

Museum International

No 181 (Vol XLVI, n° 1, 1994)

Computerization

Editorial 3

Dossier: 4 Computer systems and museum information standards *Andrew Roberts*
Computerization

7 Starting from scratch: introducing computers
John Perkins

12 Managing change: from failure to success at the National Gallery of Canada *Greg Spurgeon*

20 Museums as information centres *Leonard Will*

26 Computers and the museum business
Robert Leming

30 Computerized inventorying of museum collections in Africa *Valerie Chieze*

34 Breaking new ground: collection documentation in the Czech Republic and Slovakia
Zdenek Lenbart

38 Automating the future *David Bearman*

42 Computers in the museum: a guide to information sources *Jane Sledge*

Profile 48 Cambodia's 'killing fields' revisited: the Tuol Sleng Museum and the Memorial Stupa at Choeung Ek
Terence Duffy

Restoration 52 The Australian War Memorial: an exercise in teamwork *Catherine Challenor*

Architecture 56 The New Acropolis Museum: an international architectural competition *Ersi Philippopoulou*

Features 60 Museum-Museums

64 Professional news

Front cover

Katherina Fritsch,
Tischgesellschaft, 1988,
 Museum für Moderne Kunst,
 Frankfurt am Main.
 © Rudolf Nagel, Frankfurt am
 Main/ADAGP, Paris, 1994

Back cover

Kriki, *Module Green*
Fuzz 10, II, Paris, 1992.
 © All rights reserved.

Editor-in-Chief: Marcia Lord
 Assistant Editor: Ika Kaminka
 Editorial Assistant: Christine
 Wilkinson
 Iconography: Carole Pajot-Font
 Editor, Arabic edition:
 Mahmoud El-Sheniti
 Editor, Russian edition:
 Irina Pantykina

Advisory Board

Gaël de Guichen, ICCROM
 Yani Herreman, Mexico
 Nancy Hushion, Canada
 Jean-Pierre Mohen, France
 Stelios Papadopolous, Greece
 Elisabeth des Portes, Secretary-
 General, ICOM, ex officio
 Roland de Silva, President,
 ICOMOS, ex officio
 Lise Skjøth, Denmark
 Tomislav Šola, Croatia
 Shaje Tshilulila, Zaire

© UNESCO 1994

Published for the United Nations
 Educational, Scientific and Cultural
 Organization by Blackwell
 Publishers.

Authors are responsible for the
 choice and the presentation of the
 facts contained in signed articles
 and for the opinions expressed
 therein, which are not necessarily
 those of UNESCO and do not
 commit the Organization. The
 designations employed and the
 presentation of material in *Museum
 International* do not imply the
 expression of any opinion
 whatsoever on the part of UNESCO
 concerning the legal status of any
 country, territory, city or area or of
 its authorities, or concerning the
 delimitation of its frontiers or
 boundaries.



STOLEN

Bronze statue of Buddha seated on a throne of three elephants, stolen from the National Museum of Pakistan in Karachi in January 1993, along with ten other bronze sculptures.

Photo by courtesy of the National Museum of Pakistan

"The problems museums are experiencing lie not in computer hardware and software but rather are inherent in the procedures used to initiate and manage projects. Without determining what they want to do or exactly how to do it, museums rush into computerization with a naïveté that is startling."¹

That was the assessment made in 1981 by a leading United States computer consultant. Nearly ten years later, in October 1990, in a keynote address to a meeting of the Museum Computer Network, 'Henry Kelly of the US Congressional Office of Technology Assessment described the two phases of change that organizations went through as they computerized. The first was a phase in which past business procedures were simply put on computers. The second was a phase in which business roles and practices were reassessed in light of the potentials of technology and adjusted appropriately. Generally speaking, Dr Kelly indicated, the first phase led to organizational and informational disasters of varying magnitudes. . . . Few would take issue with the fact that phase-one-style computer projects in museums have met with more failure than success.'²

In the ten years separating these two remarks, museums had not yet achieved the computer-friendly environment that had come to dominate the commercial world. The growing need for information about museum collections, spurred on by increased public attention to the cultural heritage, catapulted many museums into 'phase one' and not beyond. Much time and energy were spent on feeding information into the computer only to find out that retrieving it in usable form often posed insurmountable problems. In other words, the organization and structure that had been lacking in the manual system was not suddenly 'put right' by the simple fact of automation. Moreover, the introduction of computers into the somewhat non-technical environment of the museum had, in many cases, created a negative psychological impact on museum staff who were ill-prepared to deal with radical changes in working methods and procedures.

Nevertheless, many museums have moved into 'phase two', developing new computer systems designed specifically for museum needs and creating the team environment among staff that is the key to success. "The old notions of education departments separate from collections managers, separate from the business functions do not hold up in the face of integrated systems. Finally, new emphasis on museums' public dimension will mean further integration of collections information, technology, and the roles that education, exhibition and interpretation play."³

These are but a few of the questions explored in this issue of *Museum International* devoted to computerization. It was compiled with the invaluable assistance of Andrew Roberts, Chair of the ICOM International Documentation Committee, who drew upon his considerable professional experience in selecting authors and themes to shed light on the challenges and opportunities confronting museums as they move inevitably into the computer age.

M.L.

Notes

1. Lenore Sarasan, 'Why Museum Computer Projects Fail', *Museum News* (Washington, D.C., American Association of Museums), Vol. 59, No. 4, 1981, pp. 40–9.
2. James R. Blackaby, 'Museum Computerization: Making the Glass Slipper Fit', *Muse* (Ottawa, Canadian Museums Association), Vol. 9, No. 1, Spring 1991, pp. 14–22.
3. Ibid.

Computer systems and museum information standards

Andrew Roberts

The various uses of microcomputers in museums and the standards that are being developed to ensure compatibility and exchange of information are described by Andrew Roberts, Documentation Officer of the Museum of London and former Secretary of the United Kingdom Museum Documentation Association where his responsibilities included developing documentation standards and the international conference series initiated in 1987. Since 1989 he has been Chair of CIDOC, the International Documentation Committee of the International Council of Museums. He is also a board member of the Museum Computer Network and a member of the Computer Interchange of Museum Information (CIMI) Committee.

Compared with many other organizations, museums have been slow to adopt computer systems until recent years. The advent of microcomputers has changed the situation, resulting in a rapidly growing level of computer use.

The initial impetus to computerize usually came from curators concerned with collections management and documentation of object collections. This interest has now diversified into more general business and office uses such as:

- *Business administration:* records management; financial management; human-resource management; facilities/gallery management; membership and development; ticketing; scheduling; and shop management.
- *Office automation:* word processing; publishing; diaries; internal communications networks; and internal and external mail, bulletin boards, etc.
- *Collections and research:* collections management; collections documentation (object, photograph, archive and bibliographic collections); text and image retrieval; conservation management; analytical research; maintaining site information; maintaining biographic information; and accessing external databases.
- *Public programmes:* public access facilities; interactive exhibits; and publishing.

We shall see a continuing extension of the impact of computers in future years. Computer systems should help museums become more effective as organizations and in the way they manage and disseminate information; however, their growing use has accentuated the need for informa-

tion standards. Standards are agreed statements which help control an action or the form of a product. Museum information standards are definitions of the form of museum information and the documentation procedures to follow when caring for and using collections.

Museums need standards as the basis for effective manual and computer systems, to support the interchange of information from one institution to another and as a focus for the museum information profession. They are a key tool which can help a museum demonstrate accountability for its collections and provide access to these collections by staff, the public and researchers.

This article outlines the context of current standards initiatives. It is based in part on a report entitled *Developments in International Museum and Cultural Heritage Information Standards: An Introduction*, published by the International Documentation Committee of ICOM (CIDOC) and the Getty Art History Information Program (AHIP). Copies of the full report are available from these two organizations.¹

The benefits of establishing agreed museum information standards include:

- *Providing a model* which can be used as the basis for practical systems and guidelines. This leads to more consistent and useful systems and recording practices within and between institutions. This principle has been particularly effective in Canada and a number of European countries, where museum organizations have established agreed standards. These have been used as the basis for manual and computer collections management and documentation systems and statements of recommended professional practices.

- *Developing staff expertise and opportunity.* The availability of agreed standards, systems and practices leads to the development of training requirements and enhanced professional contact, greater job mobility and better training opportunities.
- *Supporting information sharing.* With the growth of standards, it is becoming easier for an institution to contribute its information to outside institutions and initiatives, and to itself benefit by acquiring externally produced resources such as vocabulary lists.
- *Data structure* is concerned with the different fields that can be used to record information and the relationship between these fields.
- *Data content* is concerned with the conventions for the way data should be entered in these fields, including cataloguing rules and syntax conventions.
- *Data value* is concerned with the vocabulary that can be used in the fields.

4. *Documentation procedural standards* outline the scope of the practical functions that should be followed when managing and using a collection, such as accessioning, arranging loans in and out of the museum, preparing a temporary exhibition and movement control.

Types of museum information standard

The information standards relevant to museums fall into four main groups.

1. *Information system standards* define the components of the information system itself, such as separate facilities for cataloguing, collections management, membership, administration, finance and publishing.

2. *Information interchange standards* define the technical framework for sharing information, whether between various systems in a single organization or between different organizations. The International Organization for Standardization (ISO) and other national and international standards agencies have developed a suite of standards for this area. The Computer Interchange of Museum Information (CIMI) project is exploring these issues in depth, looking at existing information interchange standards and their application to museum needs.

3. *Data standards* define the structure, content and values for collection information:

At the international level, CIDOC has two working groups concerned with the development of data standards. The Data Model Working Group is designing a methodology for understanding museum information concepts and a model data standard. Applications of this model are being produced in collaboration with a number of national projects. The Data and Terminology Standards Working Group is taking a more practical approach in designing working data standards for individual disciplines, such as art and archaeology. This work has been applied in co-operative projects, including the NARCISSE initiative which is developing a research database of conservation images and text. The Working Group is also encouraging the adoption of uniform vocabularies, by acting as a co-ordinator and surveying existing initiatives.

National initiatives in Europe include the development of data standards in the United Kingdom, Switzerland and elsewhere.² A similar approach has been taken in Canada, where the Canadian Heritage Information Network has designed two core standards

for the humanities and the natural sciences. In the United States, a series of major initiatives is examining the information needs of individual disciplines, including art and cultural history. Details of these projects are given in the report referred to above.

It seems likely that there will be continued collaboration between these projects, leading to the gradual development of a compatible family of data standards for use by the world's museums. ■

Notes

1. The addresses of these and other relevant organizations are provided in the article by Jane Sledge on page 42.

Switzerland Database for Swiss Cultural Heritage
Italy Istituto Centrale per il Catalogo e la Documentazione (ICCD)
Thesauri terminology.

2. Examples of data standard initiatives:

Europe

	NARCISSE
Sweden	Sweterm
Netherlands	Iconclass Classification Mardoc
France	Ministry of Culture. Inventaire Général Garnier Classification Système Descriptif des Objets
Germany	Allgemeines Künstlerlexikon
United Kingdom	MDA Data Standard UK Museum Documentation Standard

North America

Canada	Canadian Heritage Information Network (CHIN): data dictionaries
USA	Art Information Task Force (AITF) Common Agenda for History Museums Association for Systematics Collections Art and Architecture Thesaurus (AAT) Nomenclature Classification.

Starting from scratch: introducing computers

John Perkins

*Once a museum has decided to automate, it may then be confronted with a bewildering array of choices and a staggering amount of documentation in frequently incomprehensible language. John Perkins cuts through the thicket of information to lay a path that is clear, straight and reaches its target; his guidelines should help even the most inveterate computer layman to benefit from the vast possibilities that automated systems offer. He operates Mus*Info, a Canadian consulting company specializing in information management and technology for museums and is Project Manager for the Computer Interchange of Museum Information (CIMI) project. He is a former director of the Conservation Information Network of the Getty Conservation Institute and a former member of the board of directors of the Museum Computer Network.*

The business of museums is information. This is perhaps not the most common way of looking at what museums do, but it cannot be denied that their functioning is based on preserving, managing, researching and communicating information. To do this, museums have adopted the available tools of the day to record, organize and file information. Over time, pen and pencil have been replaced by typewriters, ledger books by filing cabinets. Today, computers and software applications are displacing earlier methods.

Throughout this evolution, it was possible to create idiosyncratic yet functional records management and collections documentation systems requiring modest expenditure. These fragmented systems are becoming increasingly difficult to maintain since the tools involved are now expensive computer systems requiring both significant capital expenditure and ongoing maintenance and support.

Museums that are considering computerization face a number of problems. Developing and managing museum information is complex when compared with the needs of business or commerce. This may create problems, since many computer systems and experts come from the world of business. In addition, museums often lack understanding about what is involved in the automation process and consequently plan inadequately. This article thus focuses on the all-important planning process.

Traditionally, most museums have paid scant attention to how they manage information, but have accepted the status quo and have collected information on objects in whatever way possible. While computers are perceived as convenient tools, it is less readily understood that computer systems are only as good as the information they process, particularly if that information needs

to be accessible to several people. Computers require a different way of thinking about information and how it has to be organized, and the change in thinking must begin before the machine can be plugged in. Many institutions assume that acquiring hardware and software will solve problems of object inventory and documentation. But if needs are not analysed and systems not designed to improve efficiency, one merely computerizes old problems.

The answer to the question of how to use computers successfully lies in realistic, reasonable and manageable planning in proportion to the scope of the project and the size of the institution. Most museums would find it inconceivable to launch a major exhibition without extensive planning and preparation, but that is what often happens with computerization. The main functions of the planning process are: (a) to establish objectives and goals; (b) to define the functions of the application and the information to support it; (c) to prepare for implementation; and (d) to express clear requirements for hardware and software.

Objectives and goals

Information systems should reflect the aims of the institution and support its corporate plan. This is the starting point since there is likely to be little support – financial or otherwise – for projects that do not closely relate to current institutional objectives. Once decisions have been made at this level, more detailed planning activities may begin.

Defining functions and supporting information

This process starts with the description of what the software application is expected

to do and what information is required. The description need not be highly technical but should be as complete as possible and presented in a simple narrative exposition of the scope and purpose of the application.

First, the specific objectives should be stated by indicating, for example, the type of information to be accessed and the various categories of users. Next, the functions of the system should be spelt out, for example: allow for up to fifty users; provide for multiple views of centrally located data; be modular in design and give the museum the tools necessary to modify, enhance and develop new aspects; automate accessioning, cataloguing, exhibitions, loans, inventory control, conservation, research, publications, publicity and mailing; integrate the workflow of all departments.

Then, the priorities must be clearly stated. The following model might be useful:

1. *Cataloguing and core object record*

1.1 – Convert manual records to automated records.

1.2 – Provide additional functionality in report generation, selection and searching, sorting and printing information.

2. *Inventory and location control*

2.1 – Track objects and their parts both within and outside the institution.

3. *Exhibitions and loans*

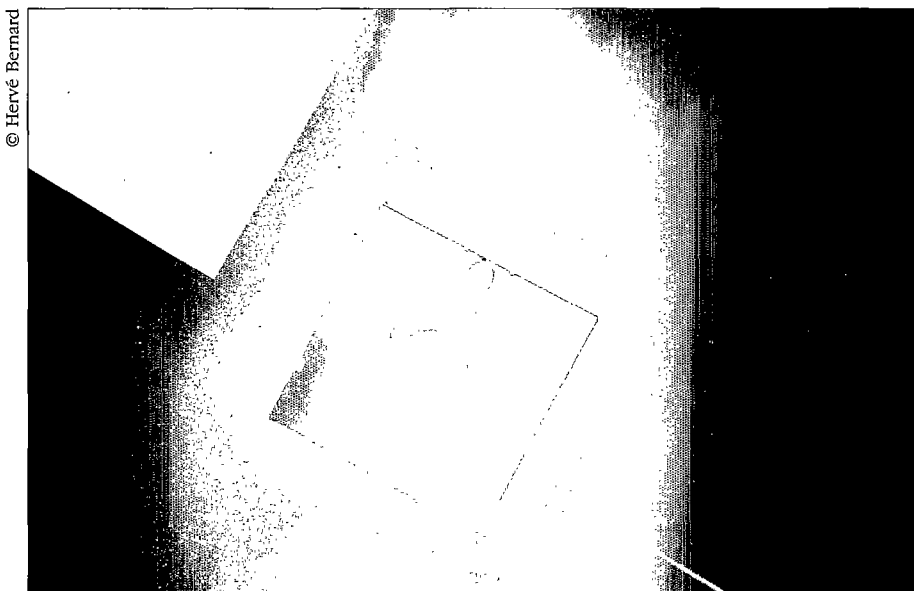
3.1 – Schedule and monitor all exhibitions.

3.2 – Track all objects loaned and borrowed in a perpetual record.

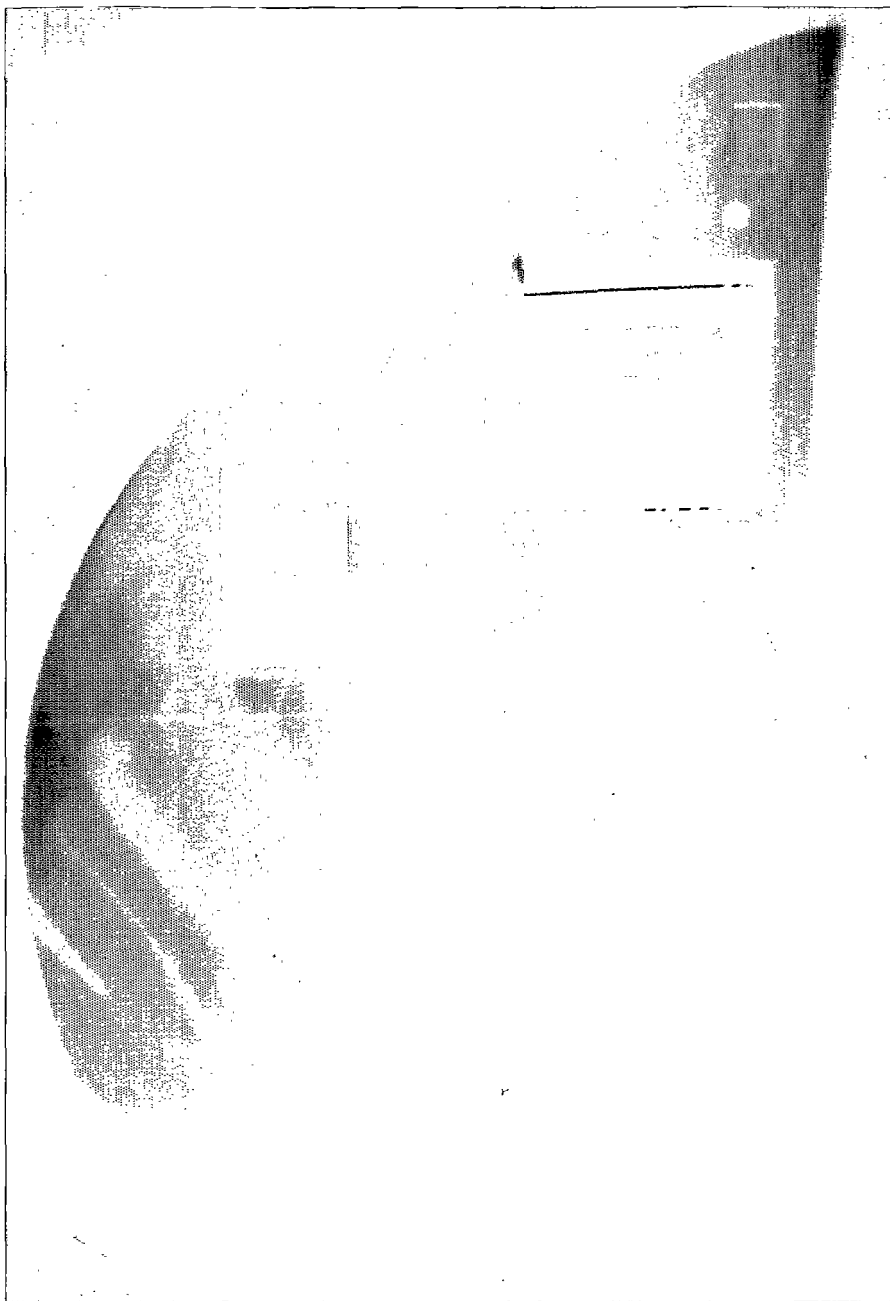
This information planning document is the result of a great deal of reflection; although simply stated, it conveys the essential requirements in clear, non-technical terms. A further document would provide additional details for each item.

In sum, the purpose of information planning is to identify the functional needs of users, define processes that the computer application should support, and identify the information required by users.

From this point on, it may be helpful to hire a specialized consultant to deal with the important technical issues for which in-house resources may not be adequate. The consultant should help refine the requirements, assemble resource lists and evaluate potential vendors, and should be able to take this component of the project to the next level of technical detail and assist in the creation of functional and information models as well as data description. It may not be worth while hiring a consultant for a modest collections management package costing \$5,000, but if the expected cost is \$500,000, it would be foolish not to consider the option.



© Hervé Bernard



© Hervé Bernard

The next step is to develop the requirements for the actual software application. With the help of the consultant and/or other competent persons, a requirements document should be prepared which describes to vendors or systems developers the details of what is required. Typically, this would include such points as general operating features, institutional procedures and practices, technical specifications for both hardware and software, system testing, delivery and

installation, training and documentation requirements, and contract conditions and budget.

This may be the most important document of all; it is the result of the entire planning process and all activities involved with planning are intended to support its production. The requirements document may vary considerably in content and detail. A particularly comprehensive specification has been produced

by the Australian War Memorial.¹ The Museum Computer Network in the United States has offered training courses on writing such documents and is another good source for assistance in this area.²

Implementation

Acquiring and implementing a system may be a costly, complex and prolonged process. The application must be built or purchased and the new system phased in; users should be trained and new equipment installed and tested and cabling completed. This process is a frequently overlooked aspect of developing a new system and severe consequences may result if adequate resources of time, staff and finances are not allocated.

The usual practice for obtaining the appropriate software is to publish the requirements document and distribute it to a number of vendors and systems developers. The responses should be closely examined to ensure that the museum's needs have been clearly understood before awarding a contract for development or customization of an existing application.

The computerization is then undertaken by a project team comprising museum staff and external resources as needed. The project manager must report directly to the museum and have ready access to management and professional staff; he or she should be able to react quickly and with authority. The project manager may be a staff member or a consultant but should be on-site, committed to the task and experienced in museum systems implementation.

A project of this type is usually so complex and large that it must be divided into manageable phases and undertaken with a team approach to ensure that tasks are carried out in accordance with their natural interdependences and in a sequence based on their perceived priority. Dealing with manageable segments of the total project, with resources focused upon the task at hand, enhances the probability of success. This approach also allows each new phase to be planned in the light of previous experience. As the implementation progresses and the process becomes more familiar, productivity should increase.

Hardware and software

Museums that automated early, in the 1960s, used mainframe and minicomputers. Today, museums of all sizes are acquiring microcomputers at a rapid pace and for a variety of purposes. Studies by CIDOC's Database Survey Group in 1989³ showed that in the United States, microcomputers constitute 86 per cent of all museum computers. It is predicted that by 1994, 64 per cent of all expenditure on computer equipment internationally will be for microcomputer hardware and software. Such massive investment and an ever-expanding market means that there is an enormous variety of powerful application software available for use by individuals working independently on a single machine, or by large groups working collaboratively on machines linked together in a network. This flexibility is enhanced by the ability of the networked machine to continue running supplementary software on its local processor, even though it may use the network software for other, co-ordinated operations.

Such flexibility is, however, not without problems. There are cases where depart-

ments are eager to use microcomputers for specific uses while the institution is grappling with a larger-scale, integrated solution. This phenomenon will become more prevalent as microcomputers proliferate, to the point where a number of different departments may want to see essentially the same information in different ways, preferring different machines and wishing to act at different times.

The situation is not unique to museums and solutions are being proposed that will allow a variety of systems to co-exist in an integrated computing environment. Such solutions require careful consideration and planning as the stakes may be quite high: for even small institutions employing less than thirty staff, hardware costs may exceed \$100,000 for a network of microcomputers and failure to plan may have expensive repercussions.

The process of planning for information systems is one that must involve the entire organization. This is particularly important in automating collections-management functions, as the information concerning collections may have the widest application in the museum. Co-ordination is the key to the effective use of institutional resources: the various systems must work with and not against each other. Finally, after all the emphasis on institution-wide planning, it must be recognized that some activities will need to be undertaken at individual or departmental levels. It would be counter-productive to stifle these initia-

tives; rather, they should be integrated into the museum's overall information management strategy.⁴ ■

Notes

1. Australian War Memorial, *The Commonwealth of Australia Request for Tender for Hardware, Software, System Development and Other Services for the Implementation of an Integrated Collection Management System for the Australian War Memorial*, 1989. Available from the Registrar, Australian War Memorial, Canberra, ACT.
2. Museum Computer Network, 8720 Georgia Avenue, Suite 501, Silver Spring, MD 20910, USA.
3. Roy Mitchell and Mary Case, *Museum Collection Documentation. The First International Report*, Washington, D.C., ICOM International Committee for Documentation (CIDOC), Database Survey Working Group, 1989.
4. The following publications may also prove useful in introducing computers in museums: Richard B. Light, D. Andrew Roberts and Jennifer D. Stewart (eds.), *Museum Documentation Systems*, London, Butterworths, 1986; John Perkins, *Planning for Museum Automation*, Pittsburgh, Pa., Archives and Museum Informatics, July 1993 (Archival Informatics Technical Report, 17); D. Andrew Roberts, *Planning and Documentation of Museum Collections*, Cambridge, Museum Documentation Association, 1985.

Managing change: from failure to success at the National Gallery of Canada

Greg Spurgeon

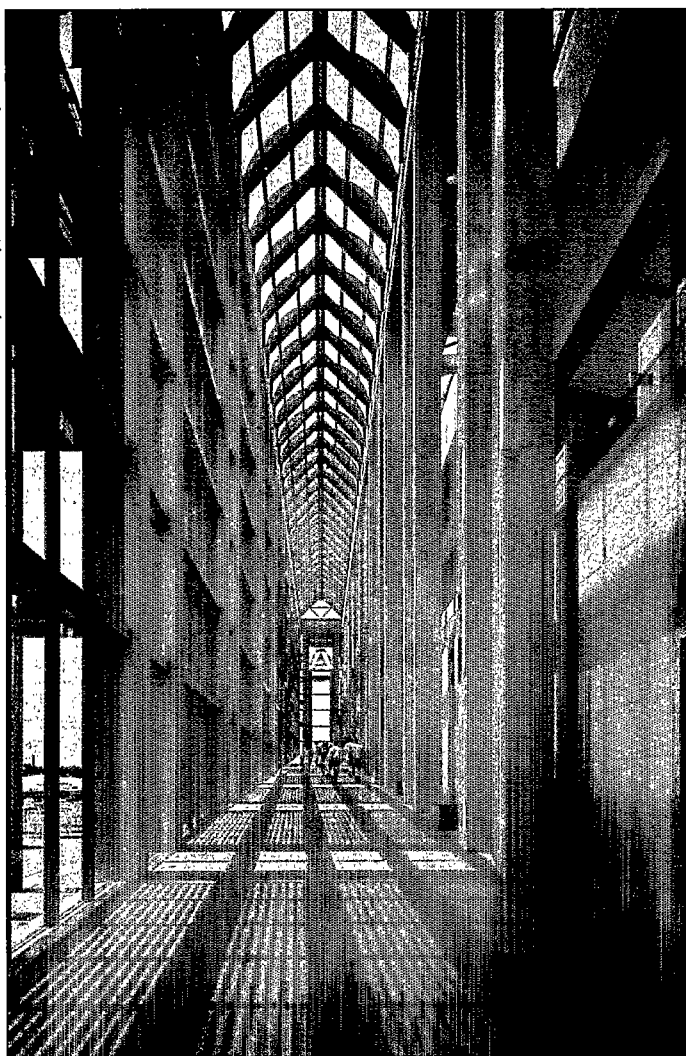
The saga of how a major Canadian museum introduced automated collections documentation begins with a cautionary tale of grandiose thinking coupled with near computer illiteracy and ends with a resounding success story based on careful planning and the development of a rational automation strategy. The author, who is Head of Art Documentation and Storage Registration at the National Gallery of Canada, spells out the do's and don'ts of coming to grips with computers.

The National Gallery of Canada, situated in Ottawa, is the largest fine arts museum in Canada, with collections in the major traditional fine arts media of paintings, sculpture, decorative arts, and prints and drawings, plus large collections of fine art photography, contemporary art and media arts. The museum has over 45,000 individual works of art in its custody. While this is not a huge collection by international museum standards, it is more than large enough to challenge our capabilities to document and manage it.

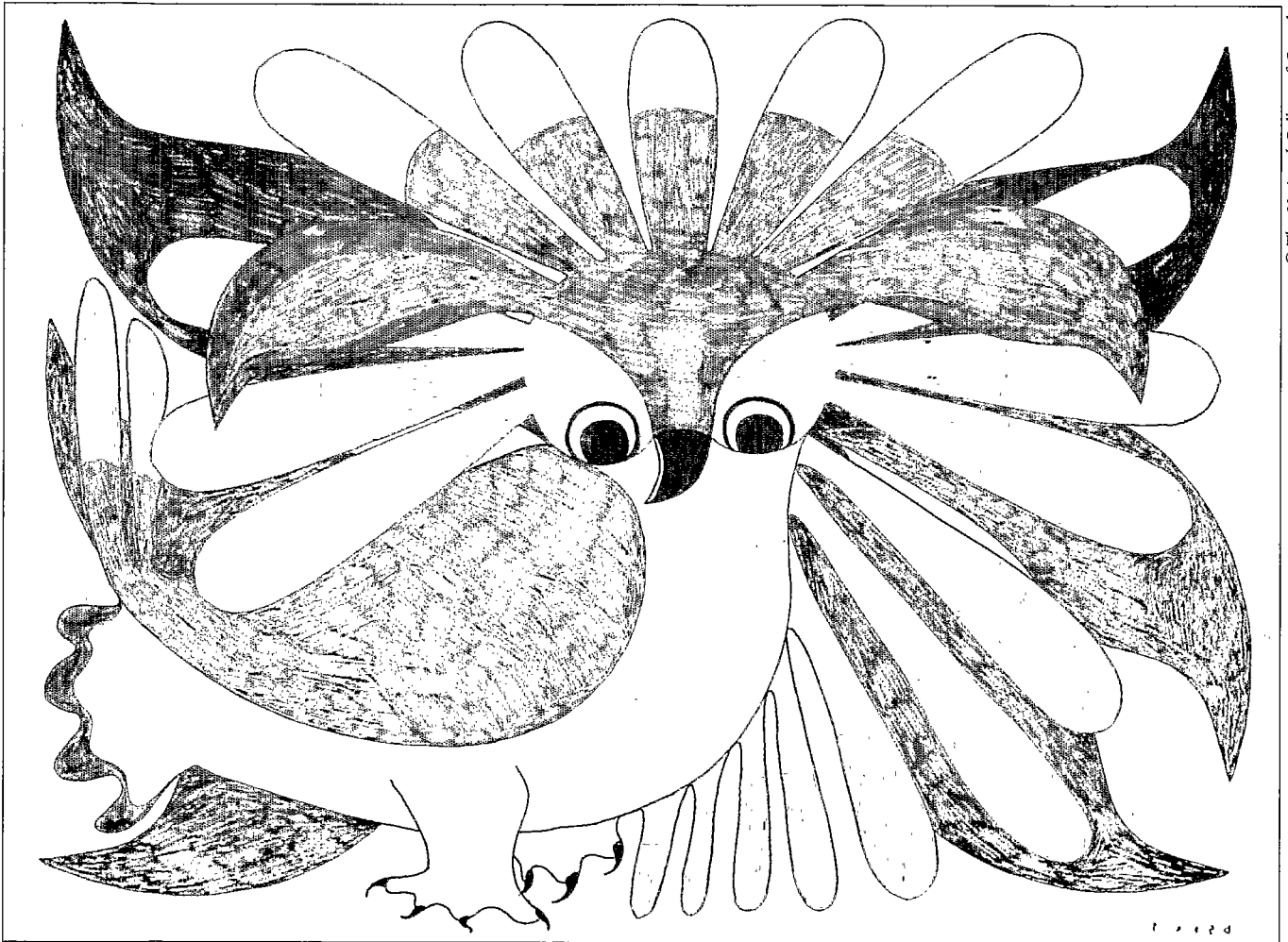
If at first you don't succeed . . .

Until the 1970s the Gallery employed manual systems for collection documentation and management. The shortcomings of the card systems were many, in particular that they represented only a portion of the total collection and that they could not be updated quickly and accurately enough to support the Gallery's increasing requirements for information about its collection, to meet its own operational needs as well as the needs of outside researchers. Computer technology arrived on the scene in 1972 when the Gallery became one of the original clients of the newly created National Inventory Programme, a government-sponsored initiative to create a computerized inventory of all objects in the national heritage held by Canadian museums. The naïveté of this grandiose national initiative was met by a correspondingly naïve institutional response on the part of the early network clients, including the National Gallery of Canada. The staff of the day were so ignorant of the implications of computer technology as to render them as 'dumb' as the first terminal that was installed in the Registration Department. From 1972 until 1982 the Registration Department, working pretty much in isolation and without a clear mandate, half-heartedly attempted to create a computerized collection inventory. The work was largely carried out by untrained contractors and summer students working with little or no supervision from the Registrar whose work priorities were elsewhere. Data from chaotic manual systems was simply copied into the computer to create automated chaos – a classic case of garbage in, garbage out. With the benefit of hindsight, it is now clear that putting a totally inadequate tool (in the form of an off-line and decidedly user-unfriendly system) into the hands of totally computer-illiterate staff (working with little support and no documentation standards) constituted a recipe

© Timothy Hursley, National Gallery of Canada



The National Gallery of Canada. Architect: Moshe Safdie.



for failure. Not only was the extended application of effort with no controls to no apparent gain a tragedy in itself, but the inevitable failure created in the minds of curators and administrators a lack of faith in and commitment to the computerization of collection data. Gallery officials tended to blame 'those computer people' and technology itself rather than shoulder any responsibility themselves for the low priority placed on collection documentation. Sadly the experience of the National Gallery was echoed throughout Canada and North America in museum after museum in their first attempts at automation of museum records.

... try, try again

Fortunately, in the 1980s three important events occurred which set the National Gallery of Canada on a renewed course in the automation of collection documentation. The first was the re-incarnation of the failed National Inventory Programme as the newly equipped and freshly mandated Canadian Heritage Information Network (CHIN). The second was the persistent demand by government auditors for increased accountability in the management of the collections of the four National Museums in Canada. The third was the

Drawing for The Owl, c. 1969, by Kenojvak Ashevak (Canadian, b. 1927). Gift of M. F. Febeley, Toronto, 1984.

announcement of a new building for the National Gallery, presenting us with the daunting prospect of a full collection move in just a few years. It was critically important that these developments provided us simultaneously with the technical means and the incentive to put our house in order. This time it was possible to establish a clear relationship between institutional goals and an automation strategy.

Equipped with lessons learned the hard way, the Gallery set out to computerize 'the second time around' in a manner both more cautious and more empowering. The renewed collection documentation project was launched in 1983 and this time a number of critical factors, external and internal, were to contribute to its success. Large among the external factors is the fact that Canada is blessed with a government-funded museum computer network in the form of CHIN. As a client of this network the Gallery was not faced with the difficult, sometimes paralysing, technical choices involved in selecting or developing a computer system. We had access to a powerful, tested, and well-supported system and to the expertise of the CHIN staff. Instead of expending time and resources searching for a system to meet our requirements (or even end up defining our requirements), we were able to focus our efforts on developing an information strategy, recognizing that the success or failure of museum computer projects is based on the decisions of the individuals who plan and implement them, not on the use of a specific line of computer hardware or software. The availability of CHIN technical expertise and training programmes helped to free us in an important way from dependence on outside consultants, vendors and computer whizzes who (until recently at least) tended to be as ignorant of the workings of museums as museum workers were of computer technology.

Working in a co-operative venture with CHIN and its client community meant that we did not have to rely solely on our own resources and resourcefulness.

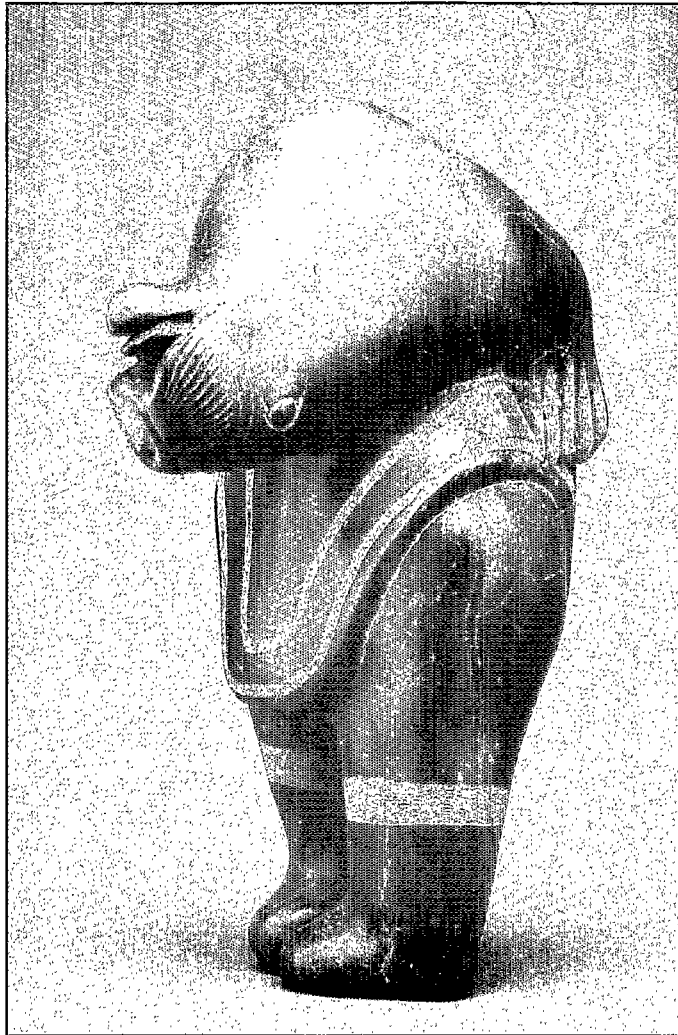
In-house it has been vitally important that the documentation initiative has had the support of management and of other staff. For the most part they have recognized that institutional commitment to quality collection documentation needs to be solid and long-term. (It must certainly transcend short-term phenomena like computer fads, sporadic personal projects, windfall gifts of computer hardware or software, and temporary incentives like collection moves.) Documentation at the National Gallery of Canada has become an institution-wide programme of activity supported by a stated and understood policy, priority status and the continuous allocation of resources. This has enabled the introduction of staff members with specialized documentation skills empowered to push the documentation project forward in partnership with other staff. A climate of creative collaboration and diplomacy has been conducive to getting people involved and keeping them involved, and has helped us to bridge the solitudes between various communities vital to the success of the project.

Planning is paramount

The articulation of a project plan has been central to building quality collection documentation resources. Museums have always been so busy acquiring, exhibiting, programming and publishing that there has never been much time left for planning. Only recently have planning processes long established in the business world been adopted (however hesitantly) by museums to aid them in charting their future courses. The planning process can

evaluate the current state of collection documentation in the museum, identify the many information requirements of the museum's administration, departments and programmes, analyse how and by whom collection information is generated, establish standards of quality and terminology for collection documentation and structure, and prioritize a programme of information capture and distribution. Needs analysis and data modelling have led to a rational strategy of collection documentation that will ultimately support institutional activities and objectives.

Of particular importance in the project plan are the concepts of standardized data structure, syntax and terminology, and their potential implications for data retrieval and manipulation. In order to standardize the cataloguing structure and content at the National Gallery of Canada, many months of consultation with CHIN personnel and key museum staff were carried out to select our field table and to develop standards for entering data into the database. The standards committee represented the range of scholarly opinion and practice in the museum, the variety of types of collections, and the different data requirements of the potential users. Our lengthy formal discussions were aimed at developing basic documentation standards for computer input and for traditional book-form catalogues that would correspond as closely as possible. We attempted to adopt the natural language of the discipline in usage by our curatorial staff. We tried to avoid distorting or encoding data (to satisfy computer system parameters) in ways that ultimately reduced its informational value to the people it was meant to serve. The committee's work helped to identify the basic elements of cataloguing and to preserve the appropriate inter-



© The National Gallery of Canada

relationships in the data, resulting in descriptive cataloguing standards with sufficient authority to ensure their use across the institution in building a database that curators and managers would understand and could trust. Standards accessible to all project participants have contributed greatly to project stability. Without them, personnel changes would undoubtedly have had a negative impact. Indeed a database built in a controlled way will gradually become its own source of syntax and terminology as the cumulative record of all decisions taken to date.

In the broader Canadian context, participation in a network has contributed significantly to recognition of the vital role of documentation standards and terminology control in data retrieval and

Walrus-Spirit, c. 1977, by Osvitok Ipeelee (Canadian, b. 1922). Gift of M. F. Febeley, Toronto, 1985.

© The National Gallery of Canada



Grizzly Bear Totem, Angidab, Nass River
c. 1930, by Emily Carr (Canadian,
1871–1945). Gift of Mr and Mrs C. S.
Band, Toronto, 1968.

information exchange, and the long-term need for collective action and a shared agenda within the museum community in developing and implementing such standards for the future. Because all CHIN clients contribute to a shared resource in the form of the National Databases, we each have a vested interest in working together to enhance the quality and usefulness of these resources. In the case of CHIN, structural issues are addressed by the shared Data Dictionaries on which all the institutional databases are modelled, supported by the client services group at CHIN headquarters. Standards and terminology issues are

addressed through user-group meetings and the ongoing work of disciplinary working groups representing the major interests of the client museums, including groups specializing in the fine arts, history, natural sciences and archaeology. Recognizing our interdependence increases our collective strength, especially when one considers that in large part we museum documentation specialists are inventing our own roles, training ourselves and building our own tools. Our development as professional staff functioning effectively in our respective museums is advanced by investing in our community, by developing strategies and programmes in forums such as conferences, by sharing experiences and applications in our professional journals and literature, by helping smaller less-developed museums through skills-sharing, internships and orientation programmes, by developing and promoting shared documentation standards, and by building databases and sharing information on computer networks.

Delivering the dividends

Beyond establishing workable standards, the second critical product of needs analysis and consultation has been clearly defined objectives for our documentation project. Many past projects in collection documentation have failed by attempting to do too much at once and to be all things to all people – this approach has generally resulted in databases that record a lot of information for a few objects and no information at all for most. Our project plan has necessarily been driven by institutional programmes and priorities; for example, at the National Gallery of Canada, the first stage of our documentation project was driven by the need to plan and execute a full move of the art collection to our new

building. This required the construction of a comprehensive descriptive inventory of the collection incorporating location tracking and control. Whatever a museum's short- and long-term objectives might be, it is essential to structure, prioritize and stage a programme of information capture and distribution to meet real needs with tangible results. Project success has been measured by our ability to deliver useful outputs (real contributions to the performance of everyday tasks) throughout the ongoing data-creation process. These contributions – a searchable collection catalogue, accurate location information, computer-generated labels for exhibits or acquisitions reports for the Board – have laid the foundations for future, more sophisticated stages in the documentation project. Our programme has been kept on track not by limiting expectations but by scheduling expectations, choosing the things to be done and directing the resources obtainable to getting them done.

Getting information to people where they want to use it has been our guiding principle in regard to information distribution. The user group has expanded from the early few who were building the database to an extended user network. The museum systems architecture is designed to bring information to people at their work sites and provide them with sufficient training to access that information for themselves. There is a micro-computer on the desk of virtually every one of our 250 staff, connected to a central switching device that allows them to communicate over a local area network with each other via electronic mail and to access a variety of information bases including the collection database, the library catalogue, the Humanities National Database, the National Reference Databases, and the Conservation Information Network among others. The Humanities National Database provides ready access to the inventory of the collection

holdings of contributing fine arts and history museums in Canada, both those who maintain their institutional databases on the CHIN system as well as the growing number of museums that use regional or local systems but contribute subsets of their data to the National Database on CHIN. This resource – even with the limitations resulting from non-standard data structures and terminology – greatly facilitates the location of objects for loan and exhibition purposes as well as information on collections for research and comparative purposes. Databases developed for their own purposes by individual client institutions or by CHIN staff can be made available over the network to the whole client community in the cases where they have general usefulness. For example the National Gallery's *Artists in Canada* database, a union list of artist documentation files held in twenty-four repositories across Canada, is an evolving research tool with wide application. Other available databases include the *Heritage Directory* listing Canadian agencies engaging in heritage activities, and the *Curatorial and Historical Index of Publications* which indexes the *Material History Bulletin/Review*, the *Museums Quarterly*, and the *Ontario History Journal*. These and other available reference databases represent only a beginning; it is easy to envisage future staff at their desks reaching for information from the growing computerized resource library with the same ease that we now reach for books from our bookshelves. To facilitate this we must of course employ existing, or develop new, office systems, communications facilities, and user-friendly interfaces to help the user access information without having to know the peculiarities of each system and each information base. Future integrated communications networks inside and outside the museum will put information tools in the hands not only of staff at their desks, but of researchers at remote sites and ultimately the public in their homes.

Progress and potential

The history of collection documentation at the National Gallery of Canada demonstrates that real change is possible with the help of technology if people are empowered to use it. After eight years of intense work involving over 6 million computer transactions, we have built a high-quality bilingual (English and French) database representing the over 45,000 objects in our care, distributed over our local area network and applied daily to such basic but important tasks as tracking locations, organizing storage areas, producing exhibit labels, preparing lists and reports, and answering inquiries. With the aid of our collection database we were able to manage a highly organized, controlled and safe move of our collection to our new facilities. The complex process of documenting, storing and accessioning new acquisitions to the collection has been streamlined and standardized. We have at our fingertips information on the nature and growth of the collections to respond to management needs for comparative analysis and future planning. The fact that all users are drawing collection-based information from the same pool ensures that they are using consistent, high-quality and up-to-date data. The ability of our registration department to respond quickly to the requirements of our clientele, both internal and external, is greatly enhanced. These encouraging results in collection documentation have taken place side by side with many other automation initiatives throughout the Gallery's departments, running the gamut from computerized accounting and finance systems through library cataloguing systems to point-of-sale systems and desk-top publishing. The emergence of our own in-house Information Technology staff has opened doors to more independent action and more effective planning for integration of systems throughout the Gallery's departments. The investment

in documentation by the Gallery over ten years has been large, considering salaries and equipment, even with the enormous advantage of having access free of cost to the CHIN network. The clear consensus is that the results to date have justified every penny invested, opening the way to the implementation of further stages in the documentation project in which we will build subject access, exhibition history, bibliography, and imaging features onto the solid foundation of the current collection database.

Beyond these tangible products (both current and future) automation has proved to be a catalyst in institutional reactions to a number of important managerial and structural issues current in the museum community. Not least among these has been the evolving debate around the shifting frontier of curatorship and collection management. Increasingly as collection managers and documentation specialists intrude in areas such as research, cataloguing and preservation, which have previously been the exclusive purlieu of curators and/or conservators, we are all challenged to abandon traditional territorial stances and to establish effective collaborative working relationships. A similar shifting frontier exists between those staff who represent the traditional academic or curatorial culture and those who personify the new business-oriented 'managerial' culture in museums. On this frontier we must strive to reconcile the very divergent objectives and measures of success/excellence that characterize the museum management crisis of the 1990s. Academics may expect primarily scholarly research information to be recorded, while managers may be more concerned with collection management issues, time-saving automated processes, or even revenue generation. Both sets of expectations must somehow be acknowledged, even when they may only be met in

the long term. In general, I believe that automation possesses great potential for facilitating an approach to museum work that I would typify as shared responsibility. Current and future applications hold the power to liberate an increasing number of staff from burdensome and repetitive tasks. They can promote interaction, communication and co-operation between disparate museum departments carrying out the institution's basic functions of administering, collecting, preserving, researching and educating. Automation capitalizes on the phenomenon of information overlap in museums, the reality that many functional units in the museum require the same basic data in order to achieve their specialized objectives. Traditional territorialities and jealousies are being challenged and access to information is being extended from the information-privileged to the information-disadvantaged, fostering more efficient and informed practices and hopefully more democratic organizational cultures. Information readily accessible for decision- and policy-making is an increasingly vital tool in defining, implementing and managing the complex corporate plan.

Automation, if wisely implemented, can focus our view on information as one of the key 'products' of the museum. In a world in which technological capability will usually outstrip 'content ability', we are becoming more aware that information, not technology for technology's sake, is paramount. Anyone involved in collection management knows that information documenting our collections is not generated overnight on demand. Knowledge evolves gradually and endlessly from many sources through the

programme of research, the production of exhibitions and publications, and the process of collection management. The exciting prospect for the future is that we are now creating the technological and procedural means to capture, utilize and distribute this growing body of knowledge. This will permit us to develop our information strategy from simply accounting for the objects in our collections to describing, explaining and contextualizing them. What is more, fundamental questions are arising about how automation can revolutionize access to information and its distribution to ever wider audiences. Advances in computer technology and communications coupled with the development and implementation of tools like thesauri, translation facilities, and text/image interfaces will radically change the ways we carry out our institutional mandates and how we deal with the issues of information, distribution and exchange. The self-justifying picture of the museum as a citadel of treasures – treasures imbued with beauty and meaning so evident that they need not be communicated – may soon be as extinct as the dinosaur. In a rapidly changing world our public wants more of us and we must find the means to deliver more. I believe automation is helping us to address the larger issues of what a museum should be in the twenty-first century.

As in all things, the seriousness with which we approach the extraordinarily complex task of computerizing museum information will be in direct proportion to the short- and long-term benefits that we stand to derive from these initiatives. We can be racked by change or we can manage change. The choice seems clear. ■

Museums as information centres

Leonard Will

The introduction of computer technology has spawned a host of information services for specialists and the general public which have broadened the traditional functions of museums. The author was formerly Head of Library and Information Services at the Science Museum Library in London and is Chair of the ICOM-CIDOC Working Group on Museum Information Centres.

Museums and galleries stimulate visitors to find out more about the objects on display and the subjects or cultures to which these objects belong. They increasingly provide information services to cater for this interest and to answer visitors' questions.

The curators are the specialists in the subjects covered by the museum, but it is not cost-effective for subject experts to be the first point of contact for the wide variety of questions that a museum receives. One way of filtering inquiries and allocating the most appropriate resources to them is by providing specialized 'information centres'. These can deal with the general public, scholars or experts in the subject, children, teachers and colleagues from other museums and libraries; they can also provide a service by letter and telephone to people unable to visit the museum.

In this article I shall describe some of the information services now being provided in museums, so that the best ideas can be combined in planning the information services of the future. There are many opportunities to use automation, but it must be seen as an aid rather than a driving force; the type of service must be based on the needs of the users and the mission of the museum.

'Self-service' information provision

At a very simple level, computers can be used to provide better quality information to visitors the moment they enter the museum. Good-quality signs and leaflets can be produced by desk-top publishing, dynamic video displays can draw attention to the day's events, and touch-screen guides can allow visitors to find their way around and learn what the museum has to offer.

Interactive displays may do much more, allowing the visitor to browse through representations of the collection and obtain introductory or detailed information. This kind of display is particularly appropriate for art galleries, which may have a limited number of items, all of them important, so that it is practicable to produce a comprehensive on-line catalogue. Examples are the Musée d'Orsay in Paris, and the Design Museum and the National Gallery in London. At the latter, the 'Micro Gallery' interactive catalogue displays high-quality images of pictures in the collections, with descriptive text, and allows users to move easily through different approaches, such as subjects, people and places. This system can also print out a free floor plan of the gallery showing where the pictures that a visitor chooses to see are located. At the Natural History Centre in the National Museums and Galleries on Merseyside, Liverpool, an interactive videodisc system allows users to examine geological specimens, draws upon the collections management database to provide information on their numbers and geographic origins, and encourages visitors to move on to examining actual specimens by directing them to where they are stored.

The success of these systems depends not only on the attractiveness and clarity of the display, but also on the thought that is put into the underlying indexing structure. Although 'hypertext' and 'visual indexing' are appealing and useful concepts, their success depends on a consistent network of links and references that has to be expressed in words even though these are not made explicit to the user. 'Free text' indexing is simple to set up but must not be allowed to give a false sense of precision or exhaustiveness.

Public-access museum catalogues are often specially written; although they may

draw on information in the museum's central catalogue and inventory records, they are not usually directly connected to it. This differs from most libraries, which have public-access catalogues that provide direct access to the main database. Museum databases are much less standardized than those in libraries, and the quality of the cataloguing is much more variable. Museum databases have often been set up by inputting existing catalogue records created over many years, before computerization was ever conceived, or they may be the results of a stocktaking exercise that records simple physical descriptions only, with no information about history or significance. Curators are often reluctant to have visitors read these descriptions, because they may not only be incomplete but also embarrassingly wrong. Besides, in many of the largest museums only a small proportion of the collections has yet been recorded in a computer database.

There are therefore considerable limits on the ability of present-day systems to provide users with full and accurate information about all the museum's collections, and to respond helpfully to whatever question a visitor may have. Staffed information services meet this need.

Information centres and services

A staffed centre can call upon all the museum's resources – the curators, the education department and the library staff. The responsibility of meeting the visitors' need for information does not lie only in a specialized centre, even when one exists; any member of staff may be asked a question, and everyone is therefore a potential entry point to the museum's information system.



© Cleveland Museum of Natural History

If we consider what the integrated system of the future might look like, we can imagine that there will be a light, comfortable and well-guided area easily accessible to visitors. Despite the attraction of electronic forms of information, it is likely that printed materials will form a major resource for many years to come. Books and journals are easy to browse through, readable without equipment, and give more information at a glance than any video display. Besides, books have been produced for hundreds of years, and much of the information that they contain will never be transferred onto computer.

Finding the right book or article, however, is a problem with which computers can help, and the information centre will certainly have a user-friendly 'on-line public access catalogue' (OPAC). This will not only give access to the resources of the information centre or library, but will also access linked databases of the museum collections and other resources. These might be files of biographical and local information, as well as lists of current events in the museum and in the community. All this information will be handled by a common interface, so that although it may come from a variety of systems it can be presented to the user in a consistent way. More important, there will be an underlying mechanism to standardize search terms for

Dr Dino (Wendy Wasman, Librarian of the Cleveland Museum of Natural History) answers questions on-line on the Cleveland Freenet.

subjects and names, to overcome the problem of different labelling systems. In an extended search the computer system will gradually learn the user's specific requirements by asking for assessments of the relevance of the items first retrieved.

Many museums provide library and information services to scholars and the public. The Victoria and Albert Museum in London houses the United Kingdom's most important library for fine and decorative arts, and the library of the Prins Hendrik Maritime Museum in Rotterdam provides an integrated service of information about the museum collections as well as on a range of maritime topics covered by the archive collections and the book stock. The new Museum of Scotland, being built by the National Museums of Scotland in Edinburgh, will have an integrated information centre as a central focus, and the Cité des Sciences et de l'Industrie at La Villette, Paris, houses the major public library for its subject in the city.

The staff of the information centre are the most important element. They need to be able to deal with many different kinds of

users, from the confident and demanding visiting expert to members of the public who worry that their questions may be too naïve or not serious enough to take up the time of the staff. At the Science Museum in London, the library staff have always felt that it is very important to provide a high-quality service to all types of users, and welcome the variety of inquiries that this range of visitors bring.

In 1991, the Science Museum ran a three-month experimental Science Information Service for non-specialist members of the public. One museum gallery was taken over and fitted out with a selection of introductory books and periodicals on science and technology, reference books, personal computers fitted with bibliographic databases and encyclopedias on compact disc (CD-ROM), and terminals giving access to the museum and library catalogues. A major aim of the service was not just to provide facts and figures as quick answers to questions, but to help inquirers to understand principles, so that they would be better able to think out answers for themselves in future. This requires staff with a sufficient general knowledge of the subject

'Learning to see' teaching software for the painting L'atelier de Corot by Jean-Baptiste Camille Corot (c. 1865, Musée d'Orsay). Screen provided by Digital Equipment.



© Musée d'Orsay, Paris

to be able to understand an inquiry, but without the need to be able to give the answer from memory; it is more important that they should show interest and be able to lead the inquirer through the process of finding out. This was achieved by a combination of staff from the library and curatorial departments, plus two specially appointed school science teachers.

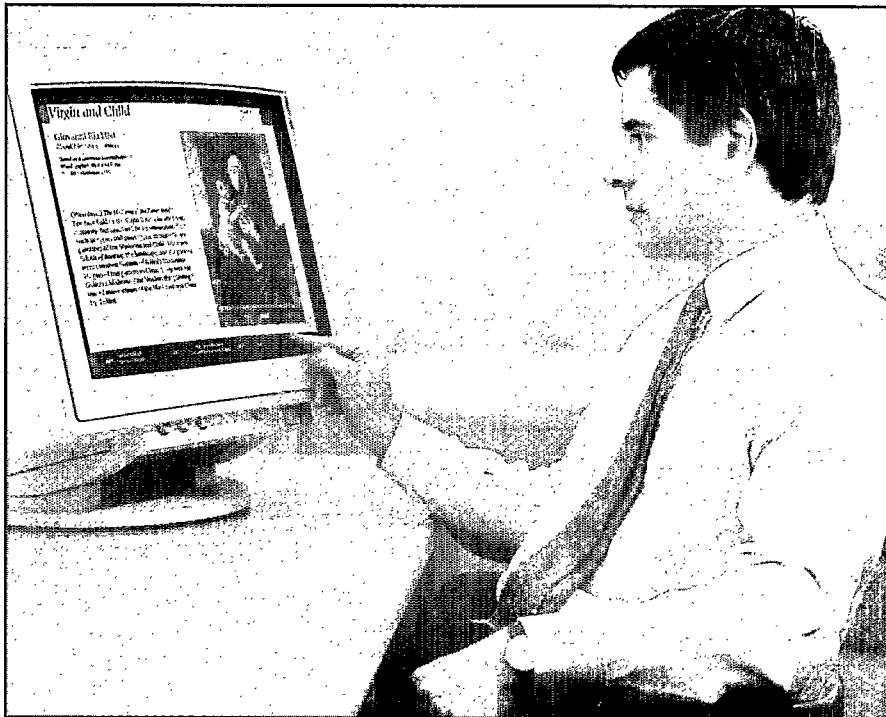
In the three-month period of the experiment the staff prepared and distributed many information sheets on scientific and technical topics of current interest, such as the hole in the ozone layer and the environmental pollution resulting from the Gulf War. They provided scientific and technical information to over 2,000 users. At the end of the experiment it was decided that although it had been very successful in terms of user satisfaction, the minimum number of people required to run it were not kept fully occupied just by museum visitors, and that ways of broadening it to a national service would be sought. At present the library deals with inquiries of all types, but arrangements are under discussion to co-operate with other institutions to provide more resources and to share the work.

Museum information centres normally log and index any non-trivial inquiries that they receive, so that if a later inquiry is received on the same topic they will not have to repeat the work. Traditionally they have used card files for this purpose, but small and cheap database software is now available and convenient for even a small museum to use. Ideally all museum staff should share any databases of this kind, so that if a curator has done some work on a subject for an inquiry it will be found by any other member of staff who needs it. If the museum has a central computer on which corporate information is stored then the file of inquiries can be located there, and ideally it will be accessed from the

same menu as the databases of objects, books and pictures. Care is needed to respect the confidence of inquirers by not disclosing their names without permission. As well as giving references to previous inquiries, a local computer system can be used as a guide for museum staff, reminding them of their own resources. This can be a simple diary or directory system, or it can embody some elements of an 'expert system', advising on the most appropriate action in the light of input data.

Information networks

Any modern information centre does not attempt to be self-contained, but sees itself as an entry point to the network of the world's information resources. This may be thought of as a metaphorical network of people and organizations who co-operate with one another, and such a spirit of co-operation is essential for success. Increasingly, though, this is facilitated by a physical network of telecommunications which both library staff and their clients can use. In many countries, with a simple personal computer and a modem it is possible to connect to the Internet, an international network of networks, giving online access to many computers and databanks throughout the world. At present most participants in the Internet are institutions such as universities, but use is rapidly widening and many museums are connected. The databases available include the catalogues of many large libraries, including those of many universities. Indexing of the available resources on the Internet is not consistent, relying mainly on free text searching of menu items or complete documents, though several guides have been published. There are services that allow a single search to cover the material in many different institutions, using pro-



© Fergus Greer

The Micro Gallery, in the new Sainsbury Wing of the National Gallery, London. This interactive gallery provides visitors with a visually coloured encyclopaedia of over 2,200 paintings, 1,000 secondary illustrations and dozens of animations. Software: Cognitive Applications Ltd, Brighton; sponsored by American Express Foundation.

grammes with such exotic names as Gopher, Archie, Veronica, World Wide Web (WWW) and Wide Area Information Server (WAIS). Because the Internet has largely developed through a combination of enthusiasm, altruism, academic interest and government sponsorship rather than as a commercial undertaking, it has an ethos of free sharing of resources, and much of the data and software is distributed without charge.

As well as allowing access to remote databases, computer networks provide other excellent ways of collecting and supplying information. Electronic mail makes it easy to send an informal note to someone who may know the answer – he or she will receive the message within minutes and can often reply the same day but is not disturbed unnecessarily and can respond when convenient, an advantage over a telephone call. The message is in writing, and can be edited and forwarded by each recipient. This system is invaluable in coping with varying time zones and in passing complex messages between people whose native languages may differ. Even if the inquirer does not know whom to ask, there are many specialist mailing lists, and a message sent to one of these

will be read by hundreds or thousands of people, a few of whom will often respond with information, leads or ideas. Subscribing to such a list keeps the information officer aware of developments both in the subject field and also in general professional matters – reading the informal traffic is like attending an ongoing conference.

Computer links are not only used at the professional level, however. There is a rapidly increasing growth of community computer networks, of which the archetype is the Cleveland Freenet, in Ohio, USA. This system, set up by Case Western Reserve University, runs on a network of computers that provides a wide range of information aimed at, but not restricted to, residents in and around Cleveland, for the price of a local telephone call. The university provides the computing facilities, but the information content comes from many different bodies and individuals, including local authorities, clubs and societies, libraries and museums.

The information provided by museums includes lists of current events and exhibitions, opening hours, and electronic mail to staff. They also run electronic bulletin boards, the most famous being *Ask Dr Dino*, run by Wendy Wasman, the librarian of the Museum of Natural History; it invites questions and provides answers on any natural history topic, including geology and astronomy. In April 1993, 466 questions and answers were available for browsing on-line. Because of the title of the board and children's insatiable appetite for information about dinosaurs, there were several questions on that topic, but other questions ranged from early hominids with long arms to garden bird feeders and from the distance of black holes to whether one can touch the sky. Often the museum staff gave

concise and factual answers, but in other cases they could make the point that there was no simple answer, while providing references to publications which users could read to pursue the questions for themselves.

The great advantage of this type of interactive inquiry answering is that the work that goes into an answer is not devoted simply to the one person who asks; by publishing the question and answer, many other people read it with interest. The other advantage is that many people can contribute, both informed people who may add helpful information or explanations and non-experts seeking information who may ask supplementary questions. Even if they did not have exposure outside their own walls, museum information services could gain much publicity by posting interesting questions and answers (without inquirers' names) on a public noticeboard for other users to read. Making a service more public in this way will also encourage feedback, not only on the quality of the service but also on the direction it is taking and the

resources being put into it. An alertness to feedback and active monitoring of what users require is essential for success.

An electronic museum bulletin board need not depend on a community information network, though it would be quite appropriate for museums and libraries to take the lead in setting one up. Bulletin board software is readily available to run on simple personal computers, as is evident from the number of systems that have been established in the back bedrooms of enthusiastic individuals, so the resources needed to make a start with such a system are very small.

In providing any information service we have to ask why we are doing it. It is a museum's job not only to collect objects but to ensure that they are understood and appreciated. We can do our best to put forward interesting facts, but the questions which users themselves raise are inevitably the most interesting to them. Modern information handling systems give us an excellent opportunity to respond to these questions in a more helpful, accurate and stimulating way than ever before. ■

Computers and the museum business

Robert Leming

Robert Leming is Manager of Computer Services at the Philadelphia Museum of Art in the United States. In this article he looks at the business side of the museum and how automation has provided new tools for management and growth.

Invariably, when I tell people I am the Manager of Computer Services at the Art Museum, they look at me blankly before they venture, 'Inventory?'

Most laypersons do not appreciate that a museum besides collecting, preserving, and exhibiting, is much like a public market-place, playing host to a bustling variety of small businesses.

We have all heard the old saying 'The museum exists for the purpose of raising funds', but there is more to the business side of the life of the museum. At our museum there are membership records to maintain,

tickets to issue, reproductions to distribute, the press to alert, a thriving shop to stock and manage, catalogues to publish, meetings to arrange, a payroll to meet, art to insure and ship and much, much more.

In Philadelphia, in an effort to support this business-side activity, we are in the midst of implementing a series of computer systems. Of course, these systems represent a sizeable investment both of capital and effort. Before embarking on such an investment we have had to articulate the motivation, develop a strategy, and project the effect of these systems on the life of the museum. In this article I shall focus on the strategy and the projected effects.

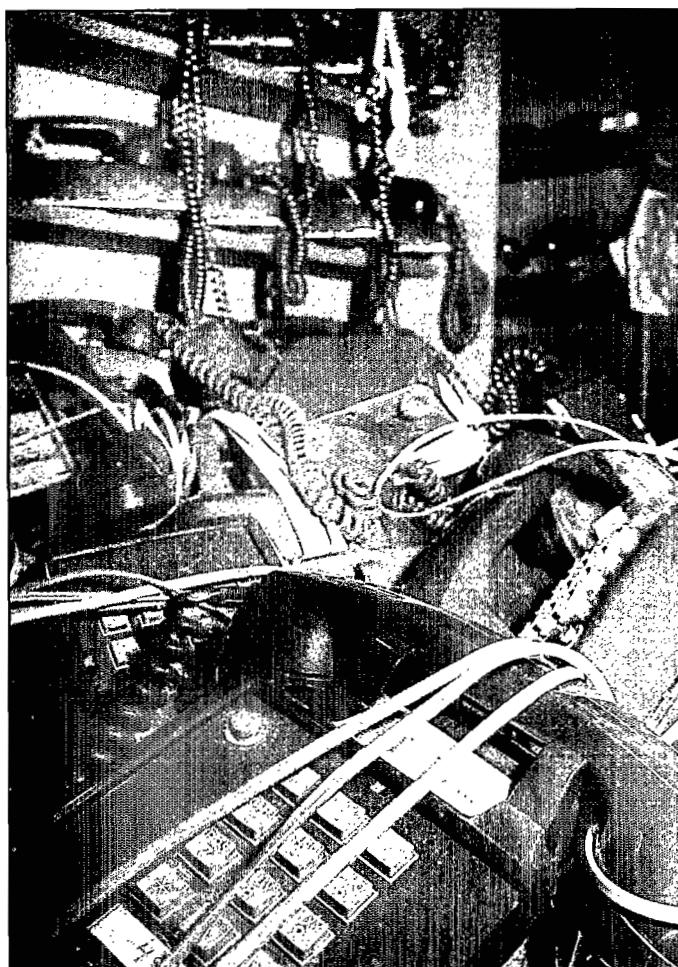
The strategy for selecting and implementing these systems has two components, the systems themselves and the supporting infrastructure.

The systems

Communications. One primary objective of systems in any museum is enhanced communication: within the museum, between the museum and its community, and with the community of museums. In our case the first order of business was to provide a new telephone system, which includes reliable basic services, voice mail and special purpose messaging. *Key consideration:* A modern telephone system is complex. We required a consultant's aid in selecting and implementing a system. Our staff has subsequently had to acquire a new set of skills and to assume a new set of responsibilities to maintain this system.

Financial management. A museum is an accountant's nightmare. Fiscal years, long-term projects, grants, restricted funds, non-profit reporting requirements, and a wide variety of incomes and expenses

© Lynn Rosenthal, 1992, Philadelphia Museum of Art



Our old telephones: scrapped after the new system was installed.

all add complexity to the environment. In planning for a new financial system we needed to: (a) develop an expanded and flexible Chart of Accounts; (b) provide for project and grant tracking; and (c) provide online access to our managers. *Key consideration:* To provide managers with access to their own accounts, it is critical that system security can be based on the department and project codes within the Chart of Accounts.

Membership, development, constituents. Museums collect lists as avidly as they collect art objects or natural history specimens. We have all seen this proliferation of lists lead to the solicitation of the dead and the invitation of the divorced. In implementing this system we are attempting to create a single central database to hold all the museum's constituents. This single system had to provide: (a) support for daily gift and dues processing; (b) a single *central* list of constituents with *distributed* access; (c) centralized printing and mailing; and (d) prospect development and tracking. *Key considerations:* First, how can a central list of constituents be kept up to date? We have settled on a relatively small VIP list where changes are closely controlled. We have provided wide access to make changes within the rest of the list. Second, remember that data is work. A modern development system offers the capability of tracking many pieces of information. In planning, the museum must keep in mind that effort will be required to record and maintain each piece.

Admissions, ticketing, participation. In addition to basic admissions and ticketing for special exhibitions and events, this system can provide a rich source of prospects for new members. *Key consideration:* A computer system offers new opportunities to capture participation in-

formation, for example, that a Member attended the Picasso opening. This participation information can be valuable in future marketing efforts. For example, we hope to bar code membership cards to facilitate the capture of this information.

Scheduling. In our museum, the scheduling of tours and the allocation of spaces, people and resources is a headache. We are planning a system that will facilitate this scheduling and identify conflicts. *Key consideration:* As the number of systems mounts, the demand on computer support staff becomes a concern. Even a large museum will typically be able to support only a small computer staff. It is essential, then, that the systems be kept as simple and uniform as possible. Applications which are based on the same database and thus share the same report generator and query language can be very helpful – systems from the same vendor are ideal.

The museum shop. A museum shop system must provide for point-of-sale terminals, inventory control and marketing analysis. *Key consideration:* As the number of systems grows, integration also becomes a key concern. It is important that all of these systems readily exchange information. Two examples: daily receipts and expenditures in the shop should be directly reflected in the financial system; members' discounts should be tracked on their membership record.

The infrastructure

It is often overlooked that the systems discussed above assume an infrastructure that is critical to computing. This infrastructure includes: cabling; a network with its file and application servers; and desk-top computers.

© Lynn Rosenthal, 1993, Philadelphia Museum of Art



The cablers at work.

Cabling can be particularly troublesome. At our museum we have recently finished the complete recabling of the building. This included cabling for voice, data and video at a cost of over \$250,000. (It is important to remember, when justifying the cost of cabling, that this represents a capital investment with a life of twenty years.) Before work could begin, a cabling scheme needed to be devised and approved, bids solicited and a cabling contractor selected.

When we were ready to proceed with the actual project, the cablers had to be oriented to work in a museum environment. They needed access to virtually every area of the museum: art works needed to be moved, security provided, and the museum staff needed to be apprised of the forthcoming disruption to their work areas and routines. Though troublesome, I feel this will be the most

important project completed on my watch. A well-designed cabling system, once in place, will facilitate the attractive and integrated information systems that we all envision.

In designing a network and selecting desktop computers it is critical to adhere to the industry standards. This guideline still allows for a wide range of choice. In our case we have settled on an Ethernet network, Novell's Network Operating System, and a mix of IBM-compatible PCs and Apple Macintosh computers. By adhering to the standards access to a wide range of products, vendors and consultants is ensured, all at competitive prices. There is also an increased possibility that new employees will already be familiar with the systems and require less training, which can represent a considerable saving.

The method

The introduction of business computer systems into the life of the museum represents a period of great risk as well as great opportunity. I believe that the greatest risk is that the systems, as they grow in number and complexity, will become unmanaged and unmanageable. Like the sorcerer's apprentice, we may become overwhelmed as individual computer systems spin out of control. To prevent this I think it is wise to stress the following.

Simplicity. It is tempting, when considering systems that are long overdue and will be in use for years to come to require sophisticated applications which will meet all of our current and anticipated needs. I have come to believe, however, that this must be balanced by ease of use which in the long run will have a great impact on ongoing costs.

Integration. Typically, each system will fall primarily into the realm of one of the fiefdoms within the museum (scheduling being a notable exception). There will be great pressure to meet all the needs of the department at hand. When the good of the entire museum is considered, however, it is equally important that all of these systems are able to communicate information to each other and that, taken together, they become an integrated source of information to the management team.

Pace. This is perhaps the most difficult of all. I believe that the successful implementation of major computer systems within a museum (or any organization) relies on the development of a 'culture of computing'. Managers, under the pressure of tight budgets, meagre resources and looming

deadlines will often demand systems and solutions immediately. However, it might be impossible for their staff to select and successfully implement a major computer system. We all must learn to crawl before we can walk and walk before we can run. I believe that small-scale and simple pilot projects should often be explored before a major system is settled on.

Finally, and most importantly, these systems will only succeed if they have a champion at the executive level within the museum. The systems are expensive and a threat to both established turf and the status quo. Compromises will be necessary. Favourite systems will be rejected. Feelings will be hurt. The best systems will only be achieved if someone with clout keeps steadfastly to the good of the whole. ■

Computerized inventorying of museum collections in Africa

Valerie Chieze

One of the most significant aspects of the AFRICOM Programme developed by the International Council of Museums (ICOM) is the project to establish computerized inventories of museum collections in Africa. Considered as a top priority by African museum professionals, the project is an ambitious effort to strengthen links between museums throughout the entire continent and to combat the illicit traffic in Africa's cultural heritage. The author is project co-ordinator at the ICOM Secretariat in Paris.

In November 1991, ICOM organized a series of meetings entitled 'What Museums for Africa? Heritage in the Future' in Benin, Ghana and Togo, and the resulting *Proceedings* have been published and widely distributed. In the course of these meetings the 120 or so African museum professionals defined priority projects, whose primary aim is to develop regional networks. These projects make up the AFRICOM Programme which was adopted within the framework of ICOM's 1993-95 triennial programme. The ICOM Secretariat, thanks to the assistance of the Swedish International Development Authority (SIDA), has decided to use the services of a Co-ordination Committee composed of professionals from different regions of Africa and resource persons from ICOM. Between 1993 and 1995, the African professionals will assume responsibility for the AFRICOM Programme, and the role of the Secretariat will come to an end in 1995.

Among the projects chosen to form part of the AFRICOM Programme, the project to establish computerized inventories of collections was considered a priority, and is among those which require the most consistent co-ordination by the ICOM Secretariat inasmuch as it concerns the entire continent. The project is being implemented in close collaboration with CIDOC, ICOM's International Committee for Documentation. It is financed by the Agency for Cultural and Technical Co-operation (ACCT) and the French Ministry for Co-operation and Development.

During the meetings entitled 'What Museums for Africa? Heritage in the Future', the participants adopted a recommendation which was presented and approved by all the participants at the plenary sessions of the meetings. The recommendation reads as follows:

After three days of work, the participants emphasized the critical situation of African museums. The lack of inventories of collections, temporary exhibitions, activities relating to research and collecting as well as documenting have inhibited the development of most museums in Africa. . . . Added to these shortcomings is the lack of communication among African museums. . . . Among the causes of the deterioration and disappearance of objects of material culture, particular attention was drawn to the plundering of archaeological sites, the illicit traffic in cultural heritage, extreme climatic conditions and the lack of specialized personnel.

In the light of the foregoing, the participants recommend that:

Each museum undertake a systematic inventory of its collection.

Each inventory be made on museographic data cards which are standardized for all the museums of the continent. Technical assistance for, and the co-ordination and follow-up of, such a programme by international organizations (ICOM, ICCROM and WAMP [West African Museums Project]) would be desirable.

This manual inventory should serve as the basis for the computerization of museographic documentation.

The inventories may include not only the collections existing within each African country but also a country's objects held abroad.

The participants in the Accra workshop suggested that a programme be defined for the computerization of inventories throughout the continent to be used in the establishment of an African databank to which all the museums of the continent would have access.

In order to perform such an operation, it would be useful to create a national and international fund to provide technical and financial support for the setting up of a computerized inventory system by equipping each country with a uniform computer network.

The role of inventories

The fight against the illicit traffic in cultural heritage is of major importance in Africa, and the inventorying of museum collections undoubtedly constitutes the indispensable basis for any action in this domain. It is obvious that, at the present time, the establishment of regional and international networks of co-operation is a prerequisite for the implementation of policies and provision of effective ways and means of combating this illicit traffic. The project to establish a standardized and computerized inventory system based on regional and international co-operation is, thus, precisely what is required.

The definition of a museum as 'a non-profitmaking, permanent institution in the service of society and of its development, and open to the public, which acquires, conserves, researches, communicates, and exhibits, for purposes of study, education and enjoyment, material evidence of man and his environment' (Statutes of ICOM, Article 2) means that the institution should carry out many activities, including research and the mounting of exhibitions, which can only be seriously envisaged in Africa at the regional level. Indeed, given the fact that present national borders, the legacies of recent history, do not coincide with those of cultural regions, the possibility of exchanging information on museum collections and their documentation is more than necessary: it is vital for the development of museums in Africa. This exchange

of information should also be carried out with Africanist museums outside Africa in which a part of the African heritage is conserved.

An initial consultation of professionals on the situation of inventories in African museums paints a very different picture from country to country.

For example, in the ten countries of the Southern African Development Co-ordination Conference (SADCC), the Association of Museums (SADCCAM, an organization affiliated to ICOM) established a working group on the documentation of museum objects, inventories and the standardization of data. Among the museums of these countries, those of Zambia had already considered this as a priority issue. Thus, in 1989, the Zambian National Committee of ICOM organized a two-week workshop with the aim of ensuring the standardization of inventories and the documentation of objects. (The National Museum of Swaziland has now fully completed its inventory, while the museums of Malawi are halfway through theirs.) In central Africa, the Institut des Musées Nationaux du Zaïre (Institute of the National Museums of Zaïre) has made a full inventory of its collections. It now provides the museums of the Central African Republic with assistance in this domain within the framework of a regional project to fight against illicit traffic. In West Africa, the National Museum of Mali, for example, has completed its inventory, and its computerization began some months ago.

A general observation which can be made is that although the situation of museums shows wide variations, the inventory and documentation of museum collections is a major concern of professionals and, in many cases, regional co-operation is already taking place in this field. Accordingly, ICOM wanted this project to compu-

terize inventories in Africa to be implemented throughout the continent. To this end, an initial consultation was organized which resulted in the preparation of a pilot project. The significance of the project will lie in initiating regional co-operation between museums and facilitating exchanges of information. It will involve the setting up or strengthening of a working method at the regional and continental levels.

The countries of the North have an obvious role to play in the fight against the illicit traffic in cultural heritage, since the objects are marketed, first and foremost, in that part of the world. Institutions outside Africa will therefore have to intervene, on the condition that information on the collections circulates sufficiently well for museum professionals in the North to be able to identify the objects sold illicitly and take action. The Africanist museums of the Netherlands, which for two years have been engaged in a common project to computerize inventories, have stated their intention to participate in the project. The African section of the British Museum in London and the Musée des Arts d'Afrique et d'Océanie (Museum of African and Oceanian Arts) in Paris have also expressed interest.

The pilot phase is programmed over three years and should encompass museums from the entire continent, which will work on limited sets of objects in order to be able to evaluate results rapidly. Its primary aims will be: (a) the standardization of data in order to facilitate exchanges between museums; (b) the training of museum professionals in each major African region so that they, in turn, can assist and train professionals from other museums of the region (this was called an 'expected snowball effect'); and (c) the equipping of several museums so that the project will take in the maximum number of concerned institutions.

On this basis, ICOM organized a meeting in Paris, in July 1993, for the standardization of data. Professionals from African museums who are already experienced in computerized inventorying took part in the meeting in order to ensure that the project could be rapidly established. One achievement of the meeting has been the drawing up of a list of data categories for inclusion in the museum inventories and the adoption, in certain cases, of the terminological lists to be used. These proposals will be circulated as widely as possible among museum professionals in Africa so that, even in the case of manual inventories, they can standardize their data on collections. This first group of museums to participate in the pilot phase has pledged to adopt the proposed standards and to apply them to each museum inventory so as to evaluate its contents. If necessary, the museums could then improve the proposed standards before computerization is begun by the second group of museums (without experience) participating in the pilot phase, and which will receive the required equipment. The synthesis of the work of these two groups should lead, finally, to the setting of standards for all African museums. To this end, each of the participating museums will play an informational and training role in regard to the other museums of its region.

Preference is to be given to the use of a number of data categories in the establishment of the inventories of collections of African museums to facilitate exchanges of data between museums and the inventory and computerization of existing collections. The content of these categories has been defined and, in some cases, lists of terminology have already been made (the Secretariat of ICOM keeps them at the disposal of concerned persons). The ultimate aim of the project as regards standardization is the establishment of complete terminological lists for each of the categories.

The strategy adopted

Two groups of museums will be selected to participate in the pilot phase of the project. The first group comprises museums which have already computerized their inventories and have participated in the setting of standards. They are the National Museum of Kenya in Nairobi, the National Museum of Mali in Bamako, the Institut des Musées Nationaux du Zaïre (Institute of the National Museums of Zaire) in Kinshasa, the Museum of Art and Archaeology of the University of Madagascar in Anatanarivo, and the National Museum of Namibia in Windhoek. The second group will comprise museums that have not yet begun to computerize their inventories and will be chosen by ICOM. The stages defined for the pilot phase are as follows: (a) evaluation of the proposed standards (and adaptation of the systems existing in each museum to these standards); (b) selection in each museum of the collections to be computerized during the pilot phase of the project (these collections should comprise at least 1,000 objects concerning, more particularly, the human sciences, archaeology and ethnography); (c) estab-

lishment of the databases and inputting of data; (d) initiation of exchanges of information between museums within the context of common projects; (e) regular exchanges of information on the progress made in carrying out the project in each museum; and (f) circulation of the standards adopted after the implementation of the pilot phase.

A schedule has been established for achieving these goals. It starts from the first meeting on the standardization of data which took place in Paris in July 1993, and envisages the inputting of data on the collections identified by the first museum group before the middle of 1994. By the end of 1993, the second group of museums will receive equipment with which it is to familiarize itself and input data as from the middle of 1994. The year 1995 will be devoted to the compilation of the results of each of the museums, with the particular aim of establishing the most comprehensive terminological lists possible for each standardized data category in time for the General Conference of ICOM to be held in Stavanger, Norway, in July 1995. ■

Breaking new ground: collection documentation in the Czech Republic and Slovakia

Zdenek Lenhart

A latecomer to computerized museum technology, the former Czechoslovakia nevertheless made important strides in introducing computerized systems to record its rich museum holdings. The author has worked since 1987 on creating the collection documentation system in the Moravian Museum in Brno and was the Czechoslovak national co-ordinator for the ICOM-CIDOC survey of computerized collection systems. In 1993 Czechoslovakia separated into two states: the Czech Republic and Slovakia.

There were altogether as many as 230 museums in the former Czechoslovakia, excluding galleries (i.e. art museums) which were considered as a separate category of cultural institution. In the Czech Republic most of the museums belong to cities or communities, and only the ten largest are administered directly by the Ministry of Culture. In Slovakia almost all museums belong to the Ministry of Culture. There are no private museums in the two republics. All museums and galleries generally follow the guidelines of the respective Ministry of Culture.

Many different catalogues were used for the documentation of collections in earlier times. In 1963 the new collection management policy issued by the Czech Ministry of Culture prescribed a universal cataloguing card for all types of collections. Three copies had to be filled in for every specimen. The first copy was classified by

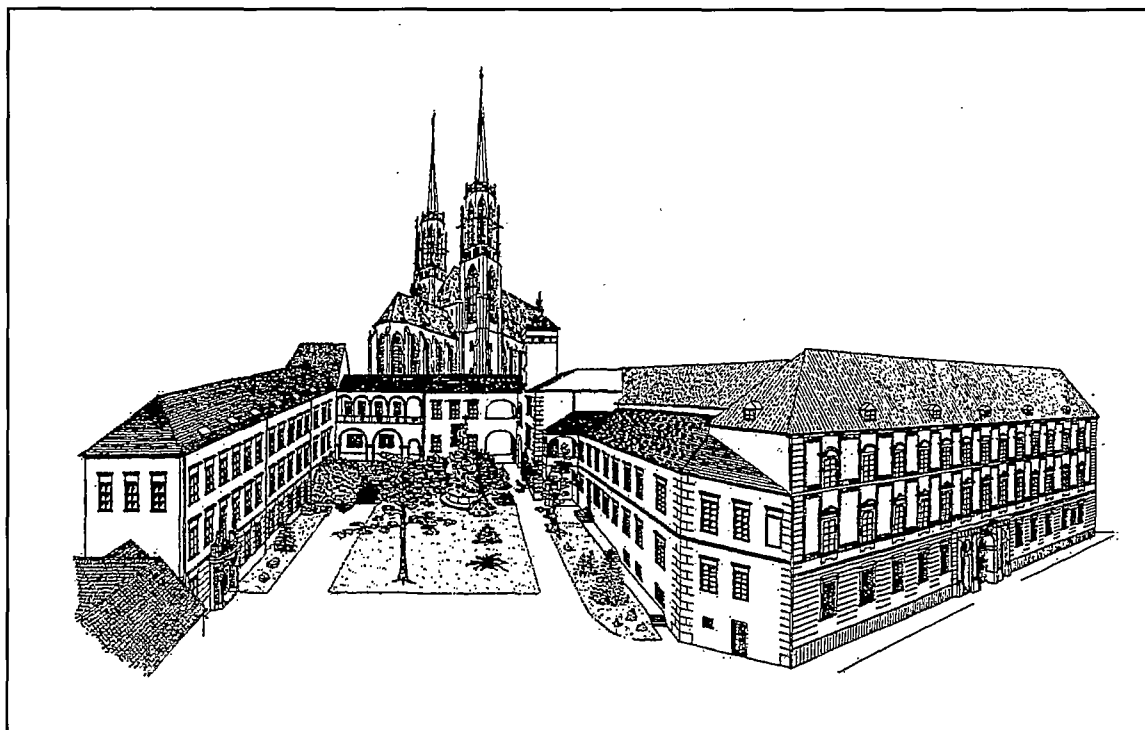
inventory number, the second in systematic order, the third as a security copy.

The cards were very general and simple and gave no guidelines for correct description of the particular type of object. The essential majority of collections are now registered on those paper cards. There were no computers (with a few exceptions) in Czechoslovak museums until the late 1980s.

Several theoretical studies on computerization of museum documentation were made in the 1970s and 1980s, mostly by museologists at the National Museum in Prague. None of them led to any practical results. Computers were extremely expensive and practically impossible to buy with Czechoslovak currency until 1990.

In spite of that, some museums tried to use computers. The first was probably the Moravian Museum in Brno where a small

Illustration by courtesy of the author



The central yard of the Moravské Zemské Muzeum in Brno unites the SS Peter and Paul's church behind it.

computer centre was created in 1986. Brno is the second largest city in the Czech Republic, with some 400,000 inhabitants, and the Moravian Museum is the second largest museum. It has a staff of about 230 and contains some 6 million specimens covering almost all museum branches except for technology and art.

The Computer Centre in the Moravian Museum turned from theoretical studies to a more practical approach and started to satisfy the particular needs of museum staff. It was entrusted by the Czech Ministry of Culture with the task of developing the model users' system AISM (Automatizovaný Informační System Muzei). An essential part of AISM is the documentation of collections. At present more than twenty museums in about fifty workplaces provide AISM with information.

We started our work on AISM with no contact with the international museum documentation movement. In spite of that, we recognize now, with contacts growing, that the main ideas of AISM are the same as those of other similar systems under similar conditions in other countries. This is a source of great satisfaction.

The main principles of AISM are based on an analysis of the general situation and basic needs of museums and museum staff. Museums are poor and cannot immediately build large computer systems. They need to progress step by step, using inexpensive machines and standard flexible database systems, to overcome the strong psychological barrier of computer illiteracy and ensure the ability to move on to new and better technologies in the future.

AISM is built on the dBase relational database system which meets the above-mentioned needs. We started in 1987 with the only available 8-bit machines under the

CP/M operating system and dBase II. Thanks to this standard system, we had no trouble moving to the IBM PC with MS-DOS and dBase IV when it became economically possible.

Political changes in 1989 were soon followed by a liberation of the market which initiated a big computer boom. Prices fell and are now lower than the world average. This is especially true of IBM-compatible computers with MS-DOS. This is the only realistic chance for museums.

Image databases are now not a technological, but remain a financial, problem. What does this mean for museums with a very limited budget? Instead of one computer with spectacular graphics, we prefer to have ten simple workstations restricted to text databases. Nevertheless, if any financial support is forthcoming, we are ready to grasp the chance.

The most important task was to find a record structure suitable for all possible purposes, simple to use and supported by dBase. The starting idea (implied by museologists) was to make a universal record structure for all types of collection from insects to paintings. We soon realized that this is almost impossible. Nevertheless a unified structure is desirable.

The solution was found in defining several compulsory unified fields at the general level, some strongly recommended fields at the departmental level (a cataloguing minimum, specific for every department) and freedom to append more specific fields for the particular needs of the respective curator, scientist, keeper, special collection, scientific research, etc. In co-operation with department committees or individual experts, we have prepared the model record structures for all main museum departments. Any of the unified fields may be

later transferred to central databases, either on departmental or general levels.

In brief, AISM is open, respects variability and differences, but recommends unification. AISM provides standardized help, coding tables, vocabulary files (e.g. a list of districts and countries, a list of European flora, an archaeological list of object types, etc.).

The use of common standards, codes, keywords, correct names, thesauri, etc., is essential for later powerful searching, indexing and data sharing. One of our main tasks is to persuade and help the committees to create (or overtake) such standards and introduce them for practical use. In this field we need more international co-operation.

A typical commercial computer application of a well-described problem may be fixed and closed. Museum collection documentation will never be an exactly defined task of this type. The user should have all the possible advantages of the wide flexibility of the original database system. AISM programmes have therefore two main goals.

First, to make the first step easier for computer beginners by including typical activities (various standard forms of data input, editing, retrieval, print and copies) in an easy menu system in a national language, independent of the data structure.

Second, to provide predefinable data checking, verification and evaluation, which partly depends on the data structure.

In considering the 'open' approach used by AISM, we see great psychological and practical advantages in the possibility of forming the users' own data according to their needs; the disadvantage is in the danger of damaging the data. As we are just beginning, the amount of data is relatively small, standards have not yet been negotiated and

the opposition against fixed systems (cards) is strong, we prefer AISM's open freedom.

There are several alternative projects for museum documentation, all of them based on dBase or Foxbase (FoxPro). The biggest difference to AISM is in their fixed predefined data structures for every included department. The structures are compatible, data standards often similar or equal, so they may be seen even as special modifications of general AISM proposals.

It should be stressed that some of those projects plan to be more complex than AISM and some have easier data input due to the restriction of data or data structure. Co-operation between the authors is unfortunately poor.

VMCLMELCO (Vlastivedne Muzeum Ceska Lipa) has several applications in various Czech museums, the best developed branch being probably zoology.

AMIS (Automatizovany Muzejny Informacny System) being developed at the Mestske Muzeum, Bratislava, Slovakia, tries to cover all possible museum and library activities.

MUZEUM created at the Narodni Technicke Muzeum, Prague, is dedicated to technology collections and stresses centralized acquisition.

PEAR-PREHLED SBIREK conceived especially for the Moravská Galerie in Brno is an example of a private or dedicated system used in a single museum.

Security documentation project

The fall of the Communist system and the disappearance of the Iron Curtain did not bring only positive changes. In the new

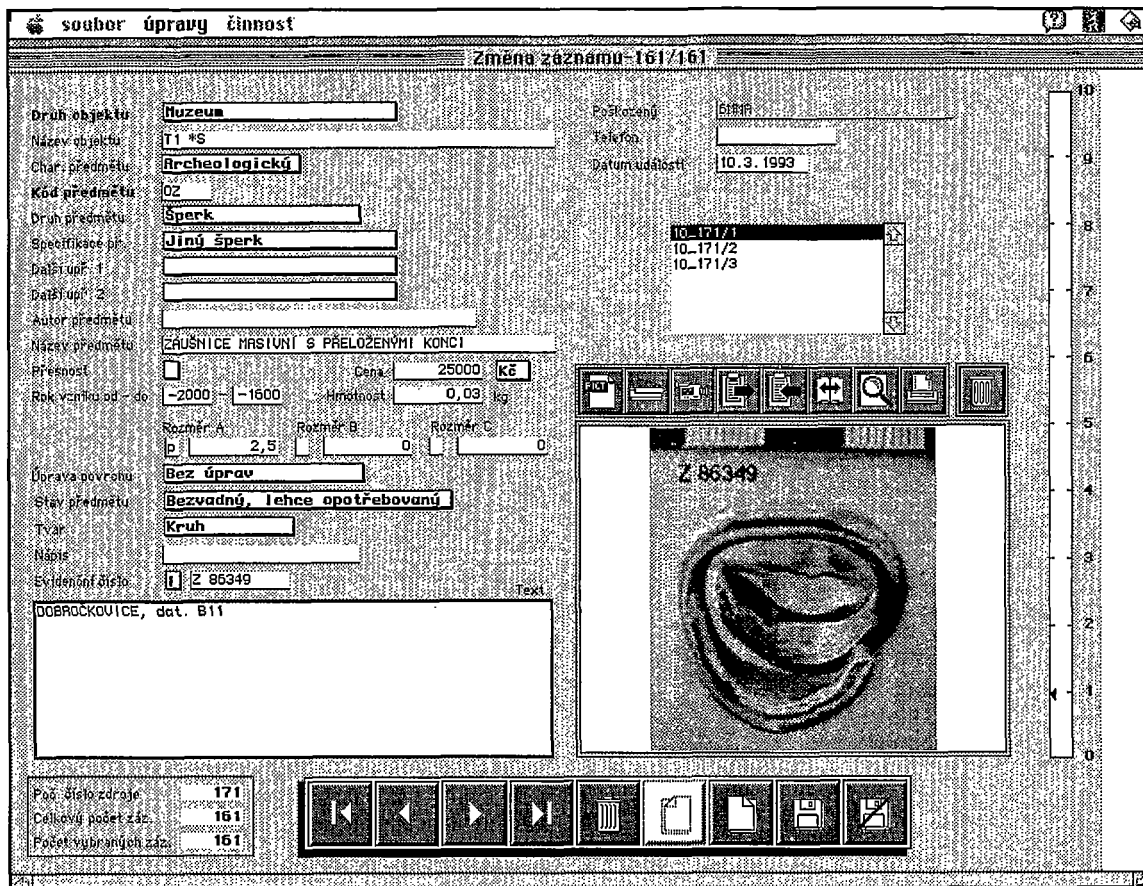


Photo by courtesy of the author

situation the number of thefts of valuable objects from churches, galleries and museums rapidly increased. In addition to primary security (locks, bars, supervisors) a new security documentation project was started by the Czech Ministry of Culture and the Ministry of Interior Affairs, in cooperation with Interpol.

Every object should be catalogued with a basic one-purpose description and high-quality image. Firm financial support (\$1.4 million) from the government and the strong interest of computer firms to enter the sphere of culture allows for good equipment (Apple Macintosh Quadra 700 and 950, colour scanners, video cameras, still videos) and rapid progress.

About 200,000 objects are to be registered by fourteen regional workplaces in the natural and human sciences museums, excluding art galleries, monuments, churches, etc. A great deal of text data will be entered on IBM PCs or transferred from existing databases. Macintosh computers will be used preferably for

operating with images. Digitalizing will not normally take place before the particular object is needed. The great majority of pictures will be stored on original video tapes or slides.

All the data will be integrated into one central database in the Moravské Zemské Muzeum. There will be no online connection for transferring data from the 'regional' databases. Text data will be transferred on diskettes, and images on video tapes.

In the case of theft or other loss the particular text data and images (which will then be digitalized from video tape) will be transferred by modem to the police computer network to be immediately available at all police stations and Customs offices.

The equipment will be fully used by the museums and the simple security database information will be complemented by scientific descriptions. Other specimens will be added and used for all possible purposes. This project will constitute a big step forward in collection documentation. ■

Screen form from the security documentation project.

Automating the future

David Bearman

The combination of multimedia computing and telecommunications will dramatically alter tomorrow's museum environment. Information will be presented in totally new forms to a public that David Bearman describes as not only literate but 'mediate'. The author is editor of the quarterly Archives and Museum Informatics and has chaired the Committee for Computer Interchange of Museum Information, which investigates standards for museum data interchange. He organized the first International Conference on Hypermedia and Interactivity in Museums (ICHIM '91) and co-chaired ICHIM '93.

Despite the limited impact of computers on museums to date, they are about to transform the very character of museums, as they revolutionize our means of experiencing culture. Previously the impact of computers has been minimized by cost factors and the minuscule market represented by museum purchases. It has been further constrained by the lack of standards within museums and across the museum market and the lack of knowledge of what computers can do. The best achievements to date have been those which broadened the market, increased the effect of standards and educated museum professionals to the opportunities, as represented in the Canadian Heritage Information Network and the Museum Documentation Association in the United Kingdom.

In the 1960s and 1970s a few large museums employed mainframe computers to retrieve information about their collections and envisioned ultimately contributing information about holdings to national cultural databases. However, the capabilities and expense of mainframe computers in those years restricted their use for information retrieval to searching highly coded representations of museum collections and printing the results. While considerable energy was expended by large institutions in the museum community on developing programs to do this, searching abbreviated versions of existing documentation for museum objects did not satisfy a critical museum need. As a consequence these software programs failed to enhance the way in which museums conducted their business.


It was not until the advent of the less expensive and more competent minicomputer followed by the microcomputer in the 1980s that automation found an important role in the museum. But this role was quite different from what was anticipated twenty years earlier. It was not applications

developed for museums that made the difference, but those developed for broader markets which could be used in museums, applications such as financial management, membership and development, word processing, database management and desk-top publishing. These applications now assist museums to do the things they have always done more quickly and easily. Although specialized software for museum collections management and information retrieval has been developed and is installed in a handful of museums, it has been little more than a convenient but expensive bundling and tailoring of these off-the-shelf applications and does not appear capable, in itself, of transforming museums in culturally significant ways.

Museums represent a tiny niche market for software; however, there is a tremendous demand in the broader society for software that does some of the things museums also do. Museums will continue to be able to take advantage of the commercial market for publication, design, exhibition, education and business applications. With few exceptions, special applications for museums will continue to have minimal impact and lag behind larger commercial developments.

However, because the market continues to experience significant decreases in hardware costs and concomitant increase in computing capabilities, and such trends will continue well into the next century, we are now at the threshold of a major breakthrough in computing capability and price. This will assure that museums, which can now only afford to provide telephones, fax machines and televisions, will be able to afford to make computing hardware universally available to staff and visitors before the end of the decade. The systems they will be able to install will be colourful, easy to use, and networked (often without wires) and integrated with other telecommunications.

Musée de L'Homme



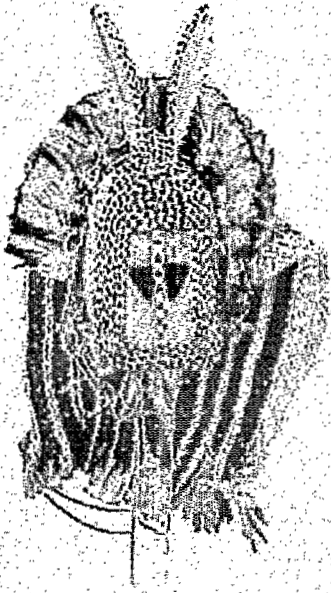
Mali
Région de Bandiagara

h. 54 cm
Bois peint, vannerie

Masque


Dogon

Ce masque qui figure un lièvre a été acheté par Georges-Henri Rivière, sous-directeur du Musée d'Ethnographie du Trocadéro, futur musée de l'Homme, lors de l'Exposition Coloniale de 1931. A cette occasion, et pour la première fois, un groupe de danseurs dogons se produit à Paris, dans un ballet intitulé "La danse des bêtes qu'on appelle sauvages" allusion au titre d'un ouvrage, alors célèbre d'André Demaison : "ces bêtes"



Masques (26 items)

11 & 16



Thèmes

Listes

Marques

Suite

All rights reserved

They will increasingly find that staff and visitors will be well acquainted with these devices, which will be widespread in their urban homes and rural villages. The uses to which this equipment will be put will again not be specific to museums, but the effect, unlike that of the previous generation of difficult-to-use computers, is likely to be dramatic. The widespread use of computers for visualization and telecommunication of experience will result from commercial applications in the 1990s. Adoption of such commercial applications by museums could alter the museum as a cultural institution more radically than at any time since the establishment of cabinets of curiosities in the late eighteenth century.

A new literacy

The coming marriage of multimedia computing and telecommunications will be fundamental because it will enable people to alter the way in which they experience

and explore the world. By transmitting and simulating remote realities, it will allow people to experience the sights, sounds and even the feel of things distant in space and/or time. It represents no less than the invention of a new means of communicating which will be accompanied by a new literacy. Our civilization as a whole will undergo this revolution over the next generation because the kinds of computers that are already becoming available can convey experience with more immediacy than can the written word. They can provide people with experiences previously available only from the object itself, and they can enhance the understanding of the artefact or specimen in ways not accessible to contemporary exhibit designers by placing the visitor in the geographical, chronological, ecological or social context from which the object came.

The transformation from literacy and numeracy to what may come to be known as 'mediacy' will not occur because of muse-

Interactive catalogue on CD-ROM in use at the Musée de l'Homme in Paris.

Conception and realization by ODA-Laser Edition, France.



© Philips Interactive Media Systems, USA/Smithsonian Institution, Washington, D.C.

Airplane BellX-1 of the Air and Space Museum of the Smithsonian Institution in Washington, D.C. The interactive disk allows visitors to pose a broad variety of questions about the collection.

ums, but one hopes that it will not have to occur in spite of them. Some exciting hypermedia prototypes in museums are already exploiting digitized text, sound and images to deliver interactive multimedia to visitors, but these groping experiments can only be considered tentative because the larger future social effect of these technologies is still unfathomed. Like other institutions in our society, museums will be challenged by the reinvention of literacy in multimedia communications in the next decade, but they need not be overwhelmed.

Despite the small market they represent as buyers of computing systems, museums are ideally positioned to be major players in computing in the near future as 'content providers' for a voracious multimedia information market. If, as we predict, the twenty-first century finds a new means of expression through multimedia computing, then at some point in the century all prior documentation of our cultures and history may be inaccessible except to textual specialists. Museums, as the curators and interpreters of the original evidence of our civilizations, will hold primary materials that will have to be captured and re-presented in new formats. Museums will explain, explore and expand the universe in a new multimedia literature.

Standards and co-operation

If they are to take a strategic perspective, the custodians of our heritage will now begin: (a) to oversee its digitization using standards that will assure the value of their investment; (b) to adopt policies for licensing the use of the information they are creating; and (c) to explore the opportunities for co-operation in information sharing provided by the fact that the social and cultural worlds with which their holdings are associated can be represented by common structures of knowledge.

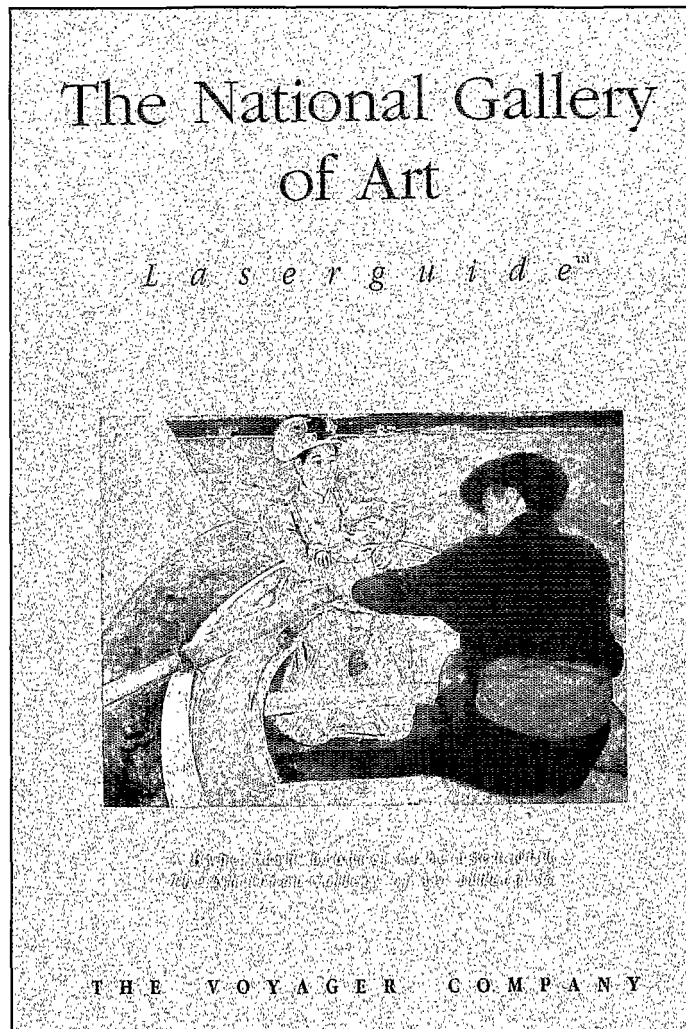
The first objective requires museum administrators to begin now to document their collections, and the world which their collection is intended to represent, on computer and to capture images, sounds and video from their collections in standard digital formats. The Committee on Computer Interchange of Museum Information (CIMI) determined that the best way to preserve such data over the long term is to mark it up using the Standard Generalized Markup Language (SGML) (ISO 8879) and shared logical data models. It also determined that museum business transactions, such as insurance, shipping, custom brokerage and contracting should be communicated using Electronic Document Interchange (EDI) standards. Computing systems supporting such re-documentation of collections need to support fully the integrated work of the museum from acquisition through exhibition, based on the policies and procedures of each institution, rather than being grafted onto existing museum programmes as an additional responsibility.

The second objective requires museums to understand that the digital representations they are creating are unique cultural properties which should be protected by copyrights and licences. The sale of rights to use such images must be centrally administered because potential users of the data cannot

afford to negotiate with hundreds of separate museums. Currently the legal environment for managing digital data rights and cultural heritage differs considerably from country to country, therefore the museums in each country need to co-operate to develop mechanisms to administer their rights in digital representations of cultural properties. Ultimately they will also need to co-operate to distribute such representations beyond the confines of museums. If they do not, these representations will soon make their way, by law or custom, into the public domain and museums will receive neither payment for their use nor protection against their misuse. Most importantly, museums will have lost a historic opportunity to break out of the walls within which their collections are curated to enter into homes, schools, offices and street corners. In these areas the interpretations and representations of collections could become the dominant force in human understanding of culture and nature.

Finally, co-operation in knowledge representation has tremendous potential because the functions of museum administration are common and because the universe that museum objects document is shared. While collections are unique, the associations between objects and the real world consisting of historical events, organizations, places and people, are universal. By developing and adhering to common logical data models of the external world, museums can enhance our common understanding of the historical past and the present, and provide a means of experiencing this world through representations of such 'associated' information.

New means of experiencing museum information, including graphic visualization techniques, make it possible to collect vast amounts of historical data from museums and present it on maps, in representations of three-dimensional space and in graphic form to explain abstractions such as trends



All rights reserved

in ecology or society. Sounds, images, holograms and even 'virtual reality' in which the visitor experiences all aspects of being in another world, permit museums to represent cultural and natural history. The newly mediate population will demand information in this form from all its communications sources, creating the potential for museums to sell data (images, textual documentation, scientific measurements) for publication and broadcast. Museums can then become laboratories for designing and evaluating means of representing remote realities to be explored by the general public, or special groups such as schoolchildren or senior citizens. In the next century, museums will discover that they have the power to present experiences which unite abstract representations and concrete artefacts in new, complex, culturally textured and authentic realities. ■

Thanks to the Laser Guide, visitors to the National Gallery in Washington, D.C., may organize as they wish the various images on the videodisc. Published by Voyager Company.

Computers in the museum: a guide to information sources

Jane Sledge

As the previous articles in this special dossier have demonstrated, computers are transforming the way museums function. So as to assist museums in making the leap into automation, Museum International asked Jane Sledge, Chief of the UNESCO-ICOM Museum Information Centre, to provide a summary of basic information sources which readers may call upon to learn more about introducing computers to provide support for the simplest to the most complex museum operations. All bibliographical references are provided in the language of publication and have not been translated. (The UNESCO-ICOM Museum Information Centre is located at 1 rue Miollis, 75732 Paris Cedex 15 (France), fax: (33.1) 43.06.78.62.)

There are many different approaches to museum automation, from national systems to individual hand-crafted systems. There are different goals, from sharing information internationally to serving the needs of a single institution or a single collection. There is no generic solution or right answer. I am often asked to advise on the acquisition of systems. The answers rest first in the mission, objectives and functional requirements of the project and only later in a comparison of computer hardware and software. While this 'bibliography' includes a few fax numbers and addresses of organizations, the best way to begin is to attend conferences, to meet with colleagues and to plunge into the discussion of issues.

Of course, this is not a complete bibliography, instead it is a smorgasbord of topics and texts that I think might provide an introduction to the ideas and concepts. Some of the texts are 'oldies but goodies' and some are new. While technology has changed rapidly, the issues, the problems and the management challenges have tended to remain the same. For example, while an inventory might be automated, the computer has very little control over who goes in and out of storage and moves the objects. Object tracking requires tight control at the human level.

Good luck!

Conference proceedings

ARCHIVES AND MUSEUM INFORMATICS. *Hypermedia and Interactivity in Museums*. Proceedings of an International Conference, 14–16 October 1991, Pittsburgh, Pennsylvania. Fall 1991. 334 pp. (Technical Report No. 14.) (ISSN 1042-1459). The Second International Conference on Hypermedia and Interactivity in

Museums was combined with the Sixth International Conference of the Museum Documentation Association in Cambridge, United Kingdom, 20–24 September 1993.

CANADA. COMMUNICATIONS CANADA. CANADIAN HERITAGE INFORMATION NETWORK. *Museums and Information: New Technological Horizons*. Proceedings of a conference, 2–4 May 1990, Winnipeg, Manitoba/Ottawa, Canadian Heritage Information Network. 212 pp.

EASTERN AND CENTRAL EUROPEAN REGIONAL CONFERENCE ON MUSEUM AND CULTURAL HERITAGE DOCUMENTATION. *RECOMDOC '92*. Proceedings of a conference in Romania, 4–6 May 1992. 174 pp. (Contact: CIMEC – Centrul de Informatica si Memorie Culturala. Piata Presei Libere No. 1, CP 33-90, 71341 Bucharest, Romania. Fax: 40.0.594.781.)

ROBERTS, D. Andrew (ed.). *Collections Management for Museums*. Conference held in Cambridge, 26–29 September 1987. Cambridge, Museum Documentation Association, 1988. 237 pp. (ISBN 0-905963-61 X).

———. *Sharing the Information Resources of Museums*. Conference held in York, 14–18 September 1989. Cambridge, Museum Documentation Association, 1992.

———. *Staff Development and Training: Meeting the Needs of Museum Documentation*. Conference held in Cambridge, 1989. Cambridge, Museum Documentation Association, 1993.

———. *Terminology for Museums*. Conference held in Cambridge, 21–24 September 1988. Cambridge, Museum Documentation Association, 1990. 623 pp. (ISBN 0-905963-62-8).

TAYLOR, Lonni W. (ed.). *A Common Agenda for History Museums*. Nashville Tenn., American Association for State and Local History, 1987. 53 pp. (ISBN 0-910050-89-9).

Image technology

- BEARMAN, David. *Optical Media: Their Implications for Archives and Museums*. Pittsburgh, Pa., Archives and Museum Informatics, Spring 1987. 73 pp. (Archival Informatics Technical Report, Vol. 1, No. 1).
- BINDER, Roberta. *Videodiscs in Museums: A Project and Resource Directory*. Falls Church, Va., Monitor Information Services, P.O. Box 26, Falls Church, VA 22040-0026, USA, 1992. 176 pp.
- FRANCE. MINISTÈRE DE LA CULTURE ET DE LA COMMUNICATION; MINISTÈRE DE LA RECHERCHE ET DE L'ENSEIGNEMENT SUPÉRIEUR; SINO, Sandra; DEGEZ-VATAIRE, Danièle (eds.). *Les logiciels documentaires de pilotage de vidéodisques*. Paris, La Documentation Française, 1987. (ISBN 2-11-001830-5).
- KERRIDWEN, Harvey; RUBENSTEIN, Rosalyn; WEINSTEIN, Elka. Museums and Information Technology: The Literature/Musées et informatique: documentation. *Muse* (Ottawa, Canadian Museums Association/Association des Musées Canadiens), Vol. IX, No. 1, Spring/Printemps 1991, pp. 36-9. (This bibliography focuses mainly on the use of computers in exhibitions.)
- MOLINE, Judi. Towards Open Multimedia Systems for Museum Objects and Their Documentation. *Spectra*, Vol. 19, No. 3/4, Summer/Fall 1992, pp. 2-8.
- PRING, Isobel (ed). *Image Technology In European Museums and Art Galleries Database*. ITEM, Vol. 5, March 1993. Published by the European Visual Arts Information Network (EVAIN), c/o European Visual Arts Centre at Ipswich, The Library, Suffolk College, Rope Walk, Ipswich, Suffolk IP4 1LT, United Kingdom. (ISSN 0961-9259.)

Journals

- Archives and Museum Informatics*. Quarterly published by Archives and Museum Informatics, 5501 Walnut Street, Suite 203, Pittsburgh, PA 15232-2311, USA. (ISSN 1042-1467.)
- CHART Newsletter*. Published three times a year by Computers and the History of Art, 43 Gordon Square, London WC1. (ISSN 7081-0239.)
- CIDOC Newsletter/Bulletin*. Published annually by the International Committee for Documentation. (Contact: Andrew Roberts, Chairperson, 53 Shelford Road, Cambridge, CB2 2LZ. Fax: 44-223 842136.)
- Spectra*. MCN, Museum Computer Network. 8720 Georgia Avenue, Silver Spring, MD 20910, USA.
- Visual Resources: An International Journal of Documentation*. Quarterly publication, edited by Helen E. Roberts, c/o STBS Ltd, 1 Bedford Street, London WC2E 9PP, United Kingdom.

Philosophy of museum documentation and automation

- CASE, Mary (ed.). *Registrars on Record: Essays on Museum Collections Management*. Washington, D.C., American Association of Museums, 1988. 257 pp.
- METROPOLITAN MUSEUM OF ART. *Computers and Their Potential Applications in Museums*. A conference sponsored by the Metropolitan Museum of Art. New York, Arno Press, 1968. 408 pp.
- ORNA, Elizabeth; PETTITT, Charles. *Information Handling in Museums*. New York, KG Saur/Clive Bingley, 1980. 190 pp. (ISBN 0-85157-300-2.)
- SARASAN, Lenore. Why Museum Computer Projects Fail. *Museum News* (Washington, D.C., American Association of Museums), Vol. 59, No. 4, 1981, pp. 40-9.

- SARASAN, Lenore; NEUNER, A. M. *Museum Collections and Computers: Report of an ASC Survey*. Lawrence, Kan., Association of Systematics Collections, 1983. 292 pp. (ISBN 0-942924-03-7.)
- STAM, Deirdre C. The Quest for a Code, or A Brief History of the Computerized Cataloguing of Art Objects. *Art Documentation*, Vol. 8, 1989, pp. 7-15.
- SZABO, Matyas. *Some Aspects of Museum Documentation*. Stockholm, Nordiska Museet, 1986. 20 pp. (Methodological Questions No. 1.) (ISBN 91-7108-2522.)
- VALLIÈRES, Nicole. Converging Collections Management Systems: The Computer Challenge/Migrations des systèmes de gestion des collections: le défi informatique. *Muse* (Ottawa, Canadian Museums Association/Association des Musées Canadiens), Vol. IX, No. 1, Spring/Printemps 1991, pp. 56-65.
- BLACKABY, James R. Museum Computerization: Making the Glass Slipper Fit/L'informatisation: les musées pourront-ils enfin chausser la pantoufle de verre? *Muse* (Ottawa, Canadian Museums Association/Association des Musées Canadiens), Vol. IX, No. 1, Spring/Printemps 1991, pp. 14-22.
- FABING, Suzannah. Facts on File. *Museum News* (Washington, D.C. American Association of Museums), Vol. 70, No. 2, pp. 56-60.
- MUSEUM OF NEW ZEALAND. *Information Systems Strategic Plan*. (Contact: Bronwyn Symes, 4th Floor, Commerce House, 126 Wakefield St., P.O. Box 11566, Wellington, New Zealand.)
- OVERMIRE, Rozell. *Functional Requirements for Exhibit Management Systems*. Pittsburgh, Pa., Archives and Museum Informatics, January 1989. 127 pp. (Archival Informatics Technical Report, Vol. 2, No. 4.)
- PERKINS, John. Planning for Information Management. In: Gail Dexter Lord and Barry Lord (eds.), *The Manual of Museum Planning*, pp. 177-86. London, HMSO, 1991. (ISBN 0-11-290483-1.)
- . *Planning for Museum Automation: Student Workbook and Teachers' Resource Guide*. Pittsburgh, Pa., Archives and Museum Informatics, July 1993. (Archival Informatics Technical Report, No. 17.)
- SUNDERLAND, Jane; SARASAN, Lenore. *Checklist of Automated Collection Management Features, or How To Go About Selecting a System*. Evanston, Ill., Willoughby Associates, 1987. 30 pp.
- TONEY, Stephen. Decision Factors in Choosing Technology. *Spectra*, Vol. 19, No. 1, Winter 1992, pp. 2-6.
- VIRGINIA MUSEUM OF FINE ARTS. *Information Systems Framework*. Richmond, Va., Virginia Museum of Fine Arts, 1987.

Planning

- BARBADOS MUSEUM AND HISTORICAL SOCIETY. *Computer Systems Analysis and Design Project*. (Contact: Alissandra Cummins, Director, St Ann's Garrison, St Michael, Barbados.)
- BEARMAN, David. *Automated Systems for Archives and Museums: Acquisition and Implementation Issues*. Pittsburgh, Pa., Archives and Museum Informatics, Winter 1987/88. 88pp. (Archival Informatics Technical Report, Vol. 1, No.4.)
- . *Functional Requirements for Collections Management Systems*. Pittsburgh, Pa., Archives and Museum Informatics, Fall 1987. 87pp. (Archival Informatics Technical Report Vol. 1, No. 3.)

Policy

- AMERICAN ASSOCIATION OF MUSEUMS. REGISTRARS COMMITTEE. *Code of Ethics for Registrars*. Washington, D.C., American Association of Museums, 1985.
- ORNA, Elizabeth. *Information Policies for Museums*. Cambridge, Museum Documentation Association, 1987. 190 pp. (ISBN 0-905963-60-1.)
- SMITHSONIAN INSTITUTION. *Collections Management Policy*. Washington, D.C., Smithsonian Institution, 1990. (Memorandum No. 808.)

Surveys

- COMAN, Florin. *L'Histoire de l'art et l'informatique documentaire*. Paris, Aux Amateurs de Livres, 1988. Vol. 1, 516 pp.; Vol. 2, 380 pp. (ISBN 2-905-053-56-9.)
- CORTI, LAURA (ed.); SCUOLA NORMALE SUPERIORE; GETTY ART HISTORY INFORMATION PROGRAM. *Report on Data Processing Projects in Art*. Pisa, Italy/Los Angeles, Scuola Normale Superiore/The J. Paul Getty Trust, 1988. 643 pp.
- . 'Linking Art Objects and Information', theme of *Library Trends* (Champaign, Ill., University of Illinois Graduate School of Information Science), Vol. 37, No. 2, Fall 1988, pp. 117–264. Quarterly edited by Deirdre C. Stam and Angela Giral.)
- MITCHELL, ROY; CASE, MARY. *Museum Collection Documentation. The First International Report*. Washington, D.C., ICOM, International Committee for Documentation (CIDOC), Database Survey Working Group, August 1989.
- WRIGHT, BELINDA; BEARMAN, DAVID 1992-93 *Directory of Software for Museums and Archives*. Pittsburgh, Pa., Archives and Museum Informatics, 1992. 164 pp. (Archives and Museums Technical Report No.15.) (ISSN 1042-1459.)

Tools

- Art and Architecture Thesaurus*. Oxford, Oxford University Press, 1990. 3 vols. (ISBN 0-19-506403-8.)
- BEARMAN, DAVID. *Archives and Museum Data Models and Dictionaries*. Pittsburgh, Pa., Archives and Museums Informatics, 1990. 100 pp. (Archives and Museum Informatics Technical Report No. 10.) (ISSN 1042-1459.)
- BLACKABY, J. R.; GREENO, P.; THE NOMENCLATURE COMMITTEE. *The Revised Nomenclature for Museum Cataloging: A Revised and Expanded Edition of Robert Chenball's System for Classifying Man-made Objects*. Nashville, Tenn., American Association for State and Local History, 1988.
- CANADA. DEPARTMENT OF COMMUNICATIONS. CANADIAN HERITAGE INFORMATION NETWORK. *Humanities Data Dictionary*. Ottawa, Canadian Heritage Information Network, 1988.
- . *Natural Sciences Data Dictionary*. Ottawa, Canadian Heritage Information Network, 1988.
- DUDLEY, D. H.; WILKINSON, IRMA BEZOLD. *Museum Registration Methods*. 3rd ed. Washington, D.C., American Association of Museums, 1979. 437 pp.
- FRANCE. MINISTÈRE DE LA CULTURE ET DE LA COMMUNICATION. DIRECTION DES MUSÉES DE FRANCE. *Système descriptif des objets*. Paris, Ministère de la Culture et de la Communication, June 1989. 129 pp.
- HOLM, STUART. *Facts and Artefacts: How to Document a Museum Collection*. Cambridge, Museum Documentation Association, 1991. 36 pp.
- MALARO, MARIE. *Legal Primer on Managing Museum Collections*. Washington, D.C., Smithsonian Institution Press. (ISBN 0-87474-656-6).
- MUSEUM DOCUMENTATION ASSOCIATION. *Practical Museum Documentation*. Duxford (United Kingdom), Museum Documentation Association, 1982.

- ORNA, E. *Build Yourself a Thesaurus. A Step-by-Step Guide*. Norwich, Running Angel Press. 1983. (ISBN 0-946600-007.)
- ROBERTS, D. Andrew. *Planning the Documentation of Museum Collections*. Duxford (United Kingdom); Museum Documentation Association, 1985.
- SHIC WORKING PARTY. *Social History and Industrial Classification*. Sheffield, University of Sheffield, Centre for English Cultural Tradition and Language, 1983.

Projects and organizations

- ARCHIVES AND MUSEUM INFORMATICS. David Bearman, author and publisher extraordinaire, covers most of the important conferences, reads and regularly reviews the literature and tests out the new products. David knows who's doing what, where, when and how. Contact: 5501 Walnut Street, Suite 203, Pittsburgh, PA 15232-2311. Fax: (1-412) 683-7366.
- ART INFORMATION TASK FORCE (AITF). Sponsored by the College Art Association and the J. Paul Getty Art History Information Program and supported by a grant from the National Endowment for the Humanities, an independent US Federal agency, AITF is an on-going established committee to define what information is used by art museums and to consider the possibility of common conventions and guidelines for fine arts data recording. Contact: Eleanor Fink, J. Paul Getty Art History Information Program, 401 Wilshire Blvd, Suite 1100, Santa Monica, CA 90401-1455, USA. Fax: (1-310) 451-5570.
- CANADIAN HERITAGE INFORMATION NETWORK (CHIN). Since July 1993 CHIN has formed part of the newly formed Federal Ministry of Canadian Heritage, maintaining a national inventory of cultural and scientific objects and specimens in Canadian museum collections and providing advice and service to Canadian museums. Contact: Peter Homulos, Canadian Heritage Information Network, 365 Laurier Avenue W., Ottawa, Ontario, Canada K1A 0C8. Fax: (1-613) 952-2318.
- THE CLEARINGHOUSE PROJECT AT THE METROPOLITAN MUSEUM OF ART. The Clearinghouse Project is both a directory and an indexed resource collection comprising information dealing with computerization as it applies to art history and related research, museum and visual-resource collection documentation, bibliographic and information systems and vocabulary control, and other aspects of library and information services. Contact: Patricia Barnett, Metropolitan Museum of Art, Thomas J. Watson Library, 5th Avenue at 82nd Street, New York, NY 10028-0198.
- COMMITTEE ON COMPUTER INTERCHANGE OF MUSEUM INFORMATION (CIMI). Administered by the Museum Computer Network. CIMI is a committee of representatives from American museum associations which works with other professional associations to study museum requirements and attempts to define information exchange formats and communication protocols to accommodate the transfer of museum information. For more information, contact: John Perkins, R.R. 1, Bootiliers Point, Halifax, Nova Scotia, Canada B0J 1G0. Fax: (1-902) 826-1337.
- COMMON DATA BASES PROJECT OF THE COMMON AGENDA FOR HISTORY MUSEUMS. AMERICAN ASSOCIATION FOR STATE AND LOCAL HISTORY. An initial project completed work to define minimum standards for American history museums, on-going affiliated projects seek to verify past results and expand the information require-

ments. Contact: American Association for State and Local History, 172 Second Avenue, N., Suite 202, Nashville, TN 37201.

CONSERVATION INFORMATION NETWORK is an international collaborative venture designed to improve the collection and distribution of information essential to the conservation and restoration of both movable and immovable cultural property. Network subscribers gain access to a bibliography of technical conservation literature, information on commercial products used in conservation, names, addresses and product lines of suppliers and manufacturers of conservation products, and an electronic mail service that enables colleagues from various parts of the globe to consult with one another. Contact: Peter Homulos, Canadian Heritage Information Network, 365 Laurier Avenue, W., Ottawa, Ontario, Canada K1A 0C8. Fax: (1-613) 952-2318.

THE GETTY ART HISTORY INFORMATION PROGRAM (AHIP). The Program's mission is to make art historical information accessible to scholars and researchers by adapting the resources for scholarly research to take advantage of the latest developments in computer technology. Contact: Eleanor Fink, J. Paul Getty Art History Information Programme, 401 Wilshire Blvd, Suite 1100, Santa Monica, CA 90401-1455, USA. Fax: (1-310) 451-5570.

INTERNATIONAL COMMITTEE FOR DOCUMENTATION (CIDOC). An international committee of the International Council of Museums, CIDOC is an important focus for the international documentation interests of museums. It meets annually,

hosts a general conference complete with papers and working groups such as Documentation Standards, Terminology Control, Database Survey, Information Centres. The most recent meeting was held from 10 to 16 September 1993 in Ljubljana, Slovenia. Contact: Andrews Roberts, Chairperson, 53 Shelford Road, Cambridge CB2 2LZ, United Kingdom. Fax: (44-223) 842136.

INTERNATIONAL COMMITTEE ON AUDIOVISUAL AND NEW TECHNOLOGIES IN IMAGE AND SOUND (AVICOM). An international committee of the International Council of Museums, AVICOM's goals are to inform museum professionals and heighten awareness of the need for audiovisual and new technologies, to study legal and financial issues related to the use of image and sound, to promote the creation of exchange networks. Contact: Dr Marco Tonon, Chairperson, Museo delle Scienze, Via della Motta 16, 33170 Pordenone, Italy. Fax: (39-434) 26 396.

MUSEUM COMPUTER NETWORK (MCN). This US-based, membership organization, established in the early 1970s, hosts an annual meeting and produces a newsletter: *Spectra*. Contact: Museum Computer Network, 8720 Georgia Avenue, Suite 501, Silver Spring, MD 20910, USA.

MUSEUM DOCUMENTATION ASSOCIATION. MDA works to raise the standards of documentation in museums throughout the United Kingdom and to encourage and help museums to document their collections more comprehensively and consistently. Contact: MDA, 347 Cherry Hinton Road, Cambridge CB1 4DH, United Kingdom. ■

Cambodia's 'killing fields' revisited: the Tuol Sleng Museum and the Memorial Stupa at Choeung Ek

Terence Duffy

How can Cambodia's turbulent and tragic recent past be transformed into a hopeful present of peace and reconciliation? Terence Duffy examines the Tuol Sleng Museum (site of the infamous S-21 interrogation centre) and the Memorial Stupa at Choeung Ek (which marks Cambodia's notorious 'killing fields'). Dr Duffy is Senior Course Tutor, Peace and Conflict Studies at the University of Ulster, Magee College in Northern Ireland and also Director of the Peace Museum Project. He has written widely on the subject of peace museums and peace culture and in 1993 was based for five weeks on mission with UNTAC in Cambodia as an election officer.

Cambodia has a new government after the successful conduct of elections under the supervision of the United Nations Transitional Authority in Cambodia (UNTAC). The Paris agreements on a comprehensive political settlement of the Cambodian conflict are gradually being implemented. The future looks hopeful for an effective programme of rehabilitation. Less easily treated are the accumulated memories of bloodshed during the Khmer Rouge regime. As symbols of these years, the Genocide Museum at the old Security Prison S-21 and the Memorial Stupa which marks the 'killing fields' are probably the most tangible legacies of Cambodia's violent past.

When the Khmer Rouge seized power in April 1975 they did so with the intention of

obliterating Cambodia's hierarchical political culture in order to reconstruct society from zero. They brought a new language of euphemisms for atrocity and their omnipresent Angkar or 'organization' in which no explanations were given for policy, just that 'Angkar orders'. For Angkar, people were merely *opakar* or instruments and when their loyalty was suspected brutal re-education or execution followed. The structure of power in Cambodia from 1975 to 1978 was that of the Communist Party of Kampuchea; its prescriptions were absolute. In a regime obsessed with counter-espionage paranoia this gave reign to the nightmares of the state security officers. So developed a climate in which everyone was suspected of being an enemy and in which units of spies or *kang chhlop* (composed mainly of children) monitored what the communes said and reported to the Angkar. Angkar exploited the minds of gullible children who would implicate their parents while anywhere, as Dith Pran puts it, 'betrayal could be purchased for a kilo of rice'.

It seems probable that under the Khmer Rouge a greater proportion of the population died than in any other revolution in the twentieth century. Many of these were the Lon Nol elite but the majority of deaths were merely symptomatic of the desperate efforts of the regime to secure itself against potential opposition. To do that it created a massive torture machine, sanctioned extra-judicial killing and genocide against religious and minority groups. At the apex of this activity was the prison-execution centre in Phnom Penh (Tuol Sleng) a former High School taken over by the security forces in April 1975. When the Vietnamese invaded Cambodia in 1979, the Khmer Rouge left behind them papers recording the deaths of nearly 20,000 people. At Tuol Sleng each prisoner was photographed before being tortured until a confession of 'treachery' was extracted.



T. M. Duffy

The Memorial Stupa, Choeung Ek. Front view of the stupa.

Rarely did execution occur before the prisoner had been forced to name collaborators, thus fuelling the purges. The typewritten summaries of these confessions illuminate the political pathology of the regime. It is revealing as to its brutality that the 'Interrogator's Notes' constantly refer to the 'problem' of preventing the death of prisoners before full confessions had been obtained.

Tuol Sleng: Cambodia's house of horror

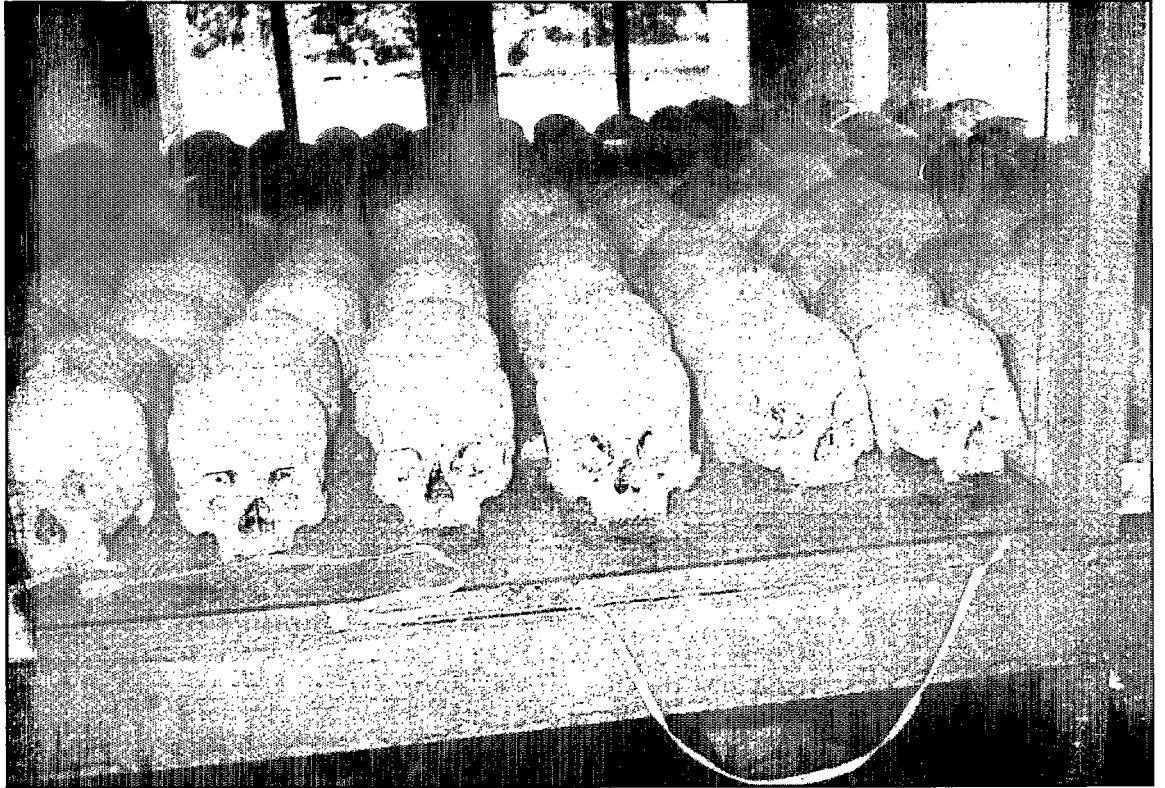
A significant number of the deaths at Tuol Sleng occurred in the wake of the purge following a 1976 coup attempt. From January 1977 onwards those suspected of conspiracy were eliminated and this process rapidly spread to include anyone whose loyalty (for whatever reason) might be suspect. Victims were processed via confinement to iron beds 'on which they were beaten and tortured with electrical shocks, passed through cells where they were left in chains without food to starve and rot, among them . . . high functionaries who were accused of treason'. Indicating the extremes of institutional paranoia, it seems that four out of five prisoners who were brought there were actually Khmer Rouge supporters. The chief of torture, 'Brother' Duch, had 200 interrogators under him in an operation in which thousands were tortured into making preposterous confessions: 'that they were agents for the CIA, the KGB, the Vietnamese . . .'. Ing Pech, one of the few survivors, recalls that when Duch indicated that someone had to be re-educated, that meant they would be 'crushed to bits after torture'. Then the arrest photographs were displayed on the ground floors where Cambodians could come to search for news of missing relatives. Some detainees who died during torture were buried in mass graves in the prison grounds while the majority were clubbed or stabbed to death at Choeung Ek. Haing Ngor recalls Tuol

Sleng thus: 'It became a symbol of Khmer Rouge atrocities, just as Auschwitz was a symbol of the Nazi regime.'

The Genocide Museum at Tuol Sleng is a frightening indictment of the tragedy of Cambodian society. The description offered in the Museum's brochure is an appropriate one: 'A terrible prison on which we would like to offer you some images of its previous activities.' Open for public view are the individual cells on the ground and first floors of the buildings and also the mass detention sectors on the second floor. The tiny cells encourage empathy with the tragic last hours of their occupants. On several walls prisoners scraped a pathetic appeal but for most the pain of interrogation would have prevented any such gesture. Many of the beds have shackles fitted while in the corridors are the cages that accommodated the scorpions and scolopendras used as instruments of torture. In other rooms are the equipment of beatings and whippings; in all a terrible arsenal of flails, whips and batons.

In the museum Pol Pot busts mingle with heaps of shackles and chains, instruments for suspending victims, beds filled with water for water-suffocation, and all the paraphernalia of electrification. Alongside these are the torture scenes painted by Heng Nath, another survivor of S-21. In what is now the visitors' reception room, prisoners were put to work. Even as one enters the museum the reality of its previous existence is frighteningly obvious. Perhaps this is intensified by the relative proximity of these terrible events and also by the comparative fragility of Cambodia's new-found peace. Visitors approaching the interrogation centre compound first confront its security regulations amongst which are stipulations that 'while getting lashes or electrification you shall not cry at all' and that during interrogation 'don't pretend to be a fool for you are a chap who dare oppose the

T. M. Duffy



The Memorial Stupa, Choeung Ek. Relief view of skulls.

revolution'. Equally forbidding is Tuol Sleng's façade, especially the upper floors of Building C, which are shrouded in barbed wire to prevent suicides. The blood of S-21's victims still stains the cells and the mechanisms of their torture have not been sanitized. This is not a place for the squeamish. But perhaps most moving of all are the row upon row of photographs of the many who died during interrogation and which form the main part of the museum's public display. They include sordid group photographs such as those of Tek Seng Eng, a railway engineer, who with his five children was killed in Tuol Sleng. Also a sleeping baby in the arms of Vann Piny, wife of Pol Pot's Vice-Minister of Foreign Affairs, oblivious to its imminent death and to that of its mother. Wall after wall of these stark black-and-white images, many of them with faces distorted by the pain of interrogation, stare at the observer. Some of these unfortunate people show the awareness that they are soon to die; others do not seem perturbed, as if Angkar has fooled them with that characteristic Khmer Rouge trick of re-education or, as François Ponchaud observed, inviting 'ideas on how to make the new society better'. Those who criticized Angkar were invariably executed.

In Tuol Sleng is the ghastly memorabilia of the murders of all classes of Cambodian society from the most affluent to the poorest peasants. There is paraphernalia relating to politicians such as Hu Nim, Minister of Information, whose forced confession is displayed alongside those of foreign victims such as the American James Clark and the Australian Lloyd Scott. In contrast are the personal belongings of so many ordinary Kampuchians who did not leave much record of their stay at Tuol Sleng and who came with few possessions. Their shoes and the heaps of prisoners' clothing are piled up 'Belsen-like' as part of the display. But almost without question each prisoner, however humble, left a tangible memento to Tuol Sleng. Each victim was photographed and his death was carefully recorded. Like the Nazis, the Khmer Rouge were meticulous in keeping records of their activities and these show how, as the revolution reached insane heights, it began devouring its own children. Generations of torturers and executioners who worked in S-21 killed their predecessors and were in turn murdered by those who took their places as Angkar became desperate to expurgate its 'traitors'. During its height, S-21 claimed at

least 100 victims a day. Tuol Sleng is both a chilling and compelling reminder of the utter dislocation of a society.

The Memorial Stupa at Choeng Ek

Tuol Sleng was just the largest and most carefully documented of a comprehensive network of interrogation centres that existed at regional and district levels across Democratic Kampuchea. The testimonies of survivors indicate that similar centres operated in communes throughout the country. The sites of mass graves (physical evidence of large-scale political killings) scar the countryside. Locally, many graves have been opened and the contents preserved in bamboo enclosures to serve as reminders of Khmer Rouge atrocities and as memorials where Buddhist funeral rites could be performed. The grave site at Choeng Ek (where over 8,000 skulls have been counted, while many others remain buried) was the burial ground for Tuol Sleng. Two other sites, Ta Mon and Tonle Bati, are examples of former Buddhist temples converted after 1975 into execution centres. Similarly, at Phnom Pros about 5,000 victims are buried in mass graves.

The histories of Tuol Sleng and Choeng Ek (some 15 kilometres from Phnom Penh) are inseparable. At Choeng Ek a memorial stupa was erected in 1988 in the form of a traditional Cambodian pagoda, floor by floor consisting of human skulls assembled in glass cases. Over 8,000 skulls grouped by sex and age are visible behind its glass panels. The result is a painful record of human suffering and violence. The skulls of the victims are themselves the final testimony to the trauma they endured. Between 1975 and 1978 about 17,000 victims (including nine Westerners) were transported to the extermination camp where they were bludgeoned to death in order to save bullets. The remains of 8,985 people, many of whom were found

bound and blindfolded, were exhumed in 1980 from the mass graves and even the grounds of this former extermination camp exhibit fragments of human bone and pieces of clothing scattered around the disinterred pits. The introductory panel at the entrance of the Memorial Stupa describes this period of history as: 'The Most Tragic Thing':

It was more cruel than the genocidal act committed by Hitler's fascists . . . we imagine we are hearing the grievous voice of the victims . . . so it is difficult for us to determine who they are for they have human form but their hearts are demon's hearts . . . they wanted to transform Kampuchean people into a group of persons without reason . . . who always bent their heads to carry out Angkar's orders blindly. . . .

Choeng Ek today is a sordid theme park of indiscriminate atrocity and political brutality. Its grounds yield culvert after culvert of the graves of innocent civilians, perhaps the most poignant of all is the 'mass grave of 166 victims without heads'. There is clearly a necessity for Tuol Sleng and Choeng Ek to play their part in a process of consensus-building in Cambodian society. One would hope that soon these museums will serve rather as symbols of peace and national reconciliation in a way that similar museums have done in other countries.¹ Cambodians have a saying about the horrors of their recent past: 'We were all conspirators – we were all victims.' It is time that Tuol Sleng and Choeng Ek become symbols of an unrepeatable tragedy in Cambodian society so that the survivors can find forgiveness and hope in what remains. ■

Note

1. Terence Duffy, 'The Peace Museum Concept', *Museum International*, No. 177 (Vol. 45, No. 1, 1993), pp. 4–8.

The Australian War Memorial: an exercise in teamwork

Catherine Challenor

Mounting an exhibition containing a wide variety of materials and objects can pose particular problems of conservation, interpretation and display. The opening of the South African War Gallery at the Australian War Memorial presented technical and aesthetic challenges which are described by Catherine Challenor, the Memorial's Textile Conservator.

In many museums, conservators are not involved in the preparation of exhibitions beyond the actual physical conservation of items. Once the objects have been conserved, conservators often take no further part in the exhibition; the objects are placed on display by curators or exhibition designers and conservators have no input into the way the objects should be handled and supported. In the worst cases, the treatment carried out by the conservator is negated by incorrect handling and display.

Of all the museum sections involved in preparing a gallery, conservators need to liaise most closely with curators and exhibition designers. In their own way, these three sections are all responsible for the care of the collection. The conservator is responsible for the physical well-being of the collection, the curator for the interpretation and integrity of the collection and the exhibition designer for the presentation of the collection in a logical and visually appealing way.

Of course, the preparation of an exhibition involves people from many sections of an institution, not just conservators, curators and exhibition designers. For the Australian War Memorial's most recent gallery, which portrays Australia's significant involvement in the South African War of 1899–1902, other museum sections involved were Historical Research, Workshop, Photography, Security, Public Relations and Education. A working group consisting of representatives from all sections was set up at the outset of the South African War Gallery. Conservators were involved in the preparation of this exhibition from the early planning stages right through to the final placement of objects on display.

The South African War Gallery differs from most of the older galleries at the War Memorial because it explores the reactions of ordinary Australians at home to the war as

well as the campaigns fought against the Boers at the turn of the century. This personal atmosphere has been achieved by including items of a more 'homely' nature for display as well as the more traditional items normally associated with war. Such 'homely' items include patriotic ribbons and badges, sewing kits, greetings cards and even decorated biscuits sent home by soldiers to loved ones at Christmas.

Conservators prepared some 200 relics for the gallery, as well as artworks, documents and photographs. The diverse nature and fragility of the items meant that objects often required unique display and support systems that had to be planned in advance – hence the need for conservators to be involved in the early planning stages. Measuring and designing support systems were time-consuming operations that spanned many months and were only successful because of the rapport established between the conservators, the curators and the exhibition design team.

The following three case-studies describe the co-operation between conservators, curators and exhibition designers in the preparation of three quite different objects for display in the South African War Gallery, the problems encountered by the team and the reasons for their successful resolution.

Case-study 1: A miniature medicine chest carried by Australian war correspondent Frank Wilkinson of the *Daily Telegraph* during the Boer War

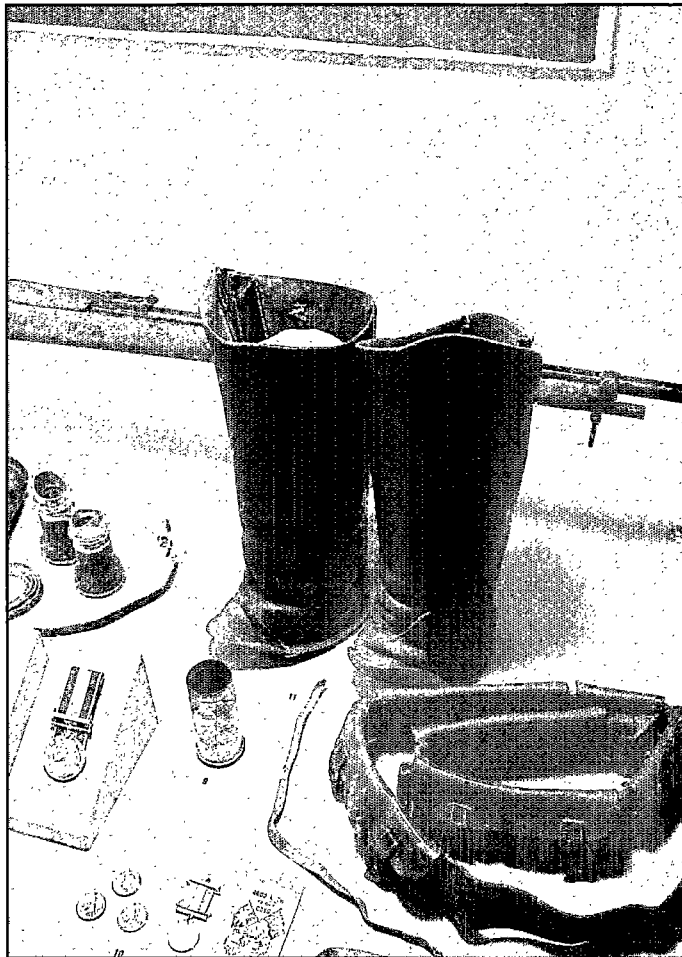
This is a simple example of how the curator, conservator and exhibition designer were able to combine their unique skills and ideas to produce a successful result. In this case, the curator and conservator imposed constraints that the exhibition designer was required to overcome.

The medicine chest was made from a yellow-coloured vegetable-tanned leather with an embossed oat-grain finish known as 'London colour cloak-hide'. Inside the chest were sixteen medicine phials made from ebonite, a forerunner of plastic, with printed paper labels stuck around the outside. The leather was in a stable and reasonably supple condition although its surface was abraded and worn in places. There were several types of staining on the leather, including spillage from one of the medicine phials, all of which were now empty.

Following conservation of the chest and before a suitable support system could be designed, it was necessary to find out how the curators wished to present the item. They decided that the chest should be displayed open to show the medicine phials and Wilkinson's signature, inscribed in ink across the centre. The conservator was asked to determine if this was possible since the leather chest, having remained closed for many years, would not stay open by itself. In the conservator's opinion, the leather was supple and strong enough to be held in a partially opened position. The exhibition designer was then set the task of producing an unobtrusive support that would gently hold the chest open.

The solution was a support made from a clear, 4 mm-thick, acrylic sheet. The acrylic was shaped, with heat, to fit the contours of the chest and small acrylic tabs were glued to the edges of the support so that the leather could be slipped gently underneath and held open without strain.

Case-study 2: A pair of brown leather leggings worn by R. C. Lane, a trooper who served with the Third New South Wales Bushmen's Contingent in South Africa



© Photographic Section, Australian War Memorial

Leggings displayed vertically on supports in the showcase.

In this example, because of the fragility of the object, the conservator was faced with the problem of finding a solution for the constraints imposed by the exhibition designer. By taking the initiative the conservator, in this case, was able to produce a result that was also historically accurate in appearance.

The leggings were of cow hide, approximately 40 cm in height and fastened at the side with iron buckles and steel splints. The leather was stiff and dry, with abrasions in some areas and cracks along folds and across the curved ankle sections. The leather was deformed, mainly through use: the calf areas had developed a rounded shape, while the leather at the curved ankle sections had a tendency to curl upwards. The exposed parts of the steel splints had rusted but did not appear to be actively corroding.

The simplest way to display the leggings would have been to lay them horizontally in

the showcase. There would have been no strain on the leather and very little support would be needed inside. There were no strict curatorial requirements regarding the manner of display so it was left to the conservator and the exhibition designer to decide how the leggings could be shown to best advantage. To achieve a spatial balance of the exhibits in this showcase, containing relics from the various Bushmen's Contingents, the exhibition designer wished to display the leggings in an upright position, fastened to appear as when worn. This idea presented the conservator with the problem of how to support the leggings vertically without having their weight resting on the fragile and deformed ankle sections.

Because of the fragile nature of the leather, the support system was constructed and designed by the conservator following stabilization of the leggings. The support consisted of two acid-free cardboard tubes, approximately 60 mm wide, each covered with a polyester wadding material to resemble the calf part of a leg in shape. Each legging was then fastened up around the leg support and was held in position by the bulk and texture of the wadding material. The remaining visible top and bottom sections of each tube were covered with a khaki polyamide suede fabric, also used to line the showcase walls and floor. The fabric had been tested for its suitability as a conservation material and the colour chosen, combined with its velvety texture, enhanced the military and Victorian flavour of the gallery. The leggings were attractively supported with no weight or strain on the fragile leather.

Case-study 3: A printed cotton flag taken at Manana, near Lichtenberg, by Major William Edward O'Brien of the New South Wales Imperial Bushmen's Contingent in 1900

In this example constraints were placed on the conservator by both the exhibition designer and the curator. The first constraint was a physical one, imposed by the exhibition designer because of insufficient space in the showcase. The conservator's 'ideal' solution for displaying the flag horizontally had to be abandoned and instead a vertical method of display was devised, ensuring that conservation standards were not compromised. The second constraint, imposed by the curator, was one of ethics – both the conservator and the curator were able to overcome this problem through mutual agreement.

The flag, which measured approximately 870 mm by 410 mm, was nailed to a rough wooden staff with five iron nails that were actively corroding. The nails had caused tears in the flag at the hoist and there were several other small holes towards the fly end. The handle of the fabric was very dry and the fibres proved to be more fragile than they had at first appeared to be. The fabric was also watermarked and yellowed along the upper, undyed edge and discoloured along the fly.

Following conservation of the flag, during which time it had to be separated from the wood so that the nails and tears could be treated, the question of how it was to be displayed arose. The conservator had initially requested that it be displayed lying flat in the showcase as this would put no strain on the weakened and damaged fabric and also require little or no support. The problem was, however, that the flag was to be displayed in the same showcase as the leggings and there was not sufficient space to allow it to lie flat. The flag would have to be displayed vertically. This posed several problems in providing an adequate support. First, the cotton fabric was very weak in places, and hanging it vertically with the nails attached along the hoist edge was likely to cause further tearing. Second, the flag

when unfurled was irregular in shape with an upward curve at the fly end. If it was displayed so that it was straight along the upper edge, then the wooden staff at the hoist would be at an angle. As the flag and staff had been separated for treatment, the conservator suggested that if they remained separated both these problems could be solved more easily than if they were re-attached. The curator, however, felt that the integrity of the flag would be lost if the two parts remained separated. It was essential that the flag remain 'whole'. After much discussion, a solution was found that satisfied the concerns of the curator and the conservator. The flag and staff would be displayed together, not physically attached to one another, but giving the illusion of being intact.

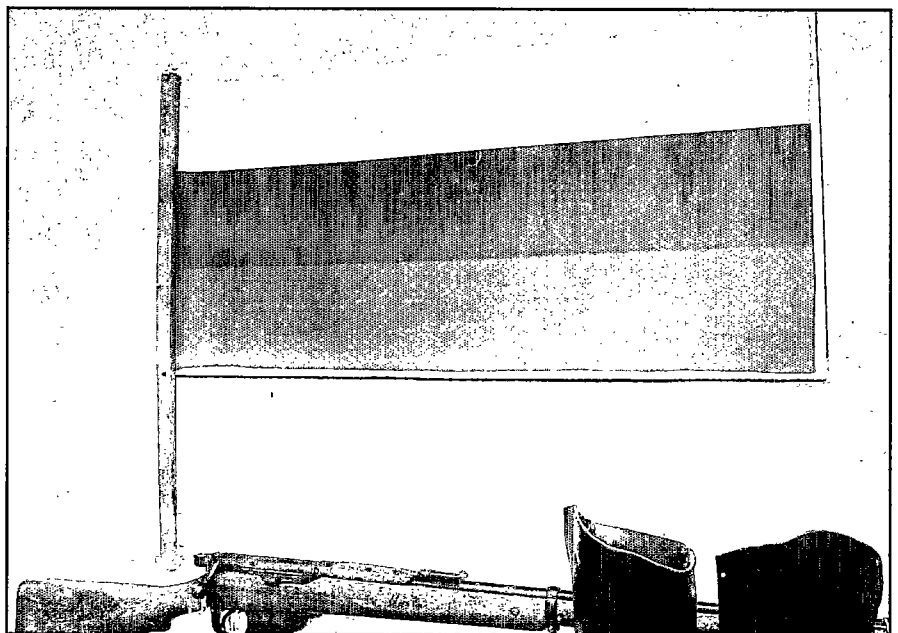
Once again the fragility of the item required that the support be constructed by the conservator. An irregular quadrilateral piece was cut from a special board that contained an inner core of polystyrene foam to give a light-weight but solid support, with a minimum border of 10 mm from the edge of the flag. Because of the curve in the flag, the border in some areas was up to 25 mm. The board was covered with a cotton/polyester fabric that was attached to the reverse side with an archival double-sided tape. The flag, still separated from the staff, was carefully sewn to the fabric-covered board. A curved needle and fine silk thread were used to stitch along the upper edge, hoist and fly. The lower edge was not stitched to prevent the flag from bulging out once the weight of the fabric was transferred to the bottom of the flag when hanging vertically. The board was then attached to the showcase wall with adhesive-backed Velcro. The conserved nails were placed back into the holes in the staff and the staff itself was then supported by acrylic brackets screwed into the showcase wall. The staff was now aligned in front of the flag with the nail holes in the flag's hoist

immediately below the nails in the staff. A slip of polyester film was placed between the staff and flag to prevent the wood from damaging the cotton fabric.

The end result, in this case, was a fruitful and rewarding lesson in patience and co-operation. It would have been easy for the conservator to insist that the flag could not be displayed at all unless the original display parameters were followed, and indeed, there are occasions where conservation standards would be unacceptably compromised, but in many cases problems can be overcome by perseverance and methodical thinking.

From the three cases described above, it is apparent that the conservator's role in exhibitions goes beyond the laboratory preparation of items. The preparation of the South African War Gallery demonstrated that through co-operation and an understanding of the needs of other members of the institution, it is possible to realize the goals of the museum without compromising the well-being of the collection. ■

Dutch flag supported on fabric-covered board with wooden staff held in position by two unobtrusive acrylic supports.



© Photographic Section, Australian War Memorial

The New Acropolis Museum: an international architectural competition

Ersi Philippopoulou

Few sites in the Western world are as laden with imagery and meaning as the Acropolis in Athens. Selecting a design for a new museum to house its historic sculptures was the challenge facing the Greek Government. The author, an architect and jurist, was general co-ordinator for the organization of the international competition for the New Acropolis Museum and a member of the Jury.

The need for a new Acropolis museum has been underlined by architects and archaeologists for decades, but this need became imperative during the last fifteen years. An extensive stabilization and restoration project which started in 1975 has led to the removal of a number of sculptures from the Erechtheion and the Parthenon in the interests of safeguarding them from atmospheric pollution. The existing museum, built on the rock of the Acropolis in 1865, is no longer able to house the number of sculptures, which is growing constantly, choking up the exhibition area. Moreover, the building's limited dimensions have created serious problems in handling the multitude of visitors to the museum, not to mention drawbacks in the quality of the exhibition.

This situation led the Greek Ministry of Culture to hold two architectural competitions, in 1976 and 1979, but both were unsuccessful in finding a solution, due not only to the restricted nature of the site in relation to the building programme, but also to the insufficiently documented analysis of the data presented.

In 1989 it was decided to hold a two-stage international architectural competition, as

the Acropolis is not merely a national treasure, but a symbol of humanity's cultural heritage. Three possible sites were to be considered:

1. The Makryianni site, to the south-east of the Acropolis rock, inside the urban fabric, with a total surface area of 24,150 m².
2. The Dionysos site, to the south-west of the Acropolis rock and at the foot of Philopappos hill, with a total surface area of 5,895 m².
3. The Koile site, to the west of Philopappos hill, with a total surface area of 25,434 m². The Koile preserves visible ancient cuttings into the natural rock, which should be respected.

A decisive factor in the choice of all three sites was the wish that the new museum should be located in the vicinity of the rock, so as not to sunder the bond between the ancient works and the classical monuments. At the same time, it should not take up unbuilt space from the hills surrounding the Acropolis, because they are listed places of archaeological importance and natural beauty.

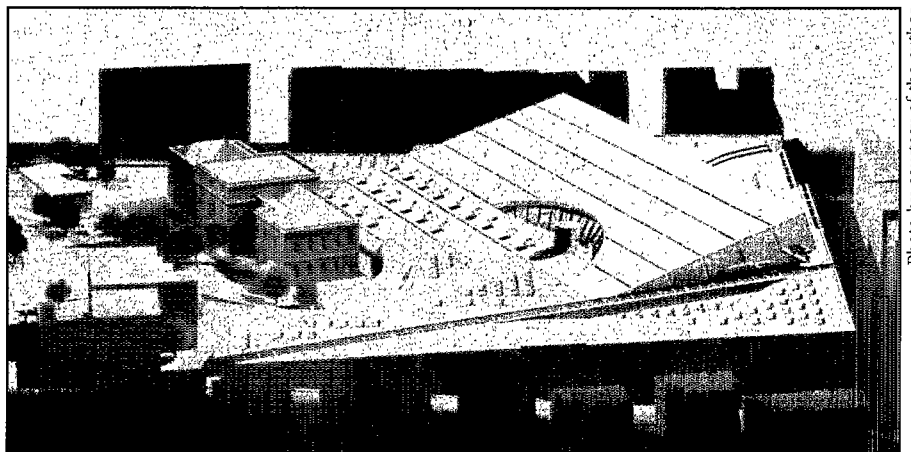


Photo by courtesy of the author

First Prize. Professor M. Nicoletti, Studio Passarelli (team representative: Lucio Passarelli). View of the model.

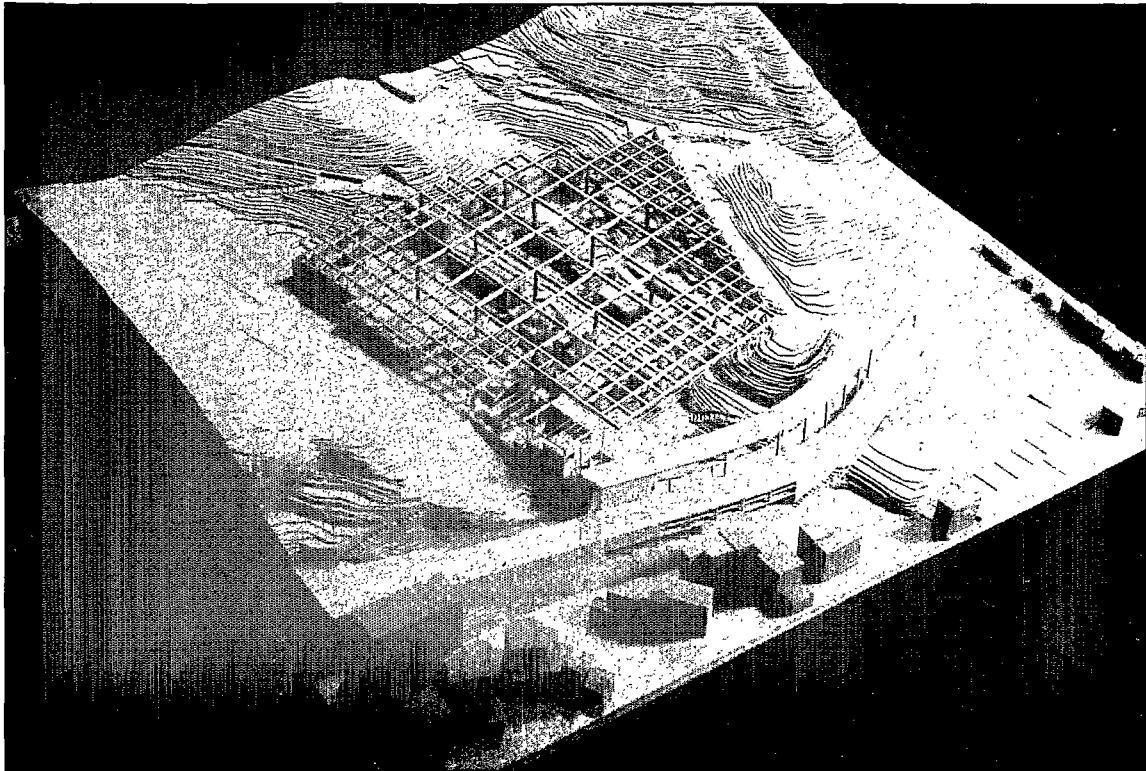


Photo by courtesy of the author

The building programme included exhibition areas of 8,800 m², which cover all historical phases of the Acropolis. The largest gallery is for the Parthenon Sculptures; it will house the unique sculptural decoration of the temple now in the Acropolis Museum and its storerooms. Many sculptures are still to be found on the monument itself.

In the new museum, casts of sculptures currently displayed in museums abroad will be exhibited as a separate entity. Since the repatriation of the original Parthenon sculptures has been demanded by the Greek Government, space will be provided to facilitate their display together with those architectural elements and sculptures already in Greece. It goes without saying that, if and when the Parthenon marbles are returned to Greece from the British Museum, the unity of the originals will be complete, and the exhibition of casts will be dismantled.

More specifically, the following items will be displayed:

Metopes. Each of the temple's ninety-two metopes measures 1.35 × 1.35 m. All extant metopes will be displayed.

The frieze. The total display of the Parthenon frieze measures 161 metres. All those original parts of the frieze at present on the monument will be exhibited (a total length of 24 metres) as well as those now in the Acropolis Museum (total length of 27 metres).

Pediments. Each of the two pediments will need an area 31m long × 1 m deep × 3.45 m high, in order to enable them to be displayed in their original dimensions.

The programme also included facilities for visitors, areas for cultural events (multipurpose and periodic exhibition hall), conservation workshops, archaeological storerooms, administrative and parking areas.

The competition was announced on 16 May 1989 by the Ministry of Culture. It was held under the aegis of the International Union of Architects (UIA) in Paris and according to the Recommendations of UNESCO.

Responses were received from 1,270 architectural practices from 52 countries, in-

Second Prize: T. Biris, D. Biris, P. Kokkoris, and E. Americanou. View of the model.

cluding 156 from Greek architects. Finally, 438 studies from 41 countries were submitted. The first stage closed on 28 April 1990, with awards going to twenty-four studies of which ten were selected to proceed to the second stage.

On 10 November 1990, the second stage brought the competition to an end with the selection of the final ten studies and the awarding of the first three prizes and one Special Mention.

The jury was international, consisting of eight foreign and six Greek members. The place reserved on the jury for the Greek Association of Architects remained empty, as no representative was appointed due to the Association's opposition to the competition.

Most members of the jury criticized the lack of political decision concerning the site, though they praised the technical preparation of the competition. The possibility of three sites was the result of an attempt at compromise to allow the competition to be held despite the friction that had occurred in the past in Greece. None of the three sites can be considered ideal, but all three were deemed equal for the jury, though this 'equality' made comparison of solutions difficult. No single site was greatly preferred by the competitors over the others, but the selection of the site also determined the architectural approach.

One other variable was the building programme, which was indicative, and could be modified according to the requirements of the architect's proposal, but nearly all the competitors followed the programme supplied by the competition organizer. The Parthenon gallery constituted the core of the architectural composition, but once more only a few studies presented a flex-

ible and documented solution pertaining to the present situation, namely that many Parthenon sculptures are displayed only in cast copies. It seems that the campaign launched by Greece for the return of the Parthenon marbles, even though it may have failed to influence the appropriate authorities in the United Kingdom, has convinced the international architectural community!

Many competitors proposed developing the new museum on more than one site. The jury considered this idea only as a last resort which failed to take into account the Museum's harmonious operation; however, exceptions did exist where the architectural solution tackled problems peculiar to a site or stimulated a new vision of the ideology of the Museum.

From a typological viewpoint, all the current trends of contemporary architecture were represented in the competition, and all these solutions were respected by the jury so long as the architect managed to bring his or her ideas to a satisfactory conclusion. The awards were as follows:

First prize: Professor Manfredi Nicoletti – Studio Passarelli (Italy). Team representative: Lucio Passarelli. This design creates an architectural form conceived as an artificial geology of the Makryianni site. The exhibit is organized in chronological sequence, dominated by the ideal void volume of the Parthenon. A sloping route underlines this visual direction which, starting at the lower level with the exhibitions of the most remote ages, ascends to the more recent ones. The Parthenon's sculptures will be displayed in their original sequential and spatial relations, thereby respecting their architectural and symbolic value. The main morphological elements are the eyed roof slab and the podium.

Second prize: Tasos Biris – Dimitris Biris – Panos Kokkoris – Eleni Amerikanou (Greece). The museum building would be the Koile site itself. The exhibition space would be the covered natural hollow formed by the intersection of its stony slopes and the inclined bed which these produce. Architectural intervention is mainly confined to the shaping of the protective covering for the sunken natural area.

Third prize: Raimund Abraham (Austria – USA). This study for a museum on the Makryianni site is notable for the classic lines it creates, but also for the inherent reference to architectural memory. The galleries are divided into two major levels. The upper entrance level forms an elevated public square to be used as an observation deck as well as an outdoor exhibition area. The entrance core of the museum forms a spatial and circulatory pivot interconnecting all parts vertically and horizontally, permitting at the same time the only open external view.

Special mention: Chi Wing Lo – Panagiota Davladi (Greece). The proposal of these young architects, sited at Makryianni, is characterized by a dignity of line within an economy of space. The main conception is the interplay of two walls, one of marble like the sculptures but thin and translucent, the other of solid masonry plastered on both sides. Their different modes of interaction form a chain of distinct enclosures along which the sculptures are deposited. The two walls (the museum) are fused with the angular edge of the site, resulting in many folds and forming a *plateia*, or square, which infuses contemporary life with the work of the ancients.

An exhibition of all the proposals was held in Athens and a part of it was then transferred to London. A book has also been published describing all 438 projects. Publicity was deemed essential, as a competition presents a panorama of trends in contemporary architecture, with each proposal expressing a different approach to the same problem. The critical appraisal resulting from the competition will no doubt contribute to the development of architectural and museological thought – and this indeed constitutes the competition's gift to the specialists of our time.

The contract between the Greek Government and the prize-winning Italian architects for the completion of the architectural study was signed in June 1992. A seven-member committee created by the Greek Ministry of Culture formulated proposals to be taken into consideration by the designers during the realization of the study, with the aim of improving the function of the museum and of reducing its total perimeter without changing its architectural concept. The designers adopted the proposals and are currently working on revising the preliminary study. Another decisive factor to be taken into consideration at this stage is the Metro station planned for the immediate vicinity. Close co-operation between the museum architects and the planners of the Metro station has been established, so that both functions (museum and Metro) complement each other.

The estimated cost of the museum is about \$100 million and construction is scheduled to start in 1995. ■

Museum-Museums

One of the most innovative features of the new Grand Louvre in Paris – and one of the most pleasing because of its concern to involve the public – is the Musée-musées (Museum-Museums) programme, an international tribune in the auditorium of the Louvre which was initiated at the opening of the Grand Louvre in April 1989. Based on the premise that ‘What with large-scale construction undertakings, extensions, conversions and renovations, museums have now become cultural facilities and places of architectural creation’, the Musée-musées programme offers a genuine platform of current information, with conferences and discussions at which museum specialists, architects and curators can discuss problems concerned with architecture, museography, conservation, acquisition of works of art, restoration, etc. There is another series of lectures by eminent people (writers, artists, researchers, for example) on what they like about their favourite museums. Beginning with this issue, Museum International will publish regular reports on this programme, the first of which covers three lectures that were delivered in the spring of 1993 on three very different undertakings.

In Spain, the Thyssen-Bornemisza Museum in Madrid and the Museum of Spanish Abstract Art at Cuenca bear witness, each in its own way, to a certain idea of the museum. They obviously differ in their genesis, framework and content, but the most interesting difference is perhaps between the fundamental inclinations that gave rise to two aesthetic styles, two atmospheres, two types of pedagogy: museology is revealed here as a reflection on the specific relation of human to object – which clearly appears as the *foundation* of the museum; museography, for its part, is the means whereby that relation is expressed. In France, the Carré d’Art in Nîmes, designed by Sir Norman Foster, one of today’s most renowned architects, opened its doors on 8 May 1993.

The Villahermosa Palace and the Thyssen-Bornemisza Collection (Madrid)

Lecture by Tomas Llorens, Director

This famous collection, which was accommodated not so long ago in the Villa Favorita, one of the most beautiful houses on the Italian lakes, was put together from 1932 onwards by Heinrich Thyssen-Bornemisza and subsequently by his son Hans-Heinrich, the first collecting paintings, sculptures and works of art of the fourteenth to eighteenth centuries, and the second adding modern and contemporary paintings to the collection as well as older works. Nearly the whole collection (some 800 items) has been lent to Spain for nine-and-a-half years as from 1993 and is accommodated in the austere Villahermosa Palace. This palace, which was built at the end of the eighteenth century for an Italian nobleman, was remodelled and expanded shortly afterwards with a garden at its centre. The architect Rafael Moneo, who was commissioned to transform it into a museum, wished to preserve and evoke

the layout of the great Italian palaces. ‘The respect shown for existing proportions, the care taken in designing the floors, the treatment to which the thick walls and delicate stucco was subjected demonstrate his concern to come close to the palace’s former architectural style.’ The style is sober and severe, having a classical façade with a pilastered central body surmounted by a pediment, its inner courtyard – which the architect has covered – and its series of linked rooms.

The collection, which is ‘universal’ in the time and space it covers, is presented in sequence along a chronological route that begins on the second floor (to give the older paintings the benefit of daylight). The distance between one painting and the next is considerable, as if to make up for the lack of quiet corners resulting from the linear arrangement. These linked rooms, which open out into a long wide gallery at every level, the pink ochre walls, all this luxurious space, carry a hint of Chirico’s imaginary architecture.

The museographical project, as Tomas Llorens explains, was to ‘demonstrate the continuity of ancient art and twentieth-century art’ by offering ‘a linear presentation’. The building lends itself admirably to this, and its remodelling has taken it into account. The rather ‘over-historical’ route is made up for by the moments of delight experienced by the visitor in coming face to face with so many works of art.

The Museum of Spanish Abstract Art (Cuenca)

Lecture by José Capa Eirtz, Director of Exhibitions, Juan March Foundation; Gustavo Torner, artist, co-founder of the Museum; José Manuel Bonet, art critic

Some 170 kilometres east of Madrid the old Acropolis-style city of Cuenca holds this museum in its fifteenth-century



© Fundación Juan March

casas colgadas (hanging houses), which overlook the Huécar river and the harsh hills of Castile.

During the 1930s a group of artists fired by the innovatory ideas of Picasso, Gris and Miró were working in Cuenca. Those of the 1950s were to become the great Spanish abstract artists: Tàpies, Millares, Saura, Torner and Feito (founders of the El Paso group), Palazuelo, Guerrero and Chillida. One of them, Fernando Zobel, on returning from Manila, collected the works of his companions. With his friend Torner, he spent two years considering how to set up the collection and learning about international museography.

In the absence of political freedom under the Franco regime, civil society and cultural circles began to take the initiatives during the 1950s: Cuenca, with its artists, collectors and galleries, replaced Madrid as a centre for the contemporary art movement.

In 1966 the museum opened its doors to the artists, their friends and the local community without any official inauguration but with a convivial lunch in the mountains. A place of shelter for

the works of artists, the museum is itself the creation of artists: the ability to give a modern feeling to an old house results from the fact that the founders were imbued with the history and landscapes of Castile. Torner, who was responsible for planning it, wanted 'no more than one painting to be seen at a time, and each painting to be specially lighted'. This has resulted in wonderful places for quiet reflection and contemplation.

In 1978 a wing was added. In 1980 Zobel, who was anxious to perpetuate the museum, donated the collection to the Juan March Foundation (for the plastic arts). He died in 1984, aged 60.

The collected works are of an abstract nature, from 'the most rational constructivism to the most instinctive informalism', and the museum is a place for the reflection on the contribution made by Spanish abstract art. The absolute criterion for choice is quality (not style), and it was therefore decided not to accept gifts. The 'aesthetic style of Cuenca' has been spoken of: light, strength, austerity, clarity and passion, which refer as much to the work of Zobel, Tàpies, Saura and the others as to the Castilian

Interior of the Museum of Spanish Abstract Art at Cuenca.



© James H. Morris

The Carré d'Art in Nîmes, with the columns of the Maison Carrée in the foreground. Sir Norman Foster and Partners.

surroundings It has some of the spirit of Theresa of Avila. Zobel's revelation about Rothko's painting, during his visit to the United States, probably has some bearing on the contemplative atmosphere to be found both in his painting and in his museum. The same characteristics can be seen in the architecture. The materials used are the wood of the framework and corbels of the *casas colgadas*, whitewash and plaster. It is a total symbiosis.

Without setting out to compare what is not comparable (the collections, buildings, opinions and situations), and is of the same standard of excellence, one subject of reflection that really belongs to museology does arise: it concerns two men, who were in love with art (one of whom was an artist himself); their social integration; the way in which they chose to communicate their message and their passion.

The Carré d'Art in Nîmes (France)
Lecture by Sir Norman Foster

Why report on Norman Foster's lecture when the press is talking about the Carré d'Art, which has just been inaugurated at the time of writing? Constructing a building with the aim of integrating it into the site, of establishing a discreet dialogue with the neighbouring built-up environment – prestigious – and adapting it to the social life of the community is a normal architect's wish. It is also very much a museum vision.

Two thousand years of history and architecture: on the one side a famous building, the Maison Carrée of Nîmes (early first century), the former Nemausus of the Romans, and on the other a renowned British architect, Sir Norman Foster, who has received ninety-two awards and won fifteen

international contests. The determination of a mayor and the plan of a contemporary art collector who donated his collection to the town led to the idea of creating a sort of 'integrated centre' including a museum, a media library, an auditorium and a cinema. Nine years' preparation was needed. Today there is a building of 11,000 m² of usable floor space around an atrium with a canopy, nine floors (four of them underground), glass walls and plenty of light, a huge awning keeping off the sun and partly sheltering the old European nettle tree (the tree that is the emblem of the South of France, if there is one), and Roman-style paving all round the building. All of this demonstrates Sir Norman's thirst for references to an age-old inheritance and for integration with the city and the way of life of its inhabitants. As from 1984, his plan rested on the unmistakable identity of the monument, the dimensions of the nearby Jardin de la Fontaine and of the main avenue (a tunnel of greenery leading to the dazzling sight of the Maison Carrée), the arrangement of the traditional houses around their closed courtyard, the urban habits of the townspeople of Nîmes and the modulation of the lighting for the works of art.

However, all this glass, all this transparency and all this light caused curators and art critics to voice immediate reservations with regard to the essentials of conservation, hanging and visibility of the collections (these are planned around

three main themes: the contemporary era since the 1960s, Mediterranean sensitivity and Anglo-Saxon and German art). Did Foster, who asserts that the 'architecture must not dominate the works of art', expect this? He already has to his credit the extension of the Royal Academy in London (Sackler Galleries of Burlington House, eighteenth century – 1992), and the Crescent Wing of the Sainsbury Centre for the Visual Arts (Norwich, United Kingdom): this exemplary centre in the University of East Anglia offers students and researchers – among other facilities – a special gallery for teaching and experimentation with lighting in museums (the first in the world).

Underground construction here again, in the form of a fan whose upper border alone, in glass, emerges from a gentle slope going down to the lake. Foster's American Air Museum (Duxford, United Kingdom), a transparent, dome-shaped suspension structure within which the aircraft themselves are suspended, should also be mentioned. And there will soon be the small museum on the prehistoric site at Carson in the Verdon gorges (France), which is in full harmony with the landscape and integrated into the village.

Sir Norman Foster incarnates a poetical vision that endeavours to harmonize the exterior, the interior and the works of art.

Report by Matilde Bellaigue of the Laboratoire de Recherche des Musées de France.

Professional news

Restoration and conservation

The international trade fair *Restoration 94* will be held in Amsterdam from 18 to 20 October 1994. For the first time, the fair will cover both the cultural and the industrial heritage and will include an extensive range of exhibits for the repair and conservation of works of art, furniture, textiles, books, archives, historic buildings and gardens. A special feature of the 1994 fair will be the inclusion of vintage cars, boats, coaches and musical instruments.

For further information:

Restoration 94, RAI Exhibition, Europaplein, NL-1078 GZ Amsterdam (The Netherlands)

Tel: (31-0-20) 549.12.12

Fax: (31-0-20) 646.44.69

Restoration – Is it Acceptable? is the theme of a two-day conference to be held at the British Museum in November 1994 to explore the relationship between conservation and restoration.

For further information:

Restoration Conference,
Department of Conservation,
The British Museum,
London WC1B 3DG (United Kingdom)

Museum volunteer conference

The Board of Directors of the Volunteer Committees of Art Museums (VCAM) of Canada and the United States invite art museum volunteers from around the world to attend the fifteenth Triennial Conference, 16–20 April 1994, in New Orleans, Louisiana. Panels, seminars and lectures will treat such themes as educational and community outreach programmes, fund-raising events and projects, volunteer organizational structure and management, volunteer/staff relationships and service projects within the museum.

For further information:

Anne Burlingame, President VCAM,
The Philbrook Museum of Art,
2727 South Rockford Road,
Tulsa, OK 74114 (United States)
Tel: (1-918) 749-5279
Fax: (1-918) 743-4230

New publications

Tokyo Museums. A Complete Guide, by Thomas and Ellen Flannigan. Rutland, Vt./Tokyo, Charles E. Tuttle Company, 1993. 246pp. Distributor in the United Kingdom and Europe: Kodansha Europe Ltd. (ISBN 0-8048-1892-4.)

The first comprehensive guide in English to Tokyo's many and varied museums, this publication ranges from the more obscure Laundromat and Tombstone museums to the 30,000-piece collection of the Tokyo Metropolitan Art Museum and the unrivalled scope of the National Museum of Japanese History. It includes maps, directions and travel instructions.

Bases de données et banques d'images. Paris, Ministère de l'Éducation Nationale et de la Culture, Direction de l'Administration Générale, Mission de la Recherche et de la Technologie, 1993. 192 pp. Distributed by La Documentation Française. (ISBN 2-11-087409-0.)

Architecture, museum collections, bibliographic, iconographic and audio-visual holdings are but a few of the cultural subjects for which the French Ministry of Culture and Education has, for more than twenty years, created databases and image banks. This directory describes 100 such reference tools in disciplines as varied as archeology, history and art history, ethnology and cultural development. The data files are grouped in three sections: databases, image banks, and vocabularies and descriptive systems.

museum *international*

Correspondence

Questions concerning editorial matters:
The Editor, *Museum International*,
UNESCO, 7 place de Fontenoy,
75352 Paris 07 SP (France).
Tel: (33.1) 45.68.43.39
Fax: (33.1) 42.73.04.01

Museum International (English edition) is published four times a year in December, March, June and September by Blackwell Publishers, 108 Cowley Road, Oxford, OX4 1JF (UK) or 238 Main Street, Cambridge, MA 02142 (USA).

New orders and sample copy requests should be addressed to the Journals Marketing Manager at the Publisher's address above. Renewals, claims and all other correspondence relating to subscriptions should be addressed to the Journals Subscriptions Department, Marston Book Services, P.O. Box 87, Oxford, OX2 0DT (UK). Cheques should be made payable to Basil Blackwell Ltd.

Subscription rates for 1994

	EUR	ROW	NA
Institutions	£47.00	£47.00	\$75.00
Individuals	£25.00	£25.00	\$37.50
Institutions in the developing world		\$36.00	
Individuals in the developing world		\$21.50	

Single issues:

Institutions	£19.00	£19.00	\$30.00
Individuals	£10.00	£10.00	\$15.00

Back issues: Queries relating to back issues should be addressed to the Customer Service Department, Marston Book Services, P.O. Box 87, Oxford, OX2 0DT (UK).

Microform: The journal is available on microfilm (16 mm or 35 mm) or 105 mm microfiche from the Serials Acquisitions Department, University Microfilms Inc., 300 North Zeeb Road, Ann Arbor, MI 48106 (USA).

US mailing: Second-class postage paid at Rahway, New Jersey. Postmaster: send address corrections to *Museum International*, c/o Mercury Airfreight International Ltd Inc., 2323 E-F Randolph Avenue, Avenel, NJ 07001 (USA) (US mailing agent).

Advertising: For details contact Pamela Courtney, Albert House, Monnington on Wye, Hereford, HR4 7NL (UK). Tel: (09817) 344.

Copyright: All rights reserved. Apart from fair dealing for the purposes of research or private study, or criticism or review, as permitted under the Copyright, Designs and Patents Act 1988, this publication may not be reproduced, stored or transmitted in any form or by any means without the prior permission in writing of the Publisher, or in the case of reprographic reproduction in accordance with the terms of licences issued by the Copyright Licensing Agency or the Copyright Clearance Centre.

Copies of articles that have appeared in this journal can be obtained from the Institute for Scientific Information, (Att. of Publication Processing), 3501 Market Street, Philadelphia, PA 19104 (USA).

Printed and bound in Great Britain by Headley Brothers Ltd, Kent. Printed on acid-free paper.