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Titel: The Colour Microfilm as Preliminary Stage of Digital Maps

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Ort: Graz

Jahr: 1995

PURL: https://resolver.sub.uni-goettingen.de/purl?514854804_0005|log73

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The Colour Microfilm as Preliminary Stage of Digital Maps

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In the following text you will find first some general information about the Ryhiner map collection and research project by Thomas Klöti. In the second part Martin Gubler, a specialist in colour microfilms, will give information about the technical aspects of the topic 'colour microfilms as preliminary stage of digital maps'

The map collection and the research project

The Bernese statesman Johann Friedrich von Ryhiner (1732-1803) collected 16,000 maps, townplans and topographical views of the whole world¹.

The legislative assembly of the Canton of Berne in Switzerland decided in the year 1993 to start a research project on the 'Ryhiner map collection'. The initiators of this project are the Institute of Geography of the University of Berne (Prof. Dr. Klaus Aerni), the City and University Library of Berne (Prof. Dr. Robert Barth) and the Bernese Cantonal Archive (Dr. Karl Wälchli).

The following persons are on the staff of the project: Dr. Thomas Klöti (geographer, head of the project), Martin Kohler and Caroline Hablützel (map librarians) and the restorers of the City and University Library of Berne (mainly Monika Lüthi and Gabriela Grossenbacher). The colour microfilm is made by employees of the Fotolabor Martin Gubler.

In February 1994 we started the Ryhiner project in the City and University Library of Berne². For the whole project we will need four and half years. The main parts are to create an online map catalogue, to restore the collection, to

¹ Thomas Klöti, Johann Friedrich von Ryhiner (1732-1803): Berner Staatsmann, Kartenbibliograph und Verkehrspolitiker. (= Jahrbuch der Geographischen Gesellschaft Bern 58/1992-1993. Bern 1994.)

² Thomas Klöti, Karten in der Stadt- und Universitätsbibliothek Bern. Die Erschliessung der Sammlung Ryhiner. In: Berner Zeitschrift für Geschichte und Heimatkunde 56, 1994, p. 179-189.

produce colour microfilms and to publish results of this research project. The map catalogue is part of the on-line catalogue DSV SIBIL (Deutschschweizer Bibliotheksverbund Bern-Basel). You can access this catalogue from everywhere through INTERNET³.

We also intend to publish this catalogue. For the publication we have to establish a separate plan to finance it. As yet we have not taken a decision about the form of this publication because we need first to review the technical progress. The possibilities are, for example, to publish a printed book or a microform without or with images, to make a CD-ROM or CD-I, but also to distribute digital images and data through World Wide Web. Use of the colour microfilm CIBA-Micrographic in the preliminary stage will make all these alternatives possible.

However, the first objective of this colour microfilm is to have one security copy and one copy for general use. In this way we can achieve an optimal protection of the Ryhiner Collection. In archives and libraries the method CIBA-Micrographic is recommended. The Federal Office of Civil Protection of Switzerland, for example, only subsidizes this method of colour microfilms. During the preparatory stage of the project we examined various contractors' offers. The high quality offered by the Fotolabor Martin Gubler has convinced us of their suitability, which was confirmed by references from Swiss archives and libraries for which this firm also makes colour microfilms.

The path to the digital map via colour microfilm

Description of the problem

Archivists and librarians throughout the whole world have done valuable work in that they have, in a time of naïve belief in progress and throwaway mentality, saved from destruction irretrievable cultural possessions. These are being stored and well protected in safe depositories. If it is necessary that these treasures of art and culture are made accessible to experts or the general public only minimal physical strain should be put onto these original artefacts.

Approaches to Solutions

There is no question that one should take advantage of the most modern technologies available. The problem can be approached in a linear fashion by applying one single method. However, systematic approaches are equally

³ Telnet access: telnet as3.afibs.ch, application cicsub. No Password or UserId. Gopher access is also possible.

noteworthy. The possibilities of digitisation incorporate the tremendous advantages with which you are familiarising yourselves in the other contributions in this issue of *The LIBER Quarterly*. Questions of permanence, of compatibility and of uncertainties in price trends have to be answered if one is thinking for the centuries to come. It is here that colour microfilming provides a noteworthy piece of the puzzle within the archiving system.

Colour microfilming

In a short overview we would like to show you how a colour microfilm is made. The most important prerequisites are a camera system, film material and the developing process. All parts of the camera system consisting of camera base, head, and table are operated and controlled by integrated multiprocessors. The camera operator is guided via monitor and is informed about the current state of operations. Part of the camera base is a vertical column with a height-adjustable, factor-controlled carriage and a high-quality lens. Thanks to exchangeable heads different formats like 35 mm, film-card, and whole fiche can be used. Originals are placed onto the 'book-seesaw' or the level table and are for the short exposure illuminated by filtered halogen spotlight. Books, maps, plans, blue-prints, etc., or three-dimensional objects can serve as originals.

Another important link in the microfilming chain is the film material. Ilford Company produces the high-resolution film we are using. This product is based on the silver-dye-bleach process utilising dies with a high stability concerning non-fade properties and archival conditions. The resolution of the film is more than 300 line-pairs per millimetre (lp/mm). In terms of sharpness, it can therefore be significantly better than chromogenic material (approx. 80-100 lp/mm). Tests concerning light and archival stability conducted by independent institutions have yielded results of at least 500 years which is comparable to black and white material⁴. This microfilm contains that much image information when a reduction factor of up to 30 times is used that it can be called an 'inter-original'. The microfilm can now be the basis for further applications, be they conventional or digital. The actual original artefact can now confidently be stored in a safe place. The microfilm can also be stored in an archive or it can serve as basis for digital scanning. Once in the form of a digital database all possibilities of electronic data processing are applicable. As files in different formats the images can be altered, improved, ordered, transmitted, etc. What one is left with in any case is the inter-original that can again in 50, 100, or more years be subjected to the latest technologies.

⁴ Wilhelm, Henry (1993), p. 6 and 199-200: *The permanence and care of color photographs : traditional and digital color prints, color negatives, slides, and motion pictures*. Grinnel (Iowa), Preservation Publishing Company.



Example of Archiving the Ryhiner Collection

When the City and University Library in Berne wanted to archive the 16,000 old maps, plans and topographical views they opted for a system based on colour microfilm as an 'inter-original'. The maps are transported in batches of approximately one month's worth of work by the company Fotolabor Martin Gubler to Märstetten (Switzerland) and there are microfilmed on 35 mm roll film. After a final control both films and folios are returned to Berne.

Advantages and possibilities of the 'inter-original'

Based on the 35mm inter-original all options are available; the original maps are all of different sizes, while now on the 35 mm film, they are all equal. This simplifies the digitisation considerably. How the images are digitised is a question of purpose and cost. The most inexpensive variant is the KODAK Photo-CD, where one can scan without special treatment costs for about Swiss Francs 1.- per image. The Photo-CD not only offers financial advantages but, thanks to its format, can be processed in practice on most hardware as well as

large-format bubble jet prints. The data transfer is made through existing networks as it has been done for a long time in text processing. Other variants of digitisation exist in the area of lithography. Based on the digital lithograph any printed material can be produced. Even the 35mm film-scanner incorporated in relatively inexpensive colour copiers can quickly produce hard copies to be used as work prints or archiving aids.

So far we have looked at colour microfilm from a conventional point of view. Looked at from the digital side the inter-original represents a data base with several advantages.

- It is very cost-effective: 10-20 Mb storage space only cost approximately Swiss Francs 5.-.
- It is forgery-proof because any manipulation of the inter-original is visible.
- It is system-independent, i.e. it can be utilised even after decades with technologies that are hitherto unknown.

Summary

Whether you as curators of maps are optimists, realists, or pessimists, with the colour microfilm you have a depository of information in your hands that, on the one hand can be utilised as basis for digital processing but, on the other hand, is still of use if only a candle and a magnifying glass should be available. Colour microfilm offers every protector of cultural assets a possibility to save unique valuables in the form of inter-originals. Based on this all forms of digital processing can be applied.