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**ESTABLISHING A COMPUTERIZED COLLECTION MANAGEMENT  
SYSTEM FOR THE NATIONAL MUSEUMS OF THAILAND**

**Jackie Chan**  
**Alex Kinney**  
**Mark Williams**

museum@wpi.edu  
<http://users.wpi.edu/~almiki/ppq/museum.html>

**Chrysanthe Demetry, Advisor**  
**Richard Vaz, Advisor**

Sponsored by National Museums of Thailand  
**Somchai Na Nakhonphanom**, Director of National Museum of Bangkok

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## ***Abstract***

The National Museums of Thailand are currently attempting to establish a standard computerized catalog to store their records. Our goal was to assist the museums in this endeavor by establishing a database structure at the Museums of Bangkok and Ayutthaya. We combined the features of two databases from previous standardization attempts with input from the staff and administration of the museums and developed an improved database application that better fits the needs and future plans of the museums. We hosted a training session for museum staff and wrote a comprehensive user manual for our database application. Our project benefited not only the National Museum community but also set the groundwork for future plans to allow scholars and researchers access to information on museum holdings.

## **1 Introduction**

The National Museums of Thailand house an enormous collection of artifacts that illustrate the country's fascinating history. Educating people about the rich heritage of Thailand, the displays at the museums provide a bridge from the past to the present. A great asset of the museums is the sheer size of their collection; tens of thousands of artifacts have provided scholars with invaluable information about thousands of years of Thailand's past. Today, the government of Thailand, which has jurisdiction over the National Museums, has begun to focus on using museum displays and other museum programs to educate the public of Thailand about their own history. Due to resulting organizational demands, the museums could significantly benefit from a convenient way to manage their large collection information.

Currently, the museums manage their collections using a paper catalog that contains all of the recorded information on an artifact assembled by the Archeology Department of Thailand. While this method is acceptable for record storage purposes, artifact information retrieval can be an awkward task. As computer technology is constantly becoming more affordable, the Director of the National Museums, Somchai Na Nakhonphanom, has been attempting to establish a standard for computerizing the paper records of the museums.

To this end, two separate database structures were created. The first was designed specifically for the Museum of Bangkok by a group of students from Worcester Polytechnic Institute in 2000. The team conducted research and developed an English database to store artifact information. Around the same time, Ms. Varlaya Srikitiwong, a computer technician from the Fine Arts Department, independently created a database to hold museum records in Thai and personally distributed it to all 43 National Museums of Thailand. Both databases were equally important because the two languages served the needs of either the international or the Thai community, respectively.

Despite the previous efforts, however, neither database was being used to its full potential. Of all of the National Museums, only one has its entire collection of records entered into the computer. On behalf of his organization, Mr. Somchai requested a new standard that consolidates the aforementioned databases into a single structure that includes advance features for the staff to use easily. He wanted to develop an improved database that would simplify the process of retrieving and sharing information among museums.

Our project goal was to assist the National Museums of Thailand in the standardization of their collection management system by establishing an expedient, remotely

accessible database structure at the National Museums in two cities: Bangkok and Ayutthaya. We evaluated the collection management methods currently in use and determined the needs of both museums. Next, we designed and implemented a new, improved database structure for the museums, and also trained the staff on how to use the database. Our team then researched the different options for remote access and other future plans for expanding the database, and provided our recommendations to Somchai. The resulting database contains records in both language, advanced search features that expand research capabilities, and an improved user-interface for easy access of the system. With this new version at more than one museum, Somchai plans to include our work in his funding proposal to the Fine Arts Department. Ultimately, our efforts should prove useful to the National Museums of Thailand, and help to preserve the heritage of a rapidly changing nation.

## **2 Background**

As we prepared to develop a database system to best suit the operations of the National Museums of Thailand, two questions came to mind:

- What are the current conventions in museum cataloging?
- What are the current practices of the National Museums of Thailand?

To prepare for our project, we researched these two areas. The following sections provide an outline of background information relevant to our work, and specify the current collection management situation of the museums at the time we began work in Thailand.

### **2.1 Computerized Museum Catalog**

As technology advances, the variety of cataloguing techniques expands to allow more ways to organize information. With current computer technology, museums can digitize records to enhance collection management. Instead of solely managing records on paper, a relatively recent alternative is to store information in a digital format. This section discusses the computerization of collection management. It introduces museum catalogs in general, discusses the differences between different types, presents the current progress in developing electronic cataloguing standards, and provides an overview of catalogs used in museums around the world, and is intended to help collection management novices to familiarize themselves with the subject.

#### **2.1.1 Catalogs for Museum Records**

A catalog allows institutions such as museums to store and locate targeted information. By looking up various criteria, a user can retrieve a list of matching identification numbers, each of which can be used to retrieve a more extensive description of the object. Unfortunately, this system requires at least one record for every searchable criterion; consequently, every descriptive item will increase the physical size of the catalog. Information for the catalog must be selected so that it will be informative enough for a user to locate the targeted object, yet simple enough for quick and easy searches. The difficulty in constructing a catalog is to determine which information to include and which to omit.<sup>1</sup>

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<sup>1</sup> Fahy, Anne. *Collection Management*. Routledge, 1995.

Although some progress is being made toward specifying a cataloguing standard for describing cultural objects and images, there is currently no such standard in practice. Every museum has its own unique way of categorizing objects' information; yet great similarities do exist among the different them. Common essential types of information included in almost any museum catalog include the registration number, location of the object, owner of the object, creator of the object, references to other related records, and a description of the object.<sup>2</sup> With such similarities among museum needs, a standard cataloguing system would be both appropriate and achievable.

### **2.1.2 Paper Cataloging versus Computerized Cataloging**

There are many different forms of catalogs, but almost all of them fit into one of two main categories: paper cataloging and computerized cataloging. A paper catalog uses paper, such as 3" x5" note cards, that can easily fit into drawers, while a computerized catalog stores the information digitally on a computer hard drive or other storage medium. At this time, the most popular collection management method for museums around the world is the paper catalog.

Despite its popularity, the paper catalog has several disadvantages. Information can be lost if the paper is damaged due to excessive exposure to conditions such as heat, moisture, light, or mechanical stress<sup>3</sup>. A computer, on the other hand, is generally better protected from these elements. Another disadvantage of a paper catalog is that in order for relationships between objects to be clear, objects' documentation in the collection should be thoroughly cross-indexed. As a result, however, data redundancy increases, requiring extra space. Any updating or duplicating of records will likely be a time consuming task in a large collection.<sup>4</sup> With a computer, cross-indexing is accomplished essentially automatically, and changes to the database can be made in a fraction of the time. A computerized catalogue is easier to maintain than paper, can protect and preserve its information without the hassle of aged paper and messy piles, and can store significantly more information in less space.

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<sup>2</sup> Chenhall, Robert G. *Museum Catalog in the Computer Age*. American Association for State & Local History, 1975.

<sup>3</sup> The New York Historical Society: *Cataloguing the Collection*. 2001  
<<http://memory.loc.gov/ammem/ndpcoop/nhihtml/buildcat.html>>

<sup>4</sup> American Association of Museum. *Caring for collections: strategies for conservation, maintenance, and documentation: a report on American Association of Museums project*. American Association of Museum, 1984.



Computerized catalogs, however, do have their drawbacks. First, one would need some degree of computer literacy to use the system. Second, building a database requires time and human resources. Moreover, the cost of establishing the system can be high, as computer equipment is often expensive. A database's performance and reliability also depends on the proper functioning of the computer, which can be unpredictable at times.

### **2.1.3 Museum Database Standards**

When one designs an information system for a museum's data collection, documentation standards can be useful references in choosing which units of information to record about the collection. A well-defined standard can enhance a collection management system because it provides accepted recording guidelines that staff can follow with consistency. This consistency helps the users to familiarize themselves with the system quickly, and therefore retrieve information easily and efficiently. Moreover, the generalized use of a common standard enables information to be exchanged with other museums using the same standard.

In 2000, CHIN, the Canadian Heritage Institute Network, conducted a Collection Management Software Review (CMSR)<sup>5</sup> that offers many of the advantages of a standard. CHIN developed a criteria checklist to provide a comprehensive list of the needs of museums, with the help of representatives from different museums across Canada. Evaluators then rated museum collection management software according to how well they met the criteria provided in the checklist, which various sections focusing on collection management, data management, user interface, query, reports, technical requirements and system administration. Each section contains specific questions and guidelines for evaluators to follow when rating the museum database. While the checklist does not specifically address the issue of linking multiple databases together, it briefly covers public accessibility via the Internet. The evaluation questions in the checklist provide a useful template for defining specifications for a database, as well as evaluating the performance of a completed database with respect to its desired capabilities.

### **2.1.4 Museum Databases around the World**

Currently, there is a strong wave of digitization among the museums throughout the world. The Institute of Museum and Library Services recently studied the use of technology

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<sup>5</sup>Reference for CHIN

and digitization activities in the United States<sup>6</sup>, in order to better gauge technology use in the country's museums. Their study shows that 87% of museums across United States are using "some kind of technology" to fulfill their collection management needs. Museums with budgets less than \$250,000, however, have a significantly lower level of technology in comparison to larger museums. Digitization is active in museums nationwide, as 30% indicated in the study that their museums had digitized in the past 12 months, and 21% indicated that they will digitize their records within the next 12 months. Statistics like these indicate that even in museums around United States, not every museum has a computerized cataloguing system yet, the three most common reasons being lack of funding, lack of staff expertise, and other institutional priorities.

The United Kingdom recently established a national database called the National Register of Archives<sup>7</sup> intended to allow the archival collection information of multiple museums to be accessible to researchers by visiting the Register or via the World Wide Web. Although the practice is not enforced, museums around the UK are "strongly encouraged" to submit their archival holdings to this database so that a complete set of information can be available to researchers. Another scholarly resource in Britain is Culture Online,<sup>8</sup> developed by the Department of Culture in the UK in which selected museum resources are digitized and made accessible over the Internet. The purpose of Culture Online is to provide access to resources pertaining to arts and culture, allowing the public to use technology to learn more about different cultures on their own. The information from Culture Online is mostly drawn from materials from museums, galleries, libraries, heritage sites, archives of written, broadcast and film materials, the performing arts, and the new digital arts. Currently in development, Cornucopia<sup>9</sup> is another online database of UK museum collections. When fully implemented, the Cornucopia will provide a fully-searchable database containing 450 detailed entries from the collections of museums in the South West and West Midlands Area.

The technological development of museums in a country such as South Africa is an important area of study, since South Africa has a similar division of economic development as Thailand; some areas of both countries are modernized and incorporate state of the art technology, while other areas are still developing. One South African museum uses a

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<sup>6</sup> Museum Staff *Status of Technology and Digitization In the Nation's Museums and Libraries*. 2002  
<<http://www.museumstuff.com/articles/ar5014.html>>

<sup>7</sup> National Register of Archives *Historical Manuscripts Commission* 2002  
<<http://www.hmc.gov.uk/nra/nra2.htm>>

<sup>8</sup> Department of Culture, UK *Culture Online* 2002 <<http://www.cultureonline.gov.uk>>

<sup>9</sup> Resources: The Council for Museums, Archives and Libraries *Cornucopia* 2002  
<<http://www.cornucopia.org.uk>>

database, appropriately known as the SAM database, to manage its collection.<sup>10</sup> This database is used primarily for correspondence records, and more detailed records with photographic images are kept separately in a manual card catalog. Access to the collection is limited to research and educational purposes; non-staff must first apply for the privilege to study the collection before they can gain access to the collection. As in South Africa, museums in more and more countries, including Thailand, are making the transition from paper to electronic cataloguing.

## **2.2 National Museums of Thailand**

An understanding of the structure of National Museums of Thailand is critical when designing a computerized catalog to be well-suited to the organization's needs. This chapter provides an overview of the National Museums of Thailand and its current collection management method. Section 2.2.1 discusses the history and governmental structure of the National Museums of Thailand. Section 2.2.2 and 2.2.3 introduce the National Museum of Bangkok and National Museum of Ayutthaya, respectively, with a description of the museum history and the collection it housed. Section 2.2.4 illustrates the current collection management methods, including two computerized catalogs and two paper catalogs, used by the museums. The intent of this chapter is to provide a clear outline of the structure and cataloguing needs of the National Museums.

### **2.2.1 History of the National Museums**

The National Museums of Thailand function in a hierarchical structure under the Fine Arts Department of Thailand<sup>11</sup>, which has recently come under the jurisdiction of a new government agency, the Ministry of Culture<sup>12</sup>. The organizational structure of the Fine Arts Department and the relationships between the department and Thailand's National Museums are shown below in Figure 1. Depending on the history and culture of a given area, each National Museum protects very different forms and different styles of Thai art. For example, the National Museum of Ayutthaya contains mainly artifacts uncovered from the ruins of the old capital city, while the Museum of Bangkok contains a variety of objects from all over the

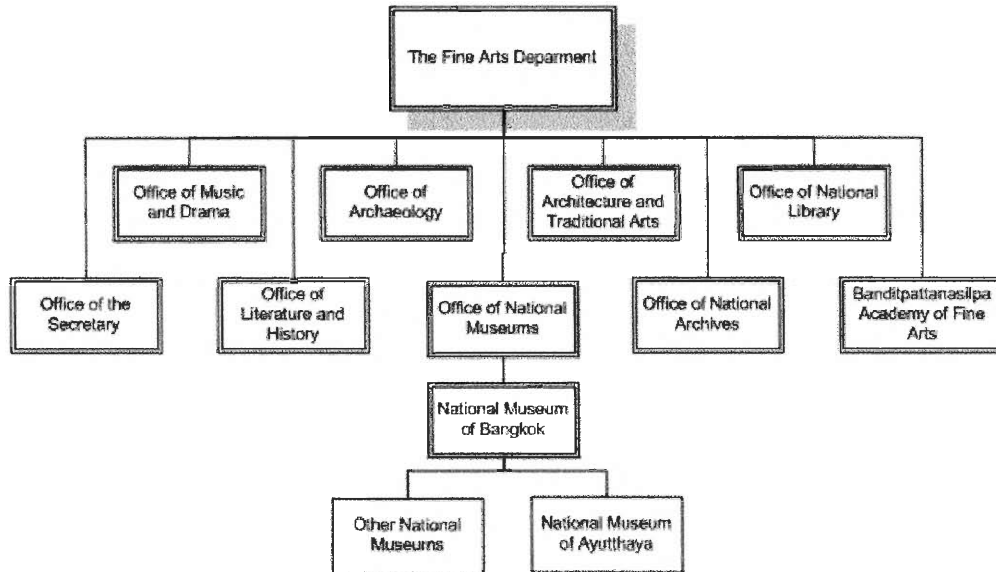
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<sup>10</sup> IZIKO, Museums of Cape Town *South African Museum* 2002  
<<http://www.museums.org.za/sam/collect/life/ento/manual/2loan.htm>>

<sup>11</sup> *National Museum in Thailand* 2002 <<http://www.thailandmuseum.com>>

<sup>12</sup> *The Fine Arts Department Calendar*. Fine Arts Department Pamphlets. Thailand: Bangkok, 2002

country. However, all National Museums support the uniform mission of maintaining and promoting Thai art and culture.



**Figure 2.1: Fine Arts Department Hierarchy Structure**

After the Governmental Organization Reform Act<sup>13</sup>, the National Museums of Thailand and the Department of Archeology, once a single government entity, separated into individual organizations to allow themselves more room to expand.<sup>14</sup> Sharing the same mission as the Fine Arts Department, both departments “carried on [their] work to raise public awareness of artistic and cultural value of national patrimony and to encourage participation of people in the preservation and promotion of the cultural heritage of the nation”<sup>15</sup>. While both departments carry the same responsibility of protecting culturally significant objects, they differ in that the Office of Archaeology handles outdoor cultural architecture, such as ancient temples, and the National Museums house the more portable artifacts that can be kept indoors. The two departments often work closely together because the Office of Archaeology is also responsible for recovering artifacts, creating a record of each one, and transferring them to the National Museums to be stored and/or displayed. For this reason, the Office of Archaeology holds a record of every artifact in the Museums of Thailand, except for those donated by private collectors.

Previously, the staff of museums of Thailand often had different systems of managing artifacts. Some objects were damaged due to the attempt to keep track of them, as serial numbers had been carved or written directly on certain pieces. Moreover, art dealers from

<sup>13</sup> The Fine Arts Department Calendar. Fine Arts Department Pamphlets. Thailand: Bangkok, 2002

<sup>14</sup> Prakittipoom, Lermasuk. Personal Interview. 22 Jan. 2003.

<sup>15</sup> The Fine Arts Department Calendar. Fine Arts Department Pamphlets. Thailand: Bangkok, 2002

other countries were given permission to take art pieces out of Thailand. As noted by curators of the National Museum of Bangkok, officials in the past did not realize the importance of artifacts and their relevance to Thai history and therefore allowed the frequent exportation of historical art pieces. Due to these past oversights, there are still parts of Thai history that remains unclear; the museum staff doesn't know as much as they would like about the "old days" of Thai history.<sup>16</sup>

Today, however, the Thai government and museums expend more effort in preserving artifacts by better managing their museum holdings and educating the public about the importance of history. There are now stricter laws and regulations concerning exporting artifacts out of the countries. Even His Majesty the King made an analogy promoting the importance of artifacts in Thai history, commenting that if the exportation continues, when followers (Thai descendants) want to study Thai culture, they will have to go abroad. Moreover, many staff members who were witness to previous practices now have the authority and position to stop important artifacts from leaving the country, so the situation is improving as Thailand retains more of its artifacts.

### **2.2.2 National Museum of Bangkok**

The National Museum of Bangkok was the first public museum to exhibit the collection of King Rama I. It consists of many sub-buildings, as indicated in Figure 2. One of the sub-buildings, the Buddhaivaryab Charpel, was formerly the palace of the Wanag Na prince; it houses the finest wall paintings in Thailand. The Vajiranana Library holds a splendid collection of stone inscriptions, old manuscripts, and lacquered bookcases. The Patihantasanai Pavilion was once the residence of the widow of King Rama II, and was later brought from Tonburi and re-erected at the National Museum of Bangkok<sup>17</sup>.

Most of the museum's collection is housed in new buildings, in the Buddhaisvarya hall, and in the old residence of the Wang Na prince. The museum collection is extremely rich, including Mesolithic and Neolithic artifacts, bronze drums and other objects of the protohistoric period; sculpture in stone, bronze, terra cotta, and stucco, ranging from the Dvaravati period to modern times; votive tablets and pottery of all periods; "Svargaloka" and Sukhodaya glazed ceramics; Chinese porcelains made for the Siamese market; wood

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<sup>16</sup> Samransuk, Mongkol. Personal Interview. 8 Jan. 2003.

<sup>17</sup> *National Museum in Thailand* 2002 <<http://www.thailandmuseum.com>>

carvings, chariots, sedan chairs, ornaments from royal barges; the paraphernalia of manastic and court life; and coins, jewelry, puppets, games and musical instruments.”<sup>18</sup>

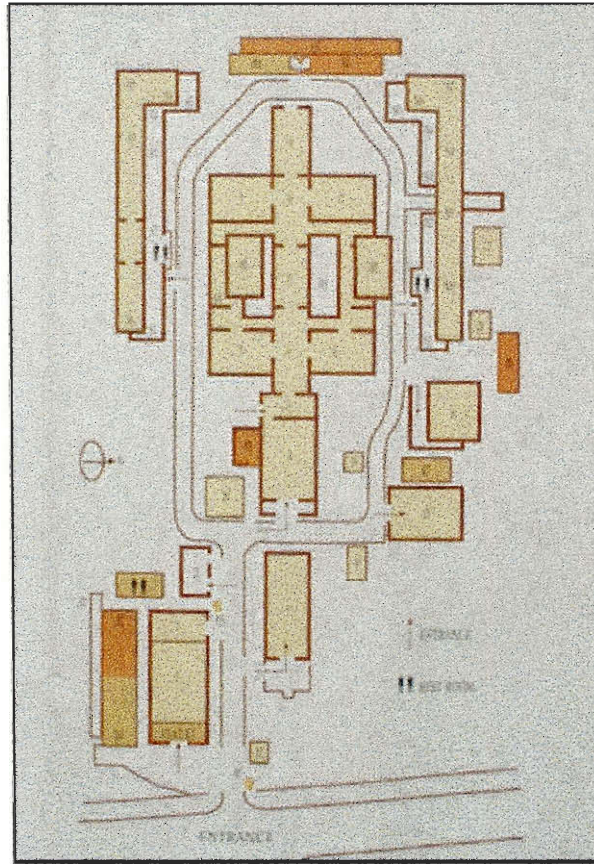


Figure 2.2: Floor Plan of the National Museum of Bangkok<sup>19</sup>

### 2.2.3 National Museum of Ayutthaya

While there are multiple national museums in Ayutthaya, our project focuses on the Chaosamphraya National Museum. This museum was created to preserve the ancient art and artifacts found in Ayutthaya after it was destroyed in the 18<sup>th</sup> century<sup>20</sup>. Since Ayutthaya was the seat of Siamese power for 417 years (approximately twice as long as Bangkok), it has many important artifacts. After the demise of Sukhothai, the first Thai capital, Prince Uthong established Ayutthaya as the Royal Capital of Thailand in 1350. The city was founded on an island at the junction of three rivers: the Lop Buri River, the Pa Sak River and, most

<sup>18</sup> Encyclopedia of World Art , Pg 37

<sup>19</sup> *National Museum in Thailand* 2002 < <http://www.thailandmuseum.com>>

importantly, the Mae Nam (River) Chao Phraya. Unfortunately, Ayutthaya was irrevocably destroyed by Burmese armies in 1767, and much of the city was reduced to rubble.<sup>21</sup>

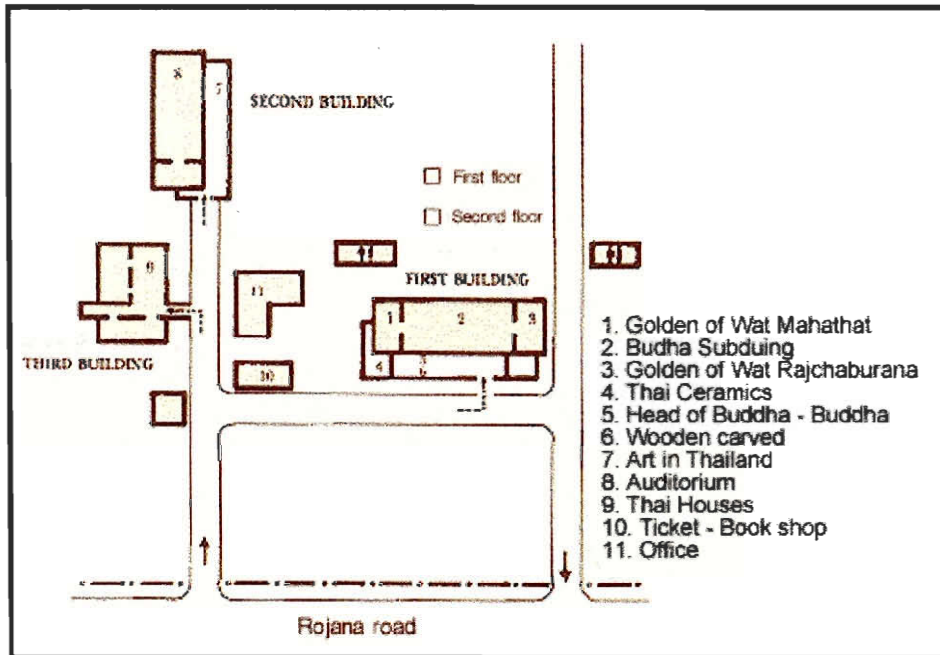


Figure 2.3: Floor Plan of the Chaosamphraya Museum<sup>22</sup>

Many artifacts survive, however, in the Chaosamphraya National Museum. As shown in Figure 3, three main buildings house objects such as Buddha images, ceramics, golden figures, and wood carvings. In the first building, the ground floor contains all of the ancient art objects recovered during the “great excavation” of 1956 and 1957, such as various styles of Buddha images and wood carvings. Upstairs can be found golden objects from the crypts of the main prang at Wat Ratchaburana along with other Buddha relics. The second building displays art dated from the Dvaravati, Srivijaya, Lopburi, Chiengsaen, Uthong, Ayutthaya, and Bangkok periods, and the third building is actually a group of houses in the style of central Thailand built within a moat. Local arts and crafts, as well as ancient Thai daily life appliances, often appear here.<sup>23</sup>

<sup>20</sup> Chaosamphraya National Museum. 2002

<[http://www.thailandmuseum.com/thaimuseum\\_eng/chaosamphraya/main.html](http://www.thailandmuseum.com/thaimuseum_eng/chaosamphraya/main.html)>

<sup>21</sup> “Ayutthaya: Capital of a Kingdom, Parts 1-14” *Welcome to Chiangmai & Chiangrai 2002*

<<http://welcome-to.chiangmai-chiangrai.com/ayutthaya.htm>>

<sup>22</sup> Chaosamphraya National Museum. 2002

<[http://www.thailandmuseum.com/thaimuseum\\_eng/chaosamphraya/main.html](http://www.thailandmuseum.com/thaimuseum_eng/chaosamphraya/main.html)>

<sup>23</sup> Chaosamphraya National Museum. 2002

<[http://www.thailandmuseum.com/thaimuseum\\_eng/chaosamphraya/main.html](http://www.thailandmuseum.com/thaimuseum_eng/chaosamphraya/main.html)>

#### **2.2.4 Cataloguing Methods in the National Museums of Thailand**

While there is no specified standard computerized cataloguing method in the National Museums of Thailand, every National Museum uses a standardized format to store object information on paper. There are four different cataloguing methods in the National Museums: registration card, curator's logbook, and two computerized catalogs. The museums uniformly use the same registration cards and logbook forms but use different computerized catalogs. Table 1 is a summary of the museum catalogs in place at the National Museum of Bangkok.

The registration card and the curator's logbook are the two paper catalogs used in the National Museums. The registration cards, organized in cabinets by objects' registration numbers, are produced when the museum first obtains the objects and are housed in the Office of Archaeology. Due to the recent separation between the National Museums and the Office of Archaeology, the museum staff now has restricted access to the registration card. Each museum does, however, keep a separate record of the catalog in the form of the curator's logbook, which contains only the most frequently used information from the registration card; as a result, though, the logbook is less complete. It is organized first according to the gallery in which each object resides, and further by registration number. In order to search for an object without knowing the object number, one has to go through all records until the specified object is identified. To add or edit object information, the registration card catalog must be manually searched to find the desired record, which then must be copied into the correct logbook.

Of the two computerized catalogues currently in place at the National Museums the first was created by a student project group from Worcester Polytechnic Institute (WPI), Massachusetts, USA in 2000. The team developed an English-language database using Access 97, a popular database software package produced by Microsoft. In addition to establishing this database in the National Museum of Bangkok, the team also trained the museum staff to use it. Meanwhile, Varlaya Srjittiwong of the Fine Arts Department also constructed a Thai-language database using the same software. Afterward, she personally installed it at all 43 National Museums and trained the resident curators to use the database. Both databases were intended to provide the museums with a useful inventory system to manage their artifact collections. Unfortunately, however, neither of the two databases was ever formally evaluated, and consequently their level of effectiveness remained a mystery.



**Table 2.1: The three museum collection management systems at the National Museum of Bangkok**

<b>Collection Management Method</b>	<b>Registration Card</b>	<b>Curator's File</b>	<b>Computerized Catalog</b>
<b>Location</b>	Office of Archaeology	Curator's desk	Curator Office
<b>Accessibility</b>	Accessible to officials	Accessible to individual curator	Accessible to anyone in the curator office
<b>Space</b>	50 cabinets (each 10"*20"*18") big	3 files, size varies depending on the number of collection in each gallery. Average size for one file is approximately 1.5 inches	One standard computer, with monitor and CPU.
<b>Informative</b>	Contain all artifact information.	Contain 3 out of 18 galleries' information.	Contain 100 artifact's information (the museum has 10000 artifacts)
<b>Searchability</b>	Can be searched only if registration number is known.	Can be searched by location and by registration number.	Can be searched by registration number, gallery room, art style, or keyword.
<b>Others</b>	Cabinets and registration cards must be renewed and re-written every 20 yr.	Information on each page has to be re-copied every 5 years.	Information is periodically backed up in a zip-disk.

### **3 Methodology**

As our project goal was to assist the National Museums of Thailand in achieving an effective collection management standard, we aimed to create a relatively inexpensive database that museum employees would find useful. In addition, our final design was to allow other National Museums to install the same database for their own uses without much difficulty. After accomplishing this task, we planned to provide the museums with a set of written guidelines to aid users and recommendations for expanding and unifying the databases in the future. This chapter describes in detail the four objectives we undertook to reach our project goal: determining the needs of the museums, designing the database structure, establishing the database in Bangkok and Ayutthaya, and providing recommendations for future expansion.

#### **3.1 Determining the Needs of the Museums**

The first step towards establishing a standard was to study the current collection management methods of our two targeted locations, the National Museums of Bangkok and Ayutthaya. From our investigations, we wanted to determine the needs of the two museums by better understanding their collection management systems. To achieve this objective we sought the answers to some specific key questions:

- What collection management methods do the museums currently use, and how does each method work?
- Who are the projected users of our database, and what are their current job responsibilities?
- Does the current collection management method(s) help the users with their jobs? If so, how? If not, do the targeted users have suggestions on how to improve it?
- How could the museum's record keeping system be improved with database technology?
- Why are there two different database structures? Why does the museum want a new database? What are the desired features for the new database?

To determine the answers to these questions, we conducted personal interviews, meetings, and field studies to both National Museums, the locations where we would establish a database structure. We conducted two types of personal interviews: the group interview which includes both the curators and the directors of the museums, and individual

interviews, which were mostly conducted with the curators. Since an inherent disadvantage of personal interview is that data might be biased according to how the interviewers perceive responses (Pg 256, black book), we only recorded the facts as spoken to us.

The reason for the group interview was to become familiar with the museums' outlook on the database and our project. We conducted group interviews during various meetings with the Directors of the Museums of Bangkok and Ayutthaya, curators from both museums, staff from the Fine Arts Dept., and our advisors. We moderated these interviews by asking open-ended questions regarding the previous databases, the current paper catalog, and the museum's general structure. From the first interview, we intended to gather general information about the database and collection management that would allow our group to ask more specific questions during individual interviews. In some cases, the responses contained information that was beyond the scope of the question asked, but we still recorded any information that seemed relevant to the museum and our project.

The intent of our individual interviews with the museum curators was to better understand the perspective of the staff members by gathering feedback from the potential users of the database in a comfortable, informal setting. To prevent respondents from being timid about sharing negative opinions, supervisors were absent from these meetings, and we kept their responses confidential. Since we conducted the interviews in an informal, conversational manner, we did not plan specific questions to ask. However, there were a few specific areas of discussion:

- Job responsibilities
- Computer literacy of museum staff
- Current museum collection management methods
- Desired improvements to current management methods

We also interviewed the Fine Arts Department technician personally; it was she who created the FAD database for the museums. The purpose of this interview was to seek information of the history behind the establishment of two similar databases and to determine the expectations of the Fine Arts Department for the computerized catalog. We valued the Fine Arts Department's opinions because we understood that the Fine Arts Department is responsible for implementing the database structure in the National Museums of Thailand; therefore, we wanted to maintain the features of the first Fine Arts Department database, but also include other criteria listed in the original expectation that was not fulfilled by the first version of the FAD database.

After speaking with the curators, museum directors, and the Fine Arts Department technician, we generated a list of missing features and desired areas for improvement in the database structure. We analyzed these potential needs by first grouping the interview results according to different areas, such as compatibility needs, or remote accessibility needs. These lists of user needs and wants provided a clear overview of the user concerns within each category. Then, we determined what possible improvements in each category would actually benefit the museums by assisting the staff in collection management. By classifying our interview results and filtering them by determining the necessity of improvements in each area, we obtained a final list of user requirements for our database design.

### ***3.2 Designing the Database Structure***

After obtaining the necessary information from the two museums, we needed to decide which of the user requirements to address in our database design. Although we wanted our design to satisfy the expectations of both museums, we had to weigh our options and capabilities against the requirements and costs of the features we could provide. We again took into account the information we gathered from the interviews at each museum and determined exactly what features to include, keeping in mind our time constraints and limited resources, and constructed a detailed specification stating what our final product would do. Our team then submitted this specification to officials of both museums, and based on their feedback we made appropriate revisions, resulting in a specification acceptable to the museums.

Once we decided exactly what features the database would provide, the next step was to create the database structure itself. We decided to base our design on the database created by the previous WPI project team. We copied the tables from that database to our computers, and made significant changes to the design structure. While building the database application, we utilized advanced capabilities of Microsoft Access in order to provide the features necessary to meet our specifications. We periodically presented our work to the sponsors for their feedback and suggestions until we had satisfied every requirement as delineated in the specification.

At this point, we tested the database in order to remove any flaws we had not yet found. The database structure we created did not contain actual artifact information, so we populated it with a small portion of the records from the database previously in use at the Museum of Bangkok. By performing a predetermined series of actions on the database that would

essentially utilize every important feature, we looked for flaws in our design, corrected them, and repeated the process until no flaws were found. Since our testing process undoubtedly was not ideal, we can not claim that our database design was absolutely perfect. We wanted to ensure, however, that it would effectively accommodate its intended users with minimal risk of corrupting important data.

### ***3.3 Establishing the Database in Bangkok and Ayutthaya***

The main purpose for our group, in designing our database, was to provide the users with a way to simplify some of their daily tasks. However, implementing a database contributes nothing to lessening a user's workload if the user doesn't know to properly use the database. Therefore, the training and the user's manual are crucial as they familiarize users with the database. The training exposes the users to the database by providing an overview and demonstration of key features, while the user manual serves as a support document that allows users to refer to a specific feature or action as needed. The following describes the procedures we took when implementing the database structure at both museums, discusses our training methods and concludes with the description of our construction of the user manual.

The procedure for implementing the database structure was similar for both museums. First, we installed the latest Thai version of Microsoft Access onto the computers, if it had not been already. Certain features of our database structure depend on newer features of Microsoft Access, and consequently the most recent version was required for the database to operate properly. If the computer carried an earlier version of Access, the installation of a later version included all the features of the previous version, and did not delete or render useless any pre-existing files. Next, we copied the database structure, in the form of the single Access file that we designed, onto the hard drive of the destination computer, being careful not to overwrite a previous database, if one existed. Since the file had not yet been populated, it did not contain any museum-specific information or images, and as a result a single floppy disk was sufficient to transfer the file.

We then performed small customizations to the database according to its respective museum, such as specifying the list of different rooms where artifacts are kept. Once the structure was in place, our team imported the information from any previous computerized catalogs into the new database to avoid having to repeat work that had already been done. After the installation process was completed, we tested the database in a process similar to

that described in the design section to ensure it worked properly not only on our computers, but on the museums' computers as well.

After successfully installing the system at both museums, we trained staff members to use it. Prior to some training sessions, we requested a translator to help us overcome the language barrier, and we ensured that he or she had an adequate understanding of the database to avoid mistranslations to the staff. We also came up with a procedure to follow, in which we would first introduce users to the database, describe its main features and capabilities, and then guide them through the process of using the various features, such as logging in, adding and deleting records, and searching the database. In addition to our own program, we prepared an abridged version of our user manual, containing instructions describing the tasks we covered, to be distributed to the group. We were unable to distribute a complete copy of our user manual to each curator because printing 100 copies of a 24 page manual was not feasible at the time. We also took note of questions asked during the training session, and noted them as possible difficulties future users may experience.

The user manual is the primary reference for the users if problems occur; therefore, we designed the user manual to be as thorough as possible. Given the limited time and resources of our project, we could not follow conventional procedures to construct a user manual<sup>24</sup>. However, we did follow the backbone of the conventional procedures by first researching the users' technical expertise and expectations of the database, then designed the database following the general layout of a user manual, and finally tested the manual by asking one of the curator's from the National Museum of Bangkok to revise it for us.

### ***3.4 Providing Recommendations for Future Expansion***

The final goal of our project was to produce not only a database standard, but also to provide the ability for separate museums to access each others' databases. The resources available at each museum were limited during our stay in Thailand; both museums lacked permanent Internet connections, and funds were unavailable at the time. Consequently, implementing temporary remote accessibility seemed unuseful, and we decided instead to create a list of connection options for the museums to refer to when the required funds become available.

When determining the available options for linking multiple databases together, we looked for recurring trade-offs between features and affordability. Because of the great variety of

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<sup>24</sup> McMurrey "Textbook for Technical Writing" 18 February 2003

options available, we researched an array of applicable technology, and rather than attempting to choose the single best one, we instead evaluated several, based on the cost of implementation and maintenance, as well as the service and features each option provided. With this information we wrote detailed recommendations to the sponsors, comparing the abilities of each solution along with the costs, and explaining the necessary procedures for integrating them with the databases in order to provide remote access to database records.

## **4 User Requirements and Design Specifications**

From our data collection, we developed a list of various needs and concerns from staff of the museums and the Fine Arts Department. Many of these were driven by the desire to expand and standardize database collection management in Thailand; some involved additional features to be included in the new design; and others would require simple revisions of features from the previous databases. After considering the benefits and urgency of each need, along with the difficulty in satisfying each, we developed a detailed specification that expands the features in the current computerized catalogs. These changes were intended to provide users with a simple, yet useful database to manage their museum collections. In this section we reveal the results of our interviews with museum staff and the details of the consequent specification.

### **4.1 Analyzing the Needs of the Museum Staff**

We interviewed the directors of both museums, two curators from National Museum of Bangkok, one curator from National Museum of Ayutthaya, two computer technicians from the Fine Arts Department, and the director of the Archeology office in Ayutthaya. We conducted both group interviews and individual interviews. Most of the group interviews occurred with most discussions in Thai among the staff. Typically, only the consensus responses were reported to us. Consequently, some of the specific desires of individual staff members may have been lost during the group interview process. Nevertheless, since definite themes emerged from these interviews, we believe that our results substantially, if not entirely, represent the greatest needs of the museums. We analyzed our interview results by considering the benefits, requirements, and urgency of addressing each concern raised by the staff, and we determined whether or not it would be feasible to attempt. Our team then developed a specification detailing the issues we planned to address in our design. Following is a summary of our interview results and the analysis relating these to our user requirements and to the specifications of our database:

#### **Digital Images of Artifacts:**

- A curator at the Museum of Bangkok noted that inserting an image of an artifact into the WPI 2000 database is an unnecessarily confusing and time-consuming procedure. The staff requested an easier approach to increase the efficiency of adding an image.



- A technician in the Fine Arts Department expressed a concern regarding the limits on file size imposed by Microsoft Access. Specifically, she requested that the image of each artifact not exceed the size of 40kB.
- A curator at the Museum of Bangkok requested a feature in the database that allows the users to adjust the picture size, because the image in the database is often too small and does not fill the entire image field.

Considering the limited capacity of a Microsoft Access database, our group decided to design a database structure that stores images outside of the database file, while containing only references to the images within the file. This feature would not only address the technician's request for minimal image capacity within the database; it would simplify the over-complicated task of adding images. To address the small images, we decided to increase the size of the image on the form.

#### **Language:**

- Almost everyone we interviewed felt that a database in both Thai and English would be beneficial in promoting the National Museums at an international level while retaining the convenience of user friendliness for the museum staff.

Considering the uniform desire to have a bilingual database that can be a resource for both Thai and international community, our group concluded that it was necessary to create a database that holds records in both languages. Moreover, we decided to include a simple way to switch between languages in the user interface, as well as including Thai and English labels and instructions in most menus and forms.

#### **Compatibility:**

- A major concern of the FAD technician and the directors from both museums was that records previously entered into either the WPI 2000 database or the FAD database would have to be re-entered into the new database. They requested that our database design allow information from the other databases to be imported so that staff would not need to re-enter information.
- An archeologist in Ayutthaya noted that the Archeology Department has its own database that contains the archeological information of many of the objects located in National Museums. She requested that our database be linked to that database in some way to allow the Archeology Department to share their artifact information with the museum community.

It would be a major hindrance to the staffs of the museums to populate our database if the existing records could not be imported from the two previous database versions. Therefore, we decided that it is critical for our database to be capable of importing information from either the WPI 2000 database or the FAD database. Although compatibility with other departments is desirable and will be beneficial to the Archeology Dept. and the museums, it was beyond the scope of our project and would have been impossible to achieve during our short stay in Thailand.

**Remote access:**

- Everyone that we interviewed expressed the desire for sharing information between museums and to “link” the databases of every National Museum, allowing staff of each museum to search the holdings of the others. Currently, the staff must contact or visit the museums personally to obtain other museum’s information.
- The FAD technician envisioned the creation of a centralized location in Bangkok that housed all the electronic records of artifacts and where students or researchers could access records from every museum in Thailand.

Despite the request of the directors to link the databases at the National Museum of Bangkok and of Ayutthaya, it was not possible to fulfill this request due to the absence of Internet access at either location. We decided, however, to specify in our design a database structure that is ready for remote access once the Internet becomes available at the museums. In order to share information among the museums, the database structure would need to be identical at both locations. Even if every database is not physically located at a centralized location, the Internet would allow them to be accessible from such a location, satisfying the vision of the FAD technician.

**Completeness:**

- The staff of both museums uniformly agreed that a complete database that contains all of the records currently held in the paper catalog would benefit their work and research. They commented that the incomplete database contributes little to their daily tasks.
- The director of the National Museum of Bangkok expressed the risk of completing the record in a database that is not recognized by the Fine Arts Department; information would need to be re-entered again if the Fine Arts Department ever assigns a standard database in the future.

We realized that these issues reinforce the importance of being able to use previous work, such as records entered into previous databases, and determined that in order to facilitate a quick population of our database, our structure must be capable of importing information from the two previous databases, such that no records have to be re-entered

**Standardization:**

- The director of the National Museum of Bangkok suggested the possibility of proposing our database design as a standard of electronic collection management for the National Museums. Therefore, he wanted our structure to be applicable for every museum in Thailand.

From our field studies, we observed that it is possible to have the same registration number for two different artifacts. Therefore, if all the museum records are linked, it is necessary to have a unique record number so that there would be no duplicate registration number. This criterion is specified in our recommendations for maintaining the database in the future. Moreover, since every museum has different gallery names, the museum staff should be able to configure the database to customize the database for each museum.

**Security:**

- The director of the National Museum of Bangkok asked for our design to include multiple login accounts, restricting unauthorized people from accessing administrative information and privileges.
- A curator commented that when the database fully replaced the paper catalog, the paper catalog could be destroyed, and artifact information may be lost if the computer malfunctions.

We fulfilled the director's request by stating in our specification that our database should allow for separate login accounts. Additionally, to prevent data loss, we should provide detailed backup procedures.

**Searchability:**

- A curator noted the benefits of being able to search multiple fields and gather information quickly. The current paper catalog requires the curator to go through every record to gather statistical information.
- The director of the National Museum of Bangkok noted the importance of being able to quickly search for a specific category of information. He commented that the paper

catalog, the method most frequently used, required the staff to go over every record if the museum wanted to find an artifact that fits a specific category.

We concluded that it is critical to be able to search for information in the database and therefore, we specified that the search feature should support complex Boolean searches on multiple fields.

#### **User Friendliness:**

- The technician from the FAD emphasized the importance of creating a user manual and providing user training to ensure that the users feel comfortable using the database. Also, she noted that it would be beneficial if the design includes as much on-screen instruction as possible for new users who may not be familiar with the system.
- A curator at the National Museum of Ayutthaya claimed that she was unable to use the FAD database because as a new staff member she never received any training.

Considering the suggestions of the technician in the FAD department, our team deemed it necessary to have a simple user interface that indicates the primary functions of the database. We also decided to create a user manual that would allow new curators and other staff to learn how to utilize the database on their own. We concluded that the user manual should be in both Thai and English and contain detailed instructions, preferably with pictures and illustrations, to assist staff. It would also be beneficial to create a webpage that contains users to refer to for assistance. However, since the museum does not currently have Internet connection. It is unrealistic for our team to accomplish this goal.

#### **Printing Hard Copy of Records:**

- A curator requested a bigger print-out size because the form that the WPI database prints out is too small to be useful.
- A curator also noted that the curators currently have to re-type the artifact information whenever a hard copy is needed. A suggestion was made to create a print-out form that closely resembles the exhibition display in the museum.

From the curator's suggestion, we decided that it is beneficial to have a print-out form that is similar in layout and size as the registration card because the registration card is currently used and accepted by the curators. Moreover, since it is not difficult to design various print-out formats, we decided to include in our design a museum display format, a fax format, and an email format. These printout formats would be beneficial to the curators, as they would not need to re-type the information.

## 4.2 Specifications

The specification describes the performance of the database, with details on the individual features the database will include. They are grouped by the user requirement they essentially fill, and also by some general categories, for ease of reading. Following is the specification we developed after determining user requirements and considering what would be feasible to accomplish in the time frame of our project:

### **Specifications for DATABASE 03: A WPI-designed database for the National Museums of Thailand**

1. Preserve and maintain the paper catalog. The database:
  - Shall contain all, if not more, information in the paper catalog.
  - Shall provide a reference to locate the paper catalog.
2. Enhance language capabilities from the WPI 2000 versions. The users:
  - Shall be able to keep records in Thai and English.
  - Shall be able to switch between Thai records and English records.
3. Minimize file size from the WPI 2000 and FAD versions. Digital images:
  - Shall be kept in a separate file/directory and located into records thru path.
4. Enhance searchability from the WPI 2000 version and FAD version. Tables:
  - Shall be searchable by any field contained within the database object form.
  - Shall support Boolean searches (AND and OR)
  - Shall include the following fields:
    - a. Name of Artifact
    - b. Registration Number
    - c. Case Number
    - d. Condition
    - e. Height
    - f. Width
    - g. Length
    - h. Radius
    - i. Material
    - j. Description
    - k. Province
    - l. History
    - m. Room Location
    - n. Museum Name
    - o. Digital Image of the Object
    - p. Date Starting Century &” Date Ending Century
    - q. Last Modified by
    - r. Date Modified by

5. Avoid data duplication. Each record:
  - Shall have a unique ID number.
  - Shall not interfere with the museum's registration number
6. Enhance safety and security features from the WPI 2000 version and the FAD version. The program:
  - Should have detailed information backup procedures.
  - Should allow for separate login accounts.
7. Enhance printing and copying needs. The print-out form:
  - Shall have a museum display format.
  - Shall have a registration card format.
  - Shall have an email format.
  - Shall have a fax format.
8. Enhance user-friendliness from the WPI 2000 version and FAD version. The user interface:
  - Should be well categorized according to the primary functions, such as browsing, searching, and adding
  - Should be similar in layout to registration form.

The user manual:

- Shall have a copy written in Thai.
  - Shall have a copy written in English.
  - Should have step-by-step procedural instructions, preferably with detailed pictures.
9. Enhance compatibility with the WPI 2000 version and FAD version. The database:
    - Shall be identical in both National Museum of Bangkok and National Museum of Ayutthaya.
    - Should be capable of importing information from WPI 2000 version and FAD version.
    - Should be capable of exporting record information to the Fine Arts Department.

## 5 System Description

Once we had decided exactly what we intended our database to do, we implemented the structure using Microsoft Access 2000, a more recent version of the same software used to create the two previous databases. We began with the version created by the WPI team in 2000, and modified it according to our specification. In the end, the database fulfilled almost every item of the specification, and was ready for use by the National Museums. The following sections describe the details of the implementation of the database, including sample screenshots.

### 5.1 Database Structure and Features

The core components of the database we created are the various tables, which store all of the collection's data. Unlike the FAD database, which contained only one table to store object information, ours follows the example of the WPI 2000 version and has four main tables: *Objects*, *Photographs*, *Insurance*, and *References*. For every artifact in the database, the *Objects* table, as shown in Figure 5.1, contains exactly one record, which includes information about the object and a unique identification number, *ObjectID*, for use within the database. The *Photographs*, *Insurance*, and *References* tables contain images, appraisal information, and references, respectively, concerning artifacts. In these three tables, each record has an additional field that relates it to a record in the *Objects* table via its *ObjectID*. As a result, multiple images, appraisals, or references can be conveniently associated with a single artifact.

We created a fifth table, *Rooms*, which contains a list of rooms complete with their names and room numbers. This table is independent of the artifact information, it is a separate table that only needs to be created once for each museum as they are configuring the database to customize the gallery names in the database. Each record of the *Objects* table contains a reference to a record in the *Rooms* table, thereby ensuring consistency in room names throughout the database.

With the foundation of the database laid, the next task was to develop the forms that users would use to interact with information. The most important of these forms is the *Object* form, shown in Figure 5.2, which displays all of the information contained in the *Objects* table except for the *ObjectID*, which has no significance to users. By clicking a small tab at the top of the screen, the Thai and English versions of the database can be instantly toggled. The form also contains a subform that displays the images associated with the given object,

as well as buttons leading to forms for references and insurance information. Using these forms, users can browse and view, modify, add, or delete records.

The screenshot shows a window titled "National Museum Database - [Objects : Table]". It contains a table with the following columns: ObjectID, MuseumName, Name, Description, ConditionComm, Material, and DateComments. The table lists several records, including a Buddha in meditation, a Buddha bestowing, and a Standing Buddha.

ObjectID	MuseumName	Name	Description	ConditionComm	Material	DateComments
	National Museum	Buddha in med	Buddha in meditat		Limestone	
11	Bangkok National	Buddha bestow	Buddha bestowing	Left hand missir	Stone	
33	National Museum	Buddha	Standing Buddha i		Bronze	
34	National Museum	Buddha	Seated Buddha de	The midle head	Stone	
39	National Museum	Wheel of the In			Stone	

Record: 1 of 100  
Identification Number

Figure 5.1: Objects Table

The screenshot shows a window titled "National Museum Database" with a sub-window "Object Records". The form contains the following fields:

- Museum Name: [Empty]
- Name: Buddha in meditation
- Provenance: Prachinburi
- Style: Dvaravati
- Description: Buddha in meditation
- Condition: Poor
- Condition Comments: This is a sample
- Material: Limestone
- History and Acquisition: Found at Khok Pip, Dong Si Maha, Phot, Prachin Buri
- Room: [Empty]
- Case Number: [Empty]
- Updated By: [Empty]
- Date Modified: 2/24/2003
- Registration: M 63
- Date: 7 - 9 Century BC
- Date: [Empty]
- Comments: [Empty]
- Size (cm): 103 x 62 x 0 x 0

Record: 1 of 2

Buttons: View Object References, View Object Insurance, Delete, Print, Refresh Image

Form View

Figure 5.2: Object Form



To search the database, we created a searching utility (Figure 5.3) that is somewhat more advanced than the one included in the WPI 2000 design. Users can specify up to three different phrases in a single search. Each phrase can be designated to a single field or to all of them at once. If quotation marks are placed around a group of words, the search treats them as a single word; otherwise, words separated by spaces are recognized as independent words. When *All words* is checked for a particular phrase, each of the specified words must be found in the designated field of a record—if unchecked, only one of the words must appear. Similarly, when *All phrases* is checked, all of the specified phrases must be satisfied by the record. Users can also narrow their searches by specifying a condition, room, or period that must apply to the object.

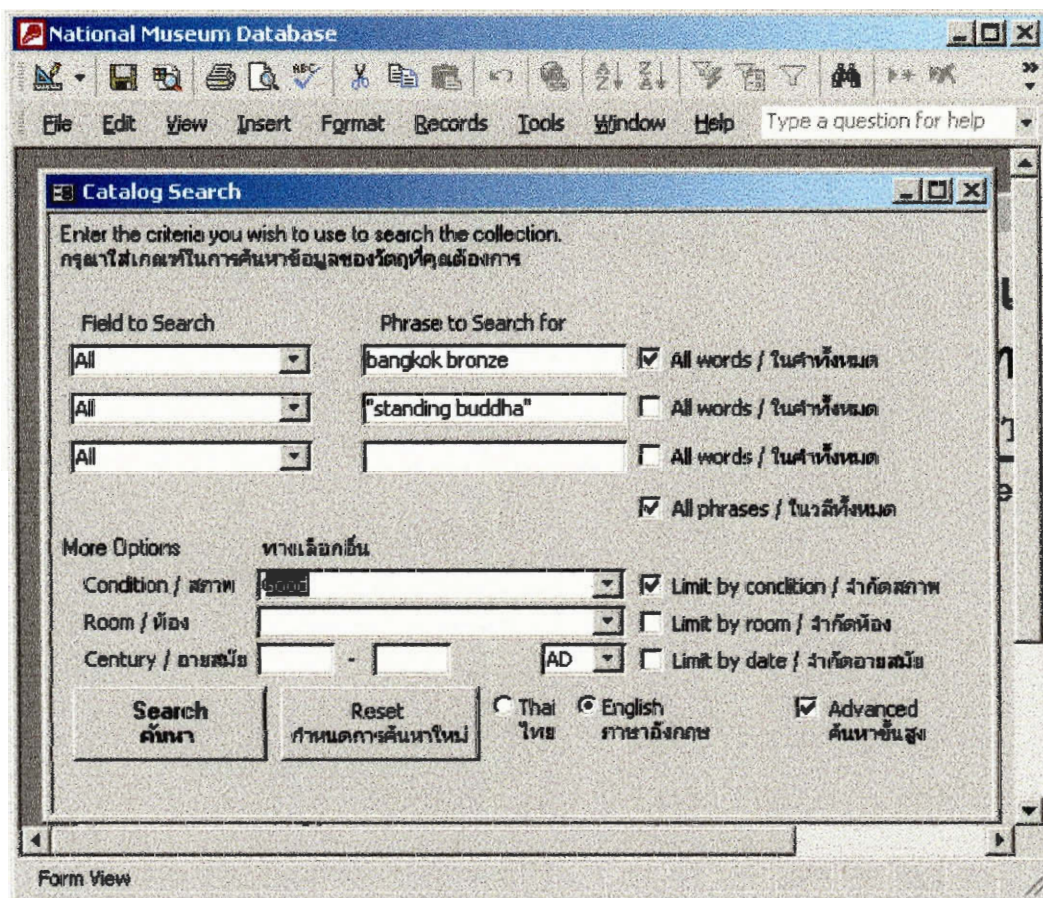


Figure 5.3: Search Form

Once the search criteria have been entered and the *Search* button is clicked, another form, seen in Figure 5.4, appears containing a list of all objects meeting the requirements

specified in the search form. While this form contains very little information about each item, clicking on the object’s registration number leads to a view of its detailed *Object* form.

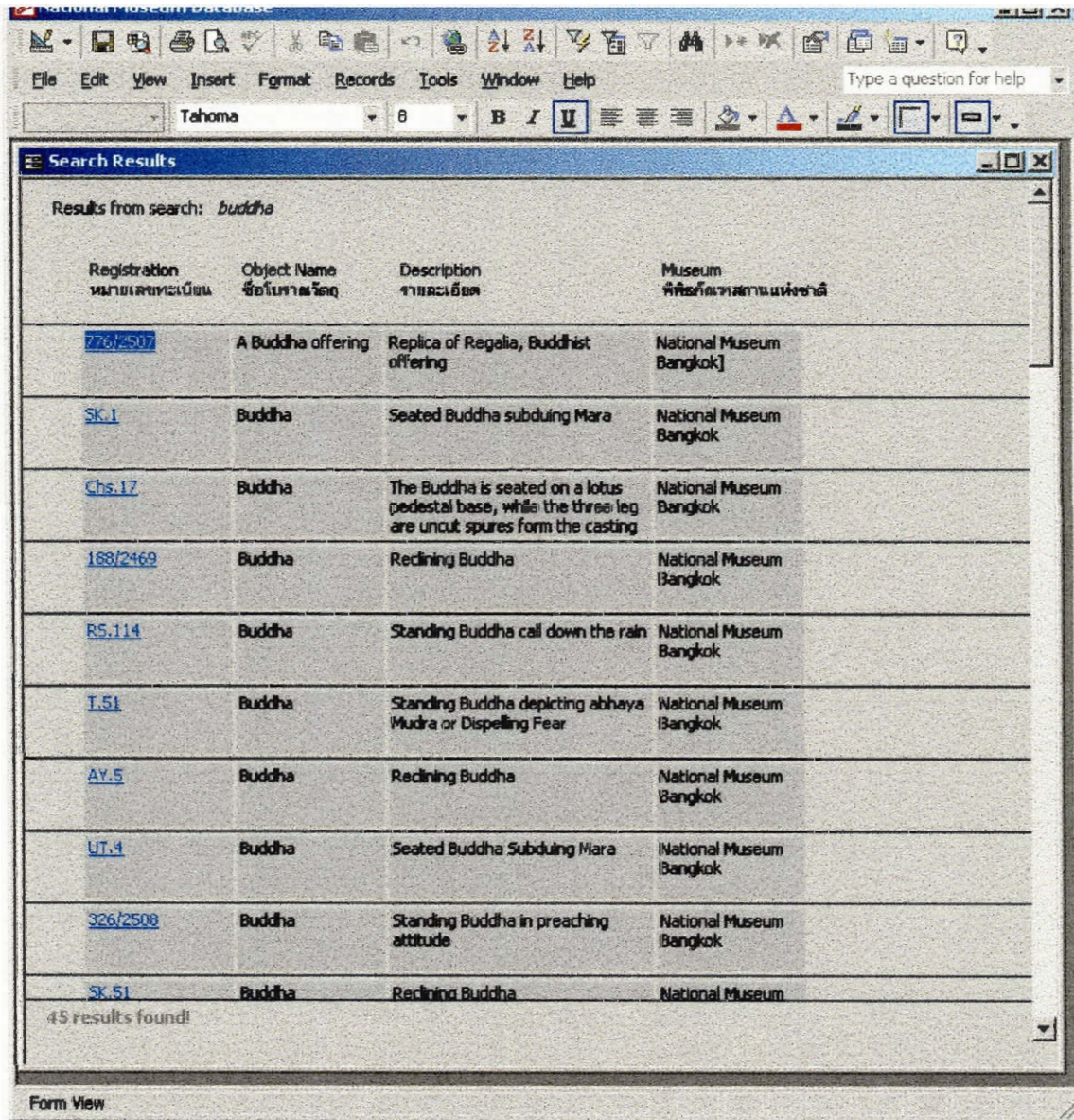


Figure 5.4: Search Results

The user does not, however, see the underlying process that leads to the search results. After clicking “Search”, Visual Basic (VB) code analyzes the information entered in the search form and creates an appropriate Structured Query Language (SQL) query, which describes to Microsoft Access the exact criteria to search for. The search resultsSearch Results window then opens, and it displays the list of records matching the query. Using VB

code to produce the query instead of simply creating pre-determined queries allowed us much more flexibility in incorporating more advanced options in the search.

To assist staff with using the database, we incorporated a number of user-friendly features in an attempt to minimize confusion. When opening the file, users see a Main Menu (Figure 5.5) allowing them to *Browse* records, *Add* records, *Search* records, *Configure* the database, or *Exit* the program.

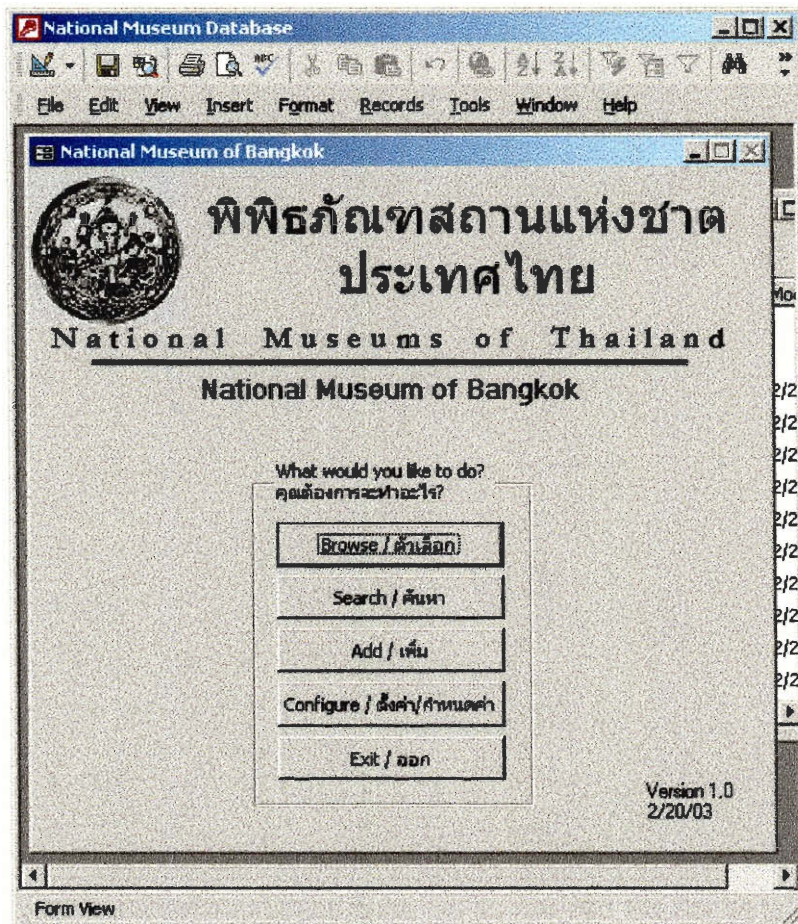


Figure 5.5: Main Menu

Every feature of the database is accessible through this simple interface. *Search*, *Add*, and *Browse* have already been discussed; *Configure* allows staff to set up the database after first installing it—set the museum's name, populate the list of available rooms in the museum, and import records from either the FAD or WPI 2000 database; and *Exit* simply closes Microsoft Access.

## 5.2 Testing the Database against Design Specifications

In order to ensure that our design would indeed meet the needs of the museums, we compared our working design to the system specification we developed from the user requirements. We were not able to meet all specifications because of time constraints but we focused on those that were most critical. We assessed the importance of the specs that our design did not meet and used this information to provide recommendations for future maintenance and expansion. Table 5.1 summarizes the results from the testing of our design against our specifications by listing the specifications and corresponding performance of the database.

**Table 5.1: Testing the performance of the database against the specifications**

Specifications	Performance
<b>Database</b>	
Shall contain all, if not more, information in the paper catalog.	Contains all fields on the museum paper record.
Shall provide a reference to locate the paper catalog.	Referenced by registration number.
Should have information backup procedures.	File can be backed up on Zip drive.
Should allow for separate login accounts.	Multiple accounts possible, but not implemented.
Shall be identical in both National Museum of Bangkok and National Museum of Ayutthaya.	Both museums have the exact same tables and forms in their databases.
Should be capable of importing information from WPI 2000 version and FAD version.	Records in WPI 2000 and FAD databases can be added onto our database automatically by <i>Configure</i> .
Should be capable of exporting record information to the Fine Arts Department.	Records can be copied in Zip drive and import to database in another computer by <i>Configure</i> .
Shall be ready for information sharing once Internet is available in both museums.	Has a form for browsing records in the Internet; however, remote searches are not possible until Internet is implemented in the two museums.
Shall be able to keep records in Thai and English.	Contains fields to store Thai, as well as English, information.
Shall be able to switch between Thai records and English records.	Both Thai and English records re kept on the same form.
<b>Images</b>	
Shall be kept in separate file/directory and linked to records through path.	One or multiple pictures can be associated with a record via file path.
<b>Objects Table</b>	
Shall be searchable by any field contained within the database object form.	Searches can be made on any fields in the object table.
Shall support Boolean searches (AND and OR).	Searchable by multiple keywords or phrases, and supports AND and OR type of searches by the <i>All words</i> or <i>All phrases</i> button.
Shall contain all the fields present in the previous two databases, as listed in the specification sheet.	Contains all specified fields.
<b>Records</b>	
Shall be assigned a unique ID number	Automatically assigned number for each record, in addition to registration number.
<b>Printing Capabilities</b>	
Shall have a museum display format.	<b>NONE</b>
Shall have a registration card format.	Card form is a reproduction of paper catalog.
Shall have an email format.	<b>NONE</b>
Shall have a fax format.	<b>NONE</b>

<b><i>User Interface</i></b>	
Should be well categorized according to the primary functions, such as browsing, searching, and adding.	Contains a switchboard menu, where users can choose to <i>Add, Search, Browse, Configure, or Exit</i> the catalog.
Should be similar in layout to registration form.	Menu driven layout.
<b><i>User Manual</i></b>	
Shall have a copy written in Thai	The completed user manual is translated into Thai by a curator from the Museum of Bangkok who had previous experience with the WPI database and was familiar with our database
Shall have a copy written in English	The completed user manual contains three sections: <i>Overview, Installation Guide, and Usage Guide.</i>
Should have step-by-step procedural instructions, preferably with illustrated pictures.	Each task has at least one picture, if not more, to illustrate the steps.
Shall contain instructions for common tasks, such as adding records and performing searches.	Each primary task ( <i>Adding, Browsing, Searching, Configuring, and Exiting</i> ) has its own chapter in the usage guide.

## **6 Assistance for Users**

In an attempt to help users obtain the necessary skills to use the database, we hosted a training session and also constructed a user manual for our database application. In the training section, we describe the observations from the training session and our analysis of the users' feedback. We will also recount how we used those results to refine our User Manual, which is outlined in detail in the second section. We created our User Manual to not only serve as a reference guide to assist current users with the database, but also to provide instruction for new users in the future. These procedures are intended to ensure that users of our database will be able to utilize the program's full capabilities to assist them in their daily collection managerial tasks.

### **6.1 Training the Users of the Database**

Out of necessity, the user training took two forms: personal and group orientation. We conducted private informal personal training for some of our coworkers at the museum, who would be using the database frequently, and would be able to train others. This consisted of sitting down with each trainee at the computer and guiding them through the use of the database. This training was only done for one or two staff members at the two museums where we personally installed the database: those at Bangkok and Ayutthaya.

Our formal group training consisted of a brief seminar, held at the National Museum of Bangkok on the 21<sup>st</sup> of February, 2003, lasting approximately three hours. Over 60 representatives from many museums attended this orientation; most of the audience consisted of current curators and staff in National Museums throughout Thailand. This information session was conducted in English and translated into Thai by two people: Miss Sirin, a curator from the National Museum of Bangkok, whom we rehearsed with beforehand, and Ms. Varlaya, the computer technician from the Fine Arts Dept. who understood the database fully and was able not only to translate our instructions, but also to explain the intricacies of the database to the Thai audience without having to repeatedly translate all questions back to us.

Most of the questions asked related to system requirements and other issues of compatibility with the museums' current computer systems; it appears to our group that the audience was mostly concerned with this aspect of implementing our program at their respective museums.

Our group was unable to allow each audience member to practice using the database because of the limited number of human resources and computers. Moreover, the manual distributed in the training session was an abridged version of the actual user manual because the manual is meant to accompany the actual program, which was not distributed, and the printing costs for reproducing the manual for all 60 attendees exceeded the resources provided for our group. The abridged version of the actual user manual is written in Thai by Miss Sirin, who based the content on the information in our full user manual.

## 6.2 *User Manual*

Our user manual is designed for readers who are familiar with the platform Windows 98 or above. It was written using general guidelines of good practice in technical writing, in order to be effective and to comply with a recognized standard. The manual covers three basic areas: an overview of the program, a guide to installing and using the database, and common questions users might have. A copy of the user manual is available in Appendix A.

The layout of our user manual follows the rules defined by McMurrey, an author of an online textbook for technical writing<sup>25</sup>. The six main chapters, with descriptive heading names, correspond to the 6 primary tasks the database can perform. Specific information on performing each task is broken down into sub-headings underneath each chapter. Lists are used to enable rapid scanning of the text by breaking up technical concepts into simpler information sets. To specify the content of each list, all lists are introduced with brief descriptive paragraphs. Numbered lists are used for procedural information, and bulleted lists are used for relating information that is best presented as points instead of prose. In a bulleted list, the most important information will be presented prior to the less important ones. Terminology, images and illustrations remain consistent throughout the manual to avoid confusion. For example, instead of using “function” or “features” interchangeably, only one term is used throughout. Images are illustrated with numbered labels to show the procedural step. Where possible, we tried to include warning notices and alerts for dangerous steps. When writing a noticed section that alerts readers to potential problems, instead of writing “do” or “do not”, we will discuss the consequences of performing a dangerous step. The user manual was written in black and uses consistent fonts.<sup>26</sup>

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<sup>25</sup> McMurrey “Textbook for Technical Writing” 18 February 2003  
<[http://www.io.com/~hcexres/tcm1603/achtml/user\\_guides.html](http://www.io.com/~hcexres/tcm1603/achtml/user_guides.html)>

<sup>26</sup> McMurrey “Textbook for Technical Writing” 18 February 2003  
<[http://www.io.com/~hcexres/tcm1603/achtml/user\\_guides.html](http://www.io.com/~hcexres/tcm1603/achtml/user_guides.html)>

Our user manual is comprised the following sections: introduction, installation guide, usage guide. Although most standard user manuals usually include an administrator section that provides information and references on database functionality beyond the user level, we didn't have the required time or resources to complete this section. We intended to include a section of Frequently Asked Questions (FAQ) that provides answers to questions that users asked during the trainings, as well as additional problem solving methods. Unfortunately, most questions were answered by the translator without translating the information to our group. Therefore, we were unable to collect the user's concerns regarding the database. The introduction contains background information about the database, an outline of the manual, and conventions the manual follows. The installation guide has a description of the system requirements for installation, provides required information on the process of installation, and illustrates the installation procedures with pictures displaying each step. The usage guide includes a description of the purpose of the database, a list of the exact tasks the database can perform, and step-by-step procedures for performing each task. The user manual is intended to provide sufficient resources and documentation for employees at other National Museums to install and use the database in the future.



## **7 Final Recommendations**

Although our database structure provides a convenient collection management method for the museum, the extent of properly utilizing our database lays within the control of the museum staff. In this chapter, we provide recommendation, based on our research and experiences, on the best way to maintain the database and prosperous areas for expansion in the future.

### **7.1 Future Expansion**

The first section of this chapter concerns the future expansion of the database. Our project resulted in an application appropriate for managing the collections of individual National Museums in Thailand. While we would have liked to implement a means by which to remotely access the information contained at each museum, we simply did not have the necessary resources. We did, however, have the ability to research appropriate networking options and provide useful recommendations. In this section, we will discuss the technological requirements and costs of making the database records of one museum remotely accessible to staff of the other National Museums.

In order to most effectively link their databases together, the National Museums should first acquire Internet connections. While a temporary connection such as dial-up could theoretically accomplish the task to some degree, it would present complications. For example, in order to access a museum's database, the museum would need to be currently connected to the Internet. As a result, a permanent connection would best suit the museums' needs. According to a representative from the Fine Arts Department, the process of providing the museums with this technology has already begun, but unfortunately we did not witness its completion during our stay in Thailand. Once connected to the Internet, however, the museums have two options for remote accessibility: a Virtual Private Network (VPN), which would be simplest; or web servers, which require more time and expertise but offer more flexibility.

The first of these options involves setting up a network among the computers of the National Museums. For computers at a single museum, a Local Area Network (LAN) would suffice, requiring only a router and enough network cable to connect each computer to the hub. For computers at remote locations, however, we recommend that the museums set up a Virtual Private Network (VPN). This is a feature included in Microsoft Windows 2000, in

addition to other inexpensive software on the market. Essentially, the VPN simulates the situation in which the databases reside on a LAN together, when in fact they are merely simultaneously connected to the Internet. Consequently, files located on the hard drives of one computer, including the database files, can be directly accessed by other. Because an Access database can only be modified by one user at a given time, remote users in general log in with a password that limits their ability to edit information. However, if a user legitimately wishes to edit the collection from a remote location, the database will allow it. In this way, the collections of every museum could be made widely available with little extra money or work.

A second option involves turning each museum's computer into a web site using web server software such as Apache, which is available for free. Each database would then not only be available to museum computers, but to the entire world via the Internet to people using web browsers such as Microsoft Internet Explorer or Netscape. One way to accomplish this would be to create HTML files (standard web pages) called Data Access Pages (DAPs), which display database information somewhat like an Access form. Although DAPs are relatively simple to create, they are limited in function as they can not easily display the images of artifacts, they can not interact with some of the more complex features such as searching, and they require a recent version of Microsoft Internet Explorer to work properly. The second approach would require programming using web scripting languages that can interact with Access databases. An example of one such scripting language is Perl, which costs nothing and is very popular among web pages. Users could view images, perform searches, and use any common Internet browser; in fact, the possibilities are only limited by the programmer.

After considering the possible options, we concluded that the most appropriate way for the National Museums to begin sharing information between museums is to set up a VPN between National Museum computers, because it is less costly and complicated than creating web sites while still allowing information to be shared or edited in remote locations. While this is the best option for making information available to the staff of all the museums, if the Museums would like to make information available over the Internet to the general public worldwide, creating a website where guests can view some database information is the best option. For these reasons, we recommend that the National Museums first utilize a VPN for the use of museum staff, and then consider making their data available on the World Wide Web as a separate project in a later stage of development.

## 7.2 *Maintaining the Database*

In this section, we discuss few appropriate ways for the Museums to maintain their database in order to avoid future problems and minimize the effects of computer malfunction. Our recommendations are outlined in bold, followed by a brief explanation of each.

### **All museums should enter the same type of information for each field**

Maintaining the database as an effective standard throughout Thailand relies heavily on the consistency of information between databases. Separate records, both within a museum and among separate museums, should contain the same information in their respective fields. For example, if the *size* field contains the dimensions of an object in centimeters at one museum, it should not contain them in meters at another. Those accustomed to one set of conventions might be confused or misled by a record that follows another. This database, however, should provide users with a clear, straightforward reference.

### **Each object should have a unique registration number**

The numbering system currently in use at the National Museums, while adequate for their current operations, could also pose problems in the future. Today, all museums use the same method for assigning registration numbers to objects: the first object is numbered as 1, the second object is numbered as 2, the 100<sup>th</sup> object is numbered as 100, and etc. When the databases of the National Museums are finally linked together, objects in different museums may have the same registration number. The registration number should be a unique identifier of the object. If two objects share the same registration number, the registration number alone would not suffice to refer to a record, and its original intention would have failed. In the process of standardizing collection management, the museums should consider standardizing the identification methods they use. A possible solution is to precede the registration numbers with a short prefix to signify the museum of origin. In short, we recommend that the museums coordinate their efforts to ensure that each artifact has its own unique identification number.

### **Museum staff should periodically back up the database**

Although computers are generally reliable machines, most users know that they can be unpredictable at times. If the database file becomes suddenly corrupted, or if a user accidentally deletes information, there is often no simple way to revive the information. To

avoid losing records due to computer or human error, museum staff should periodically back up the database, preferably once a week. The database file itself could be copied to a Zip disk, and even copied to a separate computer, and images could be copied to a recordable CD. Or, when the museums acquire Internet connections, they could exchange databases and store backups remotely. Using such a system, a malfunction may destroy recent changes to a database, but the museums can easily revert to a backed up copy with minimal damage.

**Each image should not exceed the size of 100 KB**

In order to allow the data to fit on a back up storage device, and even on the hard drive of the computer, users should attempt to minimize the size of the database. Luckily, text consumes little space, so the database file itself is not of concern. Images, however, have the potential to fill a hard disk much more rapidly. For example, in the WPI 2000 database previously in place at the National Museum of Bangkok, the catalog had grown to over 70 MB (megabytes) when only containing 1% of the eventual records. At this rate, once completed the database would have been 7000 MB, or 7 GB (gigabytes), in size, while the hard drive of the computer was limited to 6 GB. Although newer hard disks could handle this amount, backing up such amounts of data would be a difficult task. Consequently, we recommend that museum staff use JPEG images ranging from 50 KB (kilobytes) to 100 KB each, which would retain a significant degree of detail without consuming too much space. 10000 of such images would require only 500 MB to 1 GB, which modern hard disks and recordable CDs could easily handle.

**Create security accounts as necessary**

When the museums begin to allow more than just officials to access the database, we recommend that they configure separate security accounts to restrict the information available to certain groups of people. To accomplish this, the database administrator should select **User Level Security Wizard** from the **Security** menu, which falls under the **Tools** menu at the top of the Microsoft Access window. This utility will guide the user through the process of creating separate users and configuring the permissions for each. For example, a guest user could be given the ability only to view basic object information; a staff user could be further allowed to view and edit sensitive information like the monetary value of artifacts; and an administrator could have full control to modify the database structure, as well as the security accounts themselves. We suggest, however, that the museums wait until they know who the users will be and what information they should access before implementing this

feature. The museums should also keep in mind that if the passwords are forgotten, the database will become useless. Consequently, they should record the passwords and keep them in a safe place. Also, we recommend that museum staff periodically back up the information in the database to a copy of the database that is not password protected. This copy could be kept in a safe location, minimizing the danger of losing vast amounts of information because of a forgotten password.

#### **Use our database as the foundation for future work**

As our final recommendation, we would like to encourage future technicians working for the National Museums to modify and improve upon our database as is deemed appropriate or necessary (with the proper authority of course). Although our design should function well for most use, time may reveal shortcomings. Additionally, the need for improved features, such as extra printable forms, might become evident. In these cases the National Museums should not hesitate to employ an engineer to perform modifications to the forms and Visual Basic code included in the database. We do not, however, recommend altering the structure of the tables, as this would require converting the data contained within from one version to another, possibly leading to unforeseen complications. Upon revising the database, the version number and date located on the main menu should be updated, and the new database file should be distributed to each National Museum. If this recommendation is followed, the Museums should never have to create another database; any desired changes or improvements can be made to the database we have created. In this way, the National Museum Database provides a permanent, definitive starting point for entering and maintaining computerized records for the National Museums of Thailand.

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## ***Appendix A – User Manual***

# National Museum Database

Version 1.0

## User Manual

Written by: Jackie Chan, Alex Kinney, and Mark Williams

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# **1 Overview**

This manual provides a reference for users of DATABASE-03, (Version 1.0 of the National Museum Database) a Microsoft Access application created by Jackie Chan, Alex Kinney and Mark Williams. We created this database as part of an academic project in conjunction with our university, Worcester Polytechnic Institute (WPI), in Worcester, Massachusetts, USA. The Director of the National Museum of Bangkok, Somchai Na Nakhonphanom, sponsored the project, and two WPI faculty advisors, Professors Chrys Demetry and Richard Vaz, assisted the effort as well. More information on projects can be found on the website for the Interdisciplinary Global Studies Division at WPI, at "<http://www.wpi.edu/Academics/Depts/IGSD/Interactions/>".

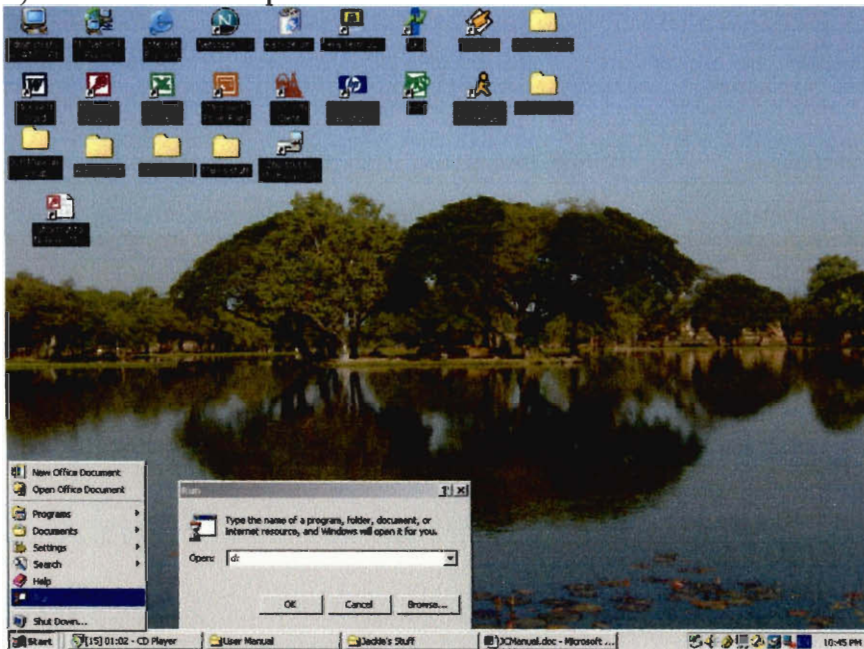
The goal of this database is to provide an expedient collection management method that simplifies the daily tasks of employees of the National Museums. DATABASE-03 is of the successor to two previous database designs from the year 2000: an English language application constructed by another group of WPI students and a Thai language application designed by Ms. Varlaya of the Fine Arts Department of Thailand. DATABASE-03 was constructed using the software application Microsoft Access 2002, although it does have the ability to be used in the previous version, Access 2000. This database was designed to preserve any previously entered information while providing a simple user interface with a powerful searching tool. Records can be kept in English as well as in Thai, in order to accommodate international scholars and researchers.

This manual contains two sections: the installation guide, and the usage manual. The installation guide shows step-by-step procedures for installing the database to a new computer. The usage manual provides instructions and illustrations to assist users with the database functions. Read on to familiarize yourself with the conveniences DATABASE-03 provides.

## 2 Installation Guide

To install the program, your computer must have the program Microsoft Access 2000 installed on your computer. This program may be included in the Office 2000 software package. Your computer must also have the operating system Windows 98 or a later version.

1) Turn on the computer.



2) Click **Start**, located at the bottom left corner.

3) Select **Run ...**

4) In the pop up box, type in d:\(or the drive containing the database file)

5) Right click on Museum.mdb

6) Select **Send to**

7) Select the desired location for your database

- The database is now installed into your computer.

8) To configure and customize the database for your museum, and also to move the records from the FAD database to the new database, please refer to Section 3.5

### 3 Usage Guide

The following section provides a step by step procedural guide for performing various tasks with the database. There are 5 main tasks: *Search* for records, *Add Records*, *Browse* all the records, *Configure* the database, or *Exit* the program. A section named “Open the program” is also available for novice users who are not familiar with Microsoft Access. Each section has its own introductory paragraph that gives a brief overview of the function of each main task. For the user’s convenience, each step is illustrated with a picture of the actual view which appears on the screen.

Database functions:

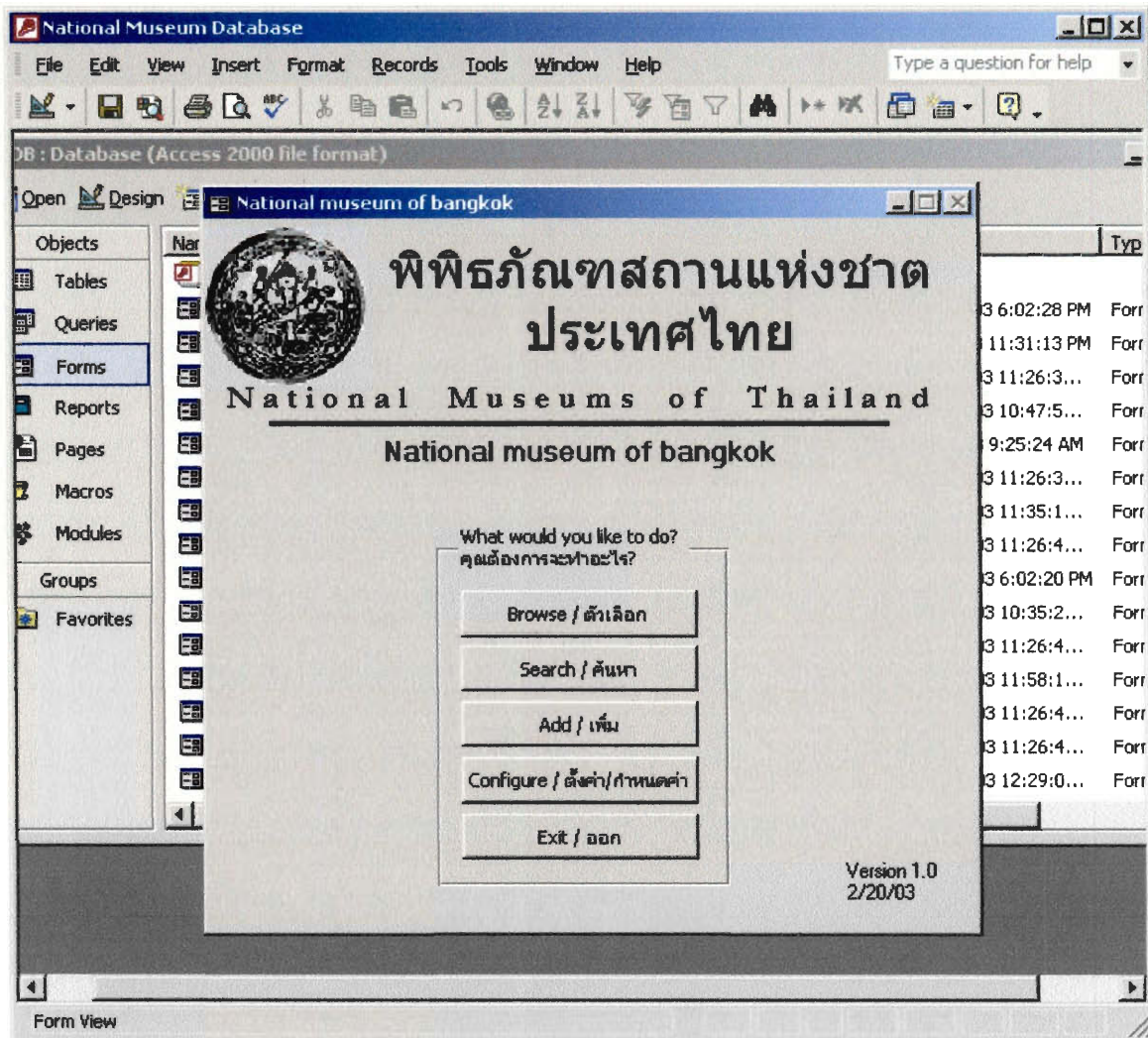
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### 3.1 Opening the Database

After the database is opened, a main menu will appear. The main menu provides a path to the 5 main functions (*Search, Add, Browse, Configure* or *Exit*) of the database. The main menu window will always be available as long as the database is running. In other words, it is always possible to select a task even if you are in the middle of another task.

- 1) Turn on the computer.
- 2) Open the file Museum.mdb
- 3) The Main Menu (Figure 1) will appear on screen.

Figure 1 Main Menu



- 4) Choose the task you would like to perform and click the corresponding button on the Main Menu.

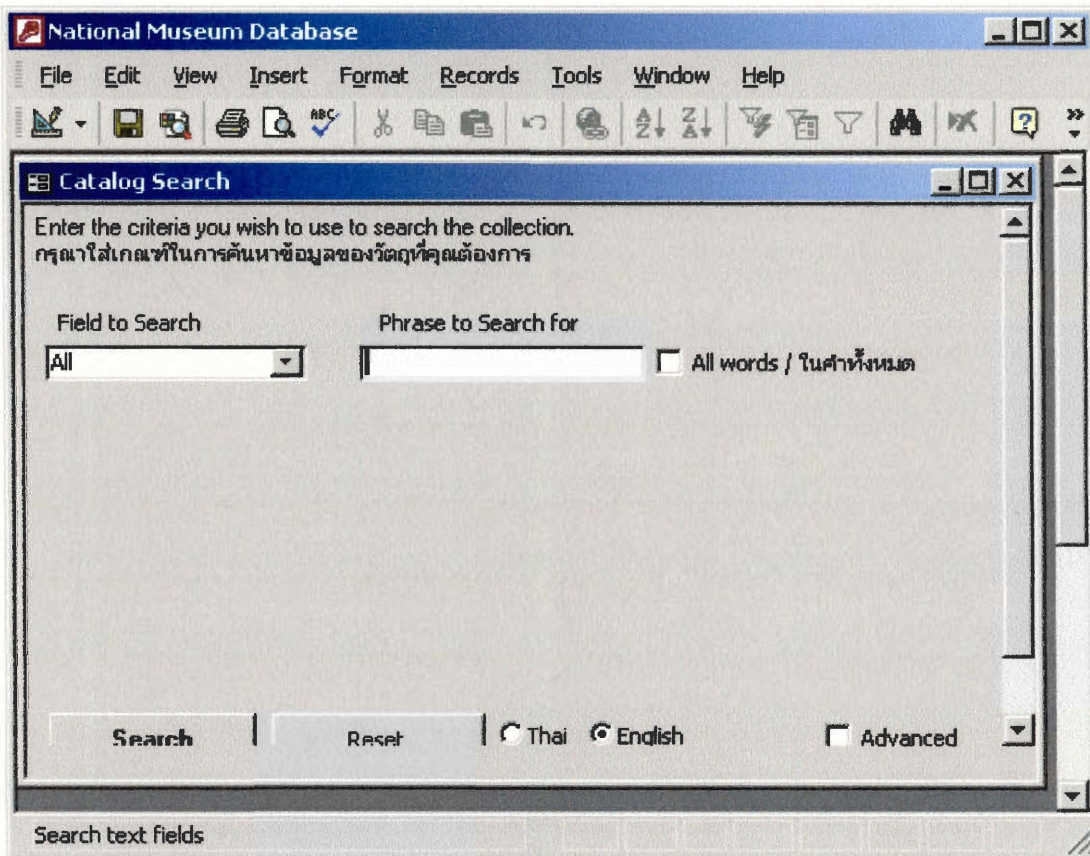
### 3.2 Searching for Object Records

The *Search* feature allows users to find existing information in the database. It can find records in 3 different information fields, and limit searches by the condition, the period, or the room.

Click **Search** in the Main Menu.

- **Catalog Search** (Figure 2) window will appear on screen.

Figure 2 Catalog Search



### 3.2.1 Setting the Search Criteria

- 1) To search for phrase in any order or words:
  - Select the specific field.
  - Enter the words separated by spaces.
    - (Eg. If you enter *Buddha smiling image*, it will return information that contains *Buddha* or *smiling* or *image* (the search is not case sensitive).
- 2) To search for a whole phrase with an exact order of words:
  - Select the specific field.
  - Enter the words with quotation marks around the phrase.
    - (Eg. If search for *Buddha Smiling Image*, it will only return records that contain the full phrase *Buddha Smiling Image*.)
- 3) To search for record that contains all words in the phrase:
  - Select  All words

For more searching options, click  Advanced

Figure 3 Catalog Advanced Search

National Museum Database

File Edit View Insert Format Records Tools Window Help Type a question for help

Catalog Search

Enter the criteria you wish to use to search the collection.  
กรุณาใส่เกณฑ์ในการค้นหาข้อมูลของวัตถุที่คุณต้องการ

Field to Search	Phrase to Search for	
All		<input type="checkbox"/> All words / ในคำทั้งหมด
All		<input type="checkbox"/> All words / ในคำทั้งหมด
All		<input type="checkbox"/> All words / ในคำทั้งหมด

All phrases / ในวลีทั้งหมด

More Options ทางเลือกอื่น

Condition / สภาพ		<input type="checkbox"/> Limit by condition / จำกัดสภาพ
Room / ห้อง		<input type="checkbox"/> Limit by room / จำกัดห้อง
Century / อยุสมัย		<input type="checkbox"/> Limit by date / จำกัดอายุสมัย

Search ค้นหา    Reset กำหนดการค้นหาใหม่     Thai ไทย     English ภาษาอังกฤษ     Advanced ค้นหาขั้นสูง

Form View

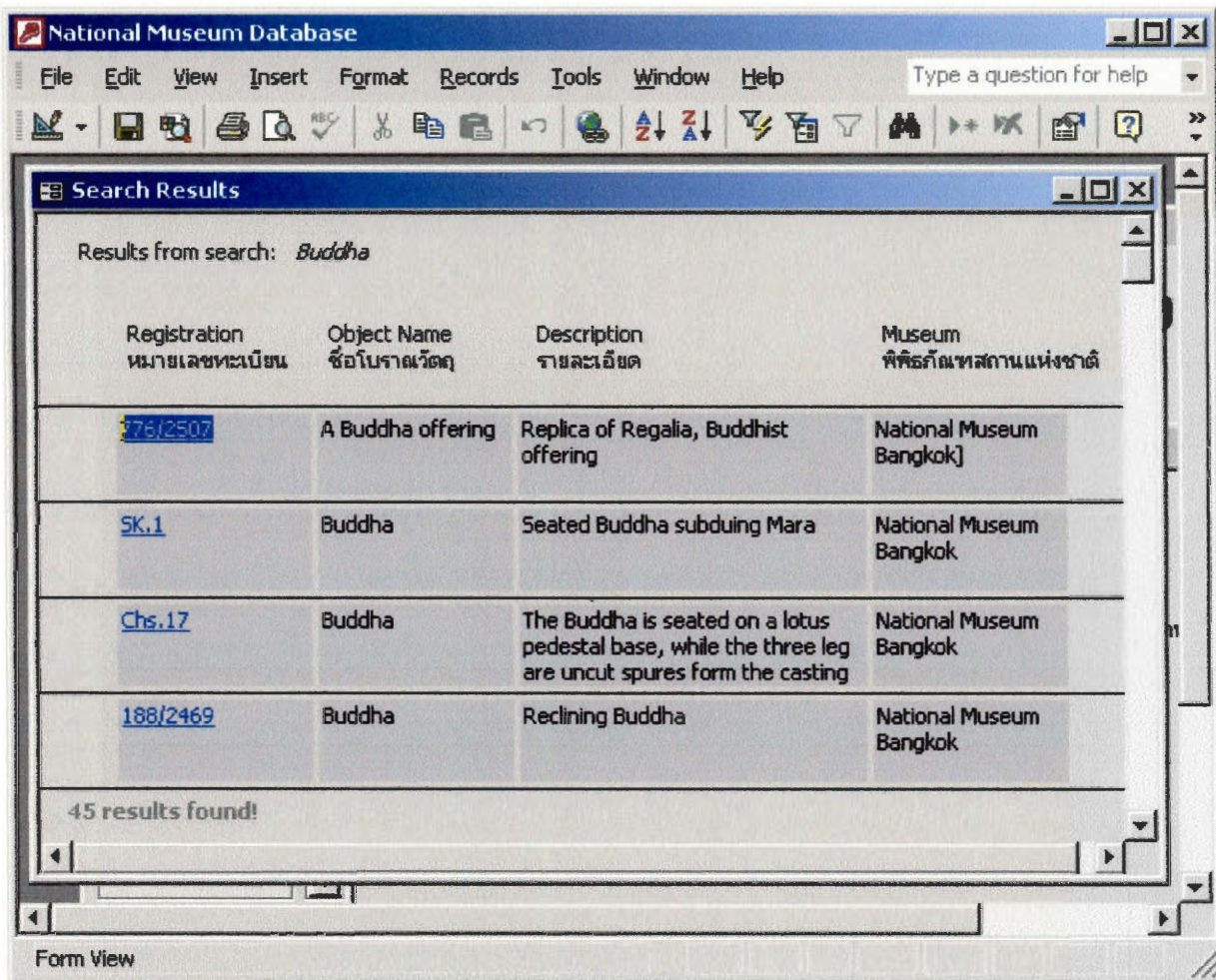
- 4) To search for record that contains all phrases:
  - Select  All phrases

- 5) To limit search result by condition:
  - Select an option beside **Condition**  
Note: **Limit by condition** will automatically be selected; un-checking the box will not limit the search according to condition.
- 6) To limit search result by room:
  - Select an option beside **Room:**
    - Note: **Limit by Room** will automatically be selected; un-checking the box will not limit the search according to room.
- 7) To limit search result by period:
  - Insert the starting year on the first box beside **Century**
  - Insert the ending year on the second box beside **Century**
  - Select either **AD** or **BC** in the third box
    - Note: **Limit by date** will automatically be selected; un-checking the box will not limit the search according to date.
- 8) After the search criteria are specified, click
- 9) To submit new searches:
  - Select 
    - Note: By submitting reset, previously entered criteria will be erased.

### 3.2.2 Selecting a Record in Search Results

After a search is made, the database will return a list of Search Results. The total number of records that meet the search criteria will appear in the bottom left corner of the **Search Results** box. The result contains the name of the object, the room name, a brief description of the object and the location of the museum.

Figure 4 Search Results



- 1) To inquire more information about a specific object in **Search Results** (Figure 4):
  - Click the blue registration number under the column **หมายเลขทะเบียน/ Registration**
  - After a record is selected, object information can be *edited*, *deleted*, or *printed*. For more information, refer to Section 3.4



### 3.3 Adding Record Information to the Database

The *Add* feature creates a new record. Artifact information not previously entered into the database should be added to the database using *Add*. Both English and Thai records can be added to the database. For descriptions of the object fields, please refer to Section 3.3.1

- 1) To start the program, refer to Section 3.1
- 2) Click **Add Record** in the Main Menu, and an empty **Object Records** (Figure 5) form will appear on screen :

Figure 5 Blank Object Records Form

The screenshot shows a software window titled "National Museum Database - [Object Records]". It features a menu bar with "File", "Edit", "View", "Insert", "Format", "Records", "Tools", "Window", and "Help". Below the menu is a toolbar with various icons. The main area contains a form with two tabs: "English" (selected) and "ไทย". The form is divided into two columns of input fields. The left column includes: "Museum Name:", "Name:", "Provenance:", "Style:", "Description:", "Condition:" (with a dropdown arrow), "Condition Comments:", "Material:", "History and Acquisition:", "Room:" (with a dropdown arrow), "Case Number:", "Updated By:", and "Date Modified:". The right column includes: "Registration:", "Date:" (with a dropdown showing "0 - 0 Century"), "Date:", "Comments:", and "Size (cm)". At the bottom of the form, there are buttons for "View Object References", "View Object Insurance", "Delete", "Print", and "Refresh Image". Below the form, a record navigation bar shows "Record: 28 of 28" and a "Name of Object" field.

- 3) To enter English information, select the tab **English**
- 4) To enter Thai information, select the tab **ไทย**

To see a list of the field names, and the corresponding information that should be entered in each field, please refer to Section 3.3.1

- 5) To insert image to the record:
  - Refer to Inserting or editing image Section 3.3.2
- 6) To enter object insurance:
  - Refer to Object Insurance Form Section 3.3.3
- 7) To enter object reference:
  - Refer to Object Reference Form Section 3.3.4

### 3.3.1 Information in the Object Record

Figure 6 Object Records

The screenshot shows a web-based form for entering object records. The form is titled "National Museum Database - [Object Records]". It has a menu bar (File, Edit, View, Insert, Format, Records, Tools, Window, Help) and a toolbar with various icons. The form is divided into several sections:

- Museum Name:** National Museum of Bangkok
- Name:** Buddha in meditation
- Provenance:** Prachinburi
- Style:** Dvaravati
- Description:** Buddha in meditation
- Condition:** Poor
- Condition Comment:**
- Material:** Limestone
- History:** Found at Khok Pip, Dong Si Maha, Phot, Prachin Buri
- Room:** Gallery of Thai History
- Case Number:**
- Updated By:**
- Date Modified:**
- Registration:** M 63
- Date:** 7 - 9 Century BC
- Date Comments:**
- Size (cm):** 103 x 62 x 0 x 0

A photograph of a Buddha statue is displayed in the center of the form. The status bar at the bottom indicates "Record: 1 of 101" and "Description of Object".

Following is a list of field names and the corresponding information that should be entered into each field:

**Museum Name:** The National Museum where the object is housed.

**Registration:** The registration number of the object.

**Name:** The name of the object.

**Provenance:** Where the object came from.

**Style:** The art style of the object.

**Description:** A short description of the object.

**Condition:** Choose what condition the object is in: Perfect, Good, Fair, or Poor.

**Condition Comment:** Any information about the condition of the object.

**Material:** The material the object is made of.

**History:** The history of the object, and how it was acquired by the museum.

**Room:** Choose the room in the museum where the artifact is located. If the room you want to choose is not there, please refer to Section 3.5.2

**Case Number:** The case number of the Archeology Department.

**Updated by:** The name of the person who changed or added this record.

**Date modified:** The date the record information was changed.

**Date century:** The century (or range of centuries) the object was made.

**Date Comments:** Any additional information about when the object was made, (such as the name of the period.)

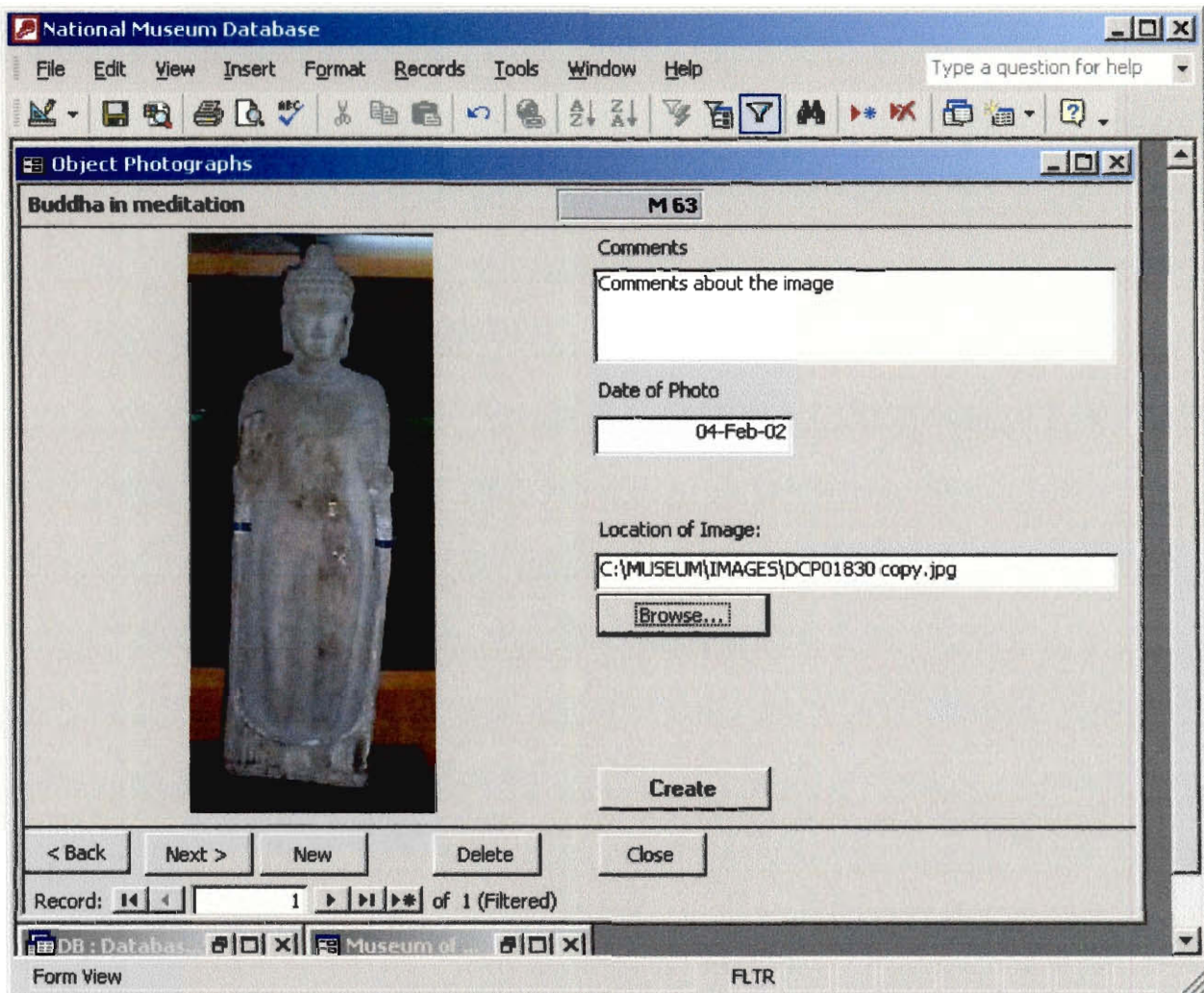
**Size:** The dimensions of the object, in cm.

### 3.3.2 Inserting or Editing Pictures of Objects

To add and manage digital images of artifacts in the database, follow the instructions below.

- 1) To insert a picture of the artifact:
  - a. Browse or Search the database to find the appropriate object.
  - b. Click “...” in the bottom right of the **Object** form
  - c. In the **Object Photographs** (Figure 7) form, click the **Browse...** button to select a digital image
  - d. Select the image file in the pop up box
  - e. After entering the information for the image, click **Create**
  - f. Click **New** to add additional images
- 2) To browse through all images of an artifact, click **Next** and **Previous**
- 3) To edit existing image records, simply edit the fields, or browse for a new image (it is not necessary to click **Create** again)
- 4) To delete an image record, click **Delete**

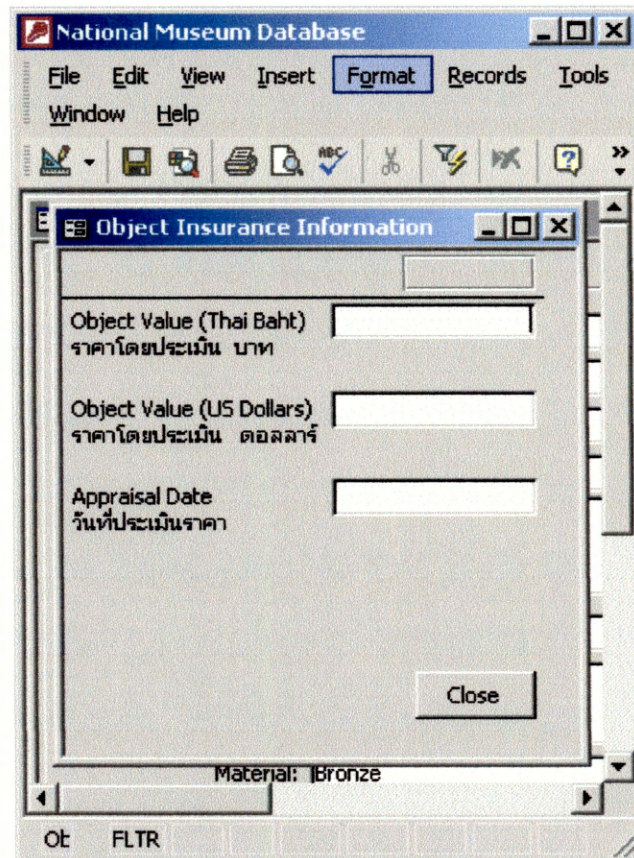
Figure 7 Object Photographs



### 3.3.3 Object Insurance Form

- 1) Click  button
  - The **Object Insurance Information** (Figure 8) window will appear.

Figure 8 Object Insurance Information



The screenshot shows a window titled "National Museum Database" with a menu bar (File, Edit, View, Insert, Format, Records, Tools, Window, Help) and a toolbar. A smaller window titled "Object Insurance Information" is open, containing three input fields: "Object Value (Thai Baht) ราคาโดยประเมิน บาท", "Object Value (US Dollars) ราคาโดยประเมิน ดอลลาร์", and "Appraisal Date วันที่ประเมินราคา". A "Close" button is located at the bottom right of this form. Below the form, the text "Material: Bronze" is visible. At the bottom of the main window, "OT FLTR" is displayed.

- Next to **Object Value (Thai Baht)**, enter the value of the object (in Baht)
  - Next to **Object Value (US dollars)**, enter the value of the object (in US dollars)
  - Next to **Appraisal Date**, enter the date that the object's value was determined
- 2) After information is entered:
    - Select  on the bottom right hand corner.

### 3.3.4 Object Reference Form

The **Object References** (Figure 9) form stores reference information. Any information of references, such as books, magazines, or articles, relating to the object should be stored in the **Object References** form for recording purposes.

Figure 9 Object References

The screenshot shows a software window titled "National Museum Database" with a menu bar (File, Edit, View, Insert, Format, Records, Tools, Window, Help) and a toolbar. A sub-window titled "Object References" is open, containing the following fields and controls:

- Author Name: Last: Carrera, First: Fabio
- Title: Artifacts of Thailand
- Journal: Museum Management Quarterly
- Publisher: Bella, Inc., City: Venice, Italy
- Date: 23 Feb. 2003, Pages: 2-5
- Available in Museum Library
- Comments: This is an example reference.
- Navigation buttons: < Back, Next >, New, Delete, Close

The status bar at the bottom of the window displays "City where published" and "FLTR".

1) Enter reference information:

**Author Name:** The author of the article in which the object is mentioned. The first box is for the first name, and the second box is for the family name.

**Title, Journal, Publisher, Date, City, Pages:** Information about the article and the journal which mention the object. If a copy of the article is in the museum library, check the box


Available in Museum Library

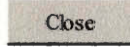
**Comments:** Additional information about the reference.

2) To view a previous reference to the object, Click 

3) To view a subsequent reference to the object, Click 

4) To delete the current reference, Click 

5) To add another reference for the same object, Click 

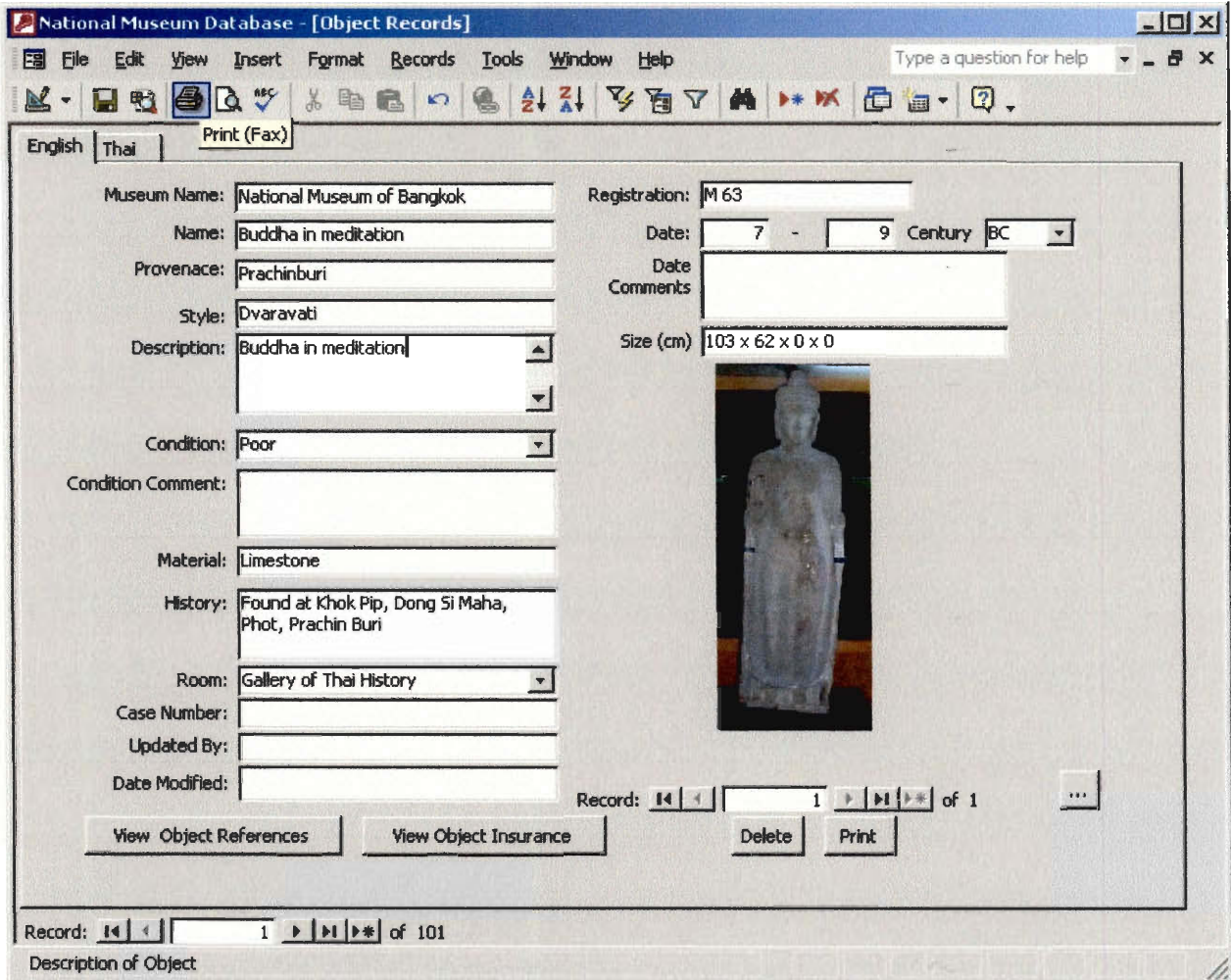
6) After all references are entered, Click 

### 3.4 Browse the Museum Records

The *Browse* feature allows users to look through records in the database. From here, record information can be viewed, edited or deleted.

- 1) Click  in the **Main Menu** (Figure 1)
  - The first **Object Record** (Figure 10) will appear on screen.

Figure 10 Object Record



The screenshot shows a software window titled "National Museum Database - [Object Records]". The window has a menu bar with "File", "Edit", "View", "Insert", "Format", "Records", "Tools", "Window", and "Help". Below the menu bar is a toolbar with various icons. The main area contains a form with the following fields:

- Museum Name: National Museum of Bangkok
- Name: Buddha in meditation
- Provenance: Prachinburi
- Style: Dvaravati
- Description: Buddha in meditation
- Condition: Poor
- Material: Limestone
- History: Found at Khok Pip, Dong Si Maha, Phot, Prachin Buri
- Room: Gallery of Thai History
- Registration: M 63
- Date: 7 - 9 Century BC
- Size (cm): 103 x 62 x 0 x 0

There is a photograph of a Buddha statue. At the bottom of the form, there are buttons for "View Object References", "View Object Insurance", "Delete", and "Print". A record navigation bar shows "Record: 1 of 1".






- 2) To browse all records, in the **Object Record** (Figure 10): section at the bottom of the form:
  - Click  for previous record.
  - Click  for next record.
  - Click  for first record.
  - Click  for last record.
- 3) To view other images:
  - Click 

Figure 11 Object Record

English Thai Print (Fax)

Museum Name: National Museum of Bangkok Registration: M 63

Name: Buddha in meditation Date: 7 - 9 Century BC

Provenance: Prachinburi Date Comments:

Style: Dvaravati

Description: Buddha in meditation Size (cm) 103 x 62 x 0 x 0

Condition: Poor

Condition Comment:

Material: Limestone

History: Found at Khok Pip, Dong Si Maha, Phot, Prachin Buri

Room: Gallery of Thai History

Case Number:

Updated By:

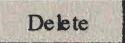



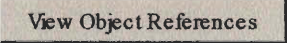
Date Modified:

Record: 1 of 1

View Object References View Object Insurance Delete Print

Record: 1 of 101

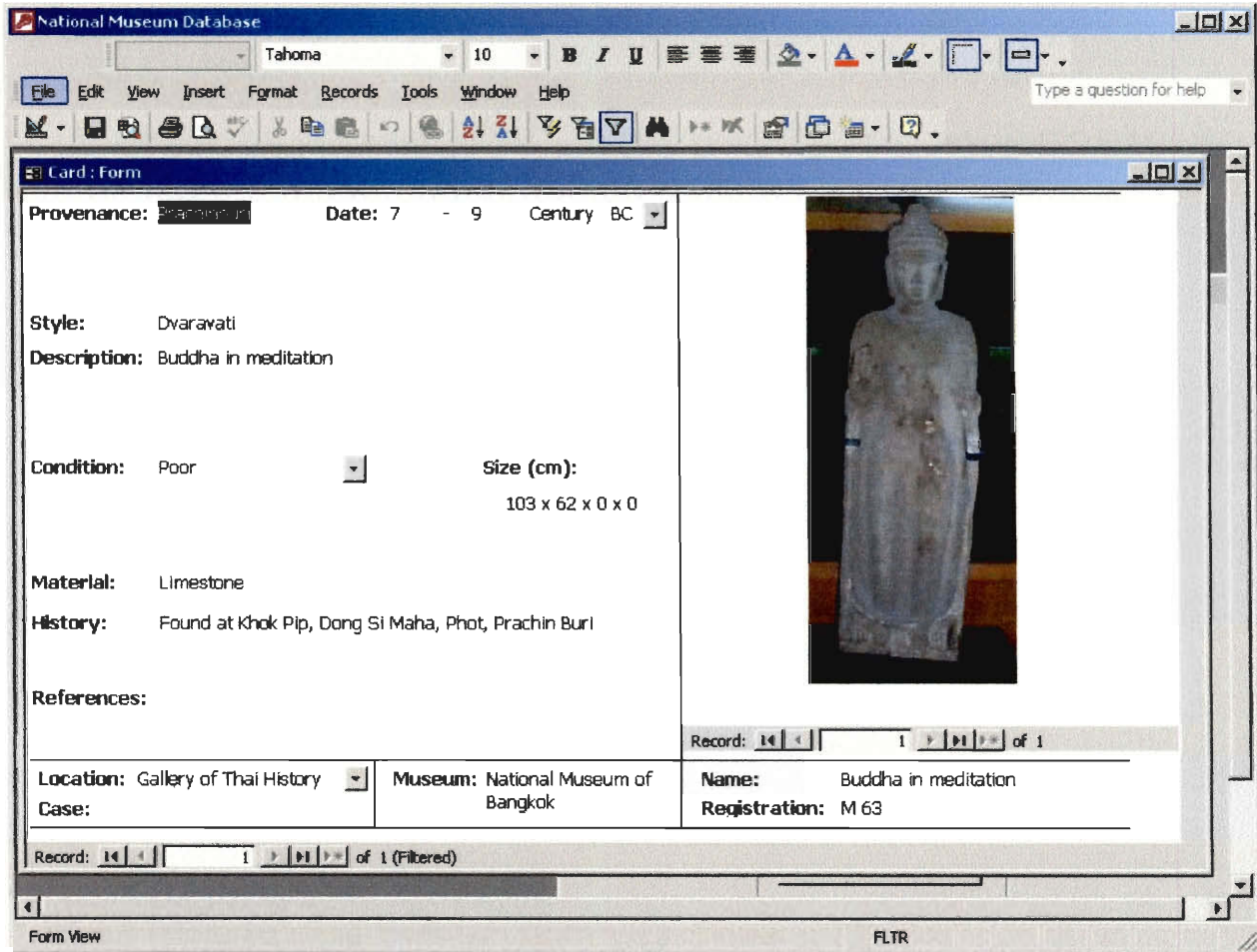
Description of Object

- 4) To edit record information:
  - Click on the field you would like to change and type in the new information.  
**These changes are saved automatically.**
- 5) To delete the current record, click   
**Caution: This permanently deletes the information, and it cannot be recovered!!**
- 6) To add record, click  at the bottom of the form.
- 7) To see a paper version of the record, click 
  - Refer to Print Record on Section 3.4.1
- 8) To see references to the object in journals and periodicals, click 
- 9) To see the value of an object, click 

### 3.4.1 To Print a Selected Record

After clicking **Print** in the form view, you will see a form that looks like a registration card of the National Museums. To print out the record in this form, click **File** in the upper left of the Microsoft Access window and select **Print**...

Figure 12 Print Display Form



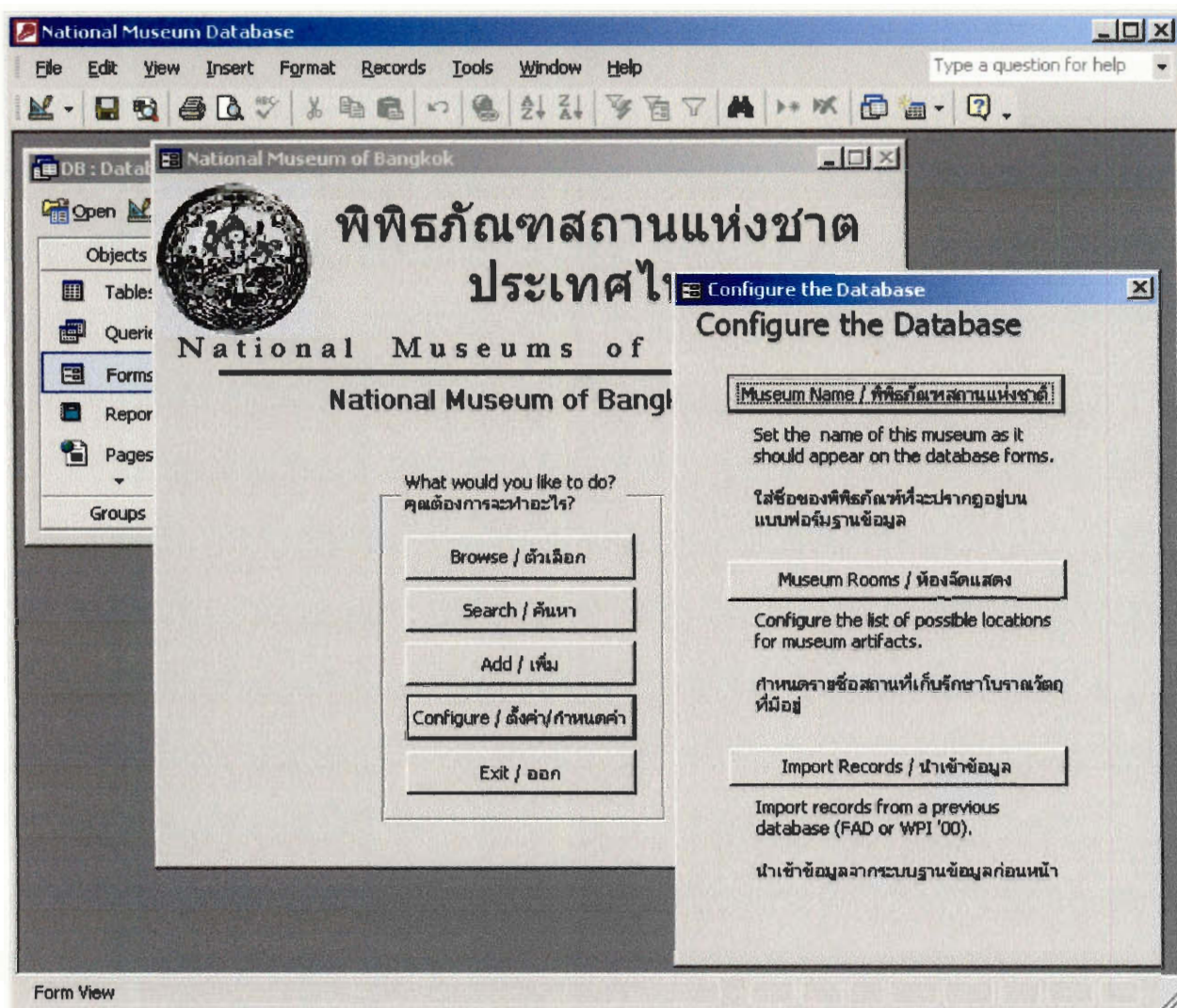


### 3.5 Configure the Database for Your Museum

The feature *Configure* allows you to make some changes to the database. The museum name can be changed, new gallery names can be added and records from another database can be imported to the current database. The following section shows the procedure for each option.

- 1 Click **Configure** in the Main Menu
  - The **Configure Menu** (Figure 13) will appear.

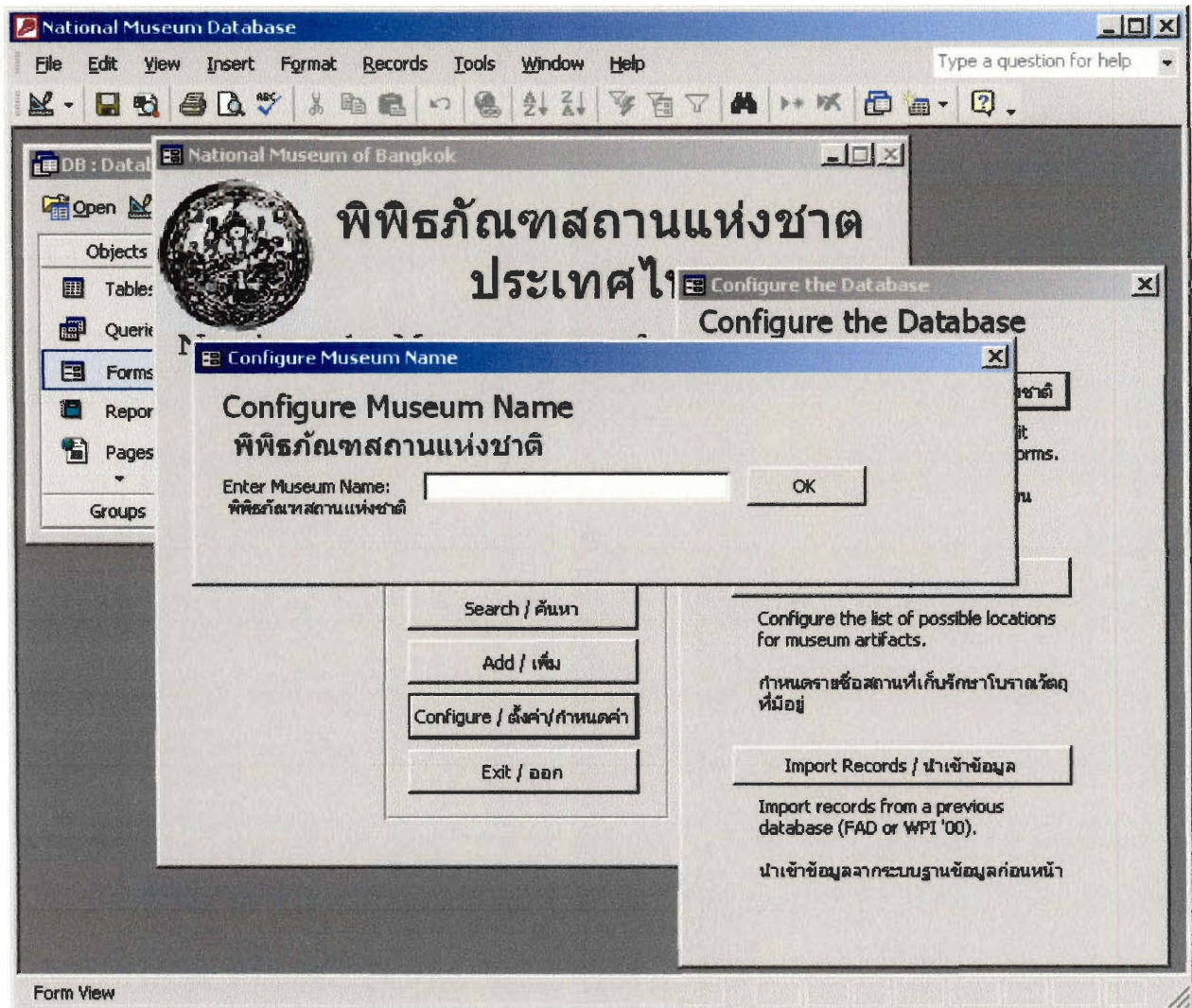
Figure 13 Configure Menu



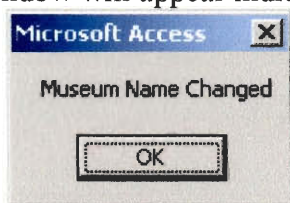
### 3.5.1 Add or Change the Museum Name

- 1) In the **Configure Menu** (Figure 13), click **Museum Name**
  - A **Configure Museum Name** (Figure 14) menu will appear.

Figure 14 Configure Museum Name



- 2) Enter the name of your museum in the box besides Enter Museum Name:
  - 3) Click **OK**
- 1.1 A window will appear indicating that the museum name has been changed:

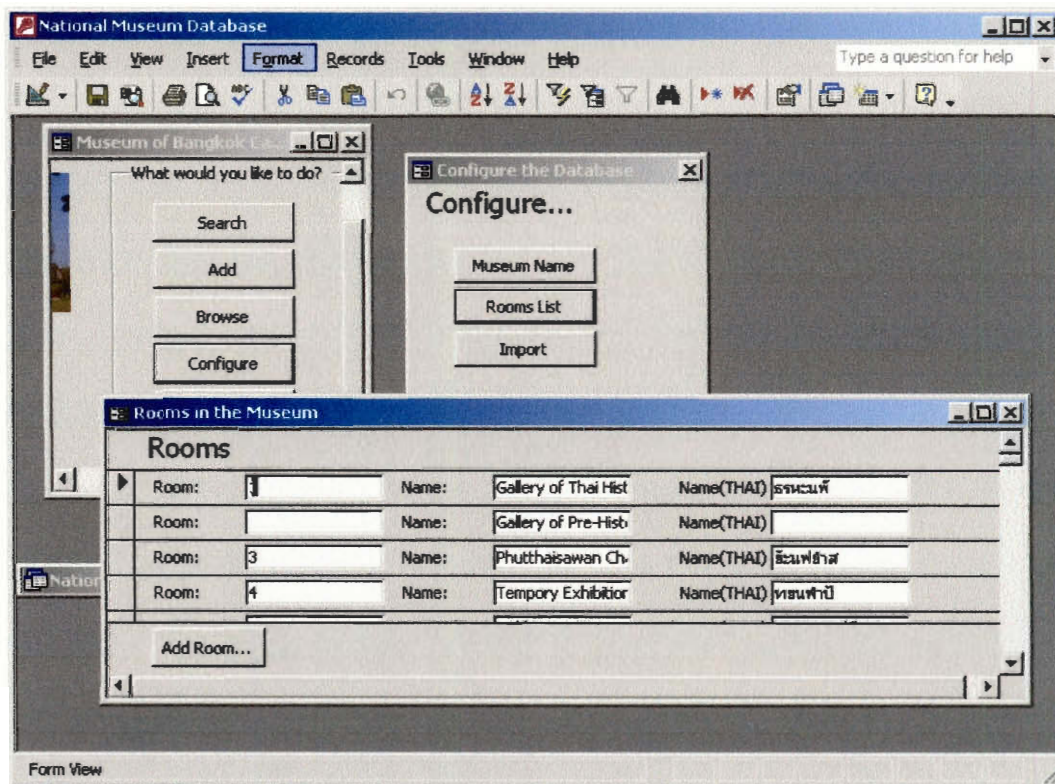


- 4) Click **OK**

### 3.5.2 Add or Change the Rooms in the Museum

- In the **Configure Menu** (Figure 13), click **Rooms List**
- A **Rooms Menu** (Figure 15) will appear with the list of current gallery names.

Figure 15 Room Menu



**Room:** The number of the room.

**Name:** The name of the room, in English

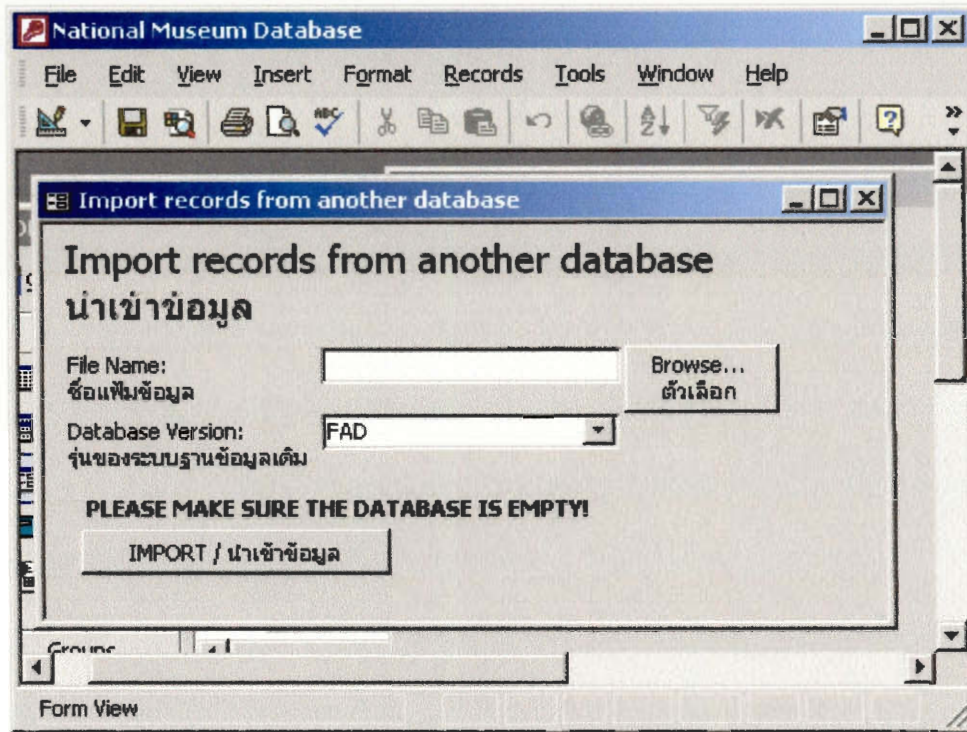
**Name(Thai):** The name of the room in Thai.

- To add another room, Click **Add Room...**

### 3.5.3 Transfer Records from the FAD or WPI Database.


- 1) In the **Configure Menu** (Figure 13), click **Import**
  - The **Import Menu** (Figure 16) will appear:

Figure 16 Import Menu



- 2) Type the file path of the previous database whose records you want to import. If you don't know the path, click **Browse...** to look for the database file.
  - A file selection menu will appear.
  - Select the file to be imported from, and then click ok.
- 3) Select the version of the database you wanted to import from.
  - For FAD, select FAD.
  - For previous version from the WPI group, select WPI00'.
  - For current version, select WPI03.
- 4) After the file is selected, click **IMPORT** to complete the import process.
  - More boxes or windows may appear, notifying you that you are about to add records to your database. To continue and add the records, click **Yes**
  - The record information entered into the FAD database should now be in the new database, and you should be able to search for your records and edit them.

### 3.6 Exit the Program

- 1) Click  in the **Main Menu** (Figure 1)
  - Note: Do not worry about saving new records or changes to the database records; they are saved automatically when you exit the program  
**This also means that when you delete records, they cannot be recovered by exiting the program or turning off the computer without saving the file!**