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"On Speaking Terms": Towards Virtual Integration of Art Information

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Changing technological paradigms require a new approach to the definition of standards in the area of art information. Technological boundaries between systems are lessening, making new realms of integrated information a possibility. Previously separate databases, image bases, computer aided design systems, and geographical information systems are now being linked into multi-media, interdisciplinary information systems. The potential exists to unite other physically separate information resources into a "virtual database", through a common interface which exploits emerging communications networks. Such integration will only be possible if all systems are built on a shared intellectual framework; unless the information which is gathered today shares a common conceptual structure, integration in the future will not be possible. This underlying philosophical approach must be based on a common understanding of what information is required about a museum object, and must appreciate the importance of contextual as well as descriptive information. By focussing our attention on the content of systems, rather than the systems themselves we can move beyond present technological imperatives and plan for a future which focusses on the information itself rather than the delivery system, and is user - rather than technology - centred.
(Author)

As Angela Giral hints, in the end of her introduction to *Cataloguing Architectural Drawings* (1), the technological paradigms which have shaped our approaches to the management of information about art objects are changing. We are moving away from the large centralized databases (the OCLCs and RLINs of the 1970s and 1980s) towards an era of distributed computing and networked information. This shift, which has only just begun to be reflected in the work surrounding Museum Information Standards, will have a dramatic impact on how we develop standards, and indeed, on what standards are necessary in order to share information. When combined with the advances in the types of applications being developed in the museum and art gallery community, this points to the need for a new approach to the definition of standards.

In his introduction to this issue of *Knowledge Organization,* Dr. Kim Veltman briefly surveys the history of computers as they relate to art. In doing so, he introduces a number of different areas where art historians have been able to exploit the computational and information management potential of information technology. These can be broken down into the following areas:

Database applications

These primarily text files incorporate large quantities of data stored in a structured fashion. Each may use a different structure, which is a result of its primary focus, be that the recording information about a museum collection, as in the Canadian Centre for Architecture Collection Documentation System[1], recording information about a special project, such as the Buildings of England Database[2], or sharing information through remote consultation of a centralized database, such as the National Humanities Database of the Canadian Heritage Information Network[3].

Imagebases

These newer applications incorporate reproductions of works of art and artefacts, often linked to textual records about the objects represented. As yet, there are not widely accepted standards regarding image file formats, compression algorithms, or storage mechanisms, and applications of this type are most often structured to optimise performance in a particular hardware/software environment[4].

Computer Aided Design and Drafting

In this type of application, drawings of buildings or records of archaeological sites are made and stored in electronic form. These recreations of two- and three-dimensional spaces make it possible for the viewer to manipulate a representation in order to view those sections of most relevance to an inquiry[5].

To these areas, may be added two other types of application, geographical information systems, and multidisciplinary systems.

Geographical Information Systems

Designed to relate data to specific places or geographic coordinates, these systems are in use for such applications as an inventory of Danish archaeological sites[7].

Interdisciplinary Systems

Most interestingly, especially for its implication for standards development, is the trend to combine these types of applications. What is considered traditional information about art is integrated with other types of data. Projects such as that now being developed by the Montreal Research Group of the Canadian Centre for Architecture can recreate historical environments by bringing together information from a diverse range of sources, and integrating it into a "big picture." A recreation of eighteenth century Montréal has been made possible, through a program written by the Center for Landscape Research at the School of Architecture, University of Toronto. It develops three dimensional models from information stored in a database, built by examining records such as registrations of land transfer and building contracts. These models enable the researcher to examine the built fabric of the city in a way that was not previously possible, as the information integrated here was scattered in disparate sources. The juxtaposition of the model with historical

views of the same locations, provides an additional "reality-check", both from the point of view of the model, and with regard to the use of topographical views as historical evidence.

Also along these lines is the work being carried out by Marilyn Lavin in the Piero Project at Princeton University[7]. This project is recreating an historical interior, Piero della Francesca's Legend of the True Cross , at Arezzo. Lavin describes the problem as follows:

> Like most large-scale fresco cycles of the Middle Ages, Renaissance, and Baroque periods, Piero's cycle is painted high on the walls and ceiling of the church, and a visitor standing at floor level finds the paintings quite difficult to see because of the sharp upward angle of vision.... An electronic version... will provide a virtual space' through which the spectator can move at will. [She continues] All phases of the commentary will be augmented by verbal information called to the screen from a database on Italian fresco cycles I previously created (5, p.2-3).

In both these projects, existing information was manipulated with computer technology to create something more than a sum of the parts. By being able to see old data in new ways, knowledge is created.

It is in the development of this broader vision, in the creation of meaning from large amounts of information, that we have been greatly aided by computer technology. However, when we attempt to retool data for a different application, we are confronted with the fact that we have created a wealth of information resources, which are incompatible, both in terms of technology and in terms of the structure of the information that they store.

Technological incompatibilities are being overcome. I work now in an environment that was merely a glimmer of hope several years ago, and regularly move files between single user and network Macintosh, DOS/Windows, and Unix systems. Inter-operability is now the goal of all large scale developers, as they strive to develop "open systems" (think for example, of the many versions of WordPerfect available)[8]. Microsoft Access promises that "By simply pointing and clicking the mouse [you can] manipulate data and analyse it from different perspectives"[9]. And advances in the area of telecommunications can now bridge what were previously seen as separate network environments. WorldLinx, a Bell Canada Company, has released a product, Vis à Vis, which can unite ISDN, X.25, synchronous or asynchronous and LAN linked sessions in a single shared screen space[10], and the potential of the Internet for sharing museum information remains to be explored. All this to say that the museum community need not concern itself with the development of base-level technological standards; the industry has adopted "standards" as a goal and is doing this for us. CIMI (the Computer Exchange of Museum Information project, sponsored by the Museum Computer Network in the United States) has validated this approach, and is examining existing technical standards to assess their suitability for use in museums. With technology, our goal should be education, not innovation.

The challenge on the information side is much greater. The information gathering exercises which interest art historians are taking place in a fragmented environment. Whether on a national network, a regional network, a single computer with remote access, or a personal computer, information regarding works of art is being collected according to differing cataloguing standards and being stored in different data structures, each designed to meet the needs of the cataloguing institution or the research goals of a particular project. The researcher wishes to cut across these boundaries, for the works that are studied as an integral group may be scattered in public and private collections around the world. Unfortunately, the very structure of the information itself may hinder this type of cross-collection searching, precluding the information sharing that this age of connectivity promises.

Initial efforts at museum data standards have concentrated on developing common Data Dictionaries, as basic as lists of minimum fields, such as the CIDOC Minimum Data Standard, or as complex as full sets of specifications, such as the CHIN National Humanities Data Dictionary. We now have an eclectic range of "standards" to chose from. The community has clustered into "denominational" groups, with the differences between those that use MARC and a non-MARC record structures as broad as those between the Eastern Orthodox and Methodist churches. Arguing the relative merits of one set of beliefs over the other is pointless. For an ecumenical movement to be successful in the museum world, we need to return to first principles and consider what the information is that we collect and which parts of it we wish to share. Only then will we be able to establish standards which will help us to reach this goal.

Standards have been characterised as falling into three broad areas, those of "technical standards," which must be rigorously adhered to, "rules" which must be followed but can be interpreted differently, and "guidelines" which set an overall approach[11]. Examples of each of these in the bibliographic world would be ISO 2709, as a "technical standard", USMARC as a set of "rules" which implements that standard, and AACR2 as the cataloguing "guidelines". As a framework within which to have developed these standards, however, the bibliographic community adhered to a "Statement of Principles" approved by fifty-three countries at the International Conference on Cataloguing Principles held in Paris in October 1961 (7). These principles addressed, on the broadest possible level, the kinds of information that would be recorded when a bibliographic item was catalogued, and provide the common core for what we accept as a bibliographic entry today. The museum community is without its own statement of principles, and our work in the area of documentation standards suffers because of it.

Our greatest challenge, in the next age of information standards making, will be to build the bridges between the separate databases which document our cultural heritage. In order to do this, we will have develop concordances between existing information systems. A pragmatic approach might be to map all the databases to an existing

reference point. Practically, however, agreement on what that point will be is unlikely. Methodologically, because of the compromises that are inherent in any particular implementation of a system, this approach would mean accepting as a given the weaknesses of the initial terms of reference.

We need to move away from the assumption that in order to share information it must be recorded in exactly the same way and stored in a centralized database, accepting, instead, the changing paradigm of system design. The information we require need not be found in a single place, but can be brought together from a wide variety of sources. Disparate databases, once networked, can come together in an intellectual whole, a "virtual" database[12].

We also need to move away from the insistence on common lists of fields, and completely standardized implementations, which has limited the development of standards to jurisdictional areas. Just as commercial software can be run on many different hardware platforms, we must develop standards which are flexible enough to be implemented in a broad range of ways, reflecting the reality of the museum situation today. While a flat-file, personal computer solution may be all that is available in one place, another may be able to implement a complex relational structure, and a third may be working on innovative object-oriented programming. Each implementation will be shaped by the requirements and budgets of the institution or project which develops the database.

What is critical is not that all implementations are the same, but that they all record the same kinds of information in a similar manner. The critical factor affecting the long-term success of information management in museums is not the technology which presently manages that information, but the quality of the information itself[13]. And it is the information gathering phase which is unlikely to be repeated. We will undoubtedly see many generations of technology in the next twenty-five years, but what is the likelihood that we will duplicate the cataloguing of collections within that time-frame?

Each application must be built with a clear understanding of the information needs of the community as a whole, what we wish to record, and how we need to manipulate and retrieve it. We can then be aware of the compromises made in a particular implementation, and can compare the "actual" to the "desirable"; or the "feasible" to the "goal". In this way, each generation of hardware and software will move closer to a shared ideal.

If applications are built on a common conceptual understanding of museum information, it will become possible to unite physically separate databases through a common interface. By mapping information resources to a common intellectual model, it will be possible to develop concordances between systems. These concordances could then be used to route queries from a shared search engine to each implementation. Such "virtual integration" would provide our cultural resources as an intellectual whole, while ensuring that each implementation maintains the flexibility and control it requires.

Interestingly, there are projects underway now, that begin to address this need.

The Data Model Working Group[14], of CIDOC, the Documentation Committee of the International Council of Museums has as its goal a shared model of museum information. It is building a conceptual relational model, which will do much to further our understanding of the museum information. This shared model could provide the bridge between the standards now implemented or in development.

Two projects of the Art History Information Project of the Getty Trust are also addressing the identification of informational needs, both from a scholarly perspective. The Foundation for Documents of Architecture will publish a Guide to the Description of Architectural Drawings shortly. The Art Information Task Force, jointly sponsored by the College Art Association and AHIP, and supported by a grant from the National Endowment for the Humanities, an independent agency of the United States Government, is identifying scholarly requirements for the description of art objects. As well as serving as a touchstone for systems designers and implementers, these projects have the added benefit of incorporating, from their inception, the perspective of the ultimate users of information systems.

All three of these initiatives reflect a changing conception of the information required about an object. We are moving towards an appreciation of both the intrinsic and extrinsic meaning carried by a work of art or artefact. It is equally important to record not only what an object is, but where it came from and what it represents (both when it was created or collected and now as it is studied). In architecture, it is accepted that information about the subject of a drawing, the building or project depicted, is as important as information about the creation of the drawing. In art, contextual information regarding the artistic milieu within which a work was created may be as important as the actual name of the artist him or herself. For historical artefacts, history of use is often more important than creation.

This inclusive approach to information may also be exactly what is required to support the trend towards interdisciplinary research[15]. The projects mentioned as most interesting, in the typology proposed above, are just those which cut across these traditional boundaries in support of a more synthetic methodology. Our concept of art information must be a catholic one, for "In art everything counts"[16].

The current, fragmented world of museum information management is composed of systems which approach the information about objects in diverse ways. Reconciling the differences between these systems will require rethinking what is significant about the information we manage, and clearly examining the need[17] for access to that information. Shared conceptual standards will ensure that we are all building upon a common foundation, without sacrificing our individual needs. To quote Costis Dallas of the Benaki Museum, Athens, Greece, "Conformity

however, does not imply uniformity.... the information system of a museum, manual or computerised, is both a reflection of and a constitutive factor for its intellectual foundations, distinctive character and aspirations. After a period when information *control* was the keyword in museum documentation, now at last the importance of *knowledge sharing* is widely recognised" (12).

International standards organizations provide the milieu within which to leave behind the pressing institutional needs that govern the development of particular systems, and to concentrate on long term issues regarding the management of information about our cultural heritage. If we set as our goal a common conceptual understanding of museum information, we can ensure that when technology makes it possible to integrate disparate and diverse systems, they will, indeed, be "on speaking terms."

Notes

1 Described in my article in (2).

2 Described by Michael Good in issue 12 of The CHArt Newsletter.

3 This National Database is described in (3), p.259.

4 A very useful inventory of this type of project can be found in the Image Technology in European Museums and Art Galleries Databases [ITEM], maintained at the European Visual Art Centre at Ipswich (EVAC) on behalf of the European Arts Visual Information Network (EVIAN) and edited by Isobel Pring. Contact: ITEM, EVIAN, c/o EVAC at Ipswich, The Library, Suffolk College, Rope Walk, Ipswich 1P4 1LT, Great Britain.

5 See for example, the projects discussed in the *Newsletter of the Center for the Study of Architecture*; contact Harrison Eiteljorg II, P.O.Box 60, Bryn Mawr, Pennsylvania, USA, 19010.

6 Described in a paper presented by Carsten U. Larsen in (4).

7 Described in her article, see (5).

8 However, these transfers are not completely transparent yet. I am among the ranks of those who have seen formatting "disappear" when a file was moved from one version of a software program to the next, let alone from one platform to another, but these problems are reducing in number.

9 Advertisement in *The Globe and Mail,* Toronto, 21 January 1993, p.A9.

10 Demonstated at the Toronto Computer Show, 24-26 November 1992.

11 I first heard this framework expressed by John Perkins at the CIDOC Reconciliation of Standards Working Group meeting in Copenhagen in September 1991. It has also been published by Andrew Roberts in (6), p.4.

12 The basic infrastructure for such a network is not far off. See the discussion of these factors in (8), which mentins the move to establish the National Research and Education Network (NREN) and the recently founded Coalition for Networked Information.

13 This fact is confirmed by Deirdre Stam in (9), p.50, and more graphically in Peter G.W.Keen (10). His "IT Balance Sheet" (p.44) shows 54% of these assets in "Data Resources", 21% in software, 16% in hardware, and 9% in facilities. Given that museum projects are often under capitalised, these figures are likely to skew more in favour of data in our context.

14 Formerly called the Reconciliation of Standards Working Group.

15 Steven Shubert makes this point, in his examination of "Classification in the CHIN Humanities Databases", a CHIN Documentation Fellowship Project Report, December 12992. "To provide access to only the physical attributes of museum objects is therefore reductionist; the fundamental cultural reality of the object is ignored in favour of the secondary physical reality" (p.5). This trend can also be seen in the Natural Science Conununity, where the research into biodiversity has led to an increased appreciation of the contextual information surrounding the collection of a specimen, in as complete a detail as the phase of the moon, or the ph of the surrounding soil.

16 This statement is attributed to Bill Ruben of The Museum of Modern Art, and is quoted by Russell Kirsch in the "Discussion: Potentials and Pitfalls", which took place "during the all-day Electronic Imaging Conference of the Museum computer Network Annual Conference, Chicago, IL, Oct.13, 1989, reprinted in Visual Resources 7(1991)No.4, p.418.

17 In considering the impact of new educational technologies, Richar A Lanhan considers their proper positioning within the University structure in (11): "Realising that the design of information resources is as critical as their content", he speculates "Where will the architects of future university information structures come from? ... What *department* will they be in? ... All the regular academic departments seem disqualified by their characterstic professional bias. Perhaps we need a new entity altogether". (p.43)

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(2) Trant, J.: In: Computers and the History of Art. 3(1992)Pt.1, p.45-64

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(7) Statement of principles, adopted at the International Conference on Cataloguing Principles, Paris, Oct.1961. International Federation of Library Associations 1971.

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