

Knowledge Organization Systems, Thesauri, and the Getty Vocabularies

Linked Conservation Data terminology workshop
Jonathan Ward, Senior Editor
Getty Vocabulary Program
Getty Research Institute

Knowledge Organization Systems

- Any type of scheme used for organizing information and promoting
- Knowledge management
- Usually used for information retrieval and management
- Locally or commercially developed
- May also be “controlled vocabularies”



Knowledge Organization Systems

Lists of Terms

- Drop-down Lists / Controlled Lists
- Glossaries and Dictionaries

ERIC PARTRIDGE
A DICTIONARY OF THE
UNDERWORLD

BRITISH & AMERICAN

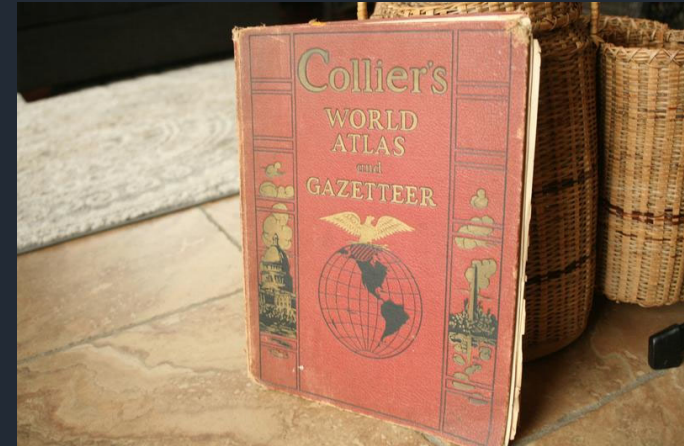
Being the Vocabularies of
CROOKS CRIMINALS RACKETEERS
BEGGARS and TRAMPS
CONVICTS
THE COMMERCIAL UNDERWORLD
THE DRUG TRAFFIC
THE WHITE SLAVE TRAFFIC
SPIVS

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Knowledge Organization Systems

Metadata-Like Schemes

- Gazetteers
- Authority Files



Sample Name Authority Record

Heading: Kesey, Ken.

Notes: His One flew over the cuckoo's nest, 1962. b. 1935

Control No.: n 50044585

The Library of Congress

>> [Go to Library of Congress Online Catalog](#)

LIBRARY OF CONGRESS AUTHORITIES



Help	New Search	Search History	Headings List	Start Over
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< Previous	Next >
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LC control no.: n 79054636

LCCN Permalink: <https://lccn.loc.gov/n79054636>

HEADING: Stanford University

000 02287cz a2200337n 450

001 2820644

005 20130110073734.0

008 790625n| azannaabn |a ana

010 __ |a n 79054636 |z n 79055672

035 __ |a (OCoLC)oca00287764

040 __ |a DLC |b eng |e rda |c DLC |d MdU |d CS: |d OrU |d DLC |d DLC-S |d CS: |d LNT

046 __ |s 18911001

110 2_ |a Stanford University

370 __ |c U.S. |e Stanford, Calif. |v Stanford University Web site, 11 Dec. 2012 |u <http://www.stanford.edu/>371 __ |a 450 Serra Mall |b Stanford |c Calif. |d U.S. |e 94305 |m <http://www.stanford.edu/> |v Stanford University Web site, 11 Dec. 2012 |u <http://www.stanford.edu/>

372 __ |a Education, Higher |a Private universities and colleges |2 lch

410 2_ |a Leland Stanford Junior University

410 2_ |a Leland Stanford Jr. University

410 2_ |a Universidad de Stanford

410 2_ |a Stenfordskii universitet

410 2_ |a Dānīshgāh-i Istānfūr-d-i Kālifurniyā

500 1_ |w r |i Founder: |a Stanford, Leland, |d 1824-1893

500 1_ |w r |i Founder: |a Stanford, Jane Lathrop, |d 1828-1905

670 __ |a Ecotono, primavera 1996: |b p. 12 (Universidad de Stanford)

670 __ |a Rossiā i rossiikaia emigratsiā ... 2003: |b t.p. (Stenfordskii universitet)

670 __ |a History of social work in the Leland Stanford Jr. University School of Medicine, 1913-1981, c2003.

670 __ |a Sālnāmah-i dawrah-i mudīriyat, 1342, i.e. 1963: |b t.p. (Dānīshgāh-i Istānfūr-d-i Kālifurniyā) added t.p. (Stanford University)

670 __ |a Stanford University Web site, 2 Jan. 2013: |b main page (Stanford University) History, etc. (Leland and Jane Stanford founded the University; the Stanfords decided to found a university to memorialize their only son, Leland, Jr.; they decided that the university would be coeducational, non-denominational; they officially established it November 11, 1885, by signing its founding grant; Stanford University opened its doors Oct. 1, 1891)

678 1_ |a Stanford University, in Stanford, California, is a private, non-denominational university founded by Leland Stanford and his wife, Jane Lathrop Stanford. It was officially established November 11, 1885, and opened its doors October 1, 1891.

952 __ |a RETRO

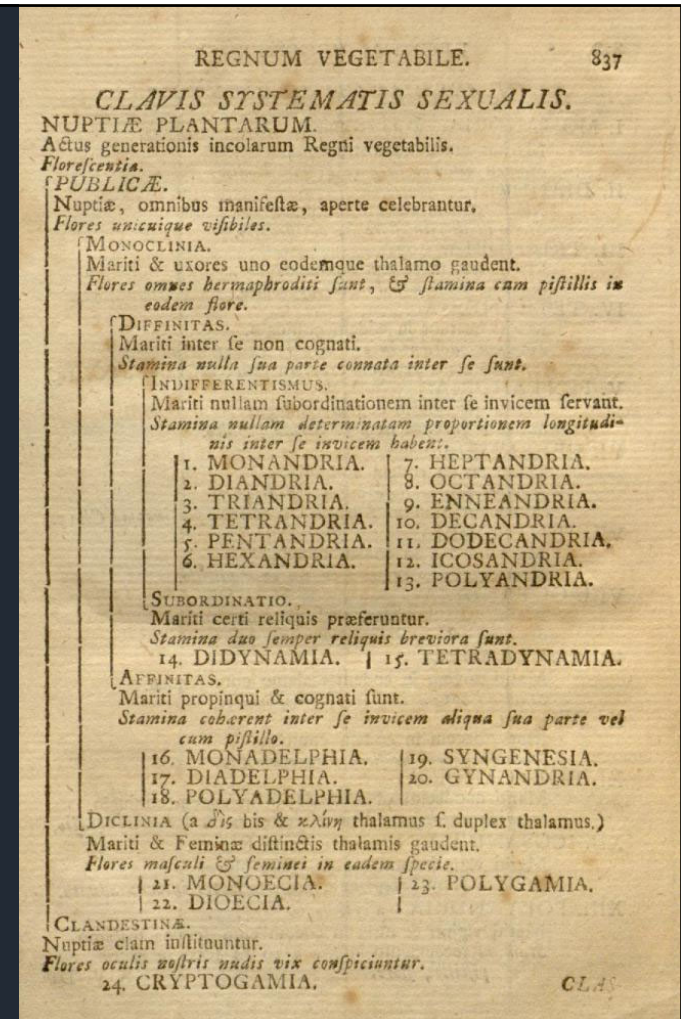
953 __ |a xx00 |b sf09

Knowledge Organization Systems

Classification and Categorization Systems

- Classification schemes (IconClass)
- Taxonomies
- Subject Heading Lists

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Image from the 10th edition of [Linnaeus: Systema naturae](#) (1758) , Wikipedia

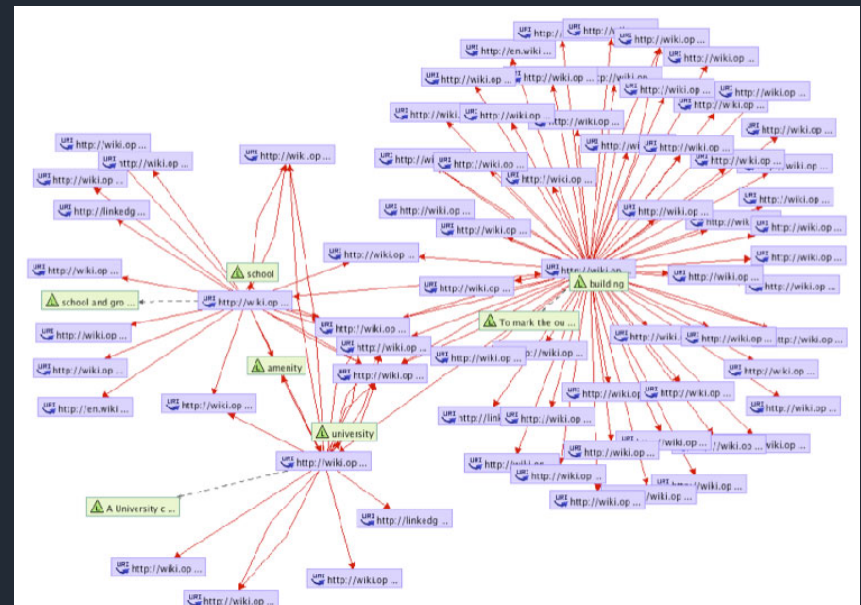


	15	1	Stanford University--Alumni and alumnae--Employment.	Library of Congress subject headings
	16	2	Stanford University--Alumni and alumnae--Exhibitions.	Library of Congress subject headings
References	17	0	Stanford University. Alumni Association	Library of Congress subject headings
Authorized Heading	18	0	Stanford University. Alumni Office	Library of Congress subject headings
References	19	0	Stanford University. American Studies Program	Library of Congress subject headings
Authorized Heading	20	0	Stanford University. Americas Program	Library of Congress subject headings
References	21	0	Stanford University. Americas Program. Americas Program visiting lecturer series	Library of Congress subject headings
References	22	0	Stanford University. Americas Program. Americas Program working paper	Library of Congress subject headings
References	23	0	Stanford University. Americas Program. Project on United States-Mexico Relations	Library of Congress subject headings
Authorized Heading	24	0	Stanford University. Applied Electronics Laboratory	Library of Congress subject headings
References	25	0	Stanford University. Applied Mathematics and Statistics Laboratories	Library of Congress subject headings
Authorized Heading	26	0	Stanford University. Applied Mathematics and Statistics Laboratory	Library of Congress subject headings
References	27	0	Stanford University. Applied Mathematics and Statistics Laboratory. Technical report	Library of Congress subject headings
References	28	0	Stanford University. Aptitude Seminar	Library of Congress subject headings
Authorized Heading	29	0	Stanford University. Arboretum	Library of Congress subject headings
References	30	0	Stanford University. Archaeology Center	Library of Congress subject headings
Authorized Heading	31	0	Stanford University. Archaeology Collections	Library of Congress subject headings
Authorized & References	32	0	Stanford University. Archives	Library of Congress subject headings
Authorized & References	33	0	Stanford University. Arms Control and Disarmament Program	Library of Congress subject headings
References	34	0	Stanford University. Arms Control Group	Library of Congress subject headings
Authorized Heading	35	0	Stanford University. Arms Control Project	Library of Congress subject headings
References	36	0	Stanford University. Art & Art History Department	Library of Congress subject headings
References	37	0	Stanford University. Art Department	Library of Congress subject headings

Knowledge Organization Systems

Relationship Models

- Thesauri (multiple relationships between terms)
- Semantic Networks
- Ontologies



Getty Vocabulary Program

- Developed in the late 1970s from a need within the museum and library communities
- AAT (Art and Architecture Thesaurus)
- ULAN (Union List of Artist Names)
- TGN (Getty Thesaurus of Geographic Names)
- CONA (Cultural Object Name Authority) / IA (Iconography Authority)
- Built by contributors, institutional contributions, content editors, user community
- Free, open, and collaborative; international and multilingual
- Available online via the search interface, through LOD and XML releases, and can be queried through a SPARQL endpoint

Controlled Vocabularies and Thesauri

- **Controlled Vocabularies:** organized words and phrases representing unique concepts, that are used to index or catalog content and/or to retrieve content through navigation or a search
- **Standards:** data values, structure, content, and release
- **Consistency:** clustering variant terms; rich metadata


Controlled Vocabularies - Relationships

Equivalence Relationships – true synonymous variants

ID: 300025820

Record Type: concept

Page Link: <http://vocab.getty.edu/page/aat/300025820>

 **conservation scientists** (scientists, <scientists and people in science-related occupations>, ... People (hierarchy name))

Note: Scientists who apply their knowledge to problems of conservation.

Terms:

conservation scientists (preferred,C,U,English-P,D,U,PN)
conservation scientist (C,U,English,AD,U,SN)
conservation scientist's (C,U,English,AD,U,N)
conservation scientists' (C,U,English,AD,U,N)
scientists, conservation (C,U,English,UF,U,N)
milieu- en natuurbeschermingswetenschappers (C,U,Dutch-P,D,U,U)
milieu- en natuurbeschermingswetenschapper (C,U,Dutch,AD,U,U)
conservadores (científicos) (C,U,Spanish-P,D,U,PN)
conservador (científico) (C,U,Spanish,AD,U,SN)



Controlled Vocabularies - Relationships

Hierarchical Relationships

- broader/narrower
- whole/part
- “instance”

Facet/Hierarchy Code: H.HG














Hierarchical Position:
















Controlled Vocabularies - Relationships

Hierarchical Relationships

- **Record Types:**
 - **Facets** – fundamental thesaurus categories

- ➔ Top of the AAT hierarchies
-  Associated Concepts Facet
-  Associated Concepts (hierarchy name)
-  Physical Attributes Facet
-  Attributes and Properties (hierarchy name)
-  Conditions and Effects (hierarchy name)
-  Design Elements (hierarchy name)
-  Color (hierarchy name)
-  Styles and Periods Facet
-  Styles and Periods (hierarchy name)
-  Agents Facet
-  People (hierarchy name)
-  Organizations (hierarchy name)
-  Living Organisms (hierarchy name)
- agents (general) [N]

-  Activities Facet
-  Disciplines (hierarchy name)
-  Functions (hierarchy name)
-  Events (hierarchy name)
-  Physical and Mental Activities (hierarchy name)
-  Processes and Techniques (hierarchy name)
- activities (general context)
-  Materials Facet
-  Materials (hierarchy name)
-  Objects Facet
-  Built Environment (hierarchy name)
-  Components (hierarchy name)
-  Furnishings and Equipment (hierarchy name)
-  Object Genres (hierarchy name)
-  Object Groupings and Systems (hierarchy name)
-  Visual and Verbal Communication (hierarchy name)
-  Brand Names Facet
-  Brand Names (hierarchy name)

Controlled Vocabularies - Relationships

Hierarchical Relationships

- **Record Types:**
 - **Facets** – fundamental thesaurus categories
 - **Guide Terms** – aka “node labels” bracketed by arrows
 - **Concepts**

Top of the AAT hierarchies

... Objects Facet ←

..... Visual and Verbal Communication (Hierarchy Name)

..... Visual Works (Hierarchy Name)

..... visual works (works)

..... <visual works by material or technique>

..... photographs

..... <photographs by form> ←

..... negatives (photographs)

..... color separation negatives

..... glass plate negatives

..... halftone negatives

..... internegatives

..... <negatives by color>

..... <negatives by process>

..... paper negatives

..... positives (photographs)

..... direct positives

..... holograms

..... photographic prints

..... photographic transparencies

Controlled Vocabularies - Relationships

Hierarchical Relationships:

Polyhierarchies – concepts that logically belong to more than one broader context

Example: “motion pictures”

Hierarchical Position:

 Objects Facet
 Visual and Verbal Communication (hierarchy name) (G)
 Visual Works (hierarchy name) (G)
 visual works (works) (G)
 <visual works by material or technique> (G)
 motion pictures (visual works) (G) ←

Additional Parents:

 Objects Facet
 Visual and Verbal Communication (hierarchy name) (G)
 Visual Works (hierarchy name) (G)
 visual works (works) (G)
 <visual works by form> (G)
 <visual works by form of image> (G)
 moving images (G)
 motion pictures (visual works) (G) ←

 Objects Facet
 Visual and Verbal Communication (hierarchy name) (G)
 Information Forms (hierarchy name) (G)
 information forms (objects) (G)
 information artifacts (G)
 <information artifacts by physical form> (G)
 motion pictures (visual works) (G) ←

 Objects Facet
 Visual and Verbal Communication (hierarchy name) (G)
 Literary and Performing Arts Works (hierarchy name) (G)
 motion pictures (visual works) (G) ←

Controlled Vocabularies - Relationships

Associative Relationships

- Link concepts in different hierarchies
- Reciprocal

“conservation scientists” AAT: 300025820

Related concepts:

meaning/usage overlaps with **conservators (people in conservation)**
 (<people in cross- and interdisciplinary fields>, <people by occupation>, ...
 People (hierarchy name)) [300102842]

practice/study **conservation (discipline)**
 (cross- and interdisciplinary fields, disciplines (concept), Disciplines (hierarchy name))
 [300054238]

Controlled Vocabularies - Relationships

Usage of Getty Vocabularies

- Multiple vocabularies
- In conjunction with local thesauri
- Built into collection management systems
- Implemented in local systems
- Via online searches, or downloadable XML, LOD

Europeana classifications linked to AAT (<http://www.europeana.eu>)

Europeana Collections Explore Exhibitions Blog

PLAIN TEXT HTML

Return to Home / Results / Item

Title **The Milkmaid | Vermeer, Johannes**

Het melkmeisje

Description A maidservant pours milk, entirely absorbed in her work. Except for the stream of milk, everything else is still. Vermeer took this simple everyday activity and made it the subject of an impressive painting – the woman stands like a statue in the brightly lit room. Vermeer also had an eye for how light by means of hundreds of colourful dots plays over the surface of objects.

People **Creator:** Vermeer, Johannes

Classifications **Type:** easel paintings (paintings by form)
Subject: kitchen-maid, kitchen servant

Properties **Size:** height 45,5 CM , width 41 CM
Format: canvas (textile material)
Language: nl

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Research

Research Home Tools Art & Architecture Thesaurus Full Record Display

Art & Architecture Thesaurus® Online
Full Record Display

New Search Previous Page Help

Click the icon to view the hierarchy.

Semantic View (JSON, RDF, N3/Turtle, N-Triples)

ID: 300177435 **Record Type:** concept

easel paintings (paintings by form) (<paintings by form>, paintings (visual works), ... Visual and Verbal Communication (hierarchy name))

Note: Paintings executed on an easel or other portable device, having either canvas or panel supports; generally restricted to those painted from the 16th century forward. The term implies not only physical aspects of creation, but also inherent concepts associated with the increased secular use of art from the 16th century and with the identification of paintings as objects of worth in their own right.

Terms:

- easel paintings (paintings by form) (preferred, C,U,English-P,D,U,PN)
- easel painting (painting by form) (C,U,English,AD,U,SN)
- paintings, easel (paintings by form) (C,U,English,UF,U,N)
- easel-paintings (paintings by form) (C,U,English,UF,U,N)
- easel pictures (C,U,English,UF,U,N)
- easel-pictures (C,U,English,UF,U,N)
- easel-pieces (C,U,English,UF,U,N)
- schilderijen (C,U,Dutch-P,D,U,U)
- schilderij (C,U,Dutch,AD,U,U)
- ezelschilderijen (C,U,Dutch,UF,U,U)
- schilderstuk (C,U,Dutch,UF,U,U)
- schilderstukken (C,U,Dutch,UF,U,U)
- doeken (C,U,Dutch,UF,U,U)
- peintures de chevalet (C,U,French-P,D,U,PN)
- peinture de chevalet (C,U,French,AD,U,SN)
- Staffeleibilder (C,U,German,D,PN)
- Staffeleibild (C,U,German-P,AD,SN)
- pinturas de caballete (C,U,Spanish-P,D,U,PN)
- pintura de caballete (C,U,Spanish,AD,U,SN)
- cuadro (pintura) (C,U,Spanish,UF,U,SN)
- cuadro portátil (C,U,Spanish,UF,U,SN)
- lienzo (pintura de caballete) (C,U,Spanish,UF,U,SN)
- tela (pintura de caballete) (C,U,Spanish,UF,U,SN)

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Yale Center For British Art

YALE CENTER FOR BRITISH ART Search this site

Collections Exhibitions Calendar Research Education Architecture Visit

Home -> Collections -> Search -> Fitzroy Street (William...)

Search Details

Creator Geoffrey Tibble, 1909–1952, British

Title Fitzroy Street (William Coldstream and Graham Bell in an Interior)

Date ca. 1935

Medium Oil on canvas

Dimensions 27 x 32 inches (68.6 x 81.3 cm)

Credit Line Yale Center for British Art, Gift of Joseph F. McCrindle, Yale LLB 1948

Accession Number B1983.24.2

Collection Paintings and Sculpture

Link to This Record <http://collections.britishart.yale.edu/vufind/Record/1665845>

Subject artist | drawing room | family | fireplace | genre subject | hat | hearth | interior | lamp | men | mirror | molding | painter | paintings | reading | reception room | screen | visitor | women

Place Represented England | Europe | Greater London | London | United Kingdom

Publications *Acquisitions : The First Decade 1977-1986, Yale Center for British Art, Yale Center for British Art, New Haven, CT, 1986, p. 19, no. 52, N590.2 A7 OVERSIZE (YCBA)*

Duncan Robinson, *Acquisitions : The First Decade 1977 - 1986, Burlington Magazine, vol. 128, October 1986, p. 19, no. 52, N1 B87 128:3 OVERSIZE (YCBA)*

Citation Show | Text or SMS | Email

Export RDF | XML

If you have information about this object that may be of assistance please contact us.



cropped to image, recto, unframed
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URI <http://collection.britishart.yale.edu/id/thesauri/department>

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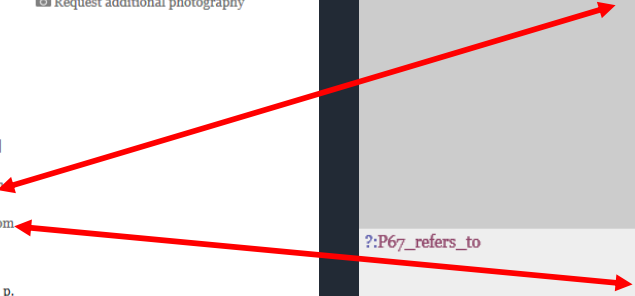
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<http://collection.britishart.yale.edu/id/bibliography/2335>

?PX_display_wrap Bibliographic reference :: Acquisitions : The First Decade 1977-1986, Yale Center for British Art, New Haven, CT, 1986, p. 19, no. 52, N590.2 A7 + (YCBA)
Bibliographic reference :: Duncan Robinson, Acquisitions, The First Decade : 1977-1986, Burlington Magazine, October 1986, p. 19, no. 52, N1 B87 128:3 OVERSIZE (YCBA)
Dimension height :: 68.6cm



RKD, Netherlands

AAT links for Object Category and Support/Medium

◀ RKDimages

collapse all ▶ share ◀ print 🖨️ download ↓

◀ previous 32 / 76137



Object information

Object category [painting](#)
 Support/medium [canvas, oil paint](#)
 Shape/dimensions [rectangle \(portrait format\)](#) 114 x 100 cm

Current attribution [● Anthony van Dyck](#)

Date ⓘ [c. 1628-1629 \(1628 - 1629\)](#)

Subject

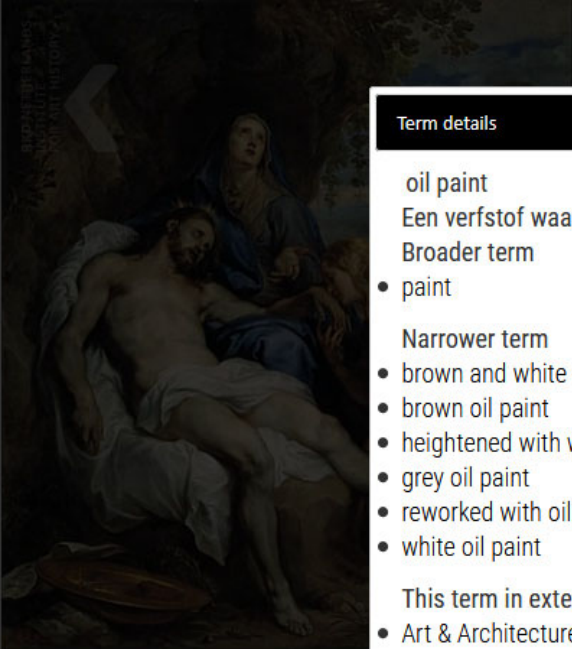
Title ⓘ [De bewening van Christus](#)
 English title [The Lamentation of Christ](#)
 Keywords [New Testament and Apocrypha, saint](#)
 Iconclass code ⓘ [73D72121](#)
[Christ's body supported by Mary, others present](#)
[11HH\(MARY MAGDALENE\)](#)
[the penitent harlot Mary Magdalene; possible attributes: book \(or scroll\), crown, crown of thorns, crucifix, jar of ointment, mirror, musical instrument, palm-branch, rosary, scourge](#)
[11H\(JOHN\)](#)

RKD, Netherlands

Direct AAT data, plus link from clicking on term

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← RKDimages collapse all ▲ share ↵ print 🖨️ download ↓ ◀️ previous 32 / 76137



Object information

Object category painting

oil paint
Een verfstof waarin drogende olie als drager voor het pigment fungeert.

Broader term

- paint

Narrower term

- brown and white oil paint
- brown oil paint
- heightened with white oil paint
- grey oil paint
- reworked with oil paint
- white oil paint

This term in external thesauri (Opens in new window)

- Art & Architecture Thesaurus ®

Illustration number 0000272127

body supported by Mary, others present
tent harlot Mary Magdalene; possible attributes: book (or crown, crown of thorns, crucifix, jar of ointment, mirror, instrument, palm-branch, rosary, scourge
castle John the Evangelist; possible attributes: book, cauldron chalice with snake, eagle, palm, scroll

AAT in Taiwan – translation & implementation by Academia Sinica

Digital Cultures SHARE

首頁 瀏覽 使用說明 **關於 AAT-TAIWAN** 聯絡與建議 ENGLISH

藝術與建築索引典
 Art & Architecture Thesaurus Taiwan

TERM 詞彙 **ID** 識別號 **SN** 範圍註

AND OR

範圍註

指定層面:

最新消息

- 2018/11/27 美國范德比大學教授Tracy Miller承訪「藝術與建築索引典」將首度
- 2018/10/27 【上線公告】中央研究院數位人文研究平台：共創臺灣人文研究新
- 2018/06/21 哈佛大學首屆中國歷史研究網絡基礎設施國際研討會「數位人文研
- 2017/11/03 美國蓋提研究中心來訪 暢談數位人文領域LOD建置趨勢
- 2017/08/10 「滬華虛畫 CCC創作集數位體驗展」 滬華與科技共舞的感官宴會！

精選詞彙

牛血紅釉



範圍註：
 一種不透光的臍化銅
 釉，色澤從深紫紅至
 棕紅色，發展於中國
 康熙年間，主要用於
 瓷器。... [詳細資料](#)

AAT-Taiwan共有36,333筆概念詞彙
 翻譯詞彙：35,230筆 / 已校詞彙：29,989筆
 專家審定：1,011筆 / 附加圖檔：3,882筆
 (更新日期：2014-11-17)

所有詞彙
 TOP OF THE AAT
 HIERARCHIES

關聯概念層面
 ASSOCIATED
 CONCEPTS FACET

物理特質層面
 PHYSICAL
 ATTRIBUTES FACET

風格與時代層面
 STYLES AND
 PERIODS FACET

代理者層面
 AGENTS
 FACET

活動層面
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 FACET

材料層面
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物件層面
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 Art & Architecture Thesaurus Taiwan

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AAT in Spanish – Centro de Documentación de Bienes Patrimoniales, Santiago



TA&A
Tesauro de Arte & Arquitectura



CENTRO DE DOCUMENTACIÓN DE
BIENES PATRIMONIALES

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BUSCAR

Tipo de término : Todos Preferentes Alternativos

[\(+\)](#) *Búsqueda avanzada*

FACETA CONCEPTOS ASOCIADOS

- conceptos asociados

FACETA ESTILOS Y PERIODOS

- estilos y periodos

FACETA ACTIVIDADES

- disciplinas
- funciones
- eventos
- actividades físicas y mentales
- procesos y técnicas
- activities

FACETA OBJETOS

FACETA ATRIBUTOS FÍSICOS

- atributos y propiedades
- Condiciones y Efectos
- elementos de diseño
- color

FACETA AGENTES

- gente
- organizaciones
- seres vivos


FACETA MATERIALES

- materiales

FACETA MARCAS DE FÁBRICA

Tesauro de Arte & Arquitectura

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VER MÁS

TÉRMINOS MÁS VISITADOS

cientista social comunicación verbal y visual

garganta (accidente geográfico)

instrumento legal

mapa corográfico paisaje suburbano



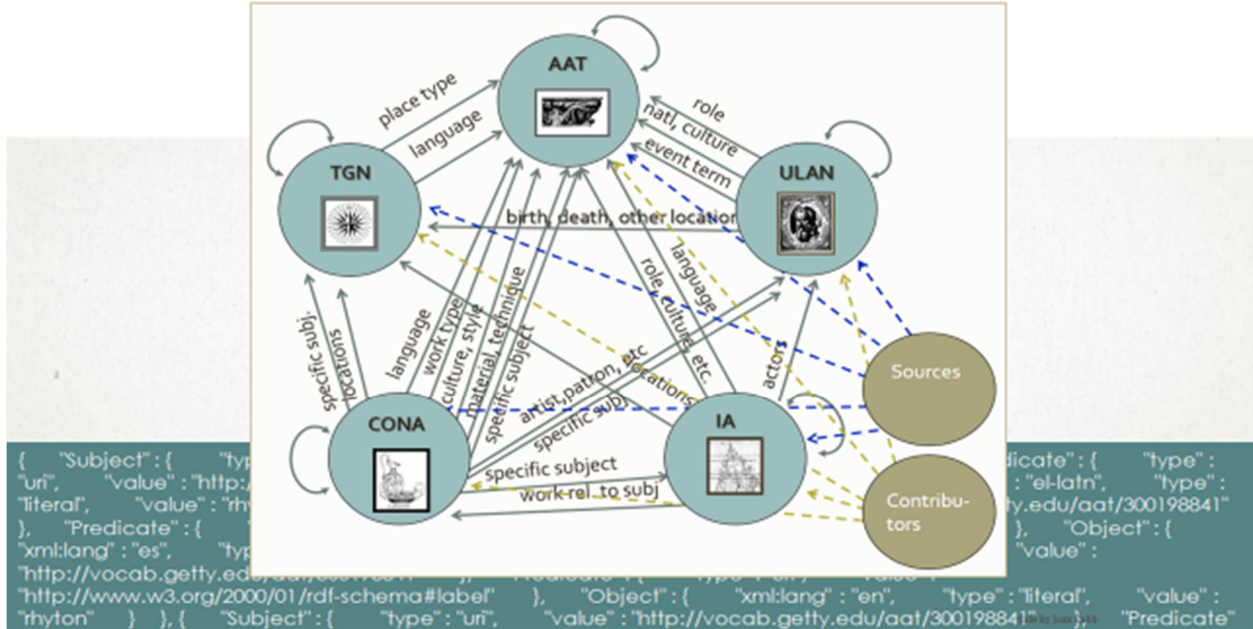
THE GETTY



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GETTY VOCABULARIES ARE LINKED TO EACH OTHER



Jonathan Ward

Linked Conservation Data – Terminology Workshop

6/6/2019

Knowledge Organization Systems, Thesauri, and the Getty Vocabularies

(Invite thanks) My name is Jonathan Ward and I'm the Senior Editor for the Getty Vocabulary Program. My work in the program straddles a few different areas. I am a lead editor of the Vocabularies' content and am often in charge of workflow. I also work with large, contributed data sets, formatting and reconciliation; I work directly with our programmer on fixes, implementation, and I do a lot of outreach, and working with contributors. We're a small team so we tend to wear a lot of hats – but that said, one thing I am not is a data scientist. I've been asked to deliver a general introduction to Knowledge Organization Systems, and I hope that this is not the equivalent of describing cooking to a roomful of chefs. This presentation will start pretty simply – what I'll do is lead up to more complex types of systems, including thesauri. The Getty Vocabularies are thesauri, so after that I'll give you a very brief introduction on the structure of the Vocabularies, and discuss relationships between terms and hierarchies. This section is also a lead-in to Marcia Zeng's presentation, which will illuminate further some of the topics I focus on.

*"Knowledge Organization System" is a generic phrase. Sometimes it's applied very broadly, referring to disciplines, theories, and models in general that structure knowledge. For our purposes I think, it applies to any particular scheme of organizing information, usually used for the management of information and the retrieval of relevant information (about a collection,

very often). They can be commercially developed or locally developed, but they have the same end goal: delivering useful results.

Some knowledge organization systems are also types of *controlled vocabularies*, although some are *not*, and I'll explain that in a little bit. But just to keep things simple, at the start I'll stick to the term "knowledge organization system" or "KOS," so we don't get bogged down in overlapping definitions. "Knowledge Organization System" is also a phrase used with regularity in the library and information science world – however, it clearly expands beyond that to the humanities in general, archives and museums, digital libraries, and of course here we'll focus on KOS's in relation to conservation, archaeology, and history in general.

The best breakdown of the types of KOS's has been prepared by the people with the Council on Library and Information Resources, and someone in the room, Marcia Zeng, who has broken them down even further in a way I particularly like. The simplest kinds of KOS's are lists of terms:

***Drop-down lists / controlled lists**, which are simple lists of to control terminology. They can be very basic like a drop-down menu in a Filemaker database for example, or really any kind of pick-list.

Glossaries and dictionaries – which are lists of terms with definitions; these are usually alphabetical and more general in scope.

*The next level of knowledge organization systems are beginning to be metadata-like in their composition:

Gazetteers – Those are lists of place names with definitions. Terms, however, are usually within a specific environment. Sometimes terms are given a geospatial location.

Authority Files are sets of established names or headings and cross-references to the preferred form of a name or heading, from variant or alternate forms.

*Authority files don't usually have a complex structure or organization. The most obvious example of an authority file would be the Library of Congress authorities for Names, Titles, and Subjects.

*The next level comprises classification and categorization systems – terms that are often used interchangeably.

Classification Schemes are usually alphanumeric schemes that represent concepts or headings or textual correlates (a description, in other words). The Dewey Decimal System is an alphanumeric classification scheme, as is Iconclass.

Taxonomies are an orderly classification for a defined domain - such as plant and animal taxonomies of Latin names

Subject Heading Lists – These are uniform words or phrases assigned to books and articles to describe the subject or topic, and then grouped with materials having similar subjects.

*Subject heading lists usually have a pre-coordination of terminology (that's several unique concepts in a string like the Library of Congress Subject Headings shown here, rather than hierarchical placement of terms); the structure is usually fairly shallow.

*Finally, we move to the top level KOSs, and those are relationship models.

I'll start with thesauri.

Thesauri are networks of unique concepts; they can be monolingual OR multilingual, and there are three important relationships between terms: equivalence relationships (synonyms), hierarchical relationships (where a term is placed in the hierarchical structure) and associative relationships. The Getty Vocabularies are thesauri, but I'll return to them and describe those relationships in more detail in just a moment.

Moving outward, **semantic networks** are knowledge organization systems of concepts and terms that are structured like a network, not necessarily in hierarchies, and the data therein is often represented in RDF triples, such as linked open data. Concepts are nodes, and relationships branch out from them, and are often wide-ranging relationships (not just term-related relationships as you would see in a thesaurus).

Ontologies - Ontologies – another word that is used very broadly - are concept models that include rules and axioms that are usually not included in semantic networks.

***Getty Vocabularies introduction**

Many of you are already quite familiar, but this might be a good spot to give a very brief history of our program at the Getty Research Institute.

The Getty Vocabularies began in the late 1970s, with a vocal need for a resource for terms used to catalogue artwork by visual resource professionals, art and architecture historians, and art literature indexing projects. In the early 1980s, work on the first of the Getty Vocabularies began. That became the AAT, or the Art and Architecture Thesaurus. It was based on the medical subject headings model (known as MESH), as well as plant and animal taxonomies. The AAT began with English sources first; with terms from the Library of Congress, and terms added from the library of source material at the Getty. Our next vocabularies appeared in the late 1980s, TGN or the Thesaurus of Geographic Names, and ULAN, the Union List of Artist Names.

And we have two vocabularies still in development: CONA, the Cultural Object Name Authority, and the IA, or Iconography Authority.

From the outset the AAT and in fact all the Getty Vocabularies, were built from the ground up by contributions from a user community, experts and content editors, and partner institutions. This was how we were able to grow, and become a trusted tool.

Over the next few decades of work, we solidified the Vocabularies as free, open, and collaborative. They share the same basic data structure. We edit our content in a SQL-based software interface that was designed for us, in-house, by our software engineer. We strive for the Vocabularies to be international and multilingual, and are eager to always expand that as much as we can, with numerous long-term translation projects being worked on. While we make the Vocabularies available in a variety of formats including linked open data, they are often accessed on the web, sometimes queried through our sparql endpoint, and they are consistently a popular tool. That said, we're a really small team – we have three editors and a managing editor. So, we really depend on contributors and nurturing those relationships.

***Controlled Vocabularies & Thesauri**

Controlled vocabularies are organized words and phrases that are used to index or catalog content and/or to retrieve content through navigation or a search.

A primary reason for using vocabularies is for adherence to standards across a broad field of knowledge. Standards: a) for data values, b) standards for data structure, c) standards for data content, and d) standards for data releases or exchange.

Controlled vocabularies promote consistency with their so-called preferred terms (in our case that is usually the term most often found in scholarly literature) but they also capture the richness of variant terms for the same content; controlled vocabularies in the form of thesauri gather together variant terms, which are synonyms, and link concepts into a logical order or into categories. In their own way, they contain a robust, networked structure.

***Relationships Between Terms**

The relationships between terms in a thesaurus is what gives it its power – there are three important relationships between terms that are built into the Getty Vocabularies' data structure. Each record or 'concept' carries these relationships with it.

Equivalence relationships are the relationships between synonymous terms or names for the same concept. These must be true synonyms or lexical variants for the same concept. They can be from different linguistic origin, different languages, they could be common terms or scientific, so long as their meaning is identical in a wide range of contexts. In the case of

homographs for terms – for example the term “drums” which has multiple entries in the AAT, qualifier phrases in a separate field are used to distinguish terms that otherwise seem identical.

The example here is from the AAT, for the term “conservation scientists” and you can see the variant terms in multiple languages. This idea of course extends to ULAN and TGN, with names of people and places.

***Hierarchical relationships**

Hierarchical relationships are the broader and narrower (or parent/child) relationships between records. This relationship distinguishes a thesaurus from simple KOS’s like synonym rings or controlled lists.

There are different types of hierarchical relationships. There’s the genus/species relationship, which is the most common; that’s where every child in a given hierarchy should be a type of the parent. In this case, “conservation scientists” are a type of “scientists.”

“Whole/part” relationships are another part of hierarchical relationship which we would apply in TGN, for example. A city is “part” of a province, for example.

And then there are “instance” relationships – those are used in ULAN and TGN, usually, the children of a parent are an “example” of the parent. In ULAN, we don’t have a very deep hierarchy, so all artists are under the “artist” parent, etc.

*Since I’ll be discussing AAT in my second presentation, I thought I’d also mention the types of records we have, that flesh out the hierarchy – and the AAT has the most complex hierarchy of all our vocabularies. AAT is divided into **facets** – those are fundamental, mutually exclusive categories in a thesaurus – the AAT happens to have eight of them.

Briefly, they are the Associated Concepts facet, consisting of abstract concepts related to human thought, theoretical and critical concerns, ideologies, social and cultural movements. The Physical Attributes facet, the Styles and Periods facet, Agents, Activities, Materials, Objects, and Brand Names – that’s a facet that I’ll discuss a bit in the next presentation.

*Then we have **guide terms**, which are also known as “node labels.” Those are records represented by a term or phrase that is created as a hierarchical level where no concept is appropriate as the level itself – this is to provide order and structure to thesauri by grouping narrower terms according to a given logic. In the example, guide terms have the arrows around them, like “photographs by form” and “negatives by process.” And then there are **concepts** themselves, which are effectively the containers for the subjects of the vocabulary records – the concepts to which the terms refer.

*A thesaurus can be polyhierarchical. Some concepts logically belong to more than one broader context, and to accommodate this, the data structure needs to allow a “child” to be linked to

multiple parents, or under multiple “facets.” This is a particularly interesting or perhaps egregious example, for the term “motion pictures” in the AAT, which is placed in several hierarchies, including under a generic “visual works” hierarchy, under “moving images,” under “information artifacts by physical form” and under “literary and performing arts works.” Warrant was found for the use of the term “motion pictures” in all of these contexts.

***Associative Relationships**

Finally, there are associative relationships between concepts, which are relationships that are closely related, and must be clear and direct, but not they are not equivalent or hierarchical. The relationships are also reciprocal – each term points back to each other in a relationship.

A benefit to these associative relationships is that they can link concepts in totally different hierarchies. This can also be done to alleviate confusion with terms. In this example, again for the record for “conservation scientists,” there are two associative relationships – a “meaning/usage overlaps with” relationship to “conservators,” under the “people” hierarchy, and a relationship to the practice or study of “conservation.” Meaning: conservation scientists practice the discipline of “conservation.” Reciprocally, “conservation” is practiced by people who are “conservation scientists.”

***Usage**

Usually, catalogers of cultural objects will want to use more than one KOS, or vocabulary. It’s rare that a single vocabulary would provide a full set of terminology needed to index a large set of cultural heritage data. This of course depends on the scope of content, the intended audience, the granularity needed, the authoritativeness desired, and the language. Despite the fact that try to be as open and as accommodating as possible when it comes to adding new terms to the Vocabularies, we often recommend using a local thesaurus in conjunction with our Vocabularies.

How people use (or do not use) our vocabularies is also of great importance to us, because we want to expand in any area that needs work. Many use our vocabs through collection management systems that have one or more of the Vocabularies built into them. Some implement our vocabs into their own systems. Many simply use our website as a lookup, to find Subject IDs for concepts, and copy/paste those IDs into their cataloging records. Many use our linked open data privately – though some display it publicly.

*Here are a few AAT-related examples that ARE publicly visible – Europeana links their classifications to AAT

*The Yale Center for British are links subject term to AAT, places to TGN, and artists names to ULAN.

*The RKD, who has provided our Dutch AAT translations, also links to AAT and ULAN

*...with a link back to AAT as an external thesaurus

*The AAT Taiwan was created by our translation partners at Academia Sinica, including Sophy Chen

*The AAT in Spanish was a long-term project based out of Santiago led by Lina Nagel whom some of you probably know, as well.

*I show these only to note that we are constantly trying to improve the vocabularies, and that includes access to them. I'll speak more on the AATs content in the next presentation, but I hope this short introduction to KOS's led naturally to our work in the Vocabularies.