Computer Database Applications in Maritime History

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If asked, most maritime museum professionals would probably indicate that their institution's major assets are the physical collections of artifacts and paper documents. Yet such a response ignores some important information resources that ought to be considered. Although few at present would consider this data a major asset, when the cost of research, recording and storage is considered it is clear that these databases have considerable value. Combined with the value added by the accumulation and accessibility of the material, they could potentially be worth as much as physical collections. Assets of this magnitude deserve the care and consideration lavished on other museum holdings.

Databases may develop haphazardly in the absence of policy, fiscal or technological direction. Often they are created as a by-product of research for articles, exhibitions or collections management. But without a focus based on sound planning, much of this effort could be wasted or duplicated. The future growth of (and participation in) maritime heritage by institutions and individuals may depend on the effectiveness with which such data is collected, stored and disseminated.

The advent of desktop computers has changed the perspectives of many younger enthusiasts and students of maritime heritage. The first generation who have never known a world without personal computers is now emerging into universities and museums, fully expecting that these institutions will provide these tools. Manual reference systems, such as printed books and card indices, are beginning to diminish in importance for these computer-literate individuals. In all likelihood this is symptomatic of changing perceptions about information resources.

The museum establishment is just not beginning to embrace digital technology to increase productivity and to perform many functions that were formerly done manually. This technology uses electronics to store and process information and is the basis of computer hardware. Automation of artifact databases is probably the main focus, and many museums are experimenting with software to track collection inventories. The flexibility afforded by an automated system provides not only greater control but also sufficient management information to enable decision-makers to make informed choices and to measure the results.

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The federal effort to promote the creation of collection standards and to centralize the efforts of large museums is reflected in the establishment of the Canadian Heritage Information Network (CHIN). Using a mainframe computer in Ottawa, individuals associated with the programme have developed standards for an artifacts database in the humanities.[1] While its dictionary has become a mainstay for museums both within and without the network, progress has not been as rapid as some would like. As a result, many non-members of CHIN, using readily available hardware and software, have also begun to develop artifact databases.[2] The best of these have embraced the standards set by CHIN while also developing their own in areas where CHIN is found wanting. Since nearly all database programmes have the ability to format information so that it can be imported and exported between installations, selection is determined principally by the funds available and the features desired. Provincial networks, such as Dogwood in British Columbia and Trillium in Ontario, are filling niches ignored by CHIN while also meeting the needs of non-member institutions for cooperation and standardization. It is hoped that these regional networks will continue to promote cooperation and to forestall any widespread fragmentation in the thousands of small and medium-sized institutions across the country.[3]

Individual researchers and institutions have amassed an impressive amount of data on ships, companies, people, events and technology. This array of material, if put into a format which is readily accessible, is potentially available to interested researchers. Unfortunately, much of it is captured in manual card indices, reports and other formats that yield information only after arduous searching. This is where computerized databases may become the bridge to the future. Simply put, a database is any collection of facts or information which is ordered in a format that allows retrieval and revision. Manual systems, such as cards and lists, have been in use for centuries. But computers have created the potential to accumulate, manipulate and retrieve massive amounts of information easily and quickly.

Although the largest institutions, usually provincial or national, possess the most fiscal and personnel resources to respond to these new opportunities, there is still room for imaginative innovation by medium or small organizations. The Canadian Museum of Civilization (CMC) is probably making the largest investment, currently budgeting two million dollars to digitize photographs, documents and records as part of an effort that began during its construction phase. When this work is completed, the CMC will be able to provide a "museum without walls" in return for an unspecified user fee.[4]

Another large-scale response has come from universities, many of which have large mainframes and well-established infrastructures. Some are beginning tentatively to market on-line information to clients as a source of revenue.[5] Often created by both staff and students, university databases have been accumulating for some years. Libraries in particular seem to be taking the lead in providing documents, literature searches and reference assistance to on-line inquirers. The internet system, for example, which already embraces more than fifteen million users worldwide, facilitates the sharing of electronic mail and provides access to many university databases. While few of the tens of thousands

of databases currently available have maritime applications, the potential to build such structures exists.

But what about the smaller institutions and individual researchers desiring to automate maritime heritage records? What are the technological and planning factors which must be considered? And how can some of the pitfalls be avoided?

To begin, when planning a database the function to which it will be put and the requirements of potential users must be considered. Collecting facts at random will produce a useless agglomeration of data. Instead, there must be a purpose to guide its development. An analysis of the needs of potential users will provide guidance on how to format the data and what types of variables need to be collected. A simple database can usually be managed instinctively by its creators using self-explanatory field names. More complex collections, however, require sophisticated documentation. The departure of a key employee could render a database useless without proper documentation. A database dictionary, including definitions of field names and full rules for data entry, should be created as early in the project as possible. Among other benefits, this will ensure that there is consistency among the various contributors and users. In an institution, the range of people who potentially could provide input over a multi-year period is likely to be large. Since each is likely to have a different style of input, unless standards are maintained the effectiveness of the database will decrease. The creation and adoption of authority lists for each field will reduce this possibility.

Searches in the various fields must be for narrow targets which will only be effective if the terms used in data entry are standardized. A search for entries described by different names or terms will fail to retrieve the information, since computers will only fetch entries which match the criteria specified exactly. Often even a "near-miss" will prevent retrieval; for example, a search for data on a vessel named *Number 5* would fail if the user requested information on *No. 5,* despite the fact that the two are obviously fairly close. The creation of authority lists — groups of terms, descriptors or names which can be used to classify information — is the most effective way to ensure that all entries are done similarly. A standardized list of the names used for types of vessels, for instance, will guarantee that a plethora of terms to describe a single type are not used. Authority lists can and should be developed for all parts of the database.

There is a compelling case for standardizing approaches to database creation and data entry. The ability to trade data or to use another researcher's system will only be possible if there are standard features. Field names, data entry rules, and authority lists are only a few examples of voluntary standards that can be developed within the maritime heritage community. Anyone who has ever observed how individual styles in describing objects and information can reduce the efficiency of a database will understand the point immediately. Different systems of describing vessel rigs or technological details can complicate searches. Through advance planning and documentation the range of such dangers can be reduced dramatically.

Storing immense amounts of data requires hardware with a large capacity. Small portable diskettes used to transport or store small files are inadequate for large databases.

Fortunately, high-capacity devices, such as magneto-optical and CD-rom disks, are capable of handling virtually any database. Indeed, for larger applications the magneto-optical disks can be stored in a "jukebox" which will provide access to five or more disks.

Copying, or "backing-up," data onto another large storage disk or tape on a regular basis is essential. A recent technological failure in the mass storage device at the Maritime Museum of British Columbia (MMBC) could have spelled disaster if a back-up had not recently been made. A regularly updated copy of the backup tape is kept off-site to minimize any disruption caused by a calamity affecting the computer system.

The degree of computer literacy possessed by users and managers also has an impact. Most researchers who have only recently become computer users have a lingering mistrust of storing data solely on disk or tape. The need to create hard copies of databases and reports as further back-ups seems irresistible. This has led to an informal "law" in the field: that computers generate rather than save paper. Hard copies must be controlled to prevent a proliferation of different versions of the file and to minimize the expense of multiple copies.

Each computer terminal in the MMBC is connected to the others. This allows each to act as a gateway to the data stored elsewhere. This "local area network" provides access to the work of all staff and volunteers and is a real boon within the museum.

Utilizing a flatbed scanner to digitize photographs, drawings and original documents, the MMBC has embarked on a programme to create an image database. The underlying theory is that digitized images will provide greater public access to the collection without the negative impact of excessive handling, thus extending the lives of fragile materials. The collection could also be available in this way for browsing by casual visitors or researchers employing serendipity as a research tool. New digital photography is also being employed to create images of three-dimensional objects and large drawings. The MMBC is using a digital camera, which utilizes a diskette instead of regular photo-sensitive film. The images can then be transferred to a computer storage device for later reference and manipulation. This camera has applications not only inside the museum but also in the field, where it can be used to document vessels and water-based heritage resources. The output can be directed to a six hundred dot-per-inch laser printer. The output from such devices are of publishable quality; depending on the machine, it is possible to produce colour images as well as colour or photo-mechanical separations required for more sophisticated printing.

Besides the collection database the MMBC is creating new inter-locking databases focusing on floating heritage, aids to navigation, biographies of mariners and navy personnel, companies, chronologies and geographic locations. These databases are likely to grow, since they are being added to and updated regularly. New databases are planned and will come on stream as resources permit.

One database which may interest many readers is the floating heritage database. British Columbians have built tens of thousands of vessels, the records of which are scattered in many locations. The data collected through various investigations and through the British Columbia Vintage Vessel Registry is stored in this database. For researchers

there is often no convenient alternative source for this information and some of it is inaccessible to casual inquirers. This database sets out to collate and consolidate the information into a single comprehensive source, including images and ship plans. It also contains a complex series of more than one hundred data fields on each vessel (regardless of size or licensing status.) Some fields are based upon those few identified by CHIN that relate to vessels, while others build on the work begun at the Maritime Museum of the Atlantic in recording shipwrecks.[6] In the interest of building on work already done competently, we have adopted their fields when they overlap our own interests; while we might have preferred that some things were done differently, we were not prepared to perpetuate the "stand alone" policy so prevalent in database management. We believe that standardization is vital to preserving and comprehending Canadian maritime heritage. If it can be done on a wider scale the impact will expand accordingly. Our database complements the shipwreck database by including vessels still afloat. Combined, they provide researchers with a complete picture of the life history and fate of a vessel, all in one or two convenient locations. In a joint project with the Vancouver Island branch of the Underwater Archaeology Society of British Columbia we are expanding on the practical applications of this work and combining efforts to link databases.

Visitors to the M M B C seem to enjoy the information in our exhibitions. Using common techniques they can control the amount of knowledge they wish to receive. A growing number, however, are motivated to inquire more deeply into issues raised by the displays. These people can be considered "museum users" rather than visitors. Such individuals, some professional and some amateur, view the museum's resources differently and are asking for access to information on a new basis. Some, by choice or circumstance, prefer to access it by mail or telephone.

Our next goal is to create a "wide area network" so that users can access the photograph and ship drawings collections, the artifact and ship information database, and all our other resources at their home or office using their own desktop computer and standard telephone lines. By sharing data with other institutions and researchers we will multiply the impact of our resources, making them truly available worldwide and contributing to the growing interest in maritime heritage.

With a limited number of maritime museums in Canada, access to data is sometimes limited by the ability of researchers to travel to the institutions that house it. Consequently, maritime publishing and coverage by the mass media have grown more slowly than many would like; in turn, this has had a ripple effect on public interest in maritime heritage. Building market demand will to a great extent determine future public support for maritime museums, and the level of such interest will be governed largely by our ability to deliver the product the public wants.

There are now some commercial maritime databases available, including one for registering shipwrecks.[7] With appropriate hardware it is possible to subscribe to large databases on tape from institutions such as Lloyd's Register of Shipping. Another database is being prepared by the Department of Communications and will at a future date be operated under the aegis of CHIN. The Canada List of Shipping, known popularly as

the "Blue Book," has been computerized, but the data is not currently available on a network or for purchase.

The recreational use of databases is already a major force in information merchandising. Commercial databases are catering to a growing market.[8] Some are marketed on television as subscriber services, promising a combination of high-tech intellectual entertainment and information. There is no reason to believe that maritime heritage information lacks similar potential. The revenue from such ventures could be used to support further investigation, classification and publishing.

The days when small and medium-sized museums gave away the product of years of research ought to end. There is an alternative: to generate revenue by charging a reasonable fee that reflects the effort put into creating the database. Attaining self-sufficiency in this way may allow the development of even more services and products. Withering government funding (at all levels) and the lack of significant private sector support for maritime heritage makes this a virtual necessity. While a market of sufficient size to make a sizeable fiscal impact on an institutional balance sheet does not yet exist, there are signs that one is forming. How long it will take and the extent to which it will grow are presently only educated guesses. But if this niche is not occupied by commercial databases, it has the potential to become a significant source of profits for museums.

Future directions will also depend on joint ventures with other organizations. Joint ownership and management of data, images and even artifacts will enable a greater range of activities and will increase their impact. A collective of agencies, institutions and individuals could bring more expertise and markets together than individual efforts. A passive approach is not enough. Combining computers with cooperation and commitment will advance the cause, status and position of maritime museums and organizations.

NOTES

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1. Canadian Heritage Information Network (CHIN), Documentation Research Group, ***Humanities Data Dictionary of the Canadian Heritage Information Network*** (reved., Ottawa, 1988).

2. See, for example, J.M. MacFarlane, ***British Columbia Ship Database Data Dictionary*** (Victoria, 1993); J.M. MacFarlane, G. Mathias and C. van Volsem, ***Collections Classification Authority List*** (Maritime Museum Notes No. 6, Victoria, n.d.); Earl Morehead, ***Marine Museum of the Great Lakes at Kingston: Research Resources, Library and Archives*** (Kingston, 1992).

3. CHIN, ***Regional Networks Policy*** (Ottawa, 1992).

4. Canadian Museum of Civilization (CMC), ***Summary of the Corporate Plan 1993-94 to 1997-98*** (Ottawa, 1993).

5. University of Victoria Library, ***The UVic INFOLINE Service*** (Victoria, 1993).

6. See Nova Scotia, Museum Services Section, ***Nova Scotia Shipwreck Inventory and Database*** (Halifax, 1991).

7. Divers Free Press, ***Canadian Ship Wrecks Network*** (St. John's, 1993).

8. ***Times-Colonist,*** 19 January 1993.