Developing a New Thesaurus
for Art and Architecture

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ABSTRACT
THE *ART AND ARCHITECTURE THESAURUS,* currently consisting of
almost 40,000 terms, is midway in its development. Methods for
constructing the thesaurus were modeled on existing standards and
on other thesauri such the National Library of Medicine's *MeSH
Thesaurus.* It was designed to provide the "hinge" between the object,
its images, and related bibliographic material. In the decade since
it was begun, however, attitudes toward the use of terminology to
describe visual images and museum objects have changed, impelling
AAT constructors to develop policies that would make the thesaurus
flexible enough to meet the needs of a new generation of database
producers. This article describes the processes and policies that were
developed to construct a language that would represent knowledge
in the field of art and architecture as well as be surrogates for the
images and objects being described. The *AAT's* presentation of an
"atomized" or faceted language is detailed.

INTRODUCTION

In 1979, when the meeting was held that resulted in a proposal
to develop a new art thesaurus, vocabulary control in the field of
art and architecture was extremely limited. Yet this field had a long
history of documenting its objects of study. A strong organization
of art librarians, the Art Libraries Society of North America (ARLIS/
NA), had existed for almost a decade. The Research Libraries Group

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(RLG) had organized the Art and Architecture Program Committee (AAPC) which comprised a growing group of the largest and most prestigious art libraries in the country to advise RLG in this field. A number of indexing and abstracting services existed, some of them decades old. In addition to these, there were visual resource collections (slides, drawings, and photographs), archival collections, and museums, all of which cataloged art objects, their surrogates in picture form, or documents related to art.

Most art librarians, whether cataloging on RLG's Research Libraries Information Network (RLIN), the Online Computer Library Center (OCLC), or other bibliographic utilities, used *Library of Congress Subject Headings (LCSH)* as a source of subject terminology although there was general dissatisfaction with its coverage in the field of art and architecture. Some art libraries, especially those with old and large collections, had developed their own subject authority files or had enhanced *LCSH* with additional headings according to their needs. The indexing and abstracting services, most of which were automated to some degree, had their own subject lists. Visual resource collections, archives, and museums almost all had manual systems with either no or little subject access and no control of their subject terms.

The advent of the large automated bibliographic utilities, the stricter use of the MARC format in automated cataloging, and the emergence of the microcomputer encouraged the proliferation of online databases and tighter control of collections of materials, whether books, journals, or objects. Automation also allowed vast quantities of data to be stored and retrieved easily and cheaply, and there was the promise of relational databases in which scholars could link a variety of information within one system. All of this new-found functionality had a significant influence on the move toward the automation of collections of materials in the field of art and architecture.

It is often frustration that serves as the catalyst for change. In 1979, Dora Crouch, an architectural historian and professor at Rensselaer Polytechnic Institute in Troy, New York, found herself increasingly frustrated with the constant difficulties she encountered in trying to assemble slides for her lectures. To solve this problem, Crouch called a meeting in February 1979 of archivists, librarians, prints and drawings curators, and indexers in order to initiate the Universal Access System for Slides (UAS). During this and a subsequent meeting in May 1979, the need for a controlled vocabulary, or thesaurus, was seen as the first and necessary step toward a system for the control of visual resource collections.

A thesaurus would provide for the consistent representation of information by determining the preferred ways of referring to

concepts, bringing together synonyms, and noting other relationships such as broader and narrower terms. It would lighten the burden of indexers and catalogers and bring about the most comprehensive retrieval of information possible on a particular topic by linking together terms whose meanings are related.

The May meeting included new participants: Pat Molholt, associate director of Libraries at Rensselaer, and this author, executive editor of *RILA (International Repertory of the Literature of Art)*. Discussion focused on the need for a means to use the latest technology in these computerized cataloging and indexing projects. Henry Millon, dean of the Center for the Advanced Study of the Visual Arts (CASVA) at the National Gallery of Art, who was unable to attend, sent his recommendation for the ideal thesaurus. His concerns summarized the issues addressed by the committee. He wrote:

> A thesaurus for computer needs to be arranged hierarchically, so that it collapses within itself, to make a nest of terms. This is a key problem in making subject categories. Designing such a thesaurus will take real collaboration among architectural historians.

In this statement Millon identified key elements that became guiding principles in the development of the *Art and Architecture Thesaurus (AAT)*—that it should be hierarchically structured and that it should be based on the collaboration of scholars in the field. Millon's understanding and forethought regarding the pivotal role of his colleagues gave him a critical role as chair of the *AAT's* Architecture Advisory Group which was established in 1983 to review and guide *AAT* research and production.

At the time, most thesauri were strictly alphabetical lists of terms, although they contained rudimentary hierarchical structures with broader and narrower term references. They were usually constructed by indexers or librarians to suit the indexing and cataloging needs of a particular application, and their compilers did not often seek the advice of their scholarly communities. As we enter the 1990s, we are witnessing a move toward natural language system interfaces which require sophisticated concept and term mapping. It is actually becoming more essential to have well-structured hierarchical thesauri mounted within natural language processors to form the basis of semantic networks. Millon's "nest of terms" was not far off the mark.

As it happened, the Universal Access System never materialized, and the group disbanded after the second meeting, but its momentum and the energy it had germinated was captured by the formation of the *Art and Architecture Thesaurus*. A trio from the UAS meeting consisting of Pat Molholt, Dora Crouch, and this author set to work to prepare grant proposals and to plan the thesaurus.

Our first grant, received from the Council on Library Resources

in early 1980, enabled us to investigate and establish the need for an art and architecture thesaurus. This work prepared the way for the filing of subsequent grant proposals to other funding agencies. The resulting report, *Indexing and Abstracting in the Arts: A Survey and Analysis,* was finished later that year and was made available through the ERIC document service (Crouch et al., 1981). The report detailed the status of subject indexing lists in the field of art and analyzed each of the major lists. It concluded that, while each was tailored to meet the needs of its own project, none was adequate in itself to provide the comprehensive thesaurus needed for the whole field. It also noted a willingness on the part of the persons who had been approached to cooperate in the production of a new thesaurus.

In September 1980, a one-year planning grant from the National Endowment for the Humanities (NEH) was received, followed by a second grant for 1981-82 to construct the architecture section. Rensselaer became the administering institution for the grants and agreed to give the infant project a home in its Folsom Library.

The thesaurus was envisioned as a set of terms that would include the history and the making of the visual arts; that is, it would form a hinge between objects and their replicas or representations and the bibliography about them. Its coverage would be geographically and historically comprehensive but would not include terminology for iconographical themes. The terminology would be hierarchically organized, based on the model of the National Library of Medicine's *Medical Subject Headings* (NLM, 1990), and optimized for computerized use. Scholars in the field would review the work at all stages.

The initial task was to gather terminology from existing glossaries, subject lists, and thesauri. This underscored yet another basic principle of the *Art and Architecture Thesaurus;* that it would build upon vocabulary already in use in the field. In this way, we hoped to maximize its relevance and enable indexing and cataloging organizations to absorb the new thesaurus easily. With this in mind, priority was to be given to *LCSH* as a source for *AAT* terms.

As the work progressed over the next decade, however, more and more differences began to emerge between Library of Congress Subject Headings and the developing *AAT.* Basic differences in the way terms were chosen and structured were analyzed in a 1983 article in which issues such as inverted versus natural word order as well as other more serious problems that violated thesaurus standards for term construction (such as inconsistencies. in LCSH's syndetic structure) were raised:

—The *Art and Architecture Thesaurus* is hierarchically arranged
   according to a rigorously constructed, internally consistent

structure. This allows terms to be graphically displayed in a nested conceptual array with terms that are broader and others that are narrower or more specific in meaning (see Figure 1 for an example of the *AAT's* hierarchical structure). *LCSH* terms are available only in an alphabetical array, leading to omissions and inconsistencies in the syndetic structure.

—*AAT* terms are chosen from available sources to make a conceptual whole within their hierarchical arrays. This does not mean that there are not general terms in the *AAT.* "Houses" is an available term as are numerous narrower terms related to it such as "country houses" and "bungalows." *LCSH* terms are often general because they are used to describe the subject of whole books rather than a specific object in an image or the subject of a periodical article. They are also generated only when a need for a term arises. Thus many terms available in the *AAT* will not be found in *LCSH*.

—Rather than expressing single concepts, *LCSH* terms are often "precoordinated"—that is, they are complex concepts put together at the time the heading is generated, and they remain in the authority list in that specific combination. For example, "Wooden doors" is an *LCSH* heading as is "Renaissance painting." In the *AAT,* because of its faceted structure, "wood" is found in the Materials hierarchy, "doors" in the Built Works Components hierarchy, "Renaissance" in the Styles and Periods hierarchy, and "painting" in the Disciplines hierarchy. Indexers are free to use terms separately or to combine them into headings that are precoordinated at the time of indexing to match the item they are describing (Petersen, 1983).

Despite these divergencies, the *AAT* still sought to give priority to *LCSH* terms because of *LCSH's* long-term preeminence as an indexing vocabulary, so long as the term form met the strict requirements for thesaurus construction set out in national and international standards. However, when necessary, *LCSH* terms were modified. Each concept in *LCSH,* whether adopted intact or modified, was noted in the corresponding *AAT* term record. It was hoped that this would enable libraries that used the *AAT* to track their older bibliographic records containing *LCSH* headings and to connect bibliographic records for like subjects.

After gathering the terminology, all the categories or possible hierarchies that would be necessary to cover the field of architecture and associated areas were identified and a computer program was written to generate term sheets for each term from the computerized lists that had been generously supplied to the *AAT* by the *Journal of the Society of Architectural Historians,* the *Avery Index to*

Architectural Periodicals, the Picture Division of the Public Archives of Canada, *RILA,* and the *Architectural Periodicals Index* of the Royal Institute of British Architects. Since there was no computerized *LCSH* file available at the time, relevant terms had been painstakingly identified in the printed *LCSH* volumes and a computerized file made.

VD.1	drawings
VD.2	<*drawings by method of representation*>
VD.3	composite drawings
VD.4	cutaway drawings
VD.5	exploded drawings
VD.6	pictorial drawings
VD.7	scale drawings
VD.8	full-scale drawings
VD.9	<*drawings by method of projection*>
VD.10	axonometric drawings
VD.11	dimetric drawings
VD.12	isometric drawings
VD.13	oblique drawings
VD.14	elevation oblique drawings
VD.15	cabinet oblique drawings
VD.16	cavalier oblique drawings
VD.17	general oblique drawings
VD.18	plan oblique drawings
VD.19	trimetric drawings
VD.20	orthographic drawings
VD.21	auxiliary views
VD.22	elevations
VD.23	exterior elevations
VD.24	interior elevations
VD.25	laid-out elevations
VD.26	partial elevations
VD.27	half elevations
VD.28	sectional elevations
VD.29	<*ship elevations*>
VD.30	body plans
VD.31	outboard profiles
VD.32	rigging plans
VD.33	sail plans
VD.34	sheer plans
VD.35	multiview drawings
VD.36	plans
VD.37	<*area plans*>
VD.38	city plans
VD.39	site plans
VD.40	block plans
VD.41	grading plans
VD.42	landscaping plans
VD.43	planting plans
VD.44	traces (area plans)
VD.45	<*building plans*>
VD.46	floor plans
VD.47	ground plans
VD.48	typical floor plans
VD.49	foundation plans

May be used in combination with other descriptors (e.g., Japanese + watercolors; ink + drawings; brush + drawings; landscape + drawings).
Source: *AAT Thesaurus,* 1990.

Figure 1. Example of *AAT*'s hierarchical structure

This first gathering of potential candidate terms for the *AAT* resulted in a stack of approximately 30,000 separate term sheets. The

terms were studied for overlaps and omissions as well as style of headings. Term sheets for like concepts were merged, and the sheets were arranged in rough stacks according to about eighteen hierarchical categories.

The next job was to arrange each stack of term sheets into hierarchies, a process called "shingling." By May 1983, a great deal of progress had been made. The first rough hierarchical arrangements were completed, and the staff began to edit them.

It had been thought that the matching and merging task would generate every known term for the cataloging and indexing of architectural materials. However, the most striking fact that emerged from this first attempt to create hierarchies was the presence of large gaps throughout. The tens of thousands of term sheets that had been generated did not, in fact, provide a complete set of terminology. The explanation was twofold. First, when terms that have been developed for an alphabetically arranged list are rearranged by concepts, missing terminology quickly becomes apparent. As Molholt said: "When the parts of a bicycle are laid out by size it's hard to see what may be missing. When those parts are laid out in the form of a bicycle, missing parts are easy to detect." The second reason for gaps was that most subject lists derived from indexing and cataloging systems contain only those terms needed to index or catalog actual documents or objects encountered.

To gain some idea of the proportion of the problem, a small experiment in "infill" was conducted; that is, terms felt to be absolutely necessary to provide a comprehensive set that would be acceptable to the scholarly community were added to one subsection of one hierarchy. That section more than doubled in size as a result. This was a major watershed for the *Art and Architecture Thesaurus* for it was now clear that the original set of lists could not be depended upon to provide a comprehensive set of terms in a hierarchical array. The scholarly mandate of the *AAT* required a decision to search out missing terms in reference works and scholarly monographs, a costly and labor-intensive task.

A number of other important problems were identified in this early stage, including issues of term form, pre- and postcoordination, and subdivisions. It quickly became apparent that many of the combinations of terms provided from the original sources could not be maintained in the *AAT* because of enumeration problems. The most frequently used combinations in the indexing of art and architectural materials were those of style or period and object name, or material and object name, such as "Victorian cottages" or "marble floors." To have enumerated all such possible combinations, the size of the thesaurus would have burgeoned uncontrollably. It was relatively simple to make a first decision to group style and period

and material terms in what were then called "quasi-hierarchies" of their own rather than keep them precoordinated with other terms. Indexers and catalogers could then choose their own combinations as required using a standard set of rules and instructions. However, as work progressed, the more difficult task of fully articulating rules for other types of pre- and postcoordination had to be undertaken.

Another problem was the fact that there is often no "real" indexing term to use as a broader or collocating term under which to array a group of like terms or siblings. The *AAT* followed the lead of some other thesauri in establishing node labels or "guide terms"—terms within brackets that express the broader concept but are not suitable as indexing terms.

We also found, surprisingly, that organizing terms into hierarchies limits their classification as well. The semantic network of a hierarchical structure stretches just over broader and narrower terms and through synonyms and near variant lead-in terms. Building a network of related terms—the next step in the process and a feature that will be added once the *Art and Architecture Thesaurus* is completed in the next few years—takes on additional significance, especially for the representation of knowledge in a field. In a sense, one builds alternative hierarchies from the paths made by related terms. For example, in the architecture hierarchies, all single architectural structures are classified within their genus-species relationships—"chapel" is a type of "church" as is a "cathedral." Through related term references, one is able to add the ability to construct the parts of the whole. "Pews" and "pulpits" will point to "chapels," "churches," and other religious structures.

To sum up the basic operating principles developed for the *Art and Architecture Thesaurus* in this first stage, the following points can be enumerated:

—The *AAT* would be constructed using standard thesaurus conventions, such as those outlined in the American National Standards Institute's (1980) *Guidelines for the Construction of Monolingual Thesauri.*

—It would be structured hierarchically, drawing on the model of *Medical Subject Headings MeSH* for its tree structures and alphabetical displays.

—It would be based on terminology that is current, that is warranted for use in standard literary sources, and that is validated by the scholarly community. If possible, it would incorporate existing lists that may be enhanced or modified.

—It would be responsible to its constituency and take cognizance of the needs of that constituency in the depth and scope of its terminology.

—The data comprising the thesaurus would be made available in

machine-readable forms lending themselves to a variety of
automated systems.
—The necessary financial commitment would be sought, not only
to build the original vocabulary but to maintain it over the long
term.
—A commitment would be made to the user groups that the
vocabulary would not be changed arbitrarily. Although change
is inevitable, it should be planned for and promulgated with the
agreement of the user community.

Scholarly input has turned out to be crucial to the *AAT*. Its staff
is composed of a combination of art historians and information
scientists. All of the editors who choose the terminology and construct
the hierarchies are art historians and/or architects. Most of the
authority work on the terms and the management of the thesaurus
system is done by information scientists/librarians. Regular editorial
meetings to develop policies and to review work in progress include
both elements of the staff.

During the editorial process, editors often call on outside experts
to answer specific questions about terms. During the course of
authority work on terms, scholarly literature as well as general
reference works are consulted to make sure that the term is in use
and to determine its scope and definition.

Scholarly review groups are assembled during the final stage
in the construction of hierarchies. Twenty-eight of these reviews,
lasting from a half to two and a half days, have occurred between
1983 and 1989. The most cohesive and enduring of the review teams
is the Architecture Advisory Group, chaired by Henry Millon,
comprising five other scholars and architects representing all elements
of the field. This group met seven times between 1984 and 1989 to
review the architecture hierarchies in their development and has
played a major role in the way these sets of terms are structured
and chosen.

Work with the scholarly community and with a growing group
of *Art and Architecture Thesaurus* test users has underscored the
conviction that, while comprehensiveness and standardization of
vocabulary is an important goal, successful thesauri can be neither
stagnant nor dictatorial. They must be able to respond to the living,
evolving language from which they are drawn—to assimilate both
the language of scholars in the field and the more popular language
found in basic literary sources. The *AAT* seeks to maintain a delicate
balance between providing standardization of a body of terms that
is as full a representation of an area or field as possible, and responding
to patterns of usage and the subtleties of language. It must be
understood that total comprehensiveness is not truly possible, given
the restraints of time and resources and the changeable nature of

language itself. A thesaurus must be seen as a living tool; a body of language that can be added to and changed as it responds to the needs of its users.

It was only with the advent of J. Paul Getty Trust support in 1983 that resources became available to carry out some of the more important methodological decisions that had been made. Prior to this, with a very small staff and with the NEH mandate to complete the architecture section in a year, there had been no opportunity for the rigor that was subsequently applied to the research aspects of choosing terms and conceptualizing them into hierarchies. From this point on, the rule of literary warrant was emphasized for each term. Rather than accept terms, even with modifications, as they were received from various indexing sources, each term was also researched in several reference sources, including scholarly monographs, glossaries, and catalogs. A record was kept of all sources consulted, and definitions of the term as found in the sources were noted. Variant forms were included as lead-in terms. Definitions or scope notes were added to many terms. These data became the basis for the *AAT's* alphabetical index entries (see Figure 2).

AAT TERM

LINE NUMBER ———— **elevations**   MAJOR SOURCE CODE

ALTERNATE TERM ————— VD.22   (A,B)

————ALT elevation

————— SN Drawings showing the vertical elements
SCOPE NOTE —| of a building, either exterior or interior,
            | as a direct projection to a vertical
            |__   plane. (DAC) ————————————— SOURCE OF SCOPE NOTE
————— UF drawings, elevation
LEAD-IN TERMS —| elevation drawings
               |__   orthographs
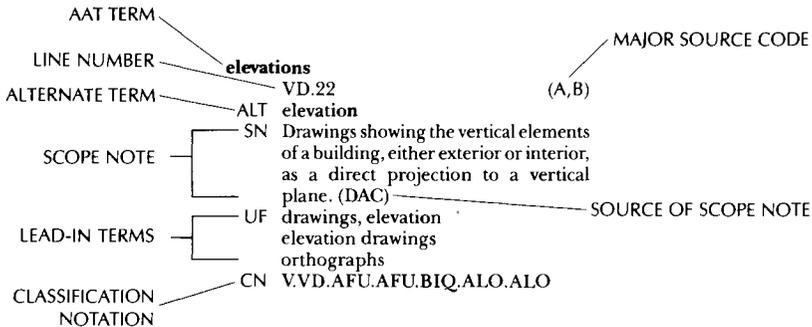————— CN V.VD.AFU.AFU.BIQ.ALO.ALO
CLASSIFICATION ——
NOTATION

Figure 2. Sample from alphabetical display

In 1985 the *Art and Architecture Thesaurus* entered a new phase with the formation of the Getty Art History Information Program (AHIP) under the direction of Michael Ester. Half a decade of work had not generated a product that could be officially distributed. With AHIP's help, a series of more realistic goals were set. The scope of

the thesaurus was narrowed to focus on Western art and architecture. Work on the decorative arts and fine arts sections was suspended until architecture, and all its supporting sections, could be completed. By the fall of 1989 a contract had been signed with Oxford University Press to publish twenty-three of the projected forty hierarchies by spring 1990 (see Figure 3 for a list of *AAT* hierarchies). The publication will consist of a set of three printed volumes and an electronic edition on floppy discs.

AAT Facets and Hierarchies

Associated Concepts Facet

Physical Attributes Facet
 Design Attributes
 Design Elements
 Colors

Styles and Periods Facet
 Styles and Periods

Agents Facet
 People and Organizations

Activities Facet
 Disciplines
 Functions
 Events
 Processes and Techniques

Materials Facet
 Materials

Objects Facet
 Built Environment
 Settlements, Systems and Landscapes
 Built Complexes and Districts
 Single Built Works and Open Spaces
 Building Division and Site Elements
 Built Works Components

 Furnishings and Equipment
 Tools and Equipment
 Measuring Devices
 Hardware and Joints
 Furniture
 Furnishings
 Personal Artifacts
 Containers
 Culinary Artifacts
 Musical Instruments
 Recreational Artifacts
 Armament
 Transportation Artifacts
 Communication Artifacts

 Visual and Verbal Communication
 Image and Object Genres
 Drawings
 Paintings
 Prints
 Photographs
 Sculpture
 Multi-Media Art Forms
 Communication Design
 Exchange Media
 Book Arts
 Document Types

Figure 3. *AAT* facets and hierarchies

In January 1986, this author assumed the full-time directorship of the *Art and Architecture Thesaurus*. Pat Molholt returned to her full-time position at Rensselaer, although her association with the *AAT* remained close. The *AAT* moved to a long-term site inWilliamstown, Massachusetts, close to its sister AHIP organization,

RILA, in summer 1986, where it will remain until its last anticipated move in the mid 1990s to the permanent Getty facility under construction in Brentwood, California.

From the earliest days of the project, financial support was only one kind of support sought by the codirectors. The *Art and Architecture Thesaurus,* as a thesaurus that is independent of any particular application, is almost unique. It must provide for a wide range of environments, building a vocabulary that fills the needs of such different indexing systems as those for books and periodicals, images, and museum objects. From the beginning, the *AAT* set itself the task of becoming the standardized vocabulary for these varied constituencies. In order to achieve this, the support of these constituencies had to be sought. Preparing for the NEH grant proposals brought the endorsements of the Society of Architectural Historians, the College Art Association, and ARLIS/NA (Art Libraries Society of North America). In addition to these, many other elements of the art and architecture community that might benefit from the *AAT* were canvassed for advice and endorsements.

At the 1982 ARLIS annual conference, an *Art and Architecture Thesaurus* advisory committee was formed with the aim of serving as a liaison between the *AAT* and the ARLIS membership. The previous year, the Subject Heading Task Force of the Art and Architecture Program Committee had officially endorsed the *AAT.* At their meeting during the 1982 ARLIS conference, Molholt and Petersen requested further support of AAPC suggesting that the *AAT* might serve as an alternative subject heading authority file in RLIN (RLG's Research Libraries Information Network). AAPC's response was to form a Subcommittee on AAT Implementation which has been working with RLG staff toward this goal since 1984. The *AAT* was mounted as an authority file on RLIN in June 1990. *AAT* records in the MARC Authorities Format will be available as well as the ability to scroll through complete hierarchies.

It was not only endorsements and working groups that influenced the direction of the *Art and Architecture Thesaurus.* The first critique of the project was delivered by Trevor Fawcett in his keynote speech at the International Seminar on Information Problems in Art History at Oxford in 1982, the precursor to the 1984 Pisa Conference. Among his recommendations were that the *AAT* should be highly prescriptive; with detailed instructions for the application of terms; that there be copious scope notes; and that there be a high degree of specificity qualified by clearly stated constraints. He also stressed the importance of having the *AAT* accepted by the major producers of bibliographic records. Prophetically, each of these recommendations has proven to be a necessity. Everyone has asked for greater comprehensiveness in the choice of terms and for definitions and scope notes to lay

out clearly the meaning of the terms. Work with test users has emphasized the necessity for training and for guidelines in the use of the *AAT*.

Seeking the acceptance of the major producers of bibliographic records necessitated several years of preparatory work. Although producers of indexing services like the *Avery Index to Architectural Periodicals* and *RILA* have had little problem in adopting the *AAT* (and indeed have been using the terminology in draft form since late 1984), the art library community, which expressed the most dissatisfaction with its existing subject heading list, LCSH, and had expressed the most need for an art and architecture thesaurus, was the least prepared to adopt it. Millions of its records already existed in national bibliographic networks with LCSH headings. Not only would it be difficult to switch to a new subject authority list, but the costs involved in training catalogers and in having to generate more specific headings to describe the contents of books would be considerable.

In the course of mapping the *AAT* into MARC, it became clear that the USMARC Authorities Format would need modifications and the addition of new fields to hold and display hierarchically organized thesauri. The *AAT*, with the support of the AAPC, proposed and successfully shepherded a set of modifications and new fields through the Library of Congress Network Development and Standards Office, and then through the national committee that passes on changes to the MARC format, the MARBI (Machine Readable Bibliographic Information) Committee.

In addition to requiring changes to the MARC Authorities Format, the topical subject field (650) in MARC presented a problem. It was inadequate for coding terms drawn from a faceted thesaurus. This problem was resolved through the implementation of a new subject field (654) for faceted thesauri like that of the *AAT*. The new field was passed by the MARBI committee in January 1988 and allows catalogers to code and identify uniquely each term that is a component of a more complex heading, noting the facets from which the terms come and also coding a "focus" term—i.e., the term that is the main concept of the indexing string. Seen first as a means of solving the problem of enumeration caused by the combining of concepts like styles and object names, the *AAT* arrived at its current faceted structure slowly and with some prodding from classification experts.

Some light on the problem had been shed at meetings in London in 1984 with Jean Aitchison, a British thesaurus expert, and then at a gathering of British librarians and classification experts hosted by the British Architectural Library at the Royal Institute of British Architects (RIBA). British classification theorists have led the way— following S. R. Ranganathan in the 1930s—in the movement toward

the classification of knowledge into faceted categories. Facets are seen as homogeneous, mutually exclusive units of information which share characteristics that demonstrate their differences from each other. For example, materials are different from the objects of which they are comprised; each is considered a different facet of information. At the RIBA meeting, the simple alphabetic listing of hierarchies hitherto developed for the *AAT* was roundly criticized. Hurried meetings with some of the attendees at this meeting, especially one or two who had worked with the Bliss Classification System, resulted in a rough arrangement that started with the most abstract concepts and proceeded to hierarchies containing terminology for styles and periods of art, agents, activities, materials, and then object types.

The development of the *AAT's* faceted classification scheme has been continually refined. In 1989, a classification notation was developed that provides a unique code for each term. The code places a term in its facet and hierarchical location and allows for the machine reconstruction of the hierarchy and for automatic explosion of terms for researchers needing to broaden searches.

With pressure building on the *AAT* to distribute its terminology to the many automated database producers (especially slide librarians and archivists, who were badly in need of it), at the end of 1984 it was decided that a small test group of *AAT* users should begin to apply the terminology in their databases. The first seven hierarchies, which were then considered completed in first draft (the Styles and Periods, Drawings, Document Types, and the four architecture hierarchies), were distributed to about twelve organizations that had requested them. By 1989 the test user group had grown to over 150 organizations. It continues to grow at the rate of about five new users per month. This process has had a two-way benefit. Indexing and cataloging organizations in the field of art and architecture which were just beginning to build online databases needed a controlled vocabulary, and the *AAT* needed to find out if the vocabulary it was building was adequate and useful.

In spring 1988, visits were made to over fifty *AAT* users to better understand what kinds of organizations they were, what computer systems they used, and how they were making use of the thesaurus. *AAT* users at this initial phase tended to be those handling architectural and archival information, not surprising given that these sections of the *AAT* were the first constructed. There is an especially strong contingent of archival and visual materials collections among them. Archives and slide and photograph collections have little subject access to their manual systems; they are therefore more open to new thesauri as they begin to automate their collections. The *AAT* has worked with both the Society of American Archivists and with the Visual Resources Association to provide for the special needs

of both of these fields in the areas of subject terminology, giving workshops and demonstrations and meeting with groups within these societies to develop particular areas of the thesaurus.

Although *AAT* users employ a wide variety of computer systems, most are microcomputer based. The survey has helped to plan for the types of machine-readable distribution of the *AAT* that will be most desirable and has pointed out that users will need software and training in mounting the thesaurus in their systems.

Through the 1988 survey—and through personal contact with a number of actual and potential *AAT* users—a clear sense of the need to provide guidance and training in the use of controlled subject vocabulary has developed. Guidelines ranging from general rules on subject analysis and term selection to the use of *AAT* terms in complex indexing systems are needed. A series of training workshops that began in 1987 will be expanded to reach all constituents who need such guidance. The *AAT's* primary focus toward its users has tended to be one of openness and flexibility: openness to a variety of information systems and their particular needs and flexibility to change the *AAT* as required by both, the user community and new developments in the field of information science. The *AAT*/user liaison will continue to be an indispensable element of the long-term maintenance and growth of the thesaurus.

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