

The watermark portal Bernstein-Memory of Paper and its Italian contributions

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Watermarks are studied, collected, and catalogued since more than 200 years. They can give important information about the date, origin, chronology, and authenticity of paper documents. The result of these studies is a huge amount of watermark catalogues and publications. Nowadays, watermark catalogues are published in digital form as online databases. The idea of the Bernstein project is the development of a portal which allows the simultaneous access to watermark databases. In 2025, 56 databases from 27 countries are connected to the project and these numbers are still growing. This article focuses on the important Italian contributions to the project.

1. Introduction

In the second half of the 13th century, a few important innovations in the paper production were introduced in Italy. These innovations were mainly implemented by papermakers in Fabriano who also introduced watermarks¹. Italian paper became popular fast. It was traded all over Europe because of its high quality.

The interest in watermarks among historians comes primarily from the fact that watermarks can help dating undated paper based documents. This was already well known at the beginning of the 19th century. Dating is done by comparing watermarks from undated paper with dated documents carrying the same watermark. Hence, historians in many countries collected watermarks from dated material and published them in watermark catalogues.

Besides the dating, watermarks are frequently used for the investigation of provenance, reception, work genesis and material layers, authenticity and attribution, genre history, collection contexts, assignment of anonymous or source fragments and writing developments. They play a role in many scientific fields like musicology, art history, palaeography, history of literature and other disciplines. In many humanities projects involving paper, the recording of watermarks is often a necessary step.

One special use of watermarks should also be mentioned here, namely that of detecting forgeries. In printmaking in particular, the paper is often the only indicator of whether the print is a forgery or reprint, or a so-called original.

¹ Sylvia Rodgers Albro, *Fabriano: City of Medieval and Renaissance Papermaking*, New Castle: Oak Knoll Press, 2016.

Among the first watermark researcher were the scholars Aurelio (1830-1902) and Augusto Zonghi (1840-1916) who studied paper history and watermarks from Fabriano. Augusto Zonghi collected 2.213 paper samples from Fabriano papers manufactured between 1267 and 1798 and he made a catalogue with 1.887 watermark tracings ordered by motifs and date. This collection of his tracings was printed not until 1953².

The literature about watermarks published for more than 200 years is large, widespread and, most of it, difficult to access. The International Association of Paper Historians (IPH) web page "Printed Watermark Repertories" contains a list of watermark catalogues³. Nowadays, watermarks are increasingly recorded digitally and stored in online databases. This offers the opportunity to connect such material online. Hence, the main objective of the project was to develop a web portal which gives access to a variety of watermark information online.

2. The eContentPlus project Bernstein (Memory of Paper)

In 2005, the European Union (EU) published the call for the programme eContentPlus (2005-2008)⁴, the successor of the eContent programme (2001-2004). The purpose of the eContentPlus programme was to stimulate the development of digital content and services in areas of public interest, to reduce the fragmentation of the European digital content market and to improve access and ease of use of geographical information, educational and scientific material and cultural content.

The project *Bernstein – Memory of Paper* – was accepted for financing with a budget of 3.2 million € by eContentPlus. The project started in September 2006 with a duration of 30 months. It was a cooperation between nine institutions from Austria, England, France, Germany, Italy, and the Netherlands⁵.

The objective of the Bernstein project was to create a multilingual integrated European digital environment for the expertise and history of paper with a focus on watermarks. The project should interlink all existing European watermark databases and also provide access to a bibliography centered on the topic of papermaking. There were four European watermark databases in 2006:

- Piccard-Online (POL, Stuttgart, Germany, 92.000 watermarks)⁶;
- Watermarks in Incunabula printed in the Low Countries (WILC, The Hague, Netherlands, 11.000 watermarks)⁷;
- Watermarks of the Middle Ages (WZMA, Vienna, Austria, 9.000 watermarks)⁸;
- Dutch Institute of Art history in Italy Watermark Database (NIKI, Florence, Italy, 2.500 watermarks)⁹;

² Aurelio Zonghi — Augusto Zonghi — Andrea Federico Gasparinetti, *Zonghi's watermarks*, (Monumenta chartae papyraceae historiam illustrantia; 3), Hilversum: The Paper Publications Society, 1953.

³ <https://www.paperhistory.org/Watermark-catalogues>.

⁴ <https://eur-lex.europa.eu/EN/legal-content/summary/econtentplus-2005-2008.html>.

⁵ <https://memoryofpaper.org/>.

⁶ Now part of Wasserzeichen Informationssysteme (WZIS): <<https://www.wasserzeichen-online.de>>.

⁷ <https://watermark.kb.nl/page/index/title/Introduction>.

⁸ <https://www.wzma.at/>.

⁹ <http://www.wm-portal.net/niki/index.php>.

The official project ended in February 2009 with a final report and the webpage¹⁰ giving access to four databases as the main result¹¹. Additionally, a bibliography with more than 31.000 bibliographic entries became searchable.

Italian scholars and institutions were involved in the project from the beginning with the involvement of the Netherlands Interuniversity Art Historical Institute (NIKI) in Florence who contributed with an international database of watermarks and paper used for prints and drawings. It was also the scholar Ezio Ornato who gave important ideas concerning watermark catalogues, statistics and geographical distributions of watermarks and the two scholars at the Istituto centrale per la patologia degli archivi e del libro (ICPAL) in Rome, Paola Munafò and Viviana Nicoletti who organized an exhibition for the project and worked specifically for the watermark terminology used in the project, and the Italian translations of the Bernstein websites.

3. Languages

One important requirement for most EU projects is the multilingualism. Six languages were chosen which had developed specific terminologies for watermark descriptions. These were English, French, German, Italian, Russian, and Spanish. Sources for the terminologies were significant watermark catalogues in these languages, like the watermark catalogues of the *Monumenta Chartae Papyrycae* series for English, Briquet for French¹², Piccard for German¹³, Zonghi for Italian¹⁴, Likhachev for Russian¹⁵, and Basanta Campos for Spanish¹⁶, to mention only a few. Four additional languages were added a couple of years later, after the end of the project. These were Hungarian, Portuguese, Greek, and Dutch. Hence, the Bernstein portal supports 10 languages in 2025.

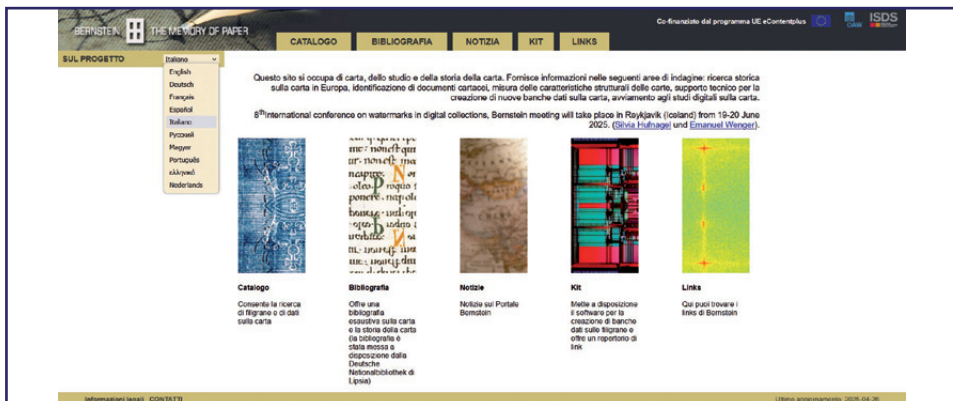


Figure 1. Italian home page of the Bernstein portal

¹⁰ <https://www.memoryofpaper.eu>.

¹¹ Wenger 2021.

¹² Briquet 1907.

¹³ Piccard 1961-1997.

¹⁴ Zonghi 1881.

¹⁵ Simmons et al. 1994.

¹⁶ Basanta Campos 1996-2005.

Two areas are language dependent. One is the language of the webpages, the so-called user interface. Such translations can nowadays be done by web browsers with automatic translation features.

The more difficult and important issue is the watermark terminology. An automatic translation between languages for watermarks cannot be used because the watermark descriptions are derived from the various watermark terminology traditions. One example is the watermark type *bull's head* which is in German *Ochsenkopf* (ox head) and not *Stierkopf* (bull's head). Hence, the Bernstein project had to organize its own translation of watermark terms with a dictionary adapted to the watermark terminology¹⁷. Paola Munafò and Viviana Nicoletti worked on the Italian translations.

4. Databases

The main part of the project is the portal to watermark databases. The website allows the multilingual search in all the databases connected with the portal. Search items are the motif, place of use, depository, date, width and height, paper mill, paper maker, distance between chain lines, and some more. 56 watermark databases were connected to the portal in May 2025.

4.1. Italian watermark databases

Four databases consist of watermark collections hosted in Italy. Additionally, Italian watermarks can be found in many non-Italian watermark collections. Catalogues like Briquet, Piccard and many other contain numerous watermarks from Italian paper mills.

4.1.1. NIKI

The watermark database¹⁸ of the Dutch Institute of Art history in Italy (NIKI) in Florence was among the first online watermark databases. It was part of the project since the beginning. The watermarks dated mainly from the 17th century in contrast to the other three Italian databases with contents from the Middle Ages until the 16th century. They were taken from drawings of mainly Dutch painters working in Italy. The recording of the watermarks was done by transparency photography with Photoshop postprocessing. This was done in cooperation with Bert W. Meijer and Georg Dietz.

4.1.2. CCI

Corpus Chartarum Italicarum¹⁹ (CCI) is the biggest database among the Italian collections. It contains paper sheets, watermarked or not. The corpus of data was initially collected by the Istituto centrale di Patologia del Libro (ICPL) in the early 1940s and increased in the following decades. The Corpus illustrates Italian paper production and its use as a support for written memory from the 13th to the 20th century. It represents the

¹⁷ https://www.memoryofpaper.eu/products/watermark_terms_v11.0_en.pdf.

¹⁸ <http://www.wm-portal.net/niki/index.php>.

¹⁹ <https://cci-icpal.cultura.gov.it/>.

most important collection of Italian paper sheets in terms of quantity and importance; it consists of various types of Western paper sheets produced starting from the mid-13th century when, in Fabriano, papermakers made significant changes to the structure and appearance of the sheets produced in the Arab-Hispanic context. The database contains a total of 5.362 watermarks. The contact persons for the Bernstein portal were Paola Munafò and Viviana Nicoletti and, more recently, Alessandra Fucini.

4.1.3. CCF

The Corpus Chartarum Fabriano²⁰ (CCF) is a catalogue of digital images of both watermarked and non-watermarked papers, manufactured in Fabriano over an uninterrupted span of eight centuries, from the late 13th century to the present day. The project involves the identification, cataloging, and digitization of the paper sheets; this data is then uploaded to a cutting-edge database designed to meet the requirements of the relevant scientific community. Livia Faccioni from the Fedrigoni Fabriano Foundation (FFF) cooperates with the Bernstein portal and makes the integration of CCF into the Bernstein portal possible.

4.1.4 Mazzoldi

The database Mazzoldi contains the watermarks which were collected by Leonardo Mazzoldi and published in two volumes. It contains 1.036 watermarks from the area of Brescia close to the Garda Lake²¹.

5. Catalogues, exhibitions, and conferences

5.1. Catalogues

The Bernstein project was only possible in close cooperation with the Landesarchiv Baden-Württemberg, Hauptstaatsarchiv Stuttgart. The entire Piccard Index collection with more than 92.000 watermarks was digitized and put online as Piccard-Online. The quantity and quality of this database was essential for the acceptance of the project by the EU in the frame of the program eContentPlus.

In connection with Piccard-Online, the Hauptstaatsarchiv Stuttgart under the guidance of Peter Rückert designed and organized a German and Italian exhibition. The title of the exhibition was “Ochsenkopf and Meerjungfrau – Wasserzeichen des Mittelalters”, respectively “Testa di bue e sirena – la memoria della carta e delle filigrane dal medio-evo al seicento”²². These exhibitions were adopted by the Bernstein project as part of the dissemination activities. The exhibitions were held in Italy, Germany, and Austria. The exhibitions were accompanied by a booklet in German (2006) and an Italian extended edition in 2007. The concept of the Italian exhibition and the Italian catalogue were mainly done by Paola Munafò, Viviana Nicoletti, Franco Mariani, Ezio Ornato, and

²⁰ <https://www.fondazionefedrigoni.it/it/il-progetto>.

²¹ *Filigrane di cartiere bresciane*, a cura di L. Mazzoldi, Brescia: Ateneo di scienze lettere ed arti, 1990-1991.

²² https://memoryofpaper.org/twiki/pub/Main/ProjectExhibitions/bernstein_2007_exhibition_catalog_it.pdf.

Giorgio Pellegrini. A third extended edition in English and German was published 2009. These booklets are self-contained books with 128 pages about the history of paper and watermarks from the Middle Ages to the modern period²³. An extended Spanish version with the title “Cabeza de Bue y Sirena” was published in 2011²⁴ and is to this day the last edition.



Figure 2. Presentation of “Testa di bue e sirena” in Fabriano by Peter Rückert

²³ https://memoryofpaper.org/twiki/pub/Main/ProjectExhibitions/bernstein_2009_book_en.pdf.

²⁴ Rückert — Perez Garcia — Wenger 2011, <https://memoryofpaper.org/twiki/pub/Main/ProjectExhibitions/bernstein_2011_book_es.pdf>.

5.2. Exhibitions

The series of exhibitions started in Stuttgart 2006 at the Archives of the State of Baden-Württemberg and continued 2007 in Vienna in the Museum of the Schottenstift. Already in July 2007, the first Italian exhibition (9 July – 24 August) took place at the Paper and Watermark Museum in Fabriano, the city of paper and watermarks. This exhibition was made possible by Franco Mariani and Giorgio Pellegrini. The series continued in September 2007 (8 September – 10 October) at the ICPAL organized by Paola Munafò and Viviana Nicoletti. This institute became one of the major supporters of the project. Among others, it contributed the database CCI.



Figure 3. Exhibition at ICPAL, 2007

The third Italian exhibition was opened at the Castello Sforzesco, Sala del Tesoro della Trivulziana in Milano with the title “Una firma nell’acqua - La memoria della carta e delle filigrane dal Medioevo all’età moderna” (28 October – 31 December 2008). Franca Porticelli was the local organizer of the exhibition. This exhibition was also the first contact with Timoty Leonardi. He became the most important supporter of the series of exhibition and the conferences. A big thanks goes to him.

The first exhibition which Timoty Leonardi organized together with Isabella Fiorentini was at the Biblioteca Nazionale di Torino with the title “Testa di bue e sirena. Cartiere e

filigrane piemontesi: prospettive di ricerca” (30 April – 27 June 2009). This exhibition was accompanied by an additional catalogue edited by Timoty Leonardi²⁵. 2011 followed the exhibition (6 May–10 July) in Vercelli at the Museo del Tesoro del Duomo, which was the working place of Timoty Leonardi.



Figure 4. Exhibition in Vercelli, 2011

Finally, the sixth and last exhibition took place in the wonderful city of Varallo at the Biblioteca Civica di Varallo in 2012 (15 June – 1 July). The Italian series of exhibitions became the most successful, wonderful, and important, one thanks to Timoty Leonardi.



Figure 5. Exhibition opening in Varallo, 2012

²⁵ https://memoryofpaper.org/twiki/pub/Main/ProjectExhibitions/bibnattorino_2009_exhibition_catalog_it.pdf.

5.3. Conferences

The Bernstein project held yearly meetings and work package meetings during the running time from September 2006 until February 2009. The first yearly meeting took place in Fabriano at the museum of paper and watermarks.



Figure 6. *First annual Bernstein meeting in Fabriano, July 2007*

The series of meetings was discontinued in February 2009 with the official end of the EU project. But after a couple of years, the former team of the project wanted to meet again. Hence, a series of international conferences on watermarks in digital collections in connection with the Bernstein portal was started in 2013 in The Hague.



Figure 7. *Conference at Fedrigoni Fabriano Foundation, 2022*

The series got the name: *International conferences on watermarks in digital collections*. It continued in Valencia (Spain, 2014), Santa Maria da Feira (Portugal, 2016), Vienna (Austria, 2017), and Cork (Ireland, 2019). After a break due to the Corona epidemic, the conference was hosted by the Fedrigoni Fabriano Foundation in Fabriano in 2022. Livia Faccioni had organized a wonderful conference which was documented totally on YouTube videos²⁶.

Already one year later, this means 2023, Timoty Leonardi organized the sixth conference in Verona at the Fondazione Biblioteca Capitolare di Verona with an interesting excursion to the paper museum in Toscolano. In 2025, the conference is held in Reykjavik.

6. Conclusion and Acknowledgements

The Bernstein portal became one of the most important tools for the identification of watermarks. The cooperation with the Italian watermark experts was an important part and enrichment of the project. I would like to thank all Italian colleagues for their wonderful work and their commitment to the Bernstein project and I hope for further cooperation. The project is still going on and new data is added. Further Italian watermark collections which are not connected with the Bernstein portal are invited to cooperate with the Bernstein project.

Da oltre 200 anni le filigrane vengono studiate, analizzate, raccolte e catalogate. Esse possono fornire informazioni importanti sulla data, l'origine, la cronologia e l'autenticità dei documenti cartacei. Il risultato di questi studi è un'enorme quantità di cataloghi e pubblicazioni sulle filigrane. Oggi i cataloghi delle filigrane sono pubblicati in formato digitale come banche dati online. Alla base del progetto Bernstein vi è l'idea dello sviluppo di un portale che consenta l'accesso simultaneo alle banche dati del settore. Ad oggi, 56 banche dati di 27 paesi sono collegate al progetto e questi numeri sono in crescita. Questo articolo si concentra sugli importanti contributi italiani al progetto.

²⁶ <https://www.youtube.com/playlist?list=PLZLyD4fwo5L-fqKuLSotSiZ7y9ngAgupd>.

L'ultima consultazione dei siti web è avvenuta nel mese di dicembre 2025.

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