

# Digitisation as a strategy for preservation and dissemination of photographic archives

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## Background and presentation

This article introduces the Picture Collection of the University of Bergen Library (UBL), presents some reflections on the photo-conservation and preservation aspects, and describes its digitisation history. Experiences with this collection are then discussed and related to the role of digitisation in photographic collections: how, when, what and why digitise?

## The Picture collection and the Knud Knudsen Archive

The Picture Collection is a department of University of Bergen Library, the bulk of the collection consists of photographs from the 1840's to the 1970's. This historical photo-archive is among the oldest and largest in Norway. It was established in the University Library in Bergen in 1966, but an important portrait-collection had already been part of the Special Collections of the Bergen Museum Library from 1898, before the Museum became part of the new University in Bergen in 1947. The total number of units is unknown, due to a large backlog, but the active part is approximately 350,000. Although the University research- and student community use the collection, patrons external to the university more frequently use it: publishing houses, museums and the general public.

Part of the collection is the Knud Knudsen archive. Knud Knudsen was one of Norway's most distinguished pioneer photographers of the 19<sup>th</sup> century (1832–1915). The Knudsen-collection contains the photographer's own archive, approximately 40,000 negatives and prints, as well as the archive of Knud Knudsen Company that existed after his death and up until 1974. In the national preservation plan for photography (Norsk Kulturråd 1992), the Knud Knudsen-archive has the status as one of the two most important photographic collections in Norway.



Knudsen, K, 1882, *Parti af Bergen* (View of Bergen)

When the Library acquired the Knudsen-archive, it was a collection with a high degree of archival order. Knudsen was a commercial photographer who produced his landscapes and genre-pictures for the tourist market. The archive had a printed catalogue with titles and numbers, corresponding with that of the negatives and the order in the negative-cabinets. The thousands of albumen prints had been kept in a dark environment, and were in mint condition, while the physical condition of the negatives ranged from mint to very damaged. The oldest negatives were collodion glass, and some of these had bad reticulations, which would print as dark lines in the image. The most dramatic damage was to the early 1880 gelatin dry-plates; on some, the emulsion had started curling up, thus coming loose from the glass support.

The University Library bought this collection in 1975, when preservation standards were different from what they are today. The planning of future digital re-photographing as a conservation and preservation strategy started in the Picture Collection as early as 1990. Therefore, our knowledge of digital practices in photographic collections found its form through working with the conservation challenges of this collection, changing and developing in step with the technical development, the general knowledge of digital preservation of photography, and of course the available economic resources at the time.

### **Photo-preservation in Norway**

National strategies for photo-preservation started early in Norway. In 1953 the Norwegian Iconographic commission published a report on the destiny and status of the photographic heritage, called "Save the Photographs!" (Norsk Ikonografisk Kommissjon, 1953). In 1976 to 1977 the groundwork was made for a national plan of photo-preservation. A government-funded national Secretariat for Photo-registration (SFFR) was established, and a plan for a three-level organization structure was proposed: A national level, (SFFR), one institution responsible for each county (mostly museums), and the local level of archive-, library- and museum-institutions owning photo-collections. Programs for collecting, cataloguing and preserving photographs were developed by the secretariat and conferences and courses in various techniques were offered. Thus the photo-conservation institutions became a close-knit professional network. In 1997 SFFR became part of the National Museum Development, (NMU), and in 2003 the photo-conservation responsibility was placed under an Archive, Library and Museum institution, ABM, established under the Ministry of Culture.

### **Some general reflections on photo-preservation**

#### **The photograph as object and information-carrier**

Silver-based photographic objects will always be in a process of destruction and disintegration because the silver compound used in photography is chemically unstable. This is the premise of all photo-conservation. Our aim is therefore primarily to delay or stop this natural chemical process working on the original object, and secondly to re-photograph the objects to contain the information. Physical preservation is always a prerequisite for content-preservation. As obvious as this may sound, with digitisation being such a buzzword and financial support following this trend, it becomes increasingly necessary to point out that digitisation cannot solve all our problems concerning preservation of cultural heritage. This is an even greater problem concerning photographic cultural preservation. There is a strong conviction that a photograph is identical with its information content. Photography has been valued mostly as a carrier of cultural information, not being in itself a remnant of cultural history. Content-preservation has been given priority before physical conservation because as such an old original print did not have any specific value over the modern copy. This is a problem that is at the core of photography as a historical phenomenon, with serious consequences for photography preservation.

Photo-conservation is expensive if done to optimal standards. The

photo-archivist is often placed in a difficult position, finding the right balance between allocation of resources to physical preservation and to digitisation for preservation of content. Also, there is a continuous pressure from the research community and the general public of making rare and important source information easily accessible through searchable databases and internet-publication. All of this makes any digitisation project easier to finance than projects of physical conservation. Also, the fight for physical conservation often feels like a lost battle since the photographic heritage contains such masses of objects that making priorities is difficult. Photographic processes of the 20<sup>th</sup> century, (nitrate and acetate carrier and color photography) have a shorter life span than the old glass-based photographs of the 19th century. The immense photographic heritage consisting of family photography is often quite repetitive in content and therefore comparatively lower in median source value than older collections. Hence we are left with large quantities of collections of questionable value demanding a disproportional large part of our preservation resources.

### **Library practice: Public access and preservation**

The Picture collection is part of the University Library, and is run according to library-ideals; that is to make collections available to the public as far as the physical conditions permit. On the other hand, as a collection of historical artifacts, the rules for handling and loan must be different from other lending-rules of the library. In principle, re-photographing the whole collection for viewing in the reading room can solve this problem. The collection is so large, however, that this is not practical or economically feasible. We do make modern prints of the originals that are highest in demand for readingroom-viewing, but when the user needs to see images that have not been through this process, the original print must be taken out of the storage. No pictures are taken out of the library, and therefore an important part of our daily work is the production of surrogate copies from the archive for research, publication or decoration. We produce a large number of digital files, analogue prints and digital prints, dependent on the user's needs. We are operating in an environment where there is a strong demand for photographic quality, not only for reasons of preservation standards, but also from the needs of our patron researchers and publishers. A photographer specialized in working with historical photography is employed to ensure this professional standard.

Over time, the practice of re-photographing has resulted in a considerable amount of second-generation negatives of the most "popular" images, protecting the original from damage through handling. We have found this to be a more economical use of our resources, than doing en-bloc re-photographing of whole collections.

## Projects

### Project of re-photographing

After the Norwegian National Preservation plan of Photography was put into effect, the library received financial support in 1994 from the Culture Council of Norway for a content-preservation project done on analogue 6x9cm film. The National Library had opened a reservoir and technical preservation department in Mo i Rana, in the north of Norway, equipped with special cameras for doing high-end re-photography. These cameras were transportable, and thus offered picture archives the means for doing the actual photography job locally. The films were then developed and copied in Mo i Rana, where they keep the master film, sending a copy back to us. After some experimenting, most of the resulting negatives were of a high quality. However, it became clear that this was a mass-production scheme that did not take into account the variations in density, exposure and damage-profile of the old negatives. In-camera manipulation of exposure-time / aperture was possible, but controlling density and contrast through development manipulation was impossible because of the technical set-up at The National Library. A decision was therefore made to exclude the most difficult and most damaged negatives from this project for a more individual treatment.

### Project “Digiknud”

#### *Digital re-photographing for preservation*

In 1997 the University in Bergen agreed to finance equipment and a photographer for a two-year project of digital re-photography to take care of these most difficult objects and at the same time develop a standard for future digital re-photographing. It took us a long time to decide on the best equipment for our purpose. The first consideration was to choose between a scanner and a camera with a digital back. We decided on a camera for several reasons. With a camera, the size of the object to be digitized presents no problem. Also, we were afraid that the strength and quality of the light emitted by scanners would be harmful to the old photographs. Thirdly, we did not want to put glass-negatives inside a scanner, fearing they would break. The equipment decided upon was a Sinar large-format camera with a digital back, developed for medicine research and therefore having the ability to do scans with very high resolution. This project, called DIGIKNUD, ran from 1997 to 1999. Simultaneously the National Library in Mo i Rana started digitisation from the master negatives of the re-

photography project. The standard for this digitisation was set in accordance with our local tests of resolution and sharpness. The resulting files were returned to us on CD's. The digitisation standard for DIGIKNUD was set for 300 dpi and 3000 pixels on the longest side, giving files of approximately 15 – 20 Mb. This is also the standard recommended in 2005 by ABM (Oulie 2005). As a result of this collaboration, we have most of the Knud Knudsen archive re-photographed both as digital files and as analogue medium format negatives.

### *Digital restoration*

Part of project DIGIKNUD was a trial project for digital restoration of some of the damaged negatives. We tested two typical damage-types: breakages and emulsion-reticulation. The original glass-plates were printable, but handling would further increase the emulsion damage and would remove information. The whole point of digitising is to prevent future handling of the original objects. The procedures were set to keep the original file of the damaged negative as a master and to digitally improve on a copy. The broken negatives were relatively easy to restore, but the success of the restoration on the reticulated negatives was more varied. Often broad lines of emulsion were missing, and it was not possible to replace the lost information. However, when there was damage in the sky-area of a landscape-motive, removing these black lines in the sky was easy and greatly enhanced the image. Our objective was never to restore the image to the level of a new one, but only to remove visible noise, to make the image easier to read. There is nothing wrong with old photographs looking their age.

### *Digital printing*

Chemical contact-printing from the old negatives will result in very sharp, but often extremely high-contrast paper prints. It takes a great deal of photographic skill to make high quality prints from old negatives on modern photographic paper. The reason for this is that old negatives were adapted to albumen printout paper, which had a contrast-curve that suited these negatives. When a hard contrast negative is printed on to a very low contrast paper, this is a perfect match. Modern chemically developed papers and modern negatives have an opposite character: hard contrast profile in the paper, fitting modern low-contrast negatives. Printing old negatives on modern paper therefore gives information-loss in the lightest and darkest areas. A scanned negative, however, gives a completely straight contrast curve, the result being that the digital print will yield all the information present in the old negatives and will be a surrogate print closer to the original albumen print. Large digital printers also present rationalization benefits for printing large format exhibition-prints, which on photo-paper was a very labor-consuming and demanding work.





Tromholt, S: *Niels Andersen Sara, 56 years old, Koutokaeino*, 1883. (... 56 years old, Kautokeino). Print on modern developing paper from glass negative.



Same image, digital print from glass negative.

## Project “Jubelknud”.

### *Database, scanning for publishing on the web*

The next natural steps in the digitisation process were importing the files into a picture-database and publish them with a web interface and functionality. At this time, in 1999, the Norwegian library system BIBSYS had no picture-module, and although a museum-picture-database was in use, it did not have web-publication functionality. A grant from the Bergen European Culture City 2000-celebration and the University in Bergen made it possible to develop a searchable database with web-functionality, presenting Knud Knudsen’s images from Bergen and Western Norway as a gift from the city of Bergen to its inhabitants. The chosen solution was an SQL /Access database with a web-interface. The deadline for publishing this was early 2000, which meant that we had less than a year to write the specifications, develop the database and enter the relevant images into the database in time for the Culture City opening.

It was specified that the database should be well adapted to web publishing, as we wanted to make database-generated net-exhibitions. To be able

to achieve this we needed the files to be the right size, not too big for searching and copyright-reasons<sup>1</sup>, not too small for reading the image-information. We also wanted to incorporate information from our old card-catalogue, our old signature-system and the hierarchical keyword and geographic system.

For the web-version we wanted a design that was easy to read, with functions of topic browsing, further search, marking and selection, and the possibility of ordering photographs by e-mail. The web-interface should also have aesthetic qualities suitable for the presentation of photographic images.

### *Economic considerations – time and labor*

The database was originally created for the Knud Knudsen-archive but we needed a strategy to integrate the new database with the rest of the collections and our daily scanning of new images. We did one more en-bloc digitisation of a collection of 1500 negatives, but soon realized that the scanning and registration of reference information into the database was so labor consuming that it would be unwise to continue with projects of large-scale en bloc digitisation. We therefore returned to the earlier practice of limiting the digitisation to ad hoc work on particularly endangered negatives, work in connection with exhibition-projects, printing for the reading room and digital production for the public. In addition, we used smaller scanners to make image-files that would fit the web-format, limiting the large camera-scanner exclusively for more demanding tasks and larger files. The database-digitisation and the larger scan for preservation became parallel workflows. The first could in principle be done by any department-employee on an office scanner, while the photographer made the high-resolution work with the scanner back of the large-format camera.

### **Project “Between two Wars” and “Women in the Workforce between 1916 and 1960”**

These two projects stem from the wish to present the collections in a wider historical setting that would combine different media-types and special collections of the Library: manuscripts, newspapers and photographs, historical articles, bibliographies and links.

It would contain articles on local-, social-, cultural-, political-, research- and economic history and we had hoped that this collaboration could include other local libraries, archives and museum. A project of this scale would need external financial backing and could not be carried out as originally proposed. But it lives on in a different form. The strategy is to propose more limited projects with

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<sup>1</sup> The use of our images in printed form is subject to a copyright fee. The images in the database are therefore presented in a file size that is too small for unauthorised use in printed form.





*From the 1928 National Exhibition in Bergen. Photo: Knud Knudsen & Co.*

content that can be fitted into the time-frame of 1918 to 1929 and thus let the “Between two Wars”-project (Ill. 4) grow according to the budget situation. One of these financed part-projects is the “Woman in the Workforce”-project; another is a project of inner-city children.



*From the Janus textile company, 1930's. Photo: Atelier KK.*



*Children at Bergen Harbour, 1920's. Photo: Schumann Olsen, O.*

## **Present situation and the future**

### **Digitise how: Technology; limitations and possibilities.**

Our equipment was regarded as high end when we bought it for DIGIKNUD in 1997, and our procedures and priorities of the time was a result of technical limitations and possibilities inherent in this technology. Scanning large negatives with a very high resolution was slow and took up much of the photographer's time. As long as the large files were stored externally on CD's, it never became a storage problem. Technological development has now made the scanning technology better and faster and CD's are no longer considered a safe, long-time archival digital carrier. Our digitisation strategy has therefore changed with the purchase of new equipment and the development of new archival standards.

The new Hasselblad with a digital back does the high resolution scan on a fraction of the time used by our old camera. Therefore, large-scale projects can again be considered, the priority still being endangered collections first, then particularly interesting collections for publishing and other special projects, and the digitisation of units for our users for publication research or private use. The standard for digitisation is now 300 dpi with 4000 to 7000 pixels for the longest side of the image, 16 bits and tiff-format. For exhibition purposes, even larger files can be made. Storage carrier is now changed from CD to files on University servers and network. At this point we have approximately 250 Gb stored files, with a calculated yearly growth of approximately 20 Gb. This is considerable, and smaller museums and independent institutions may not have access to this amount of storage space. In addition to the master files, backup files must be produced continuously. At present, the IT-department automatically produces tape backups of all the resources on the institutional network. The optimal security would be obtained by storing an additional backup on a server placed in a different building.

### **Digitize when? Waiting for lower cost and higher quality**

With the extremely fast technical development in scanner and photographic digital technology, software development and storage capabilities, it is harder than ever to know when to change the photo-studio and wet-darkroom into a digital work-place. There are advantages and costs to being a pioneer, while the waiting game can be rather nerve wrecking.

The general trend in the development of camera and photographic techniques has been for the cameras to get smaller and easier to handle and with more automation, and for the film material to develop a finer grain-resolution and sharper lenses. This trend has continued into the digital age. The photo-technology

is still developed for the mass market, where easy handling and convenience relative to cost is more important than quality. The proliferation of low cost and automatic scanning equipment may lead to the conclusion that preservation-work can be done without professional competence, and could tempt museum and archives to start doing digitisation projects too early, with the rewards of high flexibility and low cost. This mistake has been made before. In the 1970's, there was a drive throughout Norway towards collecting old photographs by small local museums and private organizations. Re-photography projects were started by enthusiastic amateurs with no knowledge of how to choose the right film and do high quality development. The result was several so-called photo-conservation collections of very poor quality. However, with photographic expertise, high-quality equipment, medium to large format film and competent development, film-based re-photographing still does long-lasting and high quality job in photo content-preservation. There is virtually no limit to enlargement and detail information, and as a medium it is not dependent on a specific media-reader.

With the present digital technology, the popularity of doing film-based preservation-work is waning. The popularity of the digital concept may have drastic consequences for the quality of the output and its durability over time. The challenge is to jump onto the fast moving train at the right time, i.e. make the right decisions both in choosing the project, the software, the scanner & camera/hardware. Most digital equipment will be obsolete in 5 years time. Buying quality equipment is expensive but will be a guarantee that quality and standard is valid for a longer time. Low-cost scanner equipment has improved over the years, but for conservation purpose there will never be a low-cost solution. And last but not least, knowledge of photography is more important than computer- and digital knowledge; digital photography is still about photographic seeing.

The economic cost of pioneering is high. Our scanner-back and first printer were very expensive, and it needed a skilled photographer to run it. Because it was so expensive, we kept it long after it was ripe for replacement. Lowering our standard for the new investment was not an option, and at this end of the technology scale, the prices were as high as before.

The advantage, we learned, in pioneering such a radical technological change is the buzz of doing something new and exciting, being at the front where things happen and finding our own quality standards and work-solutions. There is always a danger of choosing the wrong strategy, and mistakes may be costly. We are comfortable with our choices when it comes to the technology and the digitising standards. This work still stands the test of the time because we never compromised on quality and expense.

### *Making our own database or waiting for the columbi egg*

Our decision on developing our own database-software may be more questionable. It was mainly a question of timing. We were ready for a database with a web-configuration before most other museums and libraries. A few commercial systems were considered, but they were either too expensive or they did not fit our needs. At this time, an image-database for museums was under development on a national scale. However, we were not in a position to have any influence on the priorities and choices made in that project, and a museum-database might not be what we wanted. A museum-based database will have its strength in registration and description, while a library-catalogue will put emphasis on search and retrieval and availability to the public. Besides, the web-extension was at the time rather basic and did not have priority. The advantage of developing our own system was, of course, that it became custom-made to serve the needs of our workflow and the very high output of user-service. Later the image-base has been fitted with administrative- and loan-functionality that has meant a great rationalization of our daily customer-service. The process of planning for the database-functionality, writing specifications to our needs and seeing all this come to life in the resulting database and beautifully designed web-application, gave us great satisfaction and pride. And through the years it has served us very well.

The disadvantages in making custom-made applications are however several. Any database and web-application needs to grow and develop with time. This has not always worked. Application-development is largely person- and budget-dependent and we no longer have the in-house knowledge to change the database to our present needs. We are now in the process of re-examining our options for the future. We hope that we may find a solution to keep a modernized version of the database, and to change the net-application into a more modern interface and more up to date functionality so it may become more easily integrated into our library portal. A national ABM search functionality portal does not exist at present, but our future system should prepare for this possibility.

### **Digitise what and how much?**

In principle, our whole collection is open to the public. Today this means availability on the web through a searchable database: the content and number of images in the database should correspond to the content of the full archive. The amount of files published on the web per date (spring 2006) is 13000, which is less than 2% of the full collection, so the database gives us less credit than we are due. (Our in-library database has 40.000 files including mini-registrations.) Digitisation of unpublished source-material has a high priority both in the University strategy-



plan and that of the University library. The enormous backlog in the photo-archive necessitates a strict priority-plan. Criteria for this should range from age and level of physical damage to content-value. From a conservation point of view it would probably be both most cost-effective and safest in the long run to employ a specialist in photo-conservation to do the physical day-to-day health evaluations of in the collection and thus pick out the photographs in most dire need of treatment and passive cold storage. A large amount of our collections are in good condition, and the source value is varied. Properly stored in our climate-controlled rooms there is no reason why such pictures could not be left un-digitised for decades yet. The digitisation for preservation would then be done side-by-side with the digitisation needed for communication and publishing projects and the interest of the general public. Unfortunately, in our case the University does not have expertise of physical conservation of photographs. The need of our users is often given precedence before the preservation needs. For a library, this is probably typical. In my opinion, the only answer to the problem is increasing our resources of manpower.

### **Why Digitise?**

Analogue or digital preservation– or maybe both

In photography-preservation, the baryta paper prints from film-based procedures of image-preservation were expensive, cumbersome, but of high quality and long lasting. Digitising procedures present new possibilities in dealing with historical sources, and can in some cases perform tasks better than our conventional tools. Digital conservation is vastly more convenient, in some ways better, (printing and digital repair) and is steadily achieving higher quality. For digital prints both paper and ink quality now approach archive standard. However, if done to the highest standard, the digital workflow and equipment is not a cheaper alternative. It has the disadvantage of being tied to reading- and storage media that have a short time-span guarantee, and it therefore needs future and repeated re-playing into new media and new formats. Also, the decisions once made on resolution and file size will for the future determine the possibilities to enlarge for detail. The optimal solution in this situation may still be using both analogue and digital strategies in photo-preservation, opting for the belt-and-braces-tactic. For most institutions, this is a not a viable solution.



## **Conclusion: Popular presentation and democratic access to the sources**

The introduction of the digital technology in the Picture Collection has taken place over several years and in a manner relevant to our growing knowledge and understanding of the new technology. As in most groundbreaking technological changes, the new technology is initially used for solving old problems and rationalizing old procedures. This is the stage of digitisation for conservation and content-preservation, for us the DIGIKNUD project. The next stage is to discover and start using the technology for cataloguing and collection-management, developing databases and improve public access to the collections and the individual collection elements and items. (Project JUBELKNUD) This is the work that ensures access to the pictures as raw sources, and is vital to the interest of the research-community.

The main advantage of the digital technology in a global sense is without doubt the advantages in dissemination and publishing knowledge. Earlier, source material was locked in storage rooms with limited access, but the digital revolution has had the democratic effect of giving the general public access to unique source material.

Lifting the historical sources into the public arena is important. However, an even greater and more interesting challenge is to go beyond the database-presentation of the sources, by making web-exhibitions, portal-presentations and exhibitions by topic, like the “Between two Wars”-project. (Ill 4) In an information society, we need to present our resources within a context, which is exciting and will appeal to people of different ages and interests. The internet-medium is well adapted to presentation of historical knowledge. The librarians and archivists of unique documents, together with the academic staff of the University, have the competence necessary to put together this kind of information in a way that can be a travel of discovery into the past. The different elements of a library-collection will thus be given added value through context. This is a modern publishing procedure that is more flexible than traditional publishing; it is a challenge to the library-employees and a reaching-out to the general public. It is, however, labor- and time-consuming work. It presupposes a spirit of collaboration between institutions and departments, and it may go beyond the task of a research-librarian as we see it today. But from the standpoint of a picture-archivist, this is without doubt the most exciting future use of the digital media.

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