

Memory of paper 20 years

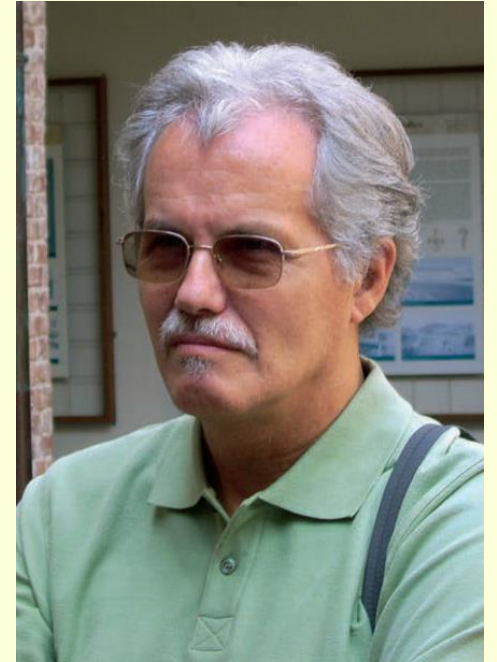
Emanuel WENGER

Institute of Medieval Research, Austrian Academy of Sciences

Vienna, Austria

How it began

- Alois Haidinger
 - art historian, pioneer of digital humanities
 - catalogue of the manuscripts of the monastery of Klosterneuburg
 - watermarks for dating undated paper manuscripts
 - 1988 x-ray images at a hospital in Vienna
 - scanning (Russian Academy of Sciences) and image processing
 - 1996 beta radiography
 - WZMA
 - Maria Stieglecker
- Russian Academy of Sciences
 - Dmitri P. Erastov: betaradiography (1958)



International Projects

- INTAS project (International Association for the promotion of cooperation with scientists from the independent states of the former Soviet Union). *A Distributed Database and Processing System for Watermarks (2001-2004)*.
 - Gerard van Thienen (KB - WILC, WIES, WIGB)
 - Victor Karnaukhov (WZMA, WZIS)
 - Elena Ukhanova
- eContentPlus (2005-2008) : 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.

Bernstein – Memory of Paper

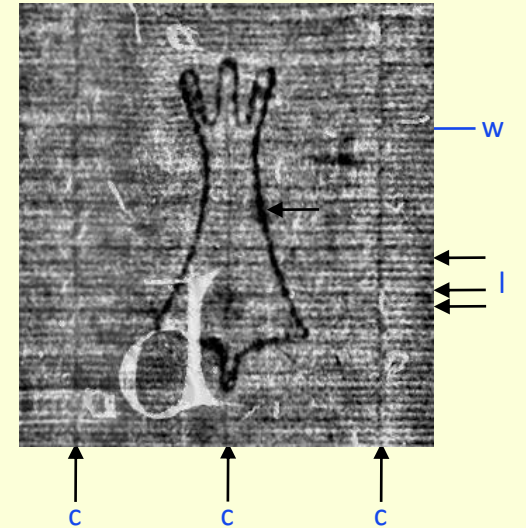
2005 project submission to EC program eContentPlus

Create a portal for online databases containing information about paper and watermarks (4)

- a multilingual interface in six languages with automatic translation (en,ge,fr,es,it,ru)
- results in form of a list, a map and a statistic summary
- on-line bibliography on paper (31.000 entries)

2006-2009 (30 months, 9 teams, 3.2 mill EUR)

Main result: Bernstein portal memoryofpaper.eu



w ... watermark
c ... chain lines (Steg-, Kettdrähte)
l ... laid lines (Boden-, Rippdrähte)



June 2025

56 databases with 325,567 watermarks from 25 countries

Australia, Austria, Belgium, Brazil, Chile, Cuba, Czech Republic, Denmark, Ecuador, Estonia, France, Germany, Great Britain, Greece, Italy, Luxembourg, The Netherlands, Norway, Portugal, Romania, Russia, Serbia, Spain, Switzerland, USA

10 languages (Dutch, English, French, German, Greek, Hungarian, Italian, Portuguese, Russian, Spanish)

31,000 bibliographic entries (2009)

International Conference on Watermarks in Digital Collections

Bernstein-meeting

1. 2013 The Hague (Netherlands, KB)
2. 2014 Valencia (Spain, Universitat de València)
3. 2016 Santa Maria da Feira (Portugal, Museu do Papel)
4. 2017 Vienna (Austria, Austrian Academy of Sciences)
5. 2019 Cork (Ireland, University College Cork)
6. 2022 Fabriano (Italy, Fedrigoni Federation Fabriano)
7. 2023 Verona (Italy, Fondazione Biblioteca Capitolare)
8. 2025 Reykjavik (Iceland, Árni Magnússon Institute for Icelandic Studies)
9. 2026 Munich (Germany, Bavarian State Library)
10. 2027 Salzburg (Austria, Archive of the Diözese)



Bernstein conference 2016

<https://memoryofpaper.org/twiki/bin/view/Main/MeetingsAgenda.html>

BERNSTEIN



THE MEMORY OF PAPER



BERNSTEIN

Jump

COMMONS

Contacts

Documents

Deliverables

Meetings

Venues

Project Calendar

Links

Bugs & wishes

WORKPACKAGES

WP1

Integration

Component Model

WP2

Harmonization

Metadata

Multilingualism

WP3

Expertise

ImgProcessing

WP4

Cartography

Bibliography

WP5

Evaluation

WP6

You are here: [Bernstein](#) > [Main Web](#) > MeetingsAgenda

Meetings Agenda

Coming meetings

2027 Salzburg, Austria - 10th International Conference on Watermarks in Digital Collections.

2026 (14.10.-16.10.) Munich, Germany - 9th International Conference on Watermarks in Digital Collections.

Past meetings

2025.09.19-21 Reykjavik, Iceland - 8th International Conference on Watermarks in Digital Collections.

2023.09.06-08 Verona, Italy - 7th International Conference on Watermarks in Digital Collections.

2022.05.26-27 Fabriano, Italy - 6th International Conference on Watermarks in Digital Collections.

2019.10.16-18 Cork, Ireland - Fifth International Conference on Watermarks in Digital Collections

2017.10.19-20 Vienna, Austria - Fourth International Conference on Watermarks in Digital Collections

2016.05.26-27 Santa Maria da Feira, Portugal - Third International Conference on Watermarks in Digital Collections

2014.05.14 Valencia, Spain - Watermark conference and Bernstein meeting

Watermark collections

(printed) Watermark catalogues

- Piccard
- Briquet
- Likhachev
- Mošin (in progress)
- Heitz
- Mazzoldi
- Wittek
- Станковић (in progress)
- Balmaceda
- to be continued

variety of search possibilities (advantage over printed books)

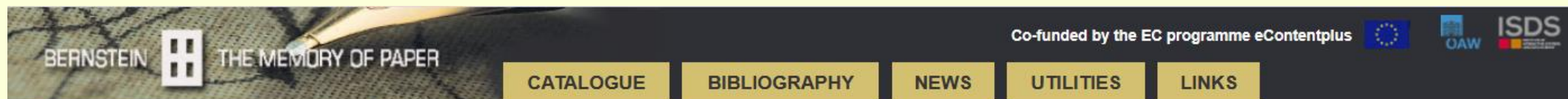
Watermark databases

- Wasserzeichen-Informationssystem (WZIS)
- Corpus de Filigranas Hispanicas (FILHISP)
- Watermarks of Medieval Manuscripts (WZMA)
- Watermarks of Incunabula (WILC, WIES, WIGB)
- Gravell Watermark Archive
- Corpus Chartarum Fabriano (Fedrigoni Foundation)
- Watermarks–Art History (Florence, Dresden, Copenhagen,...)
- Watermarks–Musicology (Vienna, Salzburg, Lisbon, ...)
-

Sources

- Archives
 - dated material, basis for catalogues (Briquet, Piccard, Balmaceda, ...)
 - from 13th – 20th century
- Art history
 - preparatory, sketches, drawings, prints, ...
 - dating, establish a chronology of works, authenticity
 - Rembrandt, Dürer, ...
- Musicology
 - sketches, scores, letters, ...
 - 17th-20th century
 - J. S. Bach (Wisso Weiß), W. A. Mozart (Alan Tyson), F. Schubert ...

https://memoryofpaper.eu



ABOUT THE PROJECT English ▾

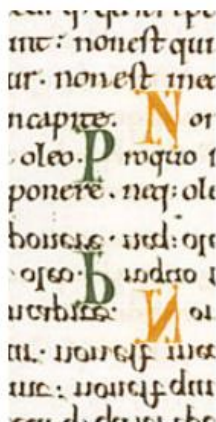
This website is about paper, paper study, and paper history. It provides various resources in the following areas: historical research of paper in Europe, expertise for paper documents, measurement of structural characteristics of paper, support for the creation of new paper databases, introduction into digital paper studies.

8th International conference on watermarks in digital collections, Bernstein meeting will take place in Reykjavik (Iceland) from 19-20 June 2025. ([Silvia Hufnagel](#) and [Emanuel Wenger](#)). [Program](#)



Catalogue

Search for watermarks and paper data



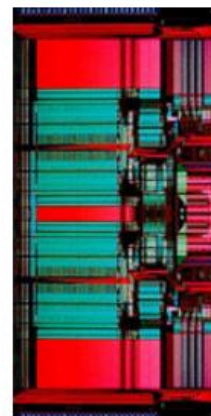
Bibliography

Bibliographic database about paper and the history of paper (provided by the German National Library, Leipzig)



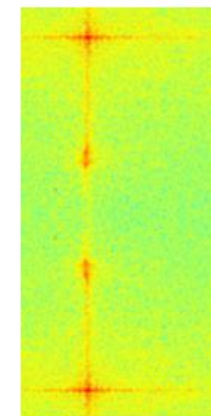
News

News about the Bernstein Portal



Utilities

Software tools for the creation and maintainance of watermark databases; Software tools for undertaking paper expertises (image processing, measurements, dating)

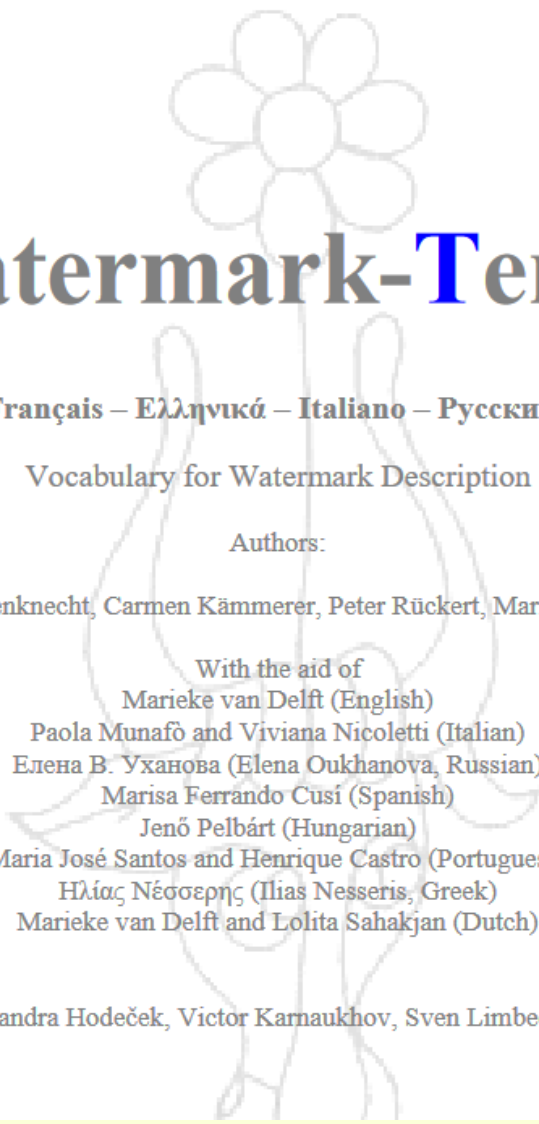


Links

A collection of links

https://memoryofpaper.eu/products/watermark_terms_v11.0_pt.pdf

approx. 1.000 terms
92 pages
work in progress



Watermark-Terms

Português – English – Deutsch – Français – Ελληνικά – Italiano – Русский – Español – Magyar – Nederlands

Vocabulary for Watermark Description

Authors:

Erwin Frauenknecht, Carmen Kämmerer, Peter Rückert, Maria Stieglecker

With the aid of

Marieke van Delft (English)

Paola Munafò and Viviana Nicoletti (Italian)

Елена В. Уханова (Elena Oukhanova, Russian)

Marisa Ferrando Cusí (Spanish)

Jenő Pelbárt (Hungarian)

Maria José Santos and Henrique Castro (Portuguese)

Ηλίας Νέσσερης (Ilias Nesseris, Greek)

Marieke van Delft and Lolita Sahakjan (Dutch)

Special thanks go to Alois Haidinger, Sandra Hodeček, Victor Karnaukhov, Sven Limbeck, Emanuel Wenger, and Luis Weruaga.

Version 11.0: April 2018

ICON	PORTUGUESE	ENGLISH	GERMAN	FRENCH	GREEK	ITALIAN	RUSSIAN	SPANISH	HUNGARIAN	DUTCH
	águia (her.)	eagle (her.)	Adler (Her.)	<i>aigle (hér.)</i>	αετός	aquila (arald.)	орел (геральд.)	águila (her)	sas (egyfejtű)	adelaar (her.)
	águia de duas cabeças	double-headed eagle	Doppeladler	<i>aigle bicéphale</i>	δικέφαλος αετός	aquila bicefala	двуглавый орел	águia de duas cabeças, águia bicefala	kétfejű sas	dubbele adelaar
	águia estendida (her.)	eagle over all (her.)	Adlerherzschild (Her.)	<i>aigle sur le tout du tout (hér.)</i>	αετός με εγγεγραμμένη ασπίδα	aquila sul tutto (arald.)	сердцевой щиток на груди орла (геральд.)	águila exployada (her)	sas szívpajzs	adelaar met hartschild (her.)
	águia no flanco dextro (her.)	dexter half of eagle (her.)	Adler rechtshalb (Her.)	<i>aigle, moitié dextre (hér.)</i>	δεξιόν ήμισυ αετού (εραλδ.)	aquila, metà destra (arald.)	правая половина орла (геральд.)	águila en diestra (her)	jobb oldali fél sas	adelaar op rechterhelft
	águia sainte (her.)	demi-eagle issuant (her.)	Adler oberhalb (Her.)	<i>aigle issant (hér.)</i>	άνω ήμισυ αετού (εραλδ.)	aquila spiegante (arald.)	верхняя половина орла (геральд.)	águila saliendo (her)	felső fél sas	uitkomende adelaar (her.)
	agulha	needle	Nadel	<i>aiguille</i>	βελόνα	ago	игла	aguja	tű	naald
	alabarda	halberd	Hellebarde	<i>hallebarde</i>	δόρυ με πέλεκυ	alabarda	алебарда	alabarda	alabárd	hellebaard
	alargado (haste, letra)	broadened (vertical stroke, letter)	verbreitert (Schaft, Buchstabe)	<i>élargé (haste verticale, lettre)</i>	πεπλατυσμένη (κατακόρυφη γραμμή, γράμματος)	allargato (asta verticale, lettera ...)	расширен (вертикаль, буква)	ensanchado (trazo, letra)	betűsárok (betű)	verbreed (stok, letter)
	algarismos	digits	Ziffern	<i>chiffres</i>	ψηφία	cifre	цифры	cifras	arab számok	cijfers
	almofariz	mortar	Mörser	<i>mortier</i>	γουδί	mortaio	ступка	mortero	mozsár	mortier
	alongado	extended	ausgezogen	<i>allongé</i>	εκτεταμένος, επιμήκης	allungato	удлинен	prolongado	kiszögellés	uitgerekt

Search for motif *mermaid*

BERNSTEIN THE MEMORY OF PAPER

Co-funded by the EC programme eContentplus



CATALOGUE

BIBLIOGRAPHY

EXPERTISE

KIT

LINKS

ABOUT THE PROJECT

English

☒ Select/deselect all

Select by time line

Years: 1280 2021 All

☒ List

☐ Grid

☐ Statistics

☐ Map

Bookmarks

Databases

Hits

☒ WZIS	111	32.3%
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☒ WIES	0	0%
☒ WIGB	10	2.9%
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☒ CAHIP	8	2.3%
☒ CATS	0	0%
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☒ CCI	22	6.4%
☒ CTMV	0	0%
☒ DGCPAAC-GENCAT	0	0%
☒ DMVA	0	0%

ABOUT

SIMPLE SEARCH

ADVANCED SEARCH

BROWSE MOTIFS

Help

You searched for: 'mermaid'

Translated Keywords: 'mermaid' [Meerjungfrau,sirène,sirena,sirena,сирена,sellō,sereia,γοργόνα,zeemeermin]

Motif

mermaid

All

INDEX

Add General Search

Add DB Specific Search

SEARCH

RESET

1 - 50

Hide thumbnails

Export results

Bookmarks (0)

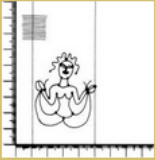
Previous

Next

Bookmark

Select/deselect all

Deselect all

	Thumbnail	Database	Ref. number ↑	Motif	Place of use	Date	Height
#1		PFES	000004	Sirena con dos colas. es mermaid with two eelas	Oviedo, Asturias.	1446	46
#2		WIGB	7	fabulous creature - mermaid - one or two fins - with additional motif globe - mermaid - to left	Westminster	1480	---
#3		FII-CHILE	31	Criatura fabulosa-Sirena-Farreras es fabulous creature-mermaid-Farreras	Santiago de Chile	s.XVII-XVIII	46

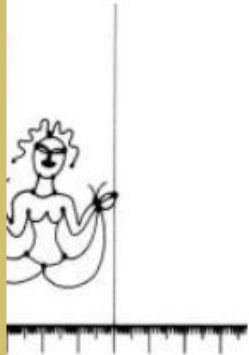
☒	WIGB	10	2.9%
☒	WZMA	60	17.4%
☒	NIKI	11	3.2%
☒	AMA	0	0%
☒	BITECA	2	0.6%
☒	BRIQUET	51	14.8%
☒	BR-RELOADED	1	0.3%
☒	CAHIP	8	2.3%
☒	CATS	0	0%
☒	CCF	13	3.8%
☒	CCI	22	6.4%
☒	CTMV	0	0%
☒	DGCPAAC-GENCAT	0	0%
☒	DMVA	0	0%
☒	FILACAD	0	0%
☒	FILHISP	0	0%
☒	FILIGRANA	0	0%
☒	FIL-CHILE	1	0.3%
☒	FIL-CUBA	0	0%
☒	FIL-DPZ	0	0%
☒	GRAVELL	2	0.6%
☒	GSA	0	0%
☒	HEITZ	0	0%
☒	HERIDATE	2	0.6%
☒	HOLLIS	0	0%
☒	INPC	0	0%
☒	IVC+R	0	0%
☒	LIKHACHEV	0	0%
☒	MARCOSMUS	0	0%

#2		WIGB	7
#3		Fil-CHILE	31
#4		WIGB	57
#5		PFES	000103
#6		Wittek	391

mark

PreviousNextClose entry details

Picture



Information

Ref. number

000004

Motif

Sirena con dos colas.

Motif (en)

mermaid with two ~~colas~~

Distance between chain lines

23-39-38-(39)-38-39

Width

39

Height

46

Date

1446

Place of use

Oviedo, Asturias.

Normalised place name

Oviedo, Asturias.

Depository

Archivo Municipal de Oviedo.

Database

PFES

Link

[Go to PFES - Papel y Filigranas en Spain](#)

Detailed date info

Creator

Ayuntamiento de Oviedo.

Shelf mark

1-1-145-4

Twin mark

Briquet Nr.

Laid line density

17

Paper mill

Mainclass IPH

F.07.01.00

Paper maker

Counter mark



PFES

Papel y Filigranas en España

M^a Dolores Díaz de Miranda Macías
Ana María Herrero Montero



Nº Filigrana: 000004



◀ 5 / 5 ▶



FILIGRANA

HOJA

DOCUMENTO

Tipo de filigrana: Sencilla

Parte estudiada: Toda la filigrana

Código del Motivo: F.07.01.00

Descripción: Sirena con dos colas.

Estructura: Tradicional de líneas

Altura (mm): 46 **Anchura (mm):** 39

Tipo de papel: Verjurado

Posición en la hoja: Medio centro

Nº de corondeles en la hoja: 5

Distancia entre corondeles:

Situada entre el corondel 3 y el corondel 4

Posición en relación al texto: Paralelo al texto en sentido contrario

Origen de los datos: Datos obtenidos del original

Información adicional: Son visibles las puntadas que unen la filigrana a la verjura.

La investigación fue realizada por María Dolores Díaz de Miranda Macías. Toda las imágenes de filigranas y fotografías que se muestran en esta página son propiedad de María Dolores Díaz de Miranda y Ana María Herrero Montero. La presentación de la página se llevó a cabo por Gabriel García y Emanuel Wenger (Viena, ÖAW).

☒ Select/deselect all

Select by time line

Years: 1280 2021 All

☐ List ☒ Grid ☐ Statistics ☐ Map

Bookmarks

Databases

☒ WZIS	111	32.3%
☒ WILC	29	8.4%
☒ WIES	0	0%
☒ WIGB	10	2.9%
☒ WZMA	60	17.4%
☒ NIKI	11	3.2%
☒ AMA	0	0%
☒ BITECA	2	0.6%
☒ BRIQUET	51	14.8%
☒ BR-RELOADED	1	0.3%
☒ CAHIP	8	2.3%
☒ CATS	0	0%
☒ CCF	13	3.8%
☒ CCI	22	6.4%
☒ CTMV	0	0%
☒ DGCPAAC-GENCAT	0	0%
☒ DMVA	0	0%
☒ FILACAD	0	0%
☒ FILHISP	0	0%
☒ FILIGRANA	0	0%
☒ FIL-CHILE	1	0.3%
☒ FIL-CUBA	0	0%
☒ FIL-DPZ	0	0%
☒ GRAVELL	2	0.6%
☒ GSA	0	0%

Translated keywords:

'mermaid' [Meerjungfrau,sirène,sirena,sirena,сирена,sellō,sereia,γοργόνα,zeemeermin]

Motif

mermaid

All

INDEX

Add General Search

Add DB Specific Search

SEARCH

RESET

Previous

Next



CCF Z00597
Mermaid with twin tail
- 1450



BRIQUET 13861
Meerjungfrau, mit
Schwanz, einen Spiegel
(?) haltend (Loreley)
Autun 1478



PFES 001653
Sirena tocando la
trompeta; a los pies la
palabra FARRERAS.
Barcelona, Cataluña.
1790



BRIQUET 13895
Meerjungfrau, mit zwei
gekrümmten, am
Körper entlang
aufgerichteten, von den
Händen gehaltenen
Schwänzen (Melusine),
in Kreis



BRIQUET 13871
Meerjungfrau, mit zwei
gekrümmten, am
Körper entlang
aufgerichteten, von den
Händen gehaltenen
Schwänzen (Melusine)
Biella 1473



MAZZOLDI 1022
Mensch - Figur -
Meerjungfrau, zwei
Flossen
Brescia 1449



WILC 55865
mermaid to left
Bruges 1473



WILC 55866
mermaid to left
Bruges 1473



CAHIP B1639
Sirena al pie
topónimo.
Buenos Aires 1839



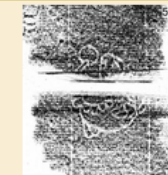
CAHIP B1407
Sirena tocando una
corneta en la base
apellido del fabricante.
Buenos Aires 1815



BRIQUET 13859
Meerjungfrau, mit
Schwanz, einen Spiegel
(?) haltend (Loreley)
Chaussin 1468



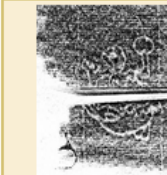
WILC 55002
mermaid to left
Delft 1483



WILC 57068
mermaid to left
Delft 1480



WILC 1183
mermaid to right
Delft 1480



WILC 57069
mermaid to right
Delft 1480



WILC 1457
mermaid, vertical, to
left
Delft 1477



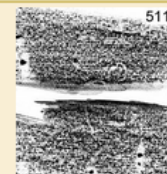
WILC 4246
mermaid to left
Deventer 1478-1479



WILC 3322
mermaid to right
Deventer 1483-1485



WILC 4245
mermaid to right
Deventer 1478-1479



WILC 51115
mermaid to right
Deventer 1500



WILC 54761
mermaid to right
Deventer 1480-1481



WILC 54762
mermaid to right
Deventer 1480-1481



BRIQUET 13852
Meerjungfrau, mit
Schwanz, einen Spiegel
(?) haltend (Loreley)
Düsseldorf 1422



CCF Z00382
Mermaid with double
tail
Fabriano 1373

Statistics

☒ Select/deselect all

Select by time line

Years: 1280 2021 All

☐ List ☐ Grid ☒ Statistics ☐ Map

Bookmarks

Databases

Hits

☒ WZIS	36205	80.4%
☒ WILC	798	1.8%
☒ WIES	99	0.2%
☒ WIGB	51	0.1%
☒ WZMA	4995	11.1%
☒ NIKI	13	0%
☒ AMA	0	0%
☒ BITECA	29	0.1%
☒ BRIQUET	1367	3%
☒ BR-RELOADED	6	0%
☒ CAHIP	0	0%
☒ CATS	0	0%
☒ CCF	0	0%
☒ CCI	42	0.1%
☒ CTMV	0	0%
☒ DGCPAAC-GENCAT	0	0%
☒ DMVA	9	0%
☒ FILACAD	0	0%
☒ FILHISP	0	0%
☒ FILIGRANA	27	0.1%

Translated Keywords:

'bull's head' [Ochsenkopf,tête de bœuf,cabeza de buey,testa di bue,голова быка,ökörfej,cabeça de touro,κεφαλή βοός,ossenkop]

Motif

bull's head

All

INDEX

Add General Search

Add DB Specific Search

SEARCH

RESET

Single valuesCombination matrix for statistical functions

Hide matrix

	Place of use	Depository	Date	Height	Distance between chain lines
Motif	☐	☐	☐	☐	☐
Place of use	☐	☐	☐	☐	☐
Depository	☐	☐	☐	☐	☐
Date	☒	☐	☐	☐	☐
Height	☐	☐	☐	☐	☐
Distance between chain lines	☐	☐	☐	☐	☐

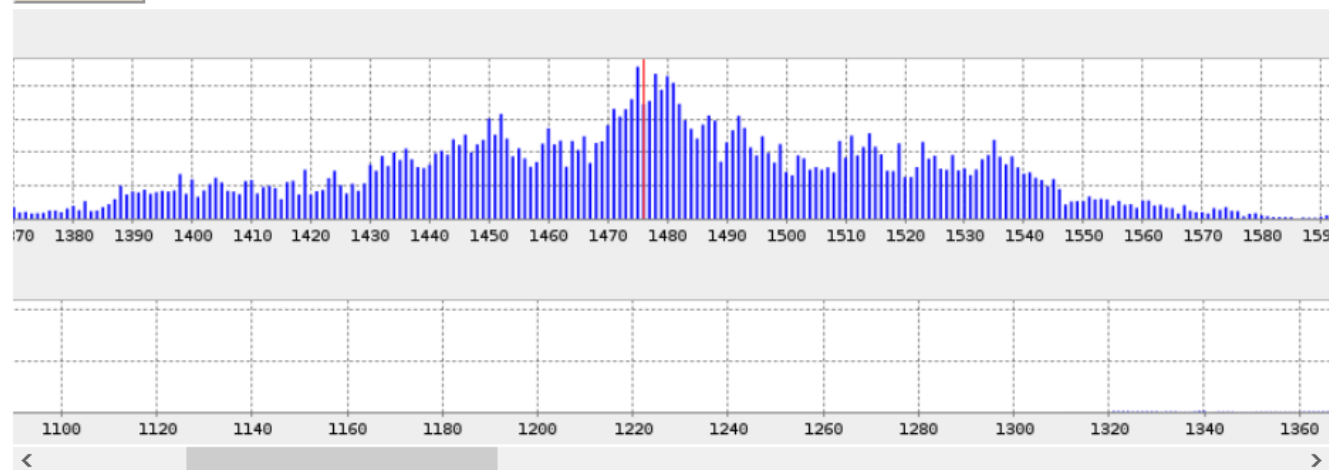
Date

Show statistics

Show list

Export

Fit into area



Why connect with Bernstein?

Bernstein is a portal and NOT a database. It is a service for data providers (collections of watermarks) and the searchers (users).

- Simultaneous search in 56 databases with more than 269.000 entries (both numbers are increasing)
- Search across fields (art history, musicology, codicology,)
- High visibility (Bernstein is well established in the watermark community)
- Multilingual search (with automatic translation)
- Maps and statistic summaries
- Part of a community with meetings and information exchange
- No costs and changes required (only necessary data field is the motif of the wm)

Cooperation

- Each watermark database is invited to cooperate
- No restrictions concerning classification, database structure
 - Recommended: WZIS classification or IPH classification
- Highly recommended: usage of the watermark terms (for translation)
- How to participate
 - Online database MySQL and web presentation of individual watermark
 - Read access for the Bernstein server with a fix IP is necessary.
 - Spreadsheet (e.g. Excel) → database on Bernstein server
 - Hybrid forms

Future

- watermark databases added
- additional functionality (map, statistics, bibliography, ...)
- search by images (depends on the databases)
- AI?

open topics

who will continue my work

who will host the server

Thank you

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