is perfect in providing access internationally. Additionally, the software can allow for the images to be easily manipulated, saved, cropped and printed. In short, every format has its own benefits and disadvantages.

[143] Ibid, 24.

Conclusion

Over the last 30 years the study of manuscripts has greatly increased and happens to be the most popular and active area within medieval studies. Not only are medievalists and other historians dependent upon manuscripts as primary evidence, but so too are art historians, literary scholars and others.[144] One of the main reasons for the increase in the study of manuscripts is the dissemination of facsimile editions and this effect is continued through the creation of facsimiles produced in CD and digital form.[145] In other words, the increase of access or the dissemination of facsimiles through publishing has stimulated research.

The goals of dissemination and stimulation of research are integral to the Arnamagnæan Institutes and the National and University Library of Iceland. With these incentives, the insititutes cooperated with publishers and others to provide facsimiles for over a century. From around the 1930s through the 1990s there was a pretty steady production of print facsimile editions. Simultaneously there was the simple production of photographs and microfilms. These two formats differ in that the facsimile editions contain scholarly introductions and the photographs and microfilms are purely graphical and not packaged with a textual component that further illuminates past and present research. Both provide access, but the photographic technique is more egalitarian, probably because of its aim and its cost. Since the photographic technique aims to have a copy of all the manuscripts, it does not limit itself to just the most important and aesthetically pleasing manuscripts, as did the facsimile edition technique. Photographic collections continue to be created; they are traditional, trusted and archival. Again, the facsimiles were only duplicating the most important and aesthetically pleasing manuscripts because of high costs. For this reason and the evolution of technology, print facsimile production died down during the 1990s and eventually was replaced with the less costly digital facsimiles; the first digital facsimile edition being produced in 2000.

Over the last eight years, only one digital facsimile edition has been completed and distributed, although another is on the way. This complex and scholarly medium produces not nearly as much as the other digital projects, which have been replicating

[144] Pearsall, 2000, xi.
[145] Doyle, 2000, 14.

hundreds of digital facsimiles and publishing them freely online. Production of digital facsimiles for public access first began with the massive Sagnanet project in 1997. This was a large project that lasted until 2001 and produced hundreds of manuscripts in digital facsimile. The number of manuscripts digitized is far greater than the sum of all the facsimile editions created. Sagnanet would be followed by one simpler project called Stafrænt Handritasafn from the Stonun Árna Magnússonar. Digital facsimiles are posted on an index on the main page. No descriptions accompany the facsimiles. Other projects had been underway at the time that would supplement Stafrænt Handritasafn; these were online catalogues. Cataloging using the MASTER standard was used to create manuscript records, which in turn facilitated joining international manuscript projects such as Manuscriptorium and creating union catalogues such as Handrit.

Projects like Manuscriptorium and Handrit are likely to continuing being on the horizon because the climate now and most likely into the future is that of international efforts and access to all. Mingling technologies with the humanities has led to an escalating interest and expectation from users to have cultural treasures easily available. This is not to say that digital publishing will replace all the other facsimile formats because they each have their own benefits and ideal uses. One must keep in mind that the original manuscript will be preferred by many scholars because of its multidimensionality. Unlike facsimiles, it is three-dimensional, possessing valuable markers of its history, creation, and even its damage or ageing. Manuscripts provide extra important codicological information, which may not be secured by using a facsimile. Print facsimiles are advantageous to the user who prefers to read and study paper rather than a screen. Photographs and microfilm are ideal for creating archival copies, because microfilm, in particular, will last hundreds of years under the right conditions.

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