# It Begins with the Cataloguer: Subject Access to Images and the Cataloguer's Perspective

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Analyzing the subject matter or iconographic content of images has a long and distinguished history stretching back to the pioneering efforts undertaken by scholars such as Cesare Ripa in the seventeenth century.[1] From such beginnings, numerous more or less systematic attempts have been made to develop structures and approaches for classifying image content in a number of disciplines, one of the most recent being that of art history.

Most cataloguing systems include one or more metadata elements or database fields for content or subject classification, and the relative position of this category or element within the overall structure of the system is usually indicative of its importance in the entire cataloguing process. A number of recent studies have shown the significance of subject access to images and the importance of this metadata element in the electronic environment.[2]After the element of creator/artist/maker, that of content or subject matter appears to be the most widely used in online queries for art-historical material. In other words, many end-users tend to search for art images using the search criteria *who* created the work and *what* is the work *of* or *about*.

The process whereby the subject matter of an image is described or catalogued in an objective textual description is complex. I would argue that, of all the different stages involved in creating access to an image, that of cataloguing is the most significant. The cataloguer or iconographer acts as a conduit between the work of art (or a visual surrogate of it) and the end-user or researcher. Online access to the work of art or its content is only as good as the work done "behind the scenes" by the cataloguer. These two people—the end-user and cataloguer—as well as the two stages in which the image is first viewed by the cataloguer and later retrieved by the end-user, are totally independent of each other and usually are separated in time and space; but they are also indefinably linked by very real levels of verbal and nonverbal communication. The cataloguer is generally the only human or subjective element involved in the classification process, and the ultimate success or failure of end-user retrieval rests with that individual. Until the time when content-based image recognition is more developed,[3] the cataloguer will remain central to the classification process, and it is only by understanding the approaches and possibilities involved in the task of cataloguing that we can improve this crucial stage of creating access to images. Despite the importance of this individual, I know of no studies on the role of the cataloguer in the classification process or on the methodology used in image classification. This essay is an attempt to describe and understand that role and that methodology.

The two elements upon which I believe good cataloguing depends are *structure* and *methodology*, and these are the focus of my analysis. *Structure in cataloguing* centers on the cataloguer's understanding of the general practices and rules of analysis and classification, as well as on his or her knowledge, expertise, and experience. *Methodology in cataloguing* is in many ways dependent on good structure in cataloguing and on the cataloguer's understanding of how to apply metadata standards, controlled vocabularies, and classification systems. Underlying both should be the goal of meeting users' needs.

**Structure in Cataloguing**

Structure for the image cataloguer has to do with the way in which content is viewed, analyzed, interpreted, and presented. A cataloguer approaches subject matter in a number of sometimes almost imperceptible stages, and these must be understood for successful cataloguing and ultimately successful end-user retrieval. The approach of a general observer, who may simply look at an image for pleasure or interest, differs significantly from that of a professional cataloguer, whose main task is to systematically analyze and classify the elements in an image for eventual use by end-users; cataloguers make end-user access possible. The cataloguer's perspective must be that of a "professional" viewer or analyst in which subjective elements are abandoned and consistency in structure and approach predominates. While there have been several studies of the psychology of perception and recognition,[4] to my knowledge none has addressed the psychological processes or methodology of the cataloguer.

**Structure in Viewing, Analyzing, and Interpreting**

Critical to understanding the actual cataloguing process is the psychology of approach—the way in which we consciously or subconsciously look at a work of art and the impact this may have on cataloguing content. The first stage in the cataloguing process begins with initial exposure to the work, one of the least understood stages in the entire process. Although this stage can have a major impact on the end result, it has never been fully researched or formally incorporated into the cataloguing process, which is usually defined as beginning with formal analysis and interpretation. Nevertheless, the initial "viewing" process—which precedes the more clearly defined and better known stage of subject analysis—is critical from the cataloguer's perspective.

Throughout the following discussion, it is important to keep in mind that the cataloguer usually works in a controlled environment in which images must be analyzed and described with little concession to casual viewing; speed is usually a significant factor. The viewing process is one in which subjective emotions can affect what is described; it is necessary to understand what we mentally do when we see a work of art and to understand how changes in this process differ between the general viewer and the cataloguer. The viewing process for the general viewer is normally one in which little structure is imposed; the cataloguer, however, must impose a degree of formality upon the way he or she views images. General viewers are free to spend as much or as little time as they want looking, and they are under no obligation to move beyond what they want to see.

Unlike casual viewers, cataloguers must train themselves to look at every work of art to be described in a consistent, ordered, and paced manner. The general viewer can dislike and mentally reject an entire work or certain elements of it or can focus only on those parts to which he or she can relate, all without affecting anybody else's perception. But a professional cataloguer's main task is to systematically record every "important" element within the work, "translating" these elements from a visual to a textual "language," to echo Patricia Harpring's observation in the preceding essay in this volume.

In viewing an image, the professional cataloguer must impose structure not only on the way in which subject matter is recorded but also on the way the work is viewed. The casual, random approach to viewing must be abandoned. The cataloguer must be aware of what is in the entire image, not just portions of it. Classification must move from a general visual analysis of the work as a whole to a detailed evaluation of its constituent parts.

In looking at Nicolas Poussin's *The Holy Family* (pl. 5), for example, a viewer's eye can immediately focus on any one of the many rather complicated visual elements in the composition. It may be the family group on the left to which the eye is first attracted, or the group of infant boys on the right, or the scene in the background of a man in a small boat ferrying a woman. The cataloguer must, however, approach the entire work in a structured and comprehensive manner, first focusing on the main subject matter and then proceeding to describe its constituent parts. Using the ICONCLASS system[5] to describe this work, a catalogue entry might read as follows:

73B8211 Holy Family with John the Baptist, Elizabeth present

33A14 embracing (John the Baptist and Jesus)

73B2 adoration of the Christ-child

92D1916 cupids, 'amores,' 'amoretti,' 'putti'

31A5463 towel

41A2415 jug and basin

41A7751 basket

41A645 ruins

41A64 garden ornaments, ewer

41A773 container of ceramics, jar, jug, vase, pot

25I2 village

25G3 tree

43C212 racing on an animal mount

46C1111 crossing a river

This entry deals primarily with the main subject of the Holy Family and the significant interaction (embracing) between the two main figures in this group, the Christ child and the infant John the Baptist. The next important visual element is the group of putti and their interaction (adoration) with the Holy Family. From here, classification proceeds in a clockwise direction to the other elements within the composition.

Such an approach attempts to include all the main visual elements that might be of interest to a researcher. Doubtless, classification could proceed further to include details such as the types of flowers and plants, but a decision has to be made as to what is of potential value to users and what is merely staffage—that is, visual "accessories" with no particular thematic significance; of course, time and money also play an important role in limiting the extent of classification in any given project.

Associated with the ICONCLASS alphanumeric notations (which can, and indeed probably should, be "hidden" from the end-user) and their textual correlates is a rich set of keywords, which is really what forms the searchable element or interface to images indexed using the ICONCLASS system. The keywords for the ICONCLASS notations listed above include the following:

> Bible, New Testament, Christ, infancy, Christ-child, Mary (Virgin), Joseph (Saint), Holy Family, John the Baptist (Saint), Elizabeth (Saint), human being, biology, mind, spirit, expression, face, mouth, lips, pressing, kissing, society, civilization, culture, housing, garden, ornaments, cloth, toilet articles, bathing, washing, hygiene, care, body, human figure, corpo humano, man, woman, jug, wash basin, bathroom, ancient history, classical antiquity, history, mythology, gods, heaven, serving, Cupid, Love, offspring, companion, train (retinue), cupid, village, landscape, world, earth, nature, recreation, movement, speed, games, exercise, sport, animal, riding, race (contest), transporting, land, road, ford, crossing a river, traffic

These keywords include high-level concepts such as "society," "civilization," "culture," and "classical antiquity" that an end-user would rarely use as search terms. Nevertheless, such keywords can offer a way to group items by broad concepts and are automatically carried along with more specific keywords such as "kissing," "village," "crossing a river," and so on.

Cataloguing the same image using the Garnier system[6] presents us with a different approach, which is interesting to compare to the ICONCLASS method; in Garnier, controlled terms are used rather than alphanumerical notations linked to textual correlates. Although the Garnier system provides less detail than ICONCLASS with regard to the main iconographic theme (the Holy Family), like ICONCLASS it moves from broad themes, such as "biblical scene," to specific details, such as "boat" and "horse," as shown below:

> Scène biblique
> Sainte Famille[7]
> Sainte Jean Baptiste (le Précurseur)
> putti
> extérieur: décor d'architecture
> rivière
> barque
> arrivée
> cheval
> cadre urbain

How do we structure an approach to viewing an image as distinct from structurally classifying its content? The cataloguer first has to control the tendency to describe by intuition and instead structure his or her personal perceptions. Structure enables the cataloguer to methodically, consistently, and comprehensively view and record every significant element in the work. Visual content can be "read" as if it were text. When reading a sentence, for example, the reader may approach the words from left to right, right to left, or top to bottom, depending on the language. But in every case the reader reads in a consistent and methodical manner, never beginning from a randomly selected word in, for example, the middle of a sentence. In the realm of images, it is possible to read from "the beginning" as well. It is possible, however, to begin "reading" a visual work in the middle, as in Islamic manuscript illuminations showing Muhammad resolving the dispute at Ka'ba, where the central focus is the figure of Muhammad and the secondary material revolves around him; or in crucifixion scenes, where the main subject in both visual and thematic terms is the figure of Christ on the cross, which more often than not occupies a central position in the work. For works in which the main element is not at the center of the composition, the approach of "reading" from left to right or right to left or top to bottom can be used. This approach can vary from work to work and clearly depends on the nature of the particular image; the point is that there is an ordered manner in viewing and describing content.

One of the most structured approaches to reading an image is the Index of Christian Art at Princeton University.[8] For example, in describing two panels from the bronze doors created by Andrea Pisano in 1330 for the Baptistery in Florence (figs. 18, 19), the Index of Christian Art employs a combination of subject terms and free-text descriptions, as shown in the following example, which depicts a typical Work record for the two panels, one showing the body of John the Baptist being borne to burial, the other the actual burial. Controlled keywords and keyword phrases are used in the Subject field, and free-text descriptions appear in the Description field.

| | |
|---|---|
| **Original Location** | Florence: Baptistery |
| **Name of Work** | florence Baptistery, Andrea Pisano Doors |
| **Medium** | metal |
| **Object Type** | door |
| **Material** | bronze-gilt |
| **Subject** | right valve, zone 5 |
| **Subject** | John Baptist: borne to burial<br>John Baptist: burial |
| **Description** | John Baptist: borne to burial — body of John carried by six disciples;<br>John Baptist: burial — body of John places in sarcophagus, one holding candle; canopy above |
| **Artist** | Andrea Pisano |
| **Style** | Gothic |
| **School** | Italian, Tuscan, Florence |
| **Date** | 1330 |
| **Bibliography** | Kreytenberg, G., *Andrea Pisano* (1984), figs. 20–21<br>Moskowitz, A., *Sculpture of Andrea and Nino Pisano* (1986), figs.24–25 |

The Index of Christian Art subject authority record for the iconographic theme of the burial of John the Baptist includes the ICONCLASS alphanumeric notation, textual correlate, keywords, and bibliographic reference, in addition to the local controlled keywords ("John Baptist: burial") and other local data elements, such as the type of subject:

| | |
|---|---|
| **Subject** | John Baptist: burial |
| **Subject** | Type scene |
| **Period of Saint** | New Testament |
| **Textual Reference** | New Testament, Matthew 14:12 |
| **ICONOCLASS Notation** | 73C134 |
| **ICONOCLASS Textual Correlate** | Lamentation and death of John the Baptist |
| **ICONOCLASS Keywords** | Bible<br>New Testament<br>John 01<br>Matthew 14<br>Mark 06<br>John the Baptist (St.)<br>martyr<br>death<br>lamenting<br>burial |
| **Bibliography** | Réau, *Iconographie de l'art chretien*, II (1) 459 |

Every word in a textual sentence has to be read for sense to be made of the sentence; the same holds true for all the elements in a work of art. The initial viewing of a work of art is a process that corresponds to a great extent to the first stage in Erwin Panofsky's three levels of image description, which are discussed by Sara Shatford Layne and Patricia Harpring in their essays in this volume. (Initial viewing differs from Panofsky's "description," however, in that the viewing process need not necessarily preclude an element of analysis or interpretation.) Structure in viewing an image is a learned process that involves training the brain both to slow its natural inclination to focus on selected subjective elements and to see the entirety of the work with all of its constituent parts.

Reading an image in an orderly, structured manner can help ensure comprehensive coverage of every element from the least significant to the most important. For example, in Jan Steen's *The Drawing Lesson* (pl. 6), the work should be read first in terms of the most important element or activity in the image—the actual lesson and those involved in it. The remaining elements in the image can then be recorded in an ordered manner, from left to right, if so desired. Using a series of controlled keywords, the subject matter of this work might read as follows:

*Primary subjects:* drawing lesson; artist training pupils; studio; implements of artist; Vanitas; personification of time; personification of temporary nature of art
*Secondary subjects:* model cast; woodcut; male nude; sculpture; ox; easel; painting; musical instrument; violin; canvas; drawing; carpet; furniture; chest; still life; wreath; skull; wine; clothing; book; pipe; window; container; frame; work associated with Jan Lievens; artist, teaching; drawing; draughtsman; draftsman; workshop; studio; brush; painters' tools; pencil; charcoal

Fig. 18. Andrea Pisano (Italian, ca. 1290–ca. 1348). *The Body of John the Baptist Being Borne to Burial*. Panel from proper left leaf of the south doors, Battistero di San Giovanni, Florence. 1330, gilded bronze, inside molding: 54 x 43 cm (211/4 x 167/8 in.)

Fig. 19. Andrea Pisano (Italian, ca. 1290–ca. 1348). *Burial of John the Baptist*. Panel from proper left leaf of the south doors, Battistero di San Giovanni, Florence. 1330, gilded bronze, inside molding: 54 x 43 cm (211/4 x 167/8 in.) (provided by Colum Hourihane)

Viewing is a process that rapidly develops into the critical stage of formal analysis and interpretation, but it can occur only after all the elements in a work have been viewed and identified. Analysis and interpretation are dependent on a number of factors, the most important of which are the knowledge, skills, and expertise of the cataloguer. A great deal also depends on the nature of the material being catalogued. If the collection is more or less focused on a particular style, period, or geographic area, and the end-user is likely to have a similarly specialized knowledge, then the cataloguer also has to have more than a passing acquaintance with the subject to proceed with adequate classification. If the collection is art-historical in the broadest sense, however, with no particular focus on period, style, or geographic area, then a cataloguer with broad knowledge will offer the best results. By and large, the best art image cataloguers are generalists with a good working knowledge of most subjects; cataloguers with expertise in a particular style or period may produce records that are too narrowly focused and that even omit access points that many end-users would likely use. A general rule might be to use specialist cataloguers for specialized collections (or for specific projects with a very definite focus (for example, images of Hindu gods, seventeenth-century French decorative arts) and generalists for more encyclopedic collections.

Good subject classification demands that every important element in a work be described first; this corresponds to Panofsky's "pre-iconographic" level of pure description. Only after the first phase has been completed should the cataloguer add a level of interpretation to the objective description. It is good practice for the cataloguer to include broad concepts underlying the more obvious descriptors, thereby making available searchable terms that may not be included in the specific terms. For example, in cataloguing one of William Wegman's famous images of Weimaraners, a cataloguer might want to include keywords such as "sporting dog," "dog," "mammal," and "animal,"[9] unless such terms are already included in the syndetic structure of the thesaurus being used to assist end-users in their searches.

The cataloguer does not rely solely on what is represented in the work of art; he or she also draws on sources external to the work. External elements can come from the title of the work, the wall label in a museum or gallery, a literary work, reference books, and so on, but the most important external source is undoubtedly the knowledge from personal experience and formal education that the cataloguer brings to an interpretation or analysis of the work. In terms of access, the most immediate source of knowledge that can add to our understanding of the work is usually

the title. Even though the title may have been assigned to the work long after the artist parted with it and may bear no relation to what the artist intended, it is usually an invaluable source of information, particularly in the area of modern art. When faced with a nonrepresentational work, such as one of the abstract paintings in Richard Diebenkorn's famous *Ocean Park* series, the title adds a level of meaning that not only can be recorded in subject classification but also is more useful than simply classifying the work as "abstract" or "nonrepresentational." Even when scholars know that the assigned title of a particular work does not relate to what the work actually represents, it is important for the cataloguer to record the obsolete information. The identification of sitters can change over time,[10] yet, even when modern scholarship provides irrefutable proof of another identification, the superseded name must be recorded as well. One such work is Rembrandt's painting at the Prado in Madrid. Over time, its subject has been identified as Lucretia, Sophonosba, Cleopatra, and, more recently, Artemisia. The sitter has also been identified as Saskia van Uylenborch, the artist's wife. Data such as these should, at all times, be included in the metadata element or database field dedicated to subject matter in an information system.

Context can also add to our understanding of subject matter. This is particularly true when works are part of a narrative sequence—that is, when there is a broader context or location of which an individual work is just a part. For example, sculptural programs on the exteriors of medieval cathedrals can provide immediate clues as to the likely subject matter of an individual sequence. Prophets are frequently found in the same location, personifications are similarly grouped in relatively few areas, and general subjects are nearly always ordered in an identifiable sequence. Similarly, manuscripts such as Bibles, missals, and books of hours follow sequential patterns where context can enlighten the cataloguer as to the likely subject matter. Miniatures in such works usually relate to the text and are likely to be ordered in a set narrative.

Three additional indirect sources of information for the cataloguer involve the artist, date, and style of a particular work of art. As Christine Sundt points out in the following essay, the cataloguer can sometimes use these elements to identify or qualify content and to place the specific work within the broader framework of the artist's output.

It goes without saying that a good library of reference works appropriate to the material in the image collection is essential for every cataloguer. Encyclopedias, geographic and cultural guidebooks, and dictionaries are essential cataloguing tools. Along with the standard print publications, cataloguers should investigate the many electronic resources that are rapidly gaining acceptance and being used with greater frequency by increasing numbers of cataloguers.

**Structure in Interpretation**

Under ideal conditions, the cataloguer first views an image and interprets its compositional elements in light of his or her experience and knowledge. An art image cataloguer with a certain cultural and visual background will immediately recognize, for example, a reproduction of Leonardo da Vinci's *Mona Lisa*, a photograph of the Taj Mahal, or an image of a Native American totem pole. In such cases, recognition and interpretation are immediate (sometimes even intuitive) and nearly always based on the cataloguer's knowledge.

When recognition occurs so quickly, the cataloguer may be unaware of the actual process of interpretation; it is not until the process becomes more paced that its stages can be understood. This happens, for example, when a cataloguer does not recognize the landscape or the individual represented in a particular image. Then the process of interpretation begins consciously. There is usually little difficulty at the initial stage of analysis, which loosely corresponds to Panofsky's pre-iconographic stage. At this stage, the cataloguer works from the broadest subjects or concepts to the most detailed when these are known. When the subject matter is not known, the iconographer builds toward an interpretation using the most detailed clues in the image and approaching a broader interpretation.

One of the great problems in image classification is the inability to distinguish between subject matter and information that tangentially relates to content, such as the style or the date of a work of art. The inclusion of such incidental information in formal classification structures exacerbates the confusion. In Garnier's system, for example, style and date are included in the classification system. Style and date are metadata categories or elements that relate to object and not to subject classification. The concept of style should be included in subject classification when a work of art with a recognizable style is represented within the image being classified. For instance, the subject classification for a seventeenth-century painting depicting galleries or private collections in which connoisseurs peruse a large group of paintings or images of classical architecture by artists such as Sir Lawrence Alma-Tadema should mention the style of the paintings represented within the scene. Otherwise, the concept of style or school or date should be recorded in metadata categories (and the fields in a database or information system that correspond to those metadata categories) other than the category intended for recording subject matter.

It is easy to classify subject matter in terms of what is identifiable in an image; the two major difficulties lie in deciding what should not be included and in attempting to classify concepts that are not explicitly represented. If it is difficult to distinguish what should not be included, it may be easier to decide what should. An unwritten rule in subject classification is to include even the minutest detail as long as this detail is depicted with sufficient clarity to potentially be of value to end-users. The users' needs should always determine whether an element should be

recorded. Experience has shown that users rarely look for a single element at a time; they are usually seeking what they request in their query in combination with some unstated element or elements.

A major difficulty arises when the cataloguer is faced with the need to encode abstract concepts, ideas, or emotions—what Panofsky called the *iconology* of a work of art. A prominent characteristic of Victorian art, for example, and one that is frequently of greater importance than the recognizable elements in individual works, is the moral message or didactic purpose behind the artist's image. Objective elements in a work of art can be easily classified, but it is frequently impossible to specify exactly what was intended when it comes to the more abstract messages that the artist wished to convey. The dividing line in visual representations of emotions or abstract concepts such as despair, sadness, destitution, poverty, and isolation is extremely fine, so it is important to include as broad a range as is practical.

Cataloguers should always try to put themselves in the place of their end-users with regard to the value of seemingly insignificant elements in an image. Qualifiers such as position, detail, and relationship with other elements can be used to gauge the importance of such elements in a visual work. The argument to exclude insignificant elements is stronger when they are clearly background details or staffage. As a general rule, however, if a detail can be specified, then it should be. Moreover, details should be either included or excluded as standard practice rather than according to the likes or dislikes of the individual cataloguer.

This element of consistency is important, especially in classification systems that allow the cataloguer to enter specific details. In most classification systems, the cataloguer can enter the details of generic objects that are specific to the work being catalogued. The names of people, bridges, or cities may be listed, or the scene from a Shakespearean play, to give just a few examples. It is important in such instances to structure the details consistently and to use interchangeable international standards wherever possible.

**Methodology in Classification**

Closely related to the way in which the cataloguer approaches content is how that content is recorded and the standards that are used. The importance of standards cannot be overemphasized. For the cataloguer, standards exist both in the systems that can be used to classify subject matter and in how those data are structured within these systems. Whatever cataloguing structure, vocabulary and classification tools, and information system are selected for a descriptive cataloguing project, it is imperative that sharing information in the broader community be considered and enforced from the start.

Whereas most of the standards used to classify art-historical content have been specifically developed for this purpose (unlike the early days, when bibliographic standards were applied to visual material), many have been adopted from the broader information universe and include, for example, standards such as the *Anglo-American Cataloguing Rules*.[11]

Once cataloguers recognized that textual and visual materials are vastly different, systems of subject classification began to proliferate, and they continue to develop at an alarming rate.[12] And once cataloguers began harnessing information technology for art-historical classification, interest in classifying content was renewed, which has led to the wheel being constantly reinvented. Systems have either been collection-generated or structured independently of any particular collection of objects or visual materials. The former, which outnumber the latter, are more specific in focus, with narrower applications. The latter, which include ICONCLASS, the Garnier system, and the *Art & Architecture Thesaurus* (AAT), attempt to be much more inclusive. Increasingly, museums and image archives have been building classification systems and indexes specific to their own collections, populating them with data values taken from systems such as ICONCLASS or the AAT. Some vendors of collection management systems now offer both a thesaurus construction module and structured vocabularies (such as the AAT) "built in" to facilitate populating local authorities or classifications with terms from recognized, standard vocabularies.

Classification systems can and in fact should differ in the way in which they are applied by cataloguers and indexers, and the way in which they are made available to end-users. When used to tag or index items in an information system, classification systems and vocabularies must be rigorously applied and need not be user-friendly, except to the professional cataloguers using them. The public face of such structures must be user-friendly and easy to understand, however. ICONCLASS is an example of such a dual-natured system, where the cataloguer applies a series of alphanumeric notations or codes that would be off-putting as well as meaningless to an end-user. End-user access to these notations is made possible through a series of natural-language keywords, rather than through the forbidding alphanumeric codes.

Classification systems can use free-text descriptions or controlled vocabularies, not that the former preclude control. Each has its own particular value, and the ideal is one where both approaches are used and complement each other.[13] Free-text descriptions enable the cataloguer to give an unrivaled mental image of the subject matter of the work of art and, in particular, to describe the relationship of elements to one another within the work. The location of a particular subject in the image ("left foreground," "right background"), the relationship of elements ("to the right of," "above this," "immediately to the left of"), or colors ("yellow hat," "red wings") can be conveyed with little difficulty.

Such free-text descriptions need not be extensive and should convey only objective accounts of content. Their most obvious fault is that they introduce an element of inconsistency, in that the cataloguer is free to use natural language rather than controlled keywords or structured strings of terms.

Controlled descriptors, which are certainly the most popular means of describing visual content,[14] consist of either alphabetically arranged headings or descriptors, such as the *Library of Congress Subject Headings* (LCSH), which include some shallow hierarchical relationships but as a whole are not structured hierarchically like a thesaurus, or of terms that carry with them hierarchical relationships. These relationships range from the broad to the specific (such as ICONCLASS, AAT, and Index of Christian Art subject terms).

Individual headings from a straightforward alphabetical list might seem to be easier to apply and easier to retrieve; in reality, greater coverage and more powerful searching capabilities are possible with a hierarchically structured system, where more context is given for individual themes or concepts, and it is possible to relate elements within a broader framework.

Another aspect of end-user searching, which the other authors of this publication also mention, is the fact that elements such as titles or captions—alone or in combination with the subject matter element and other elements such as date, style, or period—are frequently employed by end-users seeking subject access to visual materials. End-user systems and user interfaces need to take this into account.

**Primary-Secondary-Tertiary**

Most classification systems attempt to prioritize subject matter, usually on the three different levels Panofsky called *description*, *identification*, and *interpretation*. This approach to viewing and recording content more often than not also reflects the mental approach of the viewer. Even when there are no corresponding formal divisions in a particular database structure, it is still advisable to mentally approach content in terms of such a tripartite division and to classify content in terms of highest to lowest priority. As a general rule, the cataloguer should regard the primary level as the overall theme or subject; this is usually a broad type of descriptor such as "portrait," "seascape," or "still life." From my own experience, I would recommend that no more than three or four such high-level terms be used; when more are used, it is nearly impossible for the end-user to understand what the main subject is without actually seeing the work.

The age-old belief that the main subject of a work of art is the one that visually predominates does not always hold true; hence, it is up to the cataloguer to determine what is most significant. More than anything else, it is the cataloguer who determines what is important and what should be classified and how. Image quality, when the cataloguer is working with a reproduction of the work of art, can often significantly affect cataloguing. Poor-quality images, where details cannot be seen, can impede the classification process; black-and-white images can prevent color significance from being included.[15] Under ideal circumstances, cataloguing should proceed only where image quality is good enough for the cataloguer to see all the details of the work being catalogued. In practical terms, however, cataloguers usually have to work with the images available to them; under such circumstances it is advisable to include as much as possible, even when there is some ambiguity.

Once the primary level descriptors have been applied, most classification structures offer the opportunity to classify a combination of generic types, as well as details specific to that work of art. An image may be a view of a bridge, but if the particular bridge can be identified, that fact should be recorded in an orderly and structured format. ICONCLASS provides a flexible yet consistent structure within which "named" elements can be identified. In classifying a bridge in an image, for example, the final notation (25I1451) is built in a series of stages, each of which has its own associated keywords.

> 2 Nature
> 25 earth, world as celestial body
> 25I city-view, and landscape with man-made constructions
> 25I1 city-view in general, 'veduta'
> 25I14 public road
> 25I145 canals, waters (in city)
> 25I1451 bridge in a city across a river
> 25I (USA, NY, NEW YORK, BROOKLYN) 1451

Underlying this notation are the searchable keywords "nature," "earth," "world," "landscape," "veduta," "city-view," "ideal city," "public road," "road," "canal," "river," "bridge."

In handling the individual elements of an image, structure is imperative not only in terms of data entry but also in terms of retrieval. If terms are controlled, it is important that other cataloguers, in a shared environment, be able to access them to avoid duplication. Standards should be used in formulating strings of keywords or textual references. Even when it comes to naming a generic type of object depicted in an image, such as a piece of fruit, it is important to have well-defined data entry rules: Is the singular or the plural ("apple" versus "apples" versus "apple(s)") to be

used? Issues such as case sensitivity in searches ("Apples" versus "apples" versus "APPLES") can be resolved using information technology, but the decisions about how to handle such policies must be decided in advance by the individuals who are building those systems and writing the rules for data entry in them. As we have seen throughout this volume, the use of syndetically structured vocabularies can overcome differences in the terms used to describe or search for the same item (for example, "aubergine" versus "eggplant").

Organizing data into significant groupings is also useful, especially when large bodies of similar material are being catalogued. Even high-level descriptors can prove invaluable both for accurate search and retrieval and to enable users to browse through similar items. For example, American cityscapes could be prefaced with the International Organization for Standardization (ISO) three-letter country code USA, French cityscapes with FRA, and so on.[16] If one is using a true thesaurus such as the *Getty Thesaurus of Geographic Names*, it is easy to construct hierarchical strings that go from the nation down through states, counties, and other political subdivisions to the level of detail desired, until the specific place is named:

FRA, Haute-Normandie, Seine-Maritime
SYR, Damascus
GBR, Oxfordshire, Blenheim Palace
USA, CA, San Francisco

Representations of scenes from different works of literature, operas, and so on can be similarly structured, as can geographic names such as "Persia" or "Flanders," which no longer exist as political or administrative entities. All these kinds of groupings enable speedier and more efficient retrieval, as well as consistency in cataloguing.

In deciding what structure to use, it is necessary to look at the factors such as the nature of the material being catalogued, the level of detail to which cataloguing will be done, the information system that will be used, and, first and foremost, who the users are who will query the infomation system and what their needs are.

If the material is diverse in nature and covers different periods, media, and styles, then the cataloguing process will clearly take longer than in a narrowly focused image archive in which similar subject matter predominates. In an image collection with diverse materials, workflow charts in which different individuals, ideally each with expertise in a particular area, are assigned particular areas of responsibility can facilitate the cataloguing process.

The level of detail to which cataloguing takes place and the experience and skill of the cataloguers are determining factors in the success or failure of a cataloguing project. Traditionally, image archives have opted for a fairly minimal subject record in which only four or five terms were applied to an image, in the belief that these records could be upgraded in the future. Unfortunately, such improvements rarely take place. The alternative approach has been to catalogue images in detail from the outset, which is certainly more time-consuming but enables greatly enhanced end-user access to the material. If staffing and resources permit, I believe that it is advisable to choose the latter approach and to provide as extensive coverage as possible.

**Conclusion**

A survey of members of the Art Libraries Society of the United Kingdom (ARLIS/UK) showed that content classification in art image repositories is performed chiefly by "librarians," "archivists," or "cataloguers."[17] These people are trained to analyze visual subject matter and to use the appropriate reference tools, data standards, and vocabularies to describe them. Obviously, knowledge of the subject or material being classified is highly desirable. And, as I have stressed in this essay, the ability to work methodically and consistently is crucial.

To recapitulate, I believe that high-quality, thorough image cataloguing can be in four main stages:

- Slow down the cataloguer's mental processes in viewing the work of art, to ensure that it is being viewed in its entirety and not selectively
- Analyze the work of art in terms of overall subject matter and select a set of primary descriptive terms or keywords
- Catalogue the main visual elements, using a systematic approach to "reading" the work of art—left to right, right to left, top to bottom
- Determine and catalogue the meanings or symbolism in the subject matter as time, money, and expertise permit

It is important to keep in mind at all times what end-users could possibly want in an image and to attempt to classify those elements within a reasonable amount of time.

As long as a human element is involved in the cataloguing process—something that will remain with us for the foreseeable future—the role of the cataloguer is destined to be the most significant in the entire classification process. It is only by understanding this crucial aspect of the process that end-user access to images can be enhanced.

**Notes**

1. Cesare Ripa, *Iconologia*, ed. Piero Buscaroli, 2 vols. (Turin: Fògola, 1986). Thomas Heck's evaluations of subject access to images are among the most recent and include a section on Ripa; see Thomas F. Heck, ed., *Picturing Performance: The Iconography of the Performing Arts in Concept and Practice* (Rochester: Univ. of Rochester Press, 1999).

2. See, for example, Peter G. B. Enser, "Query Analysis in a Visual Information Retrieval Context," *Journal of Document and Text Management* 1, no. 1 (1993): 25–52.

3. On content-based image retrieval, see John P. Eakins and Margaret E. Graham, *Content-Based Image Retrieval: A Report to the JISC Technology Applications Programme* (January 1999), <http://www.unn.ac.uk/iidr/report.html>; Peter G. B. Enser, "Automatic Image Content Retrieval: Are We Getting Anywhere?" in Mel Collier and Kathryn Arnold, eds., *Electronic Library and Visual Information Research: Papers from the Third ELVIRA Conference, 30 April–2 May 1996* (London: Aslib, 1997), 123–35 <http://www.aslib.co.uk/pubs/2001/03/03.html>; and Venkat N. Gudivada and Vijay V. Raghavan, "Content-Based Image Retrieval Systems," IEEE Computer (Long Beach, Calif.) 28, no. 9 (1995): 18–22.

4. A useful study concerning the role of perception as regards visual material is E. H. Gombrich, Julian Hochberg, and Max Black, *Art, Perception and Reality* (Baltimore: Johns Hopkins Univ. Press, 1972).

5. ICONCLASS, which is touched upon by Sara Shatford Layne and more amply discussed by Patricia Harpring in this volume, is to my knowledge the most widely used subject classification system in art-historical image archives in North America and Europe. Among the recent publications focusing on the use of this system is Colum P. Hourihane, ed., *Image and Belief: Studies in Celebration of the Eightieth Anniversary of the Index of Christian Art (Princeton: Index of Christian Art*, in association with Princeton Univ. Press, 1999).

6. This is the French national system and is similar to ICONCLASS, but instead of using notations at the cataloguing level, it uses a thesaurus-type structure of vocabulary terms; see François Garnier, *Thesaurus iconographique: Système descriptif des représentations* (Paris: Léopard d'Or, 1984).

7. Unlike ICONCLASS, the Garnier system offers no options for variants on the traditional grouping of the Virgin, Saint Joseph, and the Christ child.

8. One of the best guides to understanding the approach used in this image archive is Helen Woodruff, *The Index of Christian Art at Princeton University: A Handbook* (Princeton: Princeton Univ. Press, 1942).

9. In addition, both singular and plural forms of nouns should be included as indexing terms, unless the end-user system or search engine allows for automatic truncation of words (which has both advantages and disadvantages) or otherwise handles this issue.

10. As is the case with the portrait by Jacopo Pontormo (see fig. 14) discussed by Patricia Harpring in this volume.

11. Michael Gorman and Paul W. Winkler, eds., *Anglo-American Cataloguing Rules*, 2d ed., 1998 rev. (Ottawa: Canadian Library Association; Chicago: American Library Association, 1998).

12. See Colum P. Hourihane, *Subject Classification for Visual Collections: An Inventory of Some of the Principal Systems Applied to Content Description in Images* (Columbus, Ohio: Visual Resources Association, 1999).

13. At the Index of Christian Art, a series of controlled subject terms (some 27,000 in number as of this writing) complements a free-text description, where controlled keywords are also used.

14. See Margaret E. Graham, *The Description and Indexing of Images: Report of a Survey of ARLIS members, 1998/99*, available at <http://www.unn.ac.uk/iidr/ARLIS>.

15. One example of the importance of color comes from the area of medieval art, where the use of yellow (on Jews' hats) or red (as in angels' wings) has recently been shown to be intentional, with a specific meaning. See Andreas Petzold, "'Of the Significance of Colours': The Iconography of Colour in Romanesque and Early Gothic Book Illumination," in Colum P. Hourihane, ed., *Image and Belief: Studies in Celebration of the Eightieth Anniversary of the Index of Christian Art* (Princeton: Index of Christian Art, in association with Princeton Univ. Press, 1999).

16. International Organization for Standardization, ISO *Standards Handbook I: Documentation and Information*, 3d ed. (Geneva: International Organization for Standardization, 1988).

17. See Graham, *Description and Indexing of Images*.