

Paper history and expertise provided by the eContentPlus project Bernstein

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Abstract: The goal of project Bernstein is the creation of a European integrated digital environment about paper history and expertise. The project connects European watermark databases and thus offers a comprehensive and significant information source about paper. The databases are augmented by specialized image processing tools for measuring, authenticating and dating papers and by a plenitude of contextual data with bibliographical and geographical contents.

This paper presents the results of the project Bernstein. An internet portal allows the multilingual access to all databases connected to Bernstein. Statistical information is extracted from about 120.000 items in the combined databases of the project and presented in numerical form or through powerful diagram visualizations. Data export capabilities forward the statistical information to a cartography tool which can show e.g. the distribution and the trade routes of paper and watermarks.

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1. Introduction

The present project revolves around paper. The significance of paper derives from being the ubiquitous physical carrier for information exchange until the present times. As such, the study of paper is used on the one hand to identify undated paper documents or expertise documents of questioned authenticity. On the other hand, paper studies have also a historical dimension, revealing aspects of technological evolutions, economical infrastructures, state policies, etc. interwoven into human networks across countries. Knowledge of this kind is partly obtained from the physical characteristics of paper, a source of 'hidden information' as opposed to the visible inscription on a paper object. Watermarks visible when holding a bank note against light are an example for such hidden information. They constitute also the most prominent characteristics examined by historians as well as reproduced and documented in catalogues. But a great amount of such and similar paper data with a broad geographical and temporal spread is necessary in order to create a reliable information source.

2. Watermark Terms and Systematics

An essential step for the integration of watermark databases was the adoption of a textual watermark description standard for the project. This textual watermark description standard should achieve two goals: firstly, creation of a common multilingual nomenclature in the form of a vocabulary for all relevant terms for describing watermarks (Bernstein vocabulary for watermark description). Watermarks of the same type can now be described in six languages (English, French, German, Italian, Russian, and Spanish) by the same names and data interoperability like search across all databases which is

now made possible. Secondly, definition of a textual watermark description standard offering a classification scheme for hierarchically organized watermark types which has so far been realized on three hierarchy levels (see www.bernstein.oeaw.ac.at/Bernstein_systematics.pdf).

3. Integrated Workspace

The integrated workspace (<http://www.memoryofpaper.eu>) is the backbone of the project that provides the digital environment necessary for the integration of resources. Specifically, this is an Internet application interfaced in six languages (English, French, German, Italian, Russian, and Spanish) that gives access to all the Bernstein resources, of which the main components are the catalogue, the atlas, the bibliography, the expertise, and the toolkit (Figure 1).

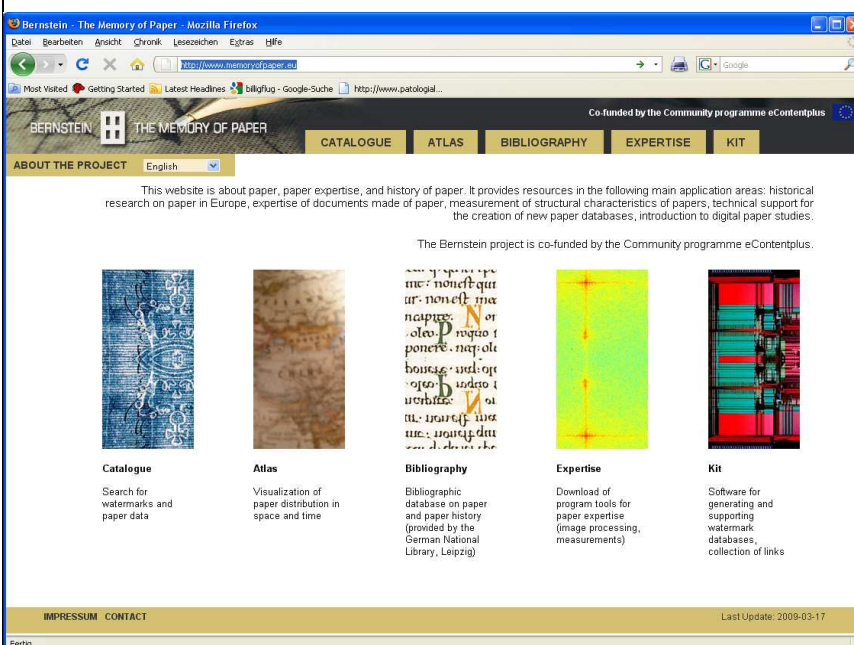


Figure 1: Start page of the integrated workspace (Bernstein web portal)

The main component is the *Catalogue* which allows search in and data retrieval from the various online databases (Figure 2). The search can be formulated in six languages. All search terms are translated automatically into the supported languages according to the Bernstein vocabulary for watermark descriptions. A search in Italian for *sirena* is carried out also for *mermaid* (English) and *Meerjungfrau* (German). Catalogue offers three modes for the search: *simple search*, *advanced search*, and *browse motif*.

Each search is performed within the 'original' databases. The databases were not mirrored but kept at the original locations of the database holders. This provides the advantage that the data is always up-to-date and also avoids copyright problems. The access to the technically different databases is implemented through SRU-gateways. The response times have proven to be satisfactory until now.



Figure 2: Catalogue (German), advanced search (motif= bull’s head, date=1470-1480, place of use=Austria)

With well over 120,000 items in the combined databases of the project, it becomes necessary to provide means for visualising the statistical properties of the collection of watermarks. The statistics module offers a wide range of possibilities. Basic statistics parameters like mean value and standard deviation (Figure 3) are displayed numerically and as a graphical representation in the form of a bar, pie or bubble diagram. Users can analyze single parameters (e.g., number of watermarks per year) or tie and inspect together two parameters (e.g., watermarks per year and country).



Figure 3: Statistics (French) – basic statistic parameters (motif=bull’s head, date=1380-1400)

The purpose of the *Bernstein Atlas* is to provide a tool for historical research based on representations of the distribution in space and time of watermarks and other paper characteristics stored in the Bernstein databases and supplemental datasets. Such a dataset of 14,000 place names representing approximately 7,500 unique and identified places with their geographical coordinates was generated. It contains all place names extant in the Bernstein databases, the digitized watermarks and papers repertories, the Bernstein paper bibliography, the incunabula reference works Incunabula Short-Title Catalogue (ISTC, <http://www.bl.uk/catalogues/istc>), Gesamtkatalog der Wiegendrucke

(GW, <http://www.gesamtkatalogderwiegendrucke.de>), and the plague dataset. The Bernstein databases were augmented with geo-referenced data. This makes it possible to visualize the geographical distribution of a search result in *Catalogue* in regard of the place of use of the paper documents (Figure 4). The field *place of use* can be specified as city or region according to the European standard NUTS (Nomenclature of territorial units for statistics – NUTS, http://ec.europa.eu/eurostat/ramon/nuts/splash_regions.html)

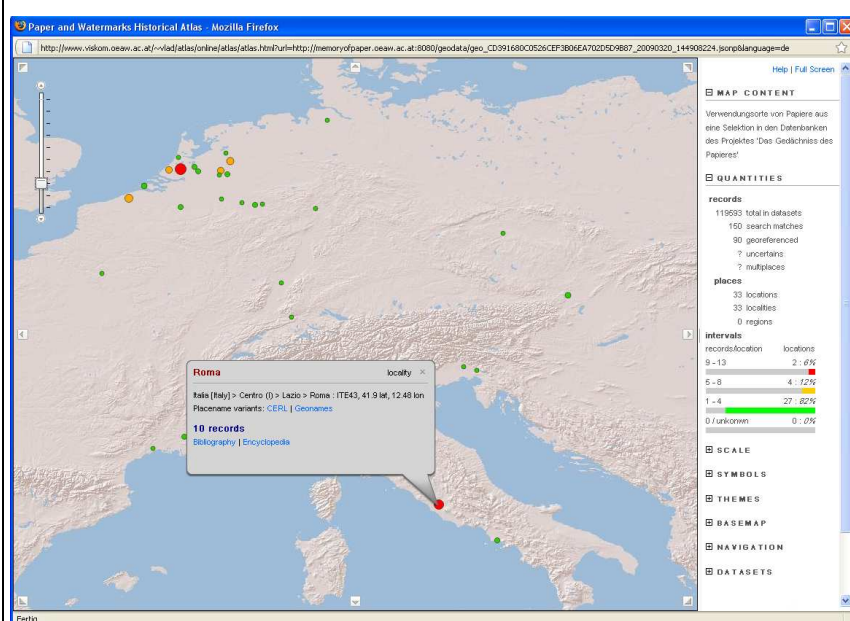


Figure 4: place of use of paper with watermark motif mermaid

4. Conclusions

Project Bernstein offers a European integrated digital environment for paper history and expertise. It connects now all European watermark databases accessible through the Internet at the onset of the project. It offers a comprehensive and unrivalled information source about paper. The databases are augmented by specialized image processing tools for measuring, authenticating and dating papers, and by a plenitude of contextual data with bibliographical, historical and geographical (GIS) contents. A substantial further project goal is the dissemination of the achieved results to a broad audience in the form of a series of exhibitions, a book about paper history and watermarks and an easily installable software package for paper cataloguing.

Further Information

The Bernstein website (<http://www.memoryofpaper.eu>) which is the Internet ‘face’ of the project and gives access to its ‘body’, the integrated workspace.

The Bernstein project presentation as a downloadable Microsoft PowerPoint file (http://www.bernstein.oew.ac.at/Bernstein_project_presentation.ppt)

The TWiki development platform (<http://www.bernstein.oew.ac.at/twiki>) serving as a common blackboard and document repository for the project’s partners.

The itinerant exhibition, for learning more about watermarks (check locations and order the catalog at <http://www.bernstein.oew.ac.at/twiki/bin/view/Main/ProjectExhibitions>).

The Watermark description standard (www.bernstein.oew.ac.at/watermark_terms.pdf).

