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BERNSTEIN

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Project presentation (final version)

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*e*Content*plus*

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[1] OJ L 79, 24.3.2005, p. 1.

BERNSTEIN – THE MEMORY OF PAPER

Collaborative systems for paper expertise and history
(targeted eContent*plus* project)

max. EU funding: 1.6 Mill EURO
project's start date: September 1st, 2006
duration: 30 months

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Project presentation
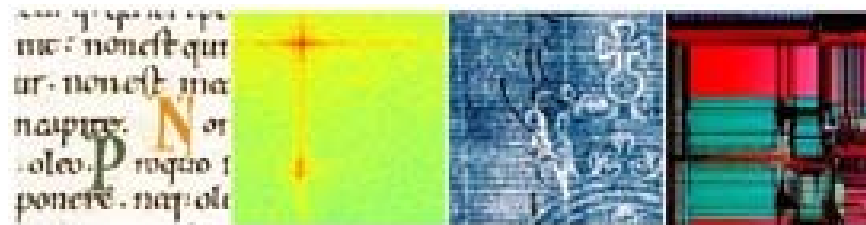
Motivation

Paper studies are important because paper is a 'memory bearer'. By examining characteristics of the paper (e.g. watermarks, chain lines, laid lines), its date, location and mill of production can be estimated and information about the technological, economical, social and cultural environment of its origin can be obtained. Tracing the movement and the usage of a sheet of paper in time and space provides a thread of captured events that form a basis for historical research and exploration of cultural heritage.

The enormous amount of papers available – millions of samples stretching 800 years back in time – contains a sizable part of what can be learned of Europe's past, and is both a richness waiting to be tapped into and a technological challenge.
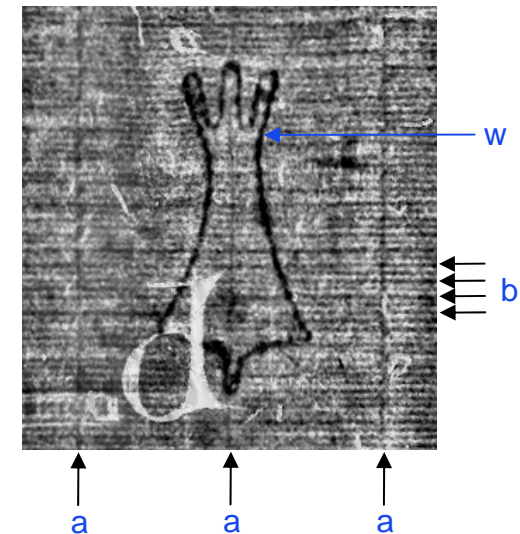
watermark of type bell (w)
chain lines (a)
laid lines (b)

A watermark is a change in the thickness of the paper that can be seen when the paper is hold up to the light.

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Main Objectives

Substantial improvements in all expertise areas related to paper studies …

- **Linking all existing European databases of paper reproductions**;

- Generating the conceptual and technical infrastructure for enabling access to paper expertise and enriching paper data by contextual data (bibliography, GIS, incunable short title catalogue ISTC etc.);

- Creating an integrated European digital environment for paper expertise;

- Providing a multilingual interface to these digital resources.

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Why "*Bernstein*"?

Bernstein is German for *amber*, which is the fossilized resin of ancient trees and famous also for the insects amber pieces may contain sometimes. They can be seen by raising the stone to the front of the eyes and looking at a source of light, a gesture identical to that of a historian looking for traces of the past captured in the structural features of a sheet of paper – hence the metaphorical name of the consortium and title of the project.
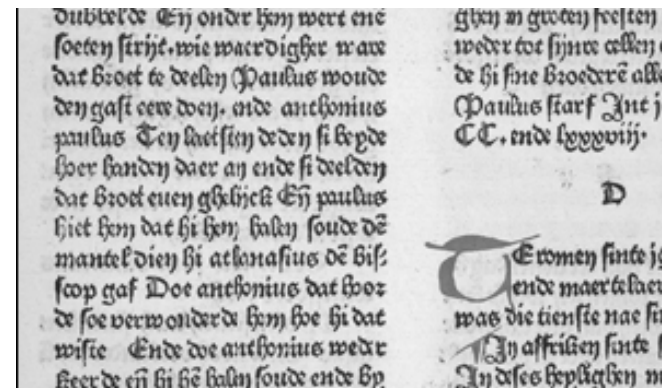
Part of a page from an incunabulum (source: KB)
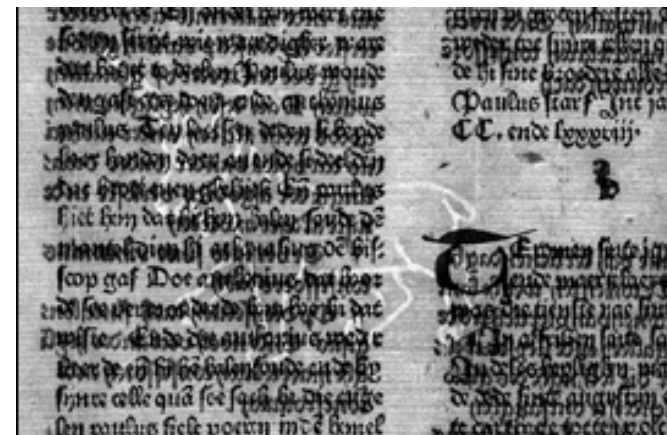
The watermark as well as the chain and laid lines are made visible with a light box (KB)

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Consortium

1. **Austrian Academy of Sciences, Vienna, Austria (OEAW, Coordinator)**
   management, database of mediaeval watermarks, dig. repertories, image processing tools;
2. **Archives of the State of Baden-Württemberg, Stuttgart, Germany (LABW)**
   huge collection of watermarks (Piccard, 95000 watermark entries);
3. **University of Technology, Institute for Information Systems and Computer Media, Graz, Austria (TUG)**
   integration software (implementation), user interface;
4. **Laboratory for Occidental Medieval Studies in Paris, France (LAMOP)**
   historical GIS;
5. **National Library of Germany, Leipzig, Germany (DNB)**
   bibliography on paper, huge paper collection;
6. **Dutch University Institute for Art History, Florence, Italy (NIKI)**
   paper database, art historical expertise;
7. **Delft University of Technology, Delft, Netherlands (DUT)**
   data mining software, intelligent image processing;
8. **Koninklijke Bibliotheek, National Library of the Netherlands, The Hague, Netherlands (KB)**
   watermarks in incunabula;
9. **Liverpool University, United Kingdom (LU)**
   integration architecture.

Co-operators
(Staatsbibliothek zu Berlin, British Library, ICPAL Rome, State Historical Museum Moscow, …)

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Project presentation

Content to be Aggregated
Paper related data and tools

A) Images (drawings, rubbings, X-ray images, beta and electron radiographies, digital photos etc.

1. WZMA (*Wasserzeichen des Mittelalters*) OEAW: gray scale images (mainly beta radiographies) with textual German descriptions; 9,500 entries (continuously growing); http://www.ksbm.oeaw.ac.at/wz/wzma.htm

2. POL (*Piccard-Online*) LABW: binary images (drawings) with textual German, English and French descriptions; 92,000 entries (completed); http://www.piccard-online.de

3. NIKI (*Dutch University Institute for Art History Florence*): gray scale images (electron radiographies) with textual English descriptions; 2,500 entries (continuously growing);7 http://www.iuoart.org/wmdb.htm

4. WILC (*Watermarks in Incunabula printed in the Low Countries*) KB: gray scale images (mainly electron radiographies and rubbings) with textual English descriptions; 16,000 entries (completed). http://www.kb.nl/bc/incun/watermerken-en.html

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Content to be Aggregated (cont.)

Examples of watermark images

Rubbing (WILC-KB)

WM I 54717, bull's head, cross, Deventer, Netherlands, deduced date 1480-1481, Koninklijke Bibliotheek, The Hague
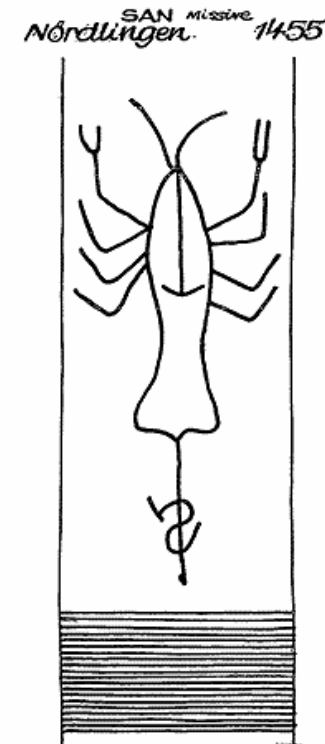
Drawing (Piccard-LABW)

Piccard-Online No. 42778, Vierfüßer – Krebs/Skorpion – Darunter S, Nördlingen 1455, Hauptstaatsarchiv Stuttgart
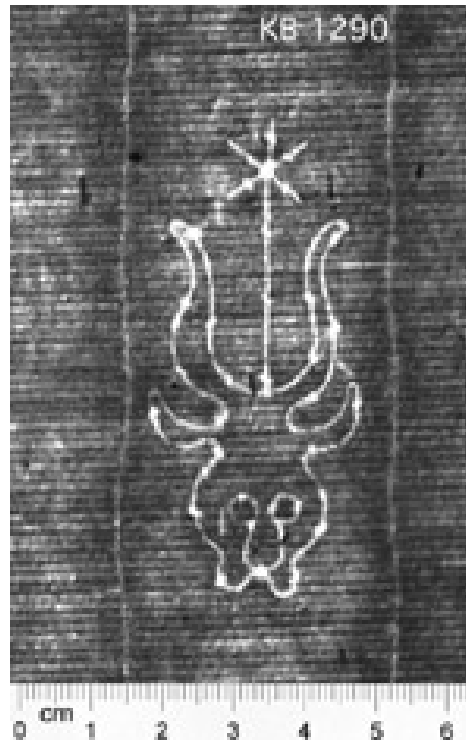
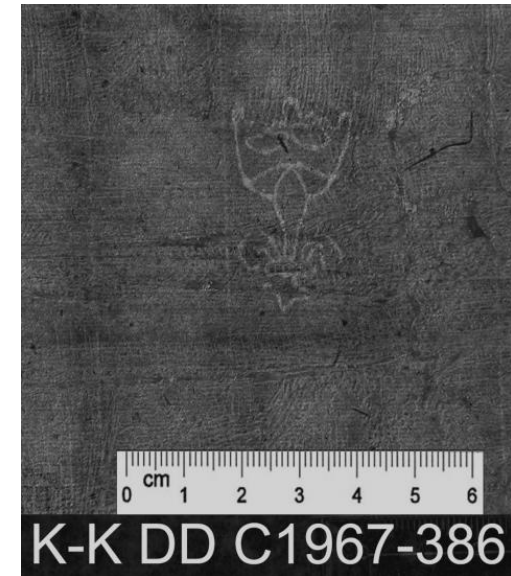# Content to be Aggregated (cont.)

Examples of watermark images
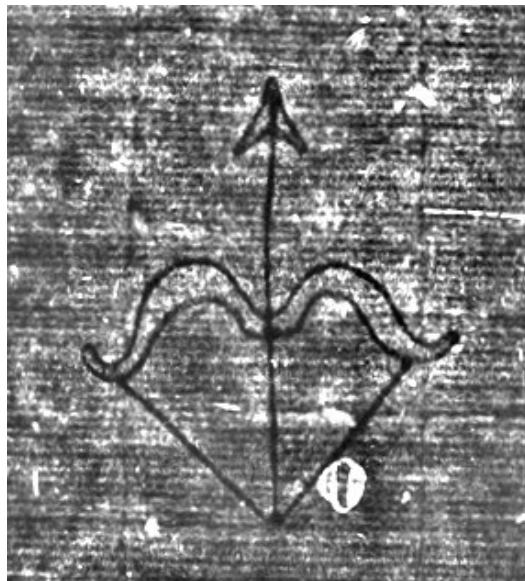
Beta radiography (WZMA-OEAW)

AT5000-158_60, Bogen / waagrecht, Handschrift: Klosterneuburg OSA, Cod. 158, Teil 2 (fol. 57-117), 1. Jz. 15. Jh.?, Klosterneuburg

Electron radiography (WILC-KB)

WM I 01290, bull's head, cross, curved muzzle, Gouda, Netherlands, Nov., 29th, 1481, Koninklijke Bibliotheek, The Hague

Electron radiography (NIKI)

DE-KKDD-C1967-386: Images, Crown, Dutch, William of Maleval (the large one), 1500, Dutch University Institute for Art History Florence

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Content to be Aggregated (cont.)

B) Metadata

Measured paper characteristics, watermark classification, date and place of production, information about the documents (manuscript, title, author, name of publisher and date of publication etc.).

C) Contextual data

- bibliography;
- incunabula short title catalogue ISTC;
- historical geographical data.

D) Content processing software

- image processing software;
- measurement tools;
- historical cartography, statistics programmes.

Hauptstaatsarchiv Stuttgart

- ⊞ Crown
- ⊟ Bull's head
  - ⊞ Without face features
  - ⊞ With eyes
  - ⊞ With eyes and nostrils
  - ⊟ With eyes and mouth
    - ⊞ Without nostrils
    - ⊟ With nostrils
      - 🗀 Without additional motif
      - 🗀 Above star
      - 🗀 Above shield
      - 🗀 Beneath shield
      - 🗀 Above crown, sticked out tongue
      - ⊟ Above serpent (snake)
        - 🗀 Above T
        - 🗀 Above cross
    - ⊞ Mouth in profile, opened
  - ⊞ With eyes, nose and further face features
  - ⊞ With eyes and nose ring in face
  - ⊞ Face to the eyes per fess
  - ⊞ In profile
- ⊞ Tower
- ⊞ Letter P
- ⊞ . . .

Excerpt of the list of watermark types (Piccard-Online)

Target Users

Everybody engaged in paper and/or paper studies …

- historians (e.g. codicologists), art historians, economic historians
- musicologists;
- archivists, conservators, librarians;
- antiquarians, art dealers, auctioneers;
- restorers, paper makers, artisans;
- computer scientists;
- forensic experts.

Main Results

- Watermark terms - Vocabulary for Watermark Description

- Bernstein systematics

- Bernstein web portal

- Paper bibliography

- Exhibitions and catalogues

- Paper studies kit

Vocabulary for Watermark Description

The Bernstein consortium has introduced a unified terminology for watermark description ("Watermark Terms") in six languages (English, French, German, Italian, Russian, and Spanish).

1. Sorted by German Terms

DEUTSCH	FRANZÖSISCH	ENGLISCH	ITALIENISCH	RUSSISCH	SPANISCH
Abakus	abaque	abacus	abbaco	счеты	ábaco
abgegrenzt	délimité	delimited	delimitata	ограничен	delimitado
abgeschnittene Exemplare	filigrane découpé	cut watermark	filigrana tagliata	филигрань обрезана	filigrana cortada
abgetrennt	séparé	separated	separata	отделен	separado
abgewendet	détournant	turned away	ritorto	повернутые в разные стороны	apartado
abgewinkelt	angulaire	angled	angolare	расположенный под углом	angulado
Abschlussstrich (Buchstabe)	trait final	finishing stroke	tratto finale (lettera ...)	завершающий штрих (буква)	trazo final (letra)
Abstand	distance	distance	distanza	расстояние	distancia
Abstand zwischen den Bindedrähten	espace entre les fils de chaînette	distance between chain lines	distanza tra i filoni	расстояние между понтюзо	distancia entre los corondeles
Abt	abbé	abbot	abate	аббат	abad
Abteilung	section	section	sezione	раздел, часть	sección
achtblättrig	à huit feuilles	eight-petalled	a otto foglie/petali	восьмилепестковый	con ocho pétalos
achtförmig	en forme de huit	eight-shaped	a forma di otto	в виде восьмерки	en forma de ocho

Bernstein Systematics

Watermarks are classified according to their motif in a hierarchical organized system. Unfortunately, this classification is not standardized and differs in all databases. A classification scheme with three levels in six languages was agreed on.

The "Browse Motif" function in the Bernstein portal (tab: *Catalogue*) allows the search for watermark motifs through icons.

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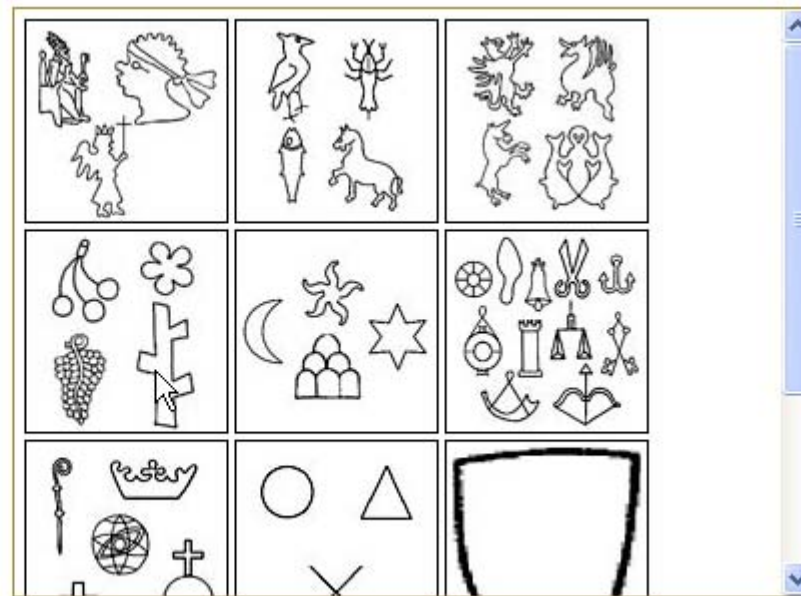
Bernstein Portal

… gives multilingual access to all Bernstein products

- *Catalogue*: Search for watermarks and paper in the Bernstein databases
- *Statistics*: Gives statistics parameters of search results like mean value, standard deviation, etc.
- *Atlas:* Visualization of geo-referenced data as maps;
- *Tools*: Download of measurement and image processing programs;
- *Paper Studies Kit:* ready to install database and toolkit for watermark recordings.
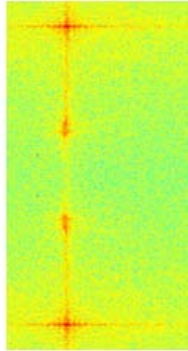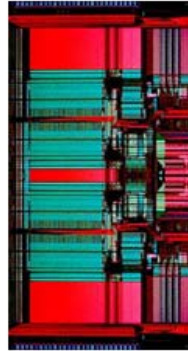
www.memoryofpaper.eu

Bernstein Portal: Entrance Page

Bernstein Portal: Catalogue

Catalogue allows to retrieve data from the databases by

Simple search: just enter a search term;
Advanced search: combine different search terms like motif, date, height;
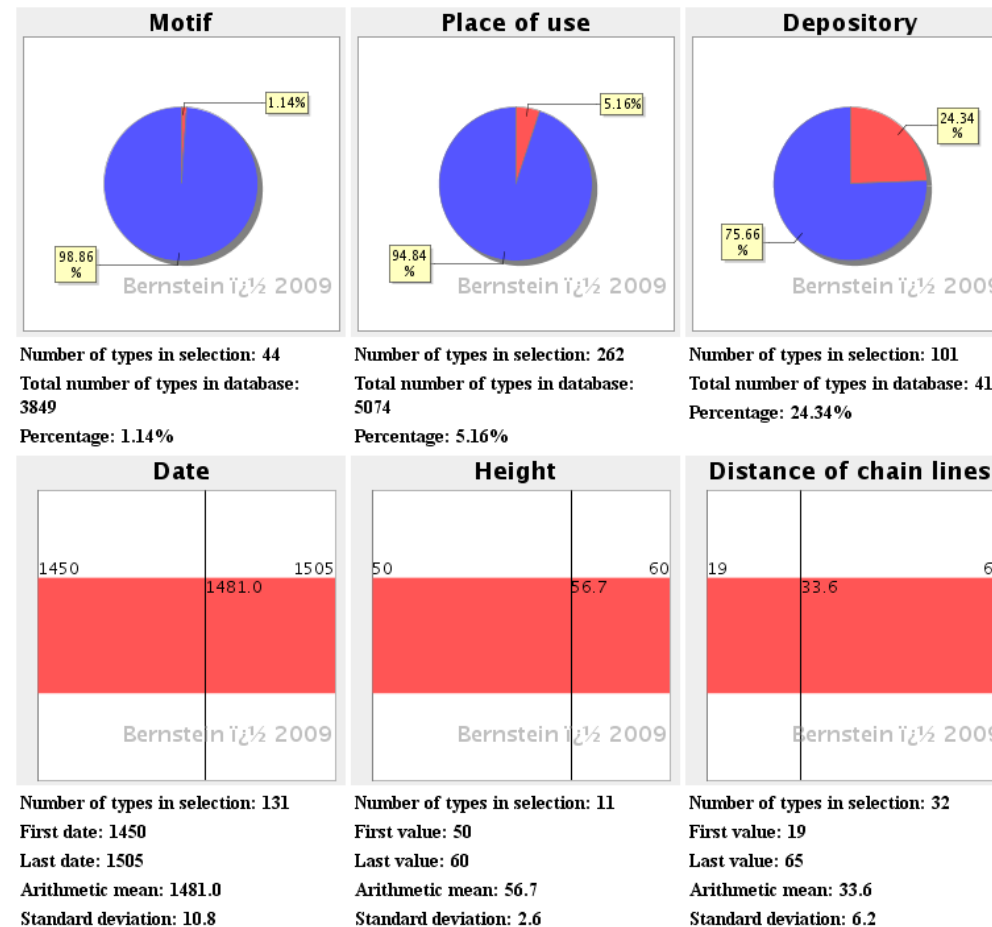*Browse motif*: browse through the watermark classification by words or icons;

Bernstein Portal: Search Results I

The results of a search in *Catalogue* can be presented in three ways: as a list, a statistics summary, or a map of the geographical distribution of the places of use.

Bernstein Portal: Statistics

Motif

1.14%

98.86 %

Bernstein ï¿½ 2009

Number of types in selection: 44

Total number of types in database: 3849

Percentage: 1.14%

Place of use

5.16%

94.84 %

Bernstein ï¿½ 2009

Number of types in selection: 262

Total number of types in database: 5074

Percentage: 5.16%

Depository

24.34 %

75.66 %

Bernstein ï¿½ 2009

Number of types in selection: 101

Total number of types in database: 415

Percentage: 24.34%

Date

1450	1505
1481.0	

Bernstein ï¿½ 2009

Number of types in selection: 131

First date: 1450

Last date: 1505

Arithmetic mean: 1481.0

Standard deviation: 10.8

Height

50	60
56.7	

Bernstein ï¿½ 2009

Number of types in selection: 11

First value: 50

Last value: 60

Arithmetic mean: 56.7

Standard deviation: 2.6

Distance of chain lines

19	65
33.6	

Bernstein ï¿½ 2009

Number of types in selection: 32

First value: 19

Last value: 65

Arithmetic mean: 33.6

Standard deviation: 6.2
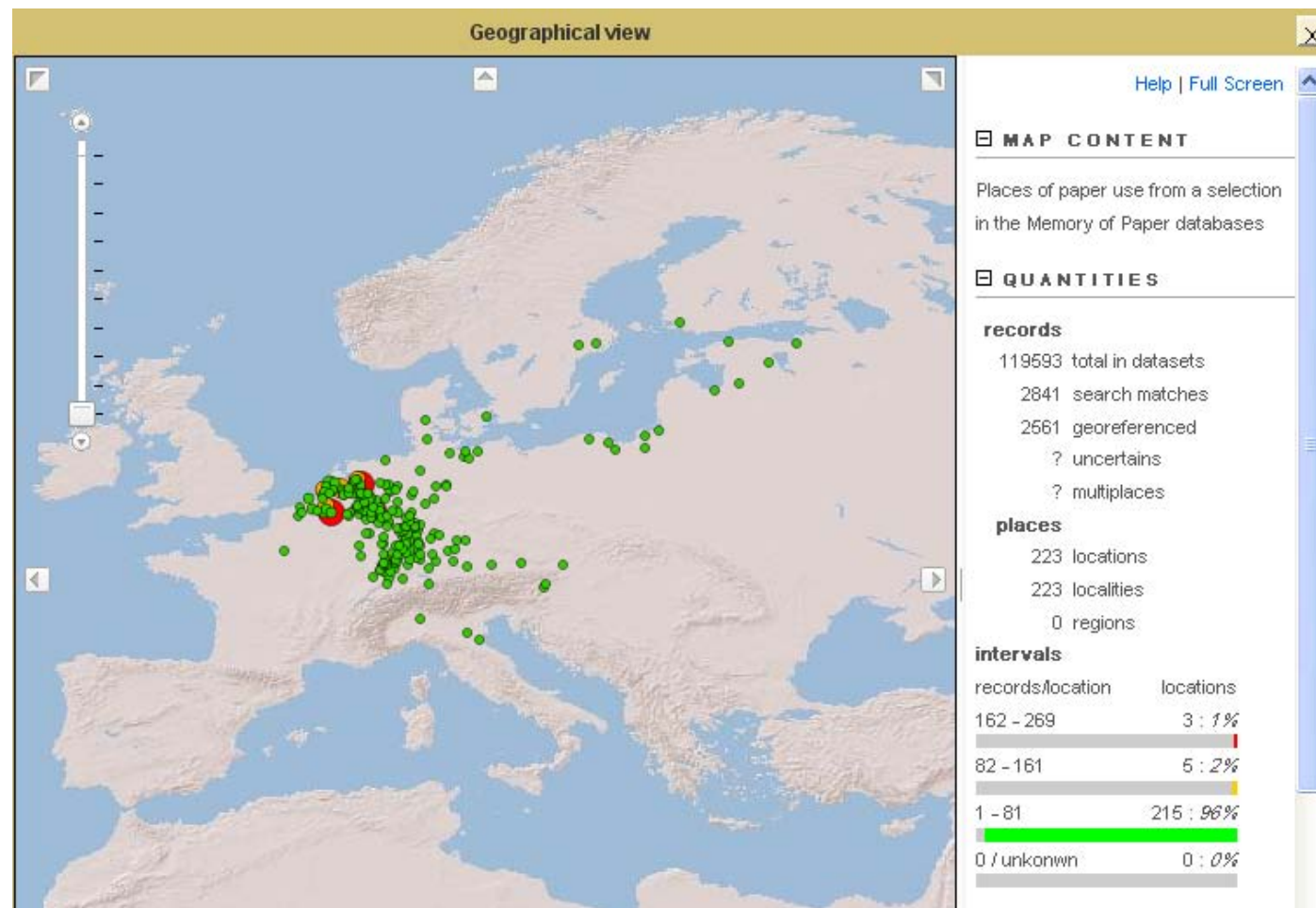
Bernstein Portal: Atlas

Bernstein Portal: Paper Bibliography

The Bibliography consists of more than 31.000 bibliographical records on historical, technological, social, economical, etc. aspects of pre-modern paper published up to 2009. It is provided and updated by the German National Library, Leipzig.

Exhibitions

A series of exhibitions about paper history and watermarks, sense and usefulness of watermark research, and collectors and collections of watermarks, developed into a powerful dissemination strategy. The exhibitions are accompanied by catalogues.

- Dec. 2006-Feb. 2nd, 2007 – "Ochsenkopf und Meerjungfrau. Wasserzeichen des Mittelalters" *Landesarchiv Baden Württemberg*, *Hauptstaatsarchiv Stuttgart*, Germany.

- Mar. 22nd,-June 9th, 2007 – "Ochsenkopf und Meerjungfrau. Wasserzeichen des Mittelalters" *Museum im Schottenstift*, Vienna, Austria.

- July 9th,-Aug. 24th, 2007 – "Testa di bue e la sirena. Filigrane del Medioevo" *Museo della Carta e della Filigrana*, Fabriano, Italy.

- Sep. 8th,-Oct. 10th, 2007 – "Testa di bue e la sirena. Filigrane del Medioevo" *Istituto centrale per la patologia del libro*, Rome, Italy.

- Oct. 28th,-Dec. 31st, 2008 – "Una firma nell'acqua – La memoria della carta e delle filigrane dal Medioevo all'età moderna" *Archivio Storico Civico e Biblioteca Trivulziana*, Milan, Italy.

Future exhibitions:
Biblioteca Nazionale, Turin, Italy (April/June 2009); *Stiftung Zanders*, Bergisch Gladbach, Germany (summer 2009);
Koninklijke Bibliotheek, The Hague, Netherlands (autumn 2009); ...

Catalogues/Books

- First edition (German): *Ochsenkopf und Meerjungfrau: Wasserzeichen des Mittelalters* (2006, 72p);

- Second, enlarged edition (Italian): *Testa di bue e sirena: La memoria della carta e delle filigrane dal medioevo al seicento* (2007, 96p);

- Third, once more enlarged edition (German): *Ochsenkopf und Meerjungfrau: Papiergeschichte und Wasserzeichen vom Mittelalter bis zur Neuzeit* (2009, 128p);

- Third, once more enlarged edition (English): *Bull's Head and Mermaid: The History of Paper and Watermarks from the Middle Ages to the Modern Period* (2009, 128p).

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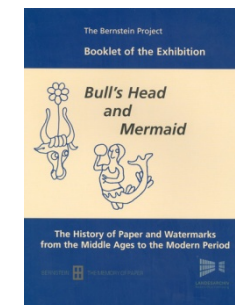
Paper Studies Kit (PSK)

The *PSK* is a collection of ready-to-use tools and data that gives people the means to set up their own digital services for paper watermark studies, such as watermark databases and Bernstein compatible application software. It consists of:

- The PSK software package;

- A set of configuration files for the PSK package;

- An empty version of a Bernstein compatible watermark database;

•A demo version of a Bernstein compatible watermark database with a set of data demonstrating the basic functionality of the PSK;

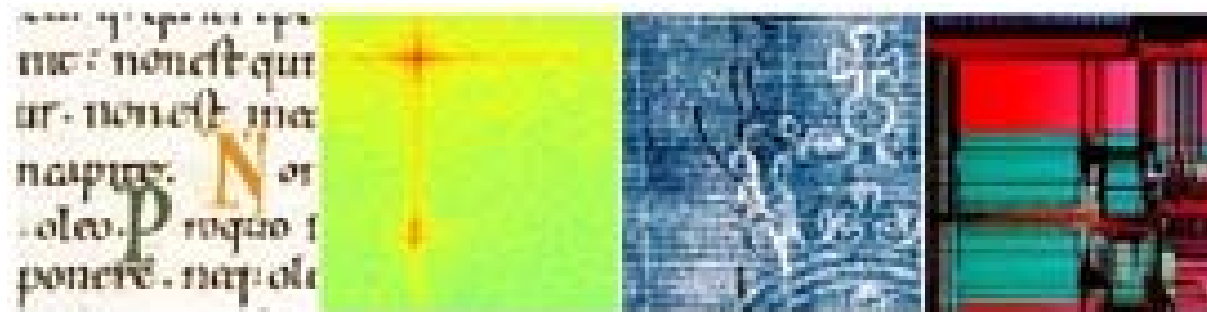- Documentation.

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Contact

www.bernstein.oeaw.ac.at

www.memoryofpaper.eu

www.bernstein.oeaw.ac.at/twiki

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