Dickens House Museum Photography Collection

An Interactive Qualifying Project Report

submitted to the

Dickens House Museum

and to the Faculty

of

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Photograph
Digitisation
Database

Abstract

The Dickens House Museum sponsored this project with the aim of digitising and cataloguing its large photography collection. Constant use by researchers was causing deterioration of the archive's images. After our research, data collection, and analysis, we provided options for creating a database to meet its needs. The completed IQP includes: a database system cataloguing the collection with a sampling of six hundred images digitised; an administrative manual to assist with future upgrades; and a user manual for Dickens researchers.

Executive Summary

The Dickens House Museum, located in London, England, was confronted with preserving its photography collection due to the slow deterioration of the images. The collection consists of over 5000 photographs, dated from the 19th century to the present day, which relate to Charles Dickens. The handling of the original images by scholars and researchers, searching for a specific photograph contained in transparent wallets, causes damage to the photographs.

The Dickens House Museum sponsored our Interactive Qualifying Project (IQP) to create a system that would reduce the damage to the photographs. Instead of handling the photographs, the system would allow a researcher to search through an electronic catalogue containing digital images. This system would result in conservation of the photographs and a more efficient and accessible searching mechanism. The database would invite researchers to perform keyword searches that would display a report of the relevant images within the collection. Although currently available on a local computer, we made suggestions for upgrading the database to an internet based application. The potential online access would affect numerous people who may want to utilise the photographs but do not have the time, means, or proximity to view them in the library.

We conducted interviews and user evaluations to better design and implement the system based upon opinions other than only the Museum's staff and our own. While the requirements of the Museum were met, several other issues were also addressed throughout the completion of the IQP. We performed a great deal of background research and testing prior to implementing a system. The team provided the Museum with various options and then, after much consideration, began employing a set procedure.

We defined specific goals in order to complete our digitisation project. First, we analysed the processes for converting physical images into a digital format and compared existing electronic database systems. In order to fully comprehend the digitisation process, we reviewed previous database projects and case studies of similar projects, at both American and British museums and institutions. In addition, we carried out interviews with experts in the fields of digitisation, photography, and databases. Data analysis and interviews affected our determination of which existing databases program served as appropriate models for our project. Second, our team tested processes using the equipment and resources available to us and then choose the best option for our project. We then used comparative analyses of the main variables of hardware, software, preparation, and time to define a set procedure. The team combined these results with other findings from our background research to determine what information a user expects to be able to access. Finally, the project group created and implemented a working database system and digitised a section of the photography collection. The set procedure allowed for the completion of the database and the creation of a functional archiving system to suit the needs of both the Dickens House Museum and those individuals who will use the catalogue.

Although we chose the most efficient methods, our project team realised that it was not feasible to complete the digitisation of the collection of 5000 photographs during our time in London. Based on our liaison's preference, we digitised the *Dickens Portraits* section, containing about six hundred photographs. This provided a good sample both for user testing and for reference during the continuation of the project. Since photographs remain that still must be digitised, the team created a manual for Museum personnel to use in order to complete the process.

Our IQP group also created a separate user manual that aids researchers in easily navigating through the database system and answers any problems that may arise.

The completed project consists of a Microsoft Access database that allows for numerous, user-friendly searches. The user can both view and print out a copy of the report containing a digital image and information about the photograph from each record. The WPI team completed the digitisation of the entire Dickens portrait section. This section consisted of mostly black and white photographs from the early 1800's to the early 1900's; it included portraits, cartoons, and characters. This provided a good sampling for users to search when conducting their evaluations. It also provided a good pilot for the Museum staff to review when they continue with the digitisation process. The manuals provided will aid in future uses. When completing the system, we found many good options that were not feasible in our time frame; therefore, we included a section containing our recommendations for future applications of the database system.

The goal of the IQP is to focus on combining technical knowledge and application to societal issues; it requires that students examine the connection between the technical aspects of a problem and their effects upon society. This Dickens House photography collection project qualified as an IQP because it involved both technological and sociological issues. The WPI team placed its main focus upon digitising the photograph collection and creating a database that allows for easy searches. However, several other issues, such as copyright, user preferences, preservation of the aesthetics of the Dickens portraits, and the Museum's requirements, were all critical concerns. Incorporating all these various features into the project required research, planning, and careful implementation.

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1.0 Introduction

A critical problem facing many historical preservation projects in museums, libraries, and universities involves the conservation of precious works of art. The Dickens House Museum, located in London, England, was confronted with preserving its photography collection due to the slow deterioration of the images. The collection consists of over 5000 photographs that relate to Charles Dickens. They range in date from the 19th century to the present day. Currently, the collection is stored in transparent wallets within filing cabinets. Constant searching through the photographs by scholars and other visitors who are looking for a specific image damages the collection.

The Dickens House Museum sponsored our project to create a system to reduce the damage to the photographs. The Dickens Fellowship, an organisation consisting of Dickens scholars and enthusiasts, retains ownership of the Dickens House Museum. This association desired a method for preserving their treasured collection of photographs. Our project group created an electronic database, which catalogued the photographs and provided a digital image, in order to increase the efficiency of the searching capabilities. This system allowed the Museum to preserve the condition of the photographs for years to come while still allowing access to them. The database allows researchers to type in keywords and find all of the relevant images. Although currently available on a local scale, we made suggestions for upgrading the database to an internet based application. The potential online database will allow researchers world-wide availability to the images. Online access would affect numerous people who may want to utilise the photographs but do not have the time, means, or proximity to view them in the library.

We defined specific goals in order to complete our digitisation project. First, we analysed the processes for converting physical images into a digital format and compared existing electronic database systems. Addressing the problems of determining which system components were needed for this project was a critical process. We researched a variety of sources and conducted interviews in order to gain a strong understanding of all options for creating the database and digitising the photographs. Second, our team tested the processes using the equipment and resources available to us and then choose the best option for our project. We narrowed the options down to what was feasible for this project and then used comparative analyses to define a set procedure. Finally, the project group created and implemented a working database system and digitised a selection of the photography collection. The set procedure allowed for the completion of the catalogue and the creation of a functional archiving system.

As part of this project, we provided all of the possible options so that the Dickens House Museum could make an informed decision and direct us on how to proceed with the digitisation of their photograph collection. We supplied plausible options before implementing any system and abided by the Museum's requests. The most important question was whether to out-source the scanning of images and database production, or to perform it all within the Dickens House library. The considered options are contained in the Methodology chapter. We designed the database with the specific interest of patrons in mind. Interviews of these patrons aided in designing the best database achievable. User evaluations of the database during its creation helped to direct us on how to advance.

In order to fully comprehend the digitisation process, we reviewed previous database projects and case studies of similar projects, at both American and British

museums and institutions. Also, we carried out interviews with experts in the fields of digitisation, photography, and databases. Data analysis and interviews were also key aspects in determining which existing database programs were appropriate models upon which to base our project. Combining these results with other findings from our background research was helpful in determining what information a user expects to be able to access. These methods allowed for a more tailored database to suit the needs of both the Dickens House Museum and those individuals that will use the catalogue.

Although the option of out-sourcing existed, the decision was made to perform the digitisation and creation of the database in-house. In this case, we evaluated the main variables of hardware, software, preparation, and time. The hardware analysis involved the comparison of the Museum's scanner and digital camera compared to our personal digital camera. The software analysis included consideration of the two graphics programs available, Adobe Photoshop and Micrografx Picture Publisher. Then, we dealt with the issues of preparation and time. Early in the project we decided on a set-up and procedure for the digitisation process, which will be explained in the Results chapter. Although we chose the most efficient methods, our project team was unable to physically complete the digitisation of the collection of 5000 photographs during our time in London. However, we were able to digitise a sampling of six hundred photographs that had been prioritised by our liaison, consisting of portraits of Dickens. Since there are still photographs that must be digitised, the team created a manual for Museum personnel to use in order to complete the process. A separate user manual was also created to aid researchers in easily navigating the database system and to answer any problems they may come across.

There are a variety of people, besides our sponsor, who will be interested in our findings. Our sponsor wants to protect the Museum's collection and, in addition, keep the photographs accessible. Therefore, the database containing the Dickens House Museum's photograph collection will be of interest mostly to scholars, Dickens enthusiasts, publishers, readers, and teachers. It is likely that people doing similar database projects would be interested in our findings as well.

Worcester Polytechnic Institute (WPI) requires for graduation that students complete an Interdisciplinary Qualifying Project (IQP). The IQP focuses on combining technical knowledge and application to societal issues; it requires that students examine the connection between the technical aspects of a problem and their effects upon society. This Dickens House photography collection project qualified as an IQP because it involved both technological and sociological issues. The main focus of this IQP was digitising the photograph collection and creating a database that allows for easy searches. However, several other issues, such as copyright, user preferences, and the Museum's requirements, were all critical concerns. Creating a functioning database that also took into account human interests is what made this project an IQP. The collection documents one of England's premier literary figures as well as a large part of British history. The project focused not only on the Museum's preferences for the result, but also those of scholars looking to do research on a variety of interests represented by the collection. Incorporating all these various features into the project required research, planning, and careful implementation. Concentrating on only one facet would be similar to class projects, whereas focusing on all components constituted an IQP.

2.0 Background and Literature Review

The introductory research done on this project is contained in the following section. It includes background research conducted on the Dickens House Museum, photography, cataloguing and archiving, digitisation, computer technology, and legal implications of digitisation. This chapter also contains a section where IQPs and public digitisation projects, similar to our project, were analysed in reference to our project goals.

2.1 History of the Dickens House Museum

2.1.1 Charles Dickens's Residence at 48 Doughty Street

The Dickens House Museum stands at 48 Doughty Street in London. The Georgian style house was built in the late 1790's and is the last remaining London dwelling of Charles Dickens (Appendix B). The famous novelist occupied it from April 1837 to December 1839, moving in soon after the first anniversary of his marriage (Appendix C). He and his wife, Catherine, along with their young son, and Dickens's brother lived at the residence. His sister-in-law, Mary Hogarth, visited the family often (Dickens House Museum Brochure). During his stay at this residence he wrote *The Pickwick Papers*, *Oliver Twist*, and *Nicholas Nickleby* (Appendix D). The conclusion of *The Pickwick Papers* was temporarily paused for a few months as he recovered from his shock and grief at Mary's death. He also stopped writing *Oliver Twist* for a brief time. He soon continued writing, finishing the serials and beginning *Nicholas Nickleby*. He also began writing *Barnaby Rudge* while staying at Doughty St., but due to a disagreement with the publisher, he stopped writing that until after his move to Regent's Park. He worked on several other pieces, including *Sketches of Young Gentlemen*, *Memoirs of Joseph Grimaldi*, and *The Lamplighter* in the Doughty

Street house. Catherine bore two daughters, Mary and Kate, during those two years. Once their third child was born in October 1839, the family decided to move to larger accommodations, 1 Devonshire Terrace, Regent's Park, see Appendix E (Dickens House Museum Brochure).

2.1.2 The Dickens Fellowship

The Doughty Street house was threatened with demolition in 1923. However, the Dickens Fellowship purchased the house and renovated it in a conservation effort. The house was converted to a museum under the direction of the Dickens Fellowship. Lord Birkenhead opened the Dickens House Museum on June 9, 1925. It continues to be the worldwide headquarters of the Dickens Fellowship. Dickens enthusiasts make up this Fellowship, established in 1902. The Dickens Fellowship created the museum to be a unparalleled archive of materials belonging to and related to Charles Dickens. In addition, *The Dickensian*, a journal for Fellowship members, is published from the house.   (Dickens House Museum Brochure).

2.1.3 The Dickens House Museum

The 48 Doughty St. building has been restored to appear as it was when Charles Dickens occupied it, including several pieces of furniture that he possessed. It now functions not only as a historical tribute to Dickens's life but also as a valuable research institution for Dickens scholars. The Museum houses numerous letters both by and to Dickens, as well as several original drafts of his novels, first editions, original illustrations, and numerous portraits. It also stores one of the largest collections of Dickens related materials including a 5000+ collection of photographs relating to his life and works (Dickens House Museum).

2.1.4 The Photography Collection

Our project focused on the photography collection, which is an integral part of the Dickens House Museum Library. The large collection is stored in the building next to the Museum, 49 Doughty Street, along with many old and rare books in a section of the Museum's library. There are approximately 5000 photographs, 2000 magic-lantern slides, and 1000 35mm slides. The Library holds many of the corresponding negatives, in both glass and film forms. The majority of the photographs are black and white. They are divided into four main categories: Portraits, Topography, Illustrations, and Miscellaneous. There are over 500 portraits of Dickens alone and portraits of his family and associates as well. The Topography section contains images dealing with places related to Dickens or his works both in England and other countries. The third category has photographs of "illustrations to the novels, contemporary cartoons and caricatures, scenes from plays, playbills, advertisements and film stills" (Dickens House Museum Brochure). The last category, Miscellaneous, contains photographs of Dickens's homes, playbills, facsimiles, and other items related somehow to Dickens. All these photographs range in date from the 19th century to the present day, with new additions every year. Many researchers look through the collection especially when a book is being published or a documentary on Dickens is being produced. The Museum's goal is to reduce the deterioration, due to handling, through the use of an electronic catalogue for search methods.

2.2 Photography

2.2.1 Types

In a crucial step before conversion of the photographs to a digital format, the team examined the various types of photographs. There are numerous different types of photographs and processes spanning from the beginning of photography to the current day methods. Some examples are letterpress halftone, photogravure, collotype, slated paper print, cyanotype, platinotype, albumen print, carbon print, woodburytype, gelatin printing-out paper, collodion printing-out paper, matte collodion, and gelatin developing-out paper. The individual characteristics of each process are shown in a Kodak flowchart in Appendix F (Reilly Appendix). According to Reilly, from the 1860s into the 20th century, many pictures were created in black and white and then edited by hand with charcoal or pastels. These handcrafted images are often referred to as crayon portraits (Reilly 6). The Kodak flowchart was helpful to our project team in determining what types of photographs the Dickens House Museum has in its collection.

The photographs in the collection are mostly black and white, though some are also in colour. There are also four types of print: matte, gloss, cabinet card, and card de visite. The photographs were made from both glass negatives as well as film, depending on when they were first produced (Xavier). Since the photographs range in date from the 19th century to present day, some of them are in a fragile state and are slowly being damaged.

2.2.2 Deterioration

Processing techniques play a key role in the potential deterioration of a photograph. "More deterioration of negatives and prints is due to the presence of residual processing chemicals in the material than to any other single cause"

(*Preservation of Photographs* 8). Silver prints are subject to increased deterioration caused by oxidants. The oxidative-reductive deterioration poses a serious effect of distortion to these silver nitrate images (Reilly 21).

One area of concern is how susceptible certain types of photographs are to direct light. For example, light can affect the original silver-based pictures. Depending upon the type of image, consideration of the potential harmful threat of direct light from a scanner to a photograph was important to this project. However, according to Professor Fontanella, the damage caused by the light is relatively insignificant when compared to the current damages sustained from the continued use.

Storage can also cause some deterioration and distortions in photographs. The temperature, humidity, atmospheric contamination, mounting, and adhesives are all factors that can affect the weakening of an image (*Preservation of Photographs* 8-9). There are procedures available to enhance the poor physical quality of an image prior to the digitisation phase. An example practice is as follows: stop baths and fix baths to clean and/or repair a photograph with the use of chemical blends (*Preservation of Photographs* 9-11). The crucial element in the preservation of irreplaceable photographs is to decrease the actual handling of the original prints. Proposing approaches for such minimization is a major element of this project. Therefore, alternatives, such as digitisation, must be examined.

2.3 Cataloguing and Archiving

2.3.1 History

Cataloguing involves the organisation of objects into a specific system with detailed categories and links to related objects. In simplified terms, cataloguing is organizing records of an object into set categories. It is a system that ultimately

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assists in the searching of records. In general, a single item in a catalogue contains information about a specific object. This can be in the form of a card, a paper, a spreadsheet, or, what is becoming increasingly common, a database. This final example is the type of catalogue that was used in our project. This single file, within a catalogue, contains information such as an object's title, ways that the object could be categorized, a reference number, and a notation of the author, illustrator, painter, and so on, depending on the case. These files are then organized in a predetermined manner. The organisation is much more difficult using older methods that involve physical files that are on paper or cards. An example of this is a card catalogue that was found in almost every library ten years ago. Each book within the library would appear in several files. A card for that book would have to be placed in a title catalogue, an author catalogue, and under at least one subject category's catalogue (Chenhall 8-9).

2.3.2 Electronic Examples

Computerized databases are a less complicated and more efficient method than the card catalogue. With computer technology, one file can be produced and all searches can be performed using that one file. Separate files do not have to be created for each type of search. Categorization methods do present some problems: subjects can be categorised into multiple sub-categories. Also, one person may categorize an object in one way, whereas another person would categorise that object in a different fashion. Therefore, by having all the data about the image stored in one file, no matter what query is performed the correct results should be reported.

2.4 Digitisation

2.4.1 Processes

Digitisation is the process of converting physical photographs into electronic digital images. The two main ways that this procedure may be accomplished are through the use of a scanner or a camera (Bishoff). There are pros and cons for each of these methods, which need to be evaluated before making a final decision on which to use.

For each digitisation project, a subjective analysis had been performed to determine the necessary equipment. The Library of Virginia made the decision to use either a camera or a scanner, depending on the material of the item being digitised. Flat objects were scanned while those that were either more fragile or three-dimensional were digitised using a camera. The digital images were then placed on Kodak photo CDs. Next, any slight problems with the presentation of the photographs were fixed using Adobe Photoshop (Roderick 61).

The California Heritage Collection used only a camera for their project (*Digitizing the Collection: Image Capture* 1). They set up a working area, consisting of a camera mounted to the workspace where they took their pictures. This method actually brings up a problem with the use of cameras. When taking a picture with a camera, one must be very careful to keep the camera steady so the picture is not blurred. This is why the California team used a stand for the camera. However, if the camera is held upright, it may be difficult to set the original photograph in front of the camera. Some remaining questions that must be considered when digitising photographs include: the picture's focus, whether the entire original will be contained in the digitised picture, if it will be centred, how the shading and lighting will come out, and any other aspects regarding the quality and resolution of the picture.

A scanner solves many of the previously mentioned problems (Bishoff). This type of device encloses the original photograph. The operator may place the original where he or she would like it positioned in the scan. Outside factors, such as light, should not affect the quality of the scan. In fact, many of the potential problems of a camera can actually be avoided by adjusting certain variables in the scanner's software to ensure that these issues do not affect the scanned image. A negative aspect is that a scanner takes much longer than a camera to capture the image.

It is important to follow a set process when working on a digitisation project. The University of Bristol's Visual Arts Data Service has set up a complex digitisation procedure. There are three phases of this process: *pre-digitisation*, *digitisation*, and *post-digitisation* (Gout 1). The first step of the process, *pre-digitisation*, addresses the different aspects of the project. Defining the objective is the first part of the venture. Next, the equipment being used must be decided upon. Then, the rest of the planned project is analysed and examined for any potential problems that could arise (Gout 1).

Once all of these preliminary steps are taken, the *digitisation* commences. First, the materials must be prepared for the actual scanning. They should be clearly, accurately, and safely organised. Gout suggests keeping a detailed record of the photographic process, including information such as when it was scanned, the operator, the condition of the photograph, and any other general information about the photograph.

The second part of this phase is the preparation of the working environment. This step involves cleaning the working area, checking the lighting in the room, fixing the settings on the monitor and scanner, and checking the corresponding software. There are very specific instructions regarding the monitor. The display settings should have 24-32 bits, the resolution should be at least 1024 by 768 pixels, and the

colour temperature should be around 6500 K. Gout advises that contact with the original should be avoided whenever possible, that protective gloves be worn, that something be placed behind the original to keep it flat on the scanner, and that a pre-scan, a quick scan to set the "white point, brightness, shadows and cropping," be performed (Gout 3-7). After all this preparation, it is time for the final scan that will be used to create the digital image.

Once the scan has been made, there are *post-digitisation* steps. Gout recommends saving the item as a TIFF file with a thumbnail option. The paper also recommends that the image should be labelled according to scanning operator, then file number. Any additional data should describe the photograph and include in the computer files details, such as format and size. Due to their large size, a storage medium or network host server may be necessary. However, the number of large files could slow the network. In the best situation, the files would be sent overnight to a server after temporarily keeping them in a "local or portable storage medium" (Gout 8-9). The recommended method of storage involves using a CD-ROM or JAZ drive. The final step is to put the original hardcopy photographs back into their place in the files.

Quality assurance is something that should be kept in mind throughout a project, checked on regularly, and then inspected at the completion of the project. With official projects in the United States, the National Archives and Records Administration (NARA) will sometimes conduct a final inspection as well. Their procedure is to take 10% of the files in each section and examine them for errors. The checklist that the NARA uses for inspection can be found in Appendix G (Puglia 16-17). In our individual project, we strived to achieve a collection that could satisfy these guidelines without problems.

2.4.2 Benefits

Digitisation has advantages and drawbacks. The positive points coincide with the objective of this project. Specifically, the photographs that will be digitised are currently filed in such a way that people who would like to view them must sort through by hand. When many people handle these images over a period of time the photographs deteriorate. Digitisation prevents manual searching and allows someone to look at a copy of the image. There are two possible uses of this digital image (*Guide to Image Digitization*). First, the replicated image can be printed from the digital file. Second, an interested person could use the identification number to go directly to the original and make a copy of it.

There are three major reasons for the use of digitised images. The first is "as a visual reference image in an electronic database" (Frey 2). The second is to allow for easier distribution. Finally, in some cases a digital image replaces the original due to excessive damage (Frey 2).

2.4.3 Problems

So far, the advantages of digital imaging have been discussed, but the drawbacks have not. One of the major disadvantages of digitisation is the potential for further deterioration of the photographs while they are being scanned. Many old photographs are very sensitive to their environment, especially light (*Preservation of Photographs* 36). Therefore, any light such as from a camera flash, a scanner, or even the natural light possibly may damage the photograph. The light can also cause glare when digitising the photographs. Another issue with digitisation is the heightened opportunity for piracy and copyright infringement. At this time there is not adequate technology to prevent a person from viewing a photograph online and copying the

image onto a personal computer. Measures may be taken to prevent piracy, such as using electronic watermarks or posting only low-resolution images.

2.5 Computer Technology

2.5.1 Software

There were two possible database programs for use in our project, MySQL and Microsoft Access. Each has both good and bad features. The biggest problem with any computer application is the fact that computer technology is constantly changing. Programs that can be updated easily are preferred. As a result, many people are beginning to use MySQL as opposed to other programs (Harkins 1).

There are additional reasons why many people are opting to use MySQL (Harkins 2-3). It does not cost much; in fact, in some cases it is free. It is less demanding on a network or even an individual computer because it has better query capabilities than other programs. This software is not as structured as others and has a backup system that can easily be restored. The last major positive point is that it is rather easy to learn (Harkins 2-3).

There are advantages to using Microsoft Access. The most obvious advantage is its availability. This program is part of the Microsoft Office package and, therefore, already is installed on most computers. One characteristic that could be positive or negative, depending on the project at hand, is that Access is more complex. Access is less demanding with regards to maintenance than MySQL (Harkins 5). There are two approaches to connect an image to a record in the database. The first method involves the inserting a hyperlink (Adamski 6.51). The use of hyperlinks limits the viewing possibilities, but will not increase the searching time. When the link is chosen, the image then will be displayed in an outside, related

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program, such as Internet Explorer. The second method involves inserting an OLE object (Adamski 6.39). During the insertion, there is an option for the image to either be embedded or linked. By embedding the digital images, the images are actually copied into a database. Yet, it is more difficult for Microsoft Access to handle a large number of embedded images in a database. The embedding process adds significant amounts of data that makes it difficult to query a database. However, there is a second option for an OLE object, whereby an embedded link to the image (separate from a hyperlink) opens up the image file in the database, keeps the database file size lower, and speeds up the search time. However, using this method requires the images to be stored in a separate folder within the computer.

2.5.2 Hardware

Due to the large amount of hard drive space required, it was possible that we would have to store the information on a server. It was likely that the Dickens House Museum already had a server because they have a website. This server could provide the data storage required for this digitisation project. If there was not one available to us, Susstrunk advises the use of a server called IVAN (8). In regards to backup, some possibilities included using a CD-ROM, zip drive, or JAZ drive (Gout 9). Networking also came into consideration for this project. The proposed networking could include two personal computers; one acting as a local host storing the database and files, while the other personal computer acted as the front end for user interaction.

After the initiation of the project, our team discovered that the files could be decreased to sizes whereby the storage issue was not a problem. The Dickens House Museum's library has a computer capable of storing all the image files and running the database. Therefore, although servers and networking were researched and presented as options, they were not needed to complete the project.

2.6 Legal Issues

Digitisation requires the examination of the legal implications with respect to intellectual property. The Dickens House Museum, for the most part, possesses the copyright to the 5000+ photographs contained in its collection. Thus, the Museum has the right to issue reprints and copies under the copyright provision of the intellectual property law. The copyright laws in the United Kingdom state that a

> Copyright gives the creators of a wide range of material, such as literature, art, music, sound recordings, films and broadcasts, economic rights enabling them to control use of their material in a number of ways, such as by making copies, issuing copies to the public, performing in public, broadcasting and use on-line.
> (*Intellectual property*)

Under these premises, an infringement can occur if a person without prior consent from the copyright owner uses the image (Elias 133). With advances in technology, there is an increased capability of creating quality reproductions with ease. Images can readily be transferred via the worldwide web, thus lessening the effects of copyright protection. Another plausible problem arises from the ability of technology to be used for editing and manipulating an image.

The potential exists for images that are copyrighted, and even marked, to be edited for other uses (Ang 383-384). The quality of the image can be greatly affected by some editing techniques. The penalties for infringement have a wide range, though it is becoming more difficult to trace the violations due to the rapid dispersal of material via the worldwide web.

A primary example of file infringement on the internet is Napster. Napster provided a peer-to-peer connection that contributed to people accessing illegal music files (Ang 390). As the sharing of files online increases, protective measures are being taken to oppose this practice. Precautions are being implemented to protect

these highly sought-after music files. One approach has been to shut down the websites that promote illegal transfers of music files. Similar precautions can be taken to protect online pictures.

One common security measure is the use of a watermark in conjunction with a low-resolution picture. This form of protection is commonly used on pay-order image websites. The watermarks are an important consideration when one places any valued pictures on the web (Kalinowski). Allowing access of the images over the internet could lead to unnecessary infringements of the Dickens House photography collection if it was not fully researched and then secured.

2.7 Library and Museum Models and Previous IQPs

During the research required for completing this project, we reviewed previous Interdisciplinary Qualifying Projects (IQPs) on similar topics and studied similar databases that other museums and libraries have completed. "The Conway Database and Digitizing Project" was completed in March 2001 in London, England by a group of WPI students. "Online Access to National Art Library Documents," another IQP, was completed in April 2001, also in London. In addition, the University of California in Berkley has completed an online database of 28,000 photographs contained in their "Heritage Collection" (*Digitizing the Collection*). The Library of Virginia, in Richmond, has also concluded a project to digitise their collection of historical documents and photographs, which allowed them to provide electronic access over the internet (Roderick 56). In this section we will review these prior cases.

2.7.1 Previous IQPs

The IQP sponsored by the Conway Library in London in 2001 was similar to our project (Jasinski iii). The Conway Library has numerous photographs of art and architecture that were digitised and then made available over the internet. The Conway IQP team updated a database, inputted some sample digital photographs, and created a website linking the database to the internet. In their project, a database was already established and they modified it. Also, digitising the photographs was not a key part of their project since it was done not at the Conway, but at another location. Their project focused more on the web-interface, an element that our IQP only proposed rather than implemented. They used FileMaker Pro when linking the images to the database; we compared this program to others when determining which software program to use. Since most of the methodology was different from our proposal, we used more of their background materials when performing our background and literature review.

The second IQP, at the National Art Library (NAL) in London, was also relevant to our project (Brancato iv). Since the NAL project focused on electronic documents, the process of digitisation was very different. However, searchable databases were created, which was what we were required to do for our project. In addition, a focus was placed on making the texts available over the internet (Brancato iv). Again, the background research performed by the Library's IQP team, and their methods for creating a user-friendly database, were constructive resources for our project at the Dickens House Museum. The NAL project team used several types of code in order to create their database. After reviewing this group's methods, we decided that using a database program such as Access or simpler coding software, such as MySQL, was better suited for our project. The NAL project team also used

surveys when planning the database. This method was not applicable to the Dickens House project because there are fewer users of the material; however we conducted interviews to gather information about who would access the electronic database and what features they would require. Similar to the NAL project, we also conducted interviews to get more first-hand and detailed answers to problems we had and as preventive measures before beginning the implementation.

2.7.2 Libraries

The University of California sought to give online access to the general public through an electronic database of its photographic collection consisting of thumbnail photos, links to higher resolution images, and a search feature. The photographic compilation, the Bancroft Library's "California Heritage Collection," contains photographs documenting life in California in the 1800's and early 1900's. This collection is similar to the one owned by the Dickens House Museum. It has been digitised in a process similar to our approach, and therefore was an excellent model for our IQP. The program they used, Kodak Photo CD, permits a variety of image resolutions. The highest resolutions allow the user to zoom in to see more detail. Comments were made on the photography program's speed and efficiency in processing the numerous images. Though the program was very effective over all, the high-resolution images took up a large amount of memory leading to the decision to offer access only to the lower resolution images over the web. The digital images were modified by changing the colour tones of the photos, adjusting for highest quality using a variety of tools involving the developing of film, scanning, and software programs (*Digitizing the Collection*). However, our IQP team did not have access to such advanced techniques.

The Library of Virginia's digitisation project was not as closely related to our IQP as that done by the University of California. Although it contains numerous photographs, the library's collection consists mostly of historical documents. In the Library of Virginia's project a variety of relevant issues were addressed, including the process of re-photographing the images and then digitising the slides, the cataloguing of items once they are in an electronic form, the capability of searching for the items, and the usage of the collection once it was digitised (Roderick 58-62). The process brought up several key aspects of the digitisation process that the WPI team researched before we began any of our work on the photographs.

3.0 Methodology

The WPI project team investigated the multitude of different options available for creating an electronic database for the Dickens House Museum's photography collection. The project methods included data collection, interviews, comparative analysis, and the design and implementation of the database. These allowed us to determine the best possible database and the procedure to complete that system. Thus, we carefully analysed currently practiced methods. We followed the advice of one specialist who suggests that institutions, before starting a digitisation project or purchasing expensive equipment, should first investigate the option of out-sourcing to companies that provide high-quality service or to collaborating with other libraries, museums, or universities (Bishoff). We compared the options of out-sourcing the project or completing the project in-house, as well as all of the various elements involved in completing the project.

3.1 Overview of Objectives

In order to meet our objectives for the completion of the project, we defined several specific goals: to research options for the project, to create an Access database that allows for efficient searching, to digitise a critical number of photographs in the collection, to create manuals for both the user and the administrator, and to provide other options for the future. The methods were divided into two sections: first, conducting background research and deciding on a course of action, and second, implementing of the established procedures. Initially, we analysed the processes for converting physical images into a digital format and compared existing electronic database systems. Addressing the problems of determining which system components were needed for this project was a critical

process. We researched a variety of sources and conducted interviews in order to gain a strong understanding of all options for creating the database and digitising the photographs. Then, our team tested the various processes using the equipment and resources available to us and chose the best option for our project. We narrowed down the options to what was feasible for this project and used comparative analyses to define a set procedure. Once the initial research and testing were complete, the second section of methodology, implementation, could commence. The project group created and implemented a working database system and digitised a major portion of the photography collection. We designed a process and carried it out to the best of our abilities.

3.2 Data Collection Procedures

3.2.1 Research of Photographic Treatment and Handling

The preservation of the photographs in the Dickens House Museum collection was a critical aspect of this project. Researching material on photography gave us a better comprehension of the key facets of this project. The information gathered from literature about different techniques, added to that gleaned from interviews, helped us to set guidelines on how to handle the original 19th century photographs.

These guidelines specified what procedure was necessary if some of the photographs had imperfections. For example, if a corner was creased, should the corner be bent back, thereby risking further deterioration (Fontanella). The decision was made to leave the photographs in the Mylar sleeves to lessen handling and to capture the image as the photograph is stored to prevent further deterioration.

3.2.2 Interviews

We conducted interviews in order to learn about available options for the database system. These interviews, performed in both Worcester and London, were open-ended to facilitate the expansion of responses and gain more information. There were three main groups we interviewed, namely photography experts, database specialists, and potential users of the photography collection.

We learned a great deal from photography experts. These specialists provided crucial information for our project and offered suggestions we would not have thought of on our own. For example, one individual suggested considering the physical appearance of the photographs, such as poor condition or physical faults (Fontanella). Authorities on photography also gave advice about how to design the database with user preferences in mind.

The database specialists served as a significant resource to us as well. We learned the most from professionals with little to no bias. Most literature is either partial towards one company or does not make sufficient comparisons to be useful. We interviewed experienced professionals with knowledge of multiple database products, in anticipation that they could suggest which database application would best suit our needs. In order to obtain the most information possible, we encouraged the interviewee to elaborate where he or she felt it was necessary. We conducted interviews with professionals in various fields at Worcester Polytechnic Institute, in Massachusetts, which we found especially helpful (Appendix H).

By interviewing actual users of the Dickens House Museum's photography collection, we were better able to tailor the database to their preferences. From these interviews, we took suggestions for creating the key fields, searchable information, and actual user access. Interviewing the Dickens House Museum curator, Andrew

Xavier, was also important since he is the most knowledgeable person concerning the photography collection. He was able to provide valuable information, concerning the photographs and the users, which improved the development of the database system.

During an interview, each team member carried out one of the following tasks: led the questions, took notes, or listened intently to comprehend information that the others may have missed. Any of the team members had the ability to tactfully jump into the question and answer phase with comments or further questions. Once the interview was complete, our project group conducted a review to clarify how the interview went. After compiling all the data, we analysed the relevance of the various topics discussed.

The interviews provided us with the direction that we desired. The interviewees offered advice and positive input. The responses provided new perspectives and technical advice concerning image systems and other more advanced fields. In areas where we had minimal knowledge, the experts were able to explain key concepts. During the interviews, we discussed the physical handling of the images, including moving them in and out of the protective sleeves, and the archiving techniques. Database specialists provided information concerning different products available and how best to archive the photographs. The interviewees also offered insight into how to proceed with the digitisation procedure.

3.2.3 Comparative Analysis

Through the research described in the previous sections, we determined that the Dickens House Museum had to weigh the pros and cons of each major element of the digitisation process before implementation. Figure 1 lists the major issues that were addressed, namely production location, imaging equipment, storage location, and system quality.

Possible Options	Option 1	Option 2
Digitisation Process	In-House	Out-Source
Equipment	Scanner	Digital Camera
Storage	Local	Outside Provider
Database	Simple	Advanced
Software	Inexpensive	Expensive

Figure 1: Digitisation Options

Many of these points of interest are interrelated; thus, changing one aspect would affect the other variables.

3.2.3.1 Digitisation Process

A high-quality system, involving higher-level software and hardware design, was a feasible option, depending upon demand for the photographs and their potential revenue. If the Museum had desired to sell the digital image files or use them for reproduction, a high-quality image would be needed. However since they are needed only for querying, low-resolution images can be used. The low-resolution would prevent any chance of an individual illegally using the image and would also conserve hard-drive space. This standard was a key element when we compared the option of either performing the digitisation project in-house or outsourcing the project to a professional company. The Colorado Digitization Project set up a table, see Figure 2, that specifically outlines possible concerns related to each option.

In-house pros:

- Development of digital imaging project experience by "doing it" (project management, familiarity with technology, etc.)
- More control over the entire imaging process as well as handling and storage of originals
- Requirements for image quality, access, and scanning can be adjusted as you go instead of defined up front
- Direct participation in development of image collections that best suit your organization and users

In-house cons:

- Requires large initial and ongoing financial investment in equipment, staff
- Longer time needed to implement imaging process and technical infrastructure
- Limited production level
- Staffing expertise not always available
- Institution must accept costs for network downtime, equipment failure, training of staff, etc.
- Lack of standards and best practices

Outsourcing pros:

- Pay for cost of scanning the image only, not equipment or staffing
- High production levels
- On-site expertise
- Less risk
- Vendor absorbs costs of technology obsolescence, failure, downtime, etc.

Outsourcing cons:

- Organization has less control over imaging process, quality control
- Complex contractual process: image specifications must be clearly defined up front, solutions to problems must be negotiated, communication must be open, and problems must be accommodated
- Vendor many know more than client or may presume a level of understanding on part of library/museum/archives that they may not have
- Lack of standards with which to negotiate services and to measure quality against
- Originals must be transported, shipped, and then also handled by vendor staff
- Possible inexperience of vendor with library/archival/museum/historical society communities

Figure 2: Location Comparison

(Bishoff)

3.2.3.2 Equipment Options

In our project, we addressed the equipment options, specifically between a scanner and a digital camera. The original project description from the Dickens House Museum requested low-resolution scans of the photographs. Our research indicated that the best approach for the scanning process is to scan an image at the highest resolution possible. In order to decrease the amount of space an image occupies on a hard drive, file compression could be used. However, making a small, low-quality file into a more complex image is not a feasible possibility. If there was a possibility that the Museum would require high-resolution images in the future, it would have been counterproductive to scan over 5000 images at a low-resolution. An advisable option would be to scan the images only once, at the highest resolution achievable. Yet, the extreme amount of space that high-resolution images occupy can be a negative aspect of this approach. Depending upon resolution, bit depth, quality, and format, each photograph can occupy multiple megabytes (Mb) of memory. The size and storage details of an example digitisation project, from the Harvard University Library, are shown in Figure 3.

System configuration	End user access: VIA Cataloging system OLIVIA Imaging: HCL Digital Imaging Group Storage DRS
Source materials	Approximately 4,800 black-and-white photographic prints of China in the 1930's and 40's from the Hedda Morrison collection, Harvard Yenching Library. Most photographs organized in albums.
Cataloging	Item-level cataloging for each photograph in OLIVIA.
Reformatting	Produced publication-quality, color-managed, 1:1 reproductions of all photographs. Photographs digitized in color to show evidence of age. Two versions of digital images: archival master; JPEG image for delivery. Average file size of highest resolution image = 13.9 Mb. Totals: 9,572 images, 84.6 GB total file size.
Storage	DRS. HCL DIG used as depositing agent. Administrative metadata created for all versions of images. DRS annual maintenance cost for collection, at current rate of $20.50 per GB, is $1,734.30.

Figure 3: Harvard University Library Example System

(Guide to Image Digitization)

The average file size for this model project was approximately 14 Mb. An average file size of up to 96 Mb per photograph has been found in other projects. However, a low-resolution image would take up less than 1 Mb of space. Harvard's project gave us an idea of what to expect if the images were kept at a high resolution and were in colour. The extreme amount of space required, however, and the Dickens House Museum's preference, led us to consider low-resolution images with a greyscale colour scheme.

The other equipment option for the digitisation process was a digital camera. This selection would provide only a low-resolution image, as per the Museum's request. To counteract this point, a digital camera has the capability of capturing images at a higher rate than a scanner. The images produced would be of a lesser quality, thus resulting in smaller file sizes. Based on an interview, we estimated that each image would take approximately 1-2 minutes to capture using a digital camera, as opposed to 6-7 minutes for a scanner (Kalinowski). This time includes the preparation for positioning the photograph for capture. The image files can be uploaded to the computer overnight so that it does not take up time during the data acquisition period.

In order to better gage the capabilities of the digital cameras and the scanner available for our use, we did a comparative study. The scanner available, Plustek OpticPro 9636P, took, on average, up to two minutes to scan at low-resolution and almost 10 minutes for a high-quality scan. The team's digital camera, Kodak DC210+ Plus Camera, only took about 30 seconds to complete each picture, taking into account the positioning of photographs. The Museum's digital camera, an Olympus CAMEDIA C-2500L, took an equivalent amount of time as well. Since the Museum personnel decided they did not need the high-resolution images, and due to

the large difference between the time that each apparatus required, the scanner was not the ideal choice. In addition, the majority of the original images have a negative from which a high-resolution copy could be made at any time. The specifications for the possible equipment options can be found in Appendix J.

3.2.3.3 Setup Options

Due to the results of the comparative analysis of equipment, which will be discussed in the following chapter, we used a digital camera. This option brought up the problem of how to set up for digitisation. We considered a variety of elements, including positioning of the photograph and camera, lighting, and camera settings, in order to determine which yielded the best results. In regards to positioning, we considered capturing an image vertically versus horizontally, using a variety of stands, arranging the photographs inside or outside of their protective sleeves, and maintaining a constant distance between the photograph and camera. There were an assortment of lighting options, as well: overhead fluorescent light, spotlight, daylight, camera flash, and different combinations of the available selections. The digital camera has a variety of settings, such as zoom and manual versus automatic, which can be used to produce assorted images. Our project team needed to compare various positioning and lighting to determine whether we had actually found the best methods of capture.

3.2.3.4 Storage Options

A method for storage had to be established in order that the captured images could be stored properly. Two options available to the Museum were either to out-source the data or to store the data locally, on a personal computer in the museum. If stored locally, data could be saved using a hard drive, CD-ROM, or backup tapes. If out-sourced, a storage company would house all of the image files. These companies

host and maintain files for a particular fee. This option could become expensive, depending upon the host and how much data was being stored. One example, representative of online hosts for small application usage, is a firm that charges £15 a month for 100Mb of space (Keizer).

The decision between local or out-sourced storage involved considering database maintenance. If the digitisation of the collection was out-sourced, a company would be responsible to handle the database aspects. This includes not only the production, but also the upkeep of the program. On the other hand, if the project was performed in-house, then outside assistance may be necessary for troubleshooting and updating the system.

Since low-resolution images better suited the Museum's needs, the space required can easily be provided by a personal computer. We estimated from initial tests that we could get each image to be only approximately 10-20 kb; therefore the computer already in place in the museum could easily store all the image files and run the database.

3.2.3.5 Database Software Options

With increasing technological advances, the database design and user interface should be a well-developed system with a potential for upgrade. The database could be based on many different software options, including Microsoft Access, MySQL, Oracle, Cold Fusion, and others. Each platform has its advantages and disadvantages, but finding the application that would best suite this project was crucial.

We determined the following selective criteria based upon the functional capabilities that our system required: the capability of supporting queries in an easy, user-friendly manner, the ability to interact or come pre-packaged with an imaging system, and the possibility of browsing the categories by image. These elements were

all considered important aspects by both our liaison and by individuals interviewed for our initial research. Further requirements for the database, including key fields and accessibility, were determined by the information gathered from written resources and interviews with database specialists.

In order for the Museum to determine which application was the most appropriate, our research and comparisons of database details were necessary. One approach was to explore similar projects, such as those done by other museums, verifying if their configuration had any qualities that we wanted to incorporate into our system. The other method was to research a variety of databases and find out the positive capabilities of each. The WPI team also used sample databases in the software packages to aid in determining whether the application met the Museum's specifications.

Current software exists, such as PastPerfect Museum Software, that is specifically designed for cataloguing library images (*PastPerfect Museum Software Basic Package*). This software is tailored for digitisation projects and costs approximately £1200. Due to the high-end cost associated with specialty software, we have analysed more commonly accessible and less expensive database applications, such as Microsoft Access.

3.2.3.6 Graphical Software Options

After database and scanning possibilities were examined, the question of editing the master image emerged. The images, after being captured by the digital camera, needed some form of digital enhancement. We required a software package that could perform the graphical functions necessary when editing the images. Some available software options include: Adobe Photoshop, Ulead PhotoImpact, Adobe Photodeluxe, and Corel Photo-Paint. Based on research, we estimated that each

digital photograph could take up to twenty minutes to edit. This prediction depended upon techniques and the quality of the original photograph.

The Dickens House Museum already had two programs available for editing the digital images; these were Micrografx Picture Publisher and Adobe Photoshop 4.0. We preferred to use Adobe Photoshop since we were most familiar with that program, though, either program could be used. If the Museum staff chooses to add any photographs to the database in the future, they could use whichever program they prefer.

3.3 Project Design

After considering all of the research previously conducted, the team designed a procedure for the project. We designed the database by implementing our ten-step procedure, as shown in Figure 4.

1. Design the Database.
2. Complete a Sample Run of Capturing and Editing Images.
3. Populate the Database with Sample Images.
4. Revise the Database.
5. Capture and Edit Photographs.
6. Populate the Database.
7. Troubleshoot and Readjust the Database.
8. Perform User Evaluations
9. Troubleshoot and Readjust the Database.
10. Create User Manuals.

Figure 4: Ten-Step Procedure to our Database Construction

Each step within the procedure will be discussed in the upcoming three subsections; database design, digitisation, and database modification and upkeep.

3.3.1 Database Design

We predicted that the most difficult part of implementing the database would be the initial design of the key fields and categories. The input provided from similar digitisation projects at London libraries and museums and through interviews with

Dickens House staff and the photography collection users would further help to define the needs and specifications of the database. To ensure the best implementation, we made multiple samples, adjustments, and revisions to the database. The electronic catalogue contained essential functions other than data tables, including various searching and querying capabilities, input forms, and reports. In addition, a switchboard functions as a way for a novice user to move about the database with ease.

3.3.2 Digitisation

The digitisation required a set scheme to capture, edit, and input information into the database. Each member of our group had a set task during this digitisation period. The various tasks completed are listed in Figure 5.

1. Retrieving and positioning of the photograph
2. Capturing the image
3. Downloading the image to the PC
4. Editing the digital image
5. Deciphering the information on the back of the photographs
6. Inputting the information into the database
7. Verifying that the information is correct
8. Connecting the digital image to the database
9. Replacing the original photograph back in the filing cabinet.

Figure 5: List of Digitisation Tasks

For the efficient completion of this scheme, we created a course of action. Designating tasks to be completed simultaneously made the best use of our time. We considered an additional method for digitising the collection involving grouping of entries into sets, otherwise referred to as batches. Each batch consisted of a small portion of the collection. While one member worked on capturing one batch of photographs another member could be recording data about another set.

3.3.3 Database Modification & Upkeep

After inputting a sample portion of the collection, troubleshooting of the database commenced and continued through the remainder of the project. We assumed that problems with design styles, report format, query options, and other unforeseen errors would arise and therefore we would need time at the end in order to resolve all the issues. User evaluations demonstrated various aspects that required adjustment in order to gear the database towards the end user, and we made appropriate revisions in the final weeks of the project.

We estimated that we would be unable to complete the digitisation of approximately 5000 photographs in our available time span. Therefore, the WPI group created a manual that would illustrate the procedure for completing the conversion of the collection. It focuses on the administrative side of updating and correcting any foreseeable conflicts or problems. In addition, it outlines how to digitise and input new images into the database. We also created a second manual that serves as a user guide on how to access the system for querying the database. Both manuals are user-friendly and include step-by-step procedures necessary for the completion of a task. Not only did the team create the database system in response to the Museum's current requirements, but also planned for a majority of the upcoming possibilities and problems.

4.0 Data Results

The following section contains all the raw results that this team collected while completing the IQP at the Dickens House Museum. These data represent all of the work put into both the database design and the digitisation sections of the project. The IQP team took this information from the interviews performed, the comparative analyses, and the procedures that were tested and then utilised.

4.1 Results of Interviews

Our student team found the interviews extremely helpful in providing detailed information that critically influenced the development of the project. The various sources provided information about their specialised fields, both at WPI and in London. The minutes of each interview can be found in Appendix I. The photography, database, and Dickens Collection experts supplied valuable information for the progress of the project.

Debra Babineau, a computer applications trainer at WPI, directed our group in what type of database system would be ideal for the Dickens House project. Her recommendation of using Microsoft Access, based on her own experience with various systems as well as information she had from other sources, was well supported when compared with other programs. She provided helpful materials that aided in the decision about the database program. As shown in Appendix I.1, she referred us to several individuals for further information.

Professor Lee Fontanella, Humanities department head at WPI, is knowledgeable in photography and restoration. He provided insight into how to handle the photographs, such as dealing with bent corners or torn edges (Appendix I.2). He concurred with other sources about how the effect of light from a scanner or

camera flash causes minimal damage compared to that caused by continued handling. As a researcher, he had the ability to provide information on what data should have been included in a database record, such as the name of an engraver. Our WPI group took these comments and suggestions into account when drafting the fields included in the database.

Professor Joel Brattin, an English professor at WPI and avid Dickens scholar, had previously accessed information at the Dickens House library. He provided more information on possible user requirements. Since he had researched information on Dickens, he suggested fields that would be helpful to include, such as relationships of an image to a novel (Appendix I.3). Finally, he recommended using interviews rather than surveys as a method to gather information.

Similar to Debra Babineau, Joseph Kalinowski and Diane Strong provided informative advice on what type of database program to use. Joseph Kalinowski compared Microsoft Access, Oracle, and MySQL, but after discussing aspects of our project with us, he recommended using Access over the other two. He made several suggestions about scanning, mentioned in Appendix I.4, that were considered when deciding on a project method. Diane Strong, a WPI Computer Science professor, also recommended using Microsoft Access for our project (Appendix I.5).

Our WPI team believed that a key person to interview was Andrew Xavier, curator of the Dickens House Museum and our liaison. Our team discussed a variety of aspects about the project and questioned the curator about his desires and the needs of the museum and any users. He approved our proposed methods and aided with the formation of our final procedure. Mr. Xavier made several other suggestions, in response to questions, and of his own accord, that are outlined in Appendix I.6.

Jacqueline Cone, another staff member of the Dickens House Museum, worked as the curatorial assistant and often accessed the photography collection. She explained the difficulties with searching through the collection previous to any database system. Ms. Cone provided information about what most people search for, aiding us in the designation of fields for the database. Her comments, recorded in Appendix I.7, provide more information on the users' side of the database requirements.

We conducted our final official interview with the Vermeer photography team from the National Gallery in London. This group had been working on a digitisation and conservation project of the Gallery's 2,300 paintings. Though their system and equipment were more advanced, they provided advice on both the database and digitisation procedure (Appendix I.8). One piece of information we found very helpful was the amount of time it took to input the data. They recommended that two people work on this task, which was how we proceeded during the end of the project.

4.2 Results of Comparative Analysis

Once our student team arrived in London at the project site, it was necessary to carefully examine the equipment and materials available for use on the project. Our group considered a variety available methods, equipment, and hardware and software options. These factors all had to be weighed by our IQP team and then discussed with the liaison before the entire Dickens House team made the final decisions, which are outlined in the following sections.

4.2.1 Digitisation Process

After considering the needs and resources of the Dickens House Museum, our team determined that it was both possible and advantageous that the project be

completed in-house. Our sponsor did not have the funds needed to out-source any part of the project readily available. The Museum possessed a scanner, a digital camera, and a computer capable of handling the database and images. Access to this equipment as well as the necessary software programs all aided in our project team's decision to complete the project at the Dickens House Museum's library site.

4.2.2 Equipment Options

The Dickens House Museum's scanner and digital camera were available for the project team to use. One of our team members also provided a personal digital camera as an option for use. Our WPI group looked up the specifications for the three tools as a means for comparison (Appendix J). The specifications alone indicated that the scanner would produce better quality images. Our project group tested the equipment to determine which would be better for this project. The results of these tests, as shown in Appendix K, prove that digital cameras have the capability to capture the images at the necessary resolution at a faster speed. Since the Museum did not require high-resolution images, and due to time constraints, our team decided to use a digital camera. Either one of the available cameras could take the necessary images and either one could have been used. Yet, the decision to use our team's camera came from our ability to take and store a larger number of images during the day and then to download them all to a laptop overnight. This increased the amount of time available to capture images during the day without wasting any needed time on the slow download of the images. As will be discussed later in the report, the Museum's camera will be efficient and capable for any future digitisation of the collection.

4.2.3 Storage Options

The determination of where the database and digital images would be stored was a major concern in the completion of the project. Initially, our WPI team considered both on-site and off-site options. However, after determining the amount of space needed on the computer hard drive, we decided that the computer in the Dickens House library contained sufficient space to hold the database. Therefore, a local computer in the Dickens House library houses the database and images.

4.2.4 Database Software Options

Several options existed for the database software package that we could use for the digitisation project. Our team considered Microsoft Access, Oracle, and MySQL as the main choices for the task. After deliberating over the suggestions of interviewees, the research compiled, and our own knowledge of the systems, we decided that Microsoft Access would be the most feasible option. Our team chose this program because it is readily available, installed on most computers along with the Microsoft Office package, and easy to learn and use. The Museum already possessed a Microsoft Access database on the computer in their library; therefore the employees felt more comfortable with that program than with another software package. Additionally, our team members had more familiarity and skill with Access than with a different database program.

4.2.5 Graphical Software Options

Despite the availability for purchase of many graphical software programs, our IQP group narrowed down the decision for this project to two products: Micrografx Picture Publisher and Adobe Photoshop. We considered both products and compared their abilities. They both contained all the necessary options and features needed to edit the images. Yet, our team chose to use Adobe Photoshop for two reasons: first,

it could perform batch operations, thereby cutting down time spent on simple editing techniques, and second, our project team members were more familiar with this program and therefore could work more efficiently by using this software program. Once decisions had been made concerning all of our options, the implementation began. The following two sections explain how our team employed the various elements and created the final product, namely the designed database and the digitisation procedure.

4.3 Final Database Procedure

Our WPI project team completed its goal of creating a user-friendly database for the conservation of the Dickens House Museum photography collection. We created a full Access database composed of tables, queries, forms, reports, Visual Basic code, and a user-friendly design. The database includes full records of information about each photograph, various queries, and a printable report of the results from those queries. Most importantly, each record contains a visual image of the photograph. The complete database allows the photography collection's users to find which photograph they desire without ever having to touch or even see the original. This will aid in the conservation of the photographs a great deal because every time that one is handled, it deteriorates a bit more. Our team developed a procedure and schedule in order to finish the project, this aided in the organisation and efficient completion of the database (Appendix L).

The brainstorming phase initiated the construction of the Museum's database. The fields within the database constitute an integral part of the database. The key fields chosen by our team determined the layout of the database and the information that it now contains. From the list of fields, we organized tables. Through trial and

error, we found that our best option was to house all of the fields in two tables, called *Main* and *Image_Info*. We only placed one field, namely *PhotoID*, in both tables. This procedure allowed for the linkage between the tables. After planning the table layout, we began entering the field information into the tables.

In order to create a new table, we began by selecting the "Create table in Design view" option. Making this selection prompts the opening of a blank table with column headings: *Field Name*, *Data Type*, and *Description*. Our WPI team first built the *Main* table. This contains descriptive information about the photograph, such as its title. We built the *Image_Info* table second. It contains more technical information, such as the photograph's dimensions. After entering the field name, we entered the data type. The possible options in this category are *Text*, *Memo*, *Number*, *Date/Time*, *Currency*, *AutoNumber*, *Yes/No*, *OLE Object*, *Hyperlink*, and *Lookup Wizard*. The details of each of these options can be found in Appendix M. Next the description column explains what is contained in that field. At the bottom of the screen, a small table displays more details about the highlighted row in the upper table. This smaller table contains general information, such as field size, and lookup information, such as the options found in a pull-down menu for that field. The following charts display the pertinent information found in the *Design View* for both database tables (Figure 6 and Figure 7). The charts, however, exclude the information about the row source for the fields with pull downs menus, which can be found in Appendix N.

Field Name	Data Type	Description	Field Size	Lookup Menu
PhotoID	AutoNumber	Assigned Identification Number	Long Integer	No
Title	Text	Photograph Title	50	No
NegNumber	Text	Reference number to find negative	35	No
Rel_Work	Text	Related Literary Work	50	Yes
Date	Text	Date of photograph	4	No
Category	Text	4 major categories	15	Yes
Portraits	Text	Subcategories for Portraits	20	Yes
Topography	Text	Subcategories for Topography	50	Yes
Illustrations	Text	Subcategories for Illustrations	50	Yes
Miscellaneous	Text	Subcategories for Miscellaneous	50	Yes
Owner	Text	Person or organisation who owns the rights to the photograph	35	Yes
Link to Image	OLE Object	Visual Image		No
Description	Memo	Summary of photograph		No
Duplicate	Text	Notes whether there is more than one copy	10	Yes

Figure 6: *Main* **Table Information**

Field Name	Data Type	Description	Field Size	Lookup Menu
Colour	Text	Black and White or Colour	20	Yes
Print_Type	Text	Matte or Gloss	10	Yes
Condition	Text	Rating of the condition of the photograph	10	Yes
Cond_Remarks	Text	Added comments about the condition of the photograph	75	No
Height (mm)	Number	Height dimension of the original photograph in milimeters	Integer	No
Width (mm)	Number	Width dimension of the original photograph in milimeters	Integer	No
ObjectName	Text	Image file name	8	No
ObjectType	Text	File type	4	No
RecBy	Text	Initials of person who recorded this photograph in the database	3	Yes
RecDate	Date/Time	Date that this photograph was recorded in the database	Medium Date	No
PhotoID	AutoNumber	Assigned identification number	Long Integer	No

Figure 7: *Image_Info* **Table Information**

One of the most important fields within this database is *Link to Image*. We assigned *OLE object* as its data type, with a specification that the object is embedded. When viewing a form or report, the user can see the image within the record. Throughout this project, our team knew that this ability was an essential part of the database. The visible image allows the user to immediately view an image that he would otherwise have to find by hand within the filing cabinets of archival wallets. The major objective of this IQP was to build a database that would prevent such searching through the valuable photographs. Our team researched and attempted various methods of viewing the image within the database, but we found that embedding the object was the best method for including this feature. The image, surrounded by the information about the photograph, found in the tables, allows for efficient searching and therefore conservation of the collection.

The tables create a foundation because they hold all of the information within the database. The *PhotoID* number served as the link that formed the relationship between the two tables. Our team created this association using the *Relationship* command under the Tools menu. We entered the two tables into the workspace, dragged the *PhotoID* from one table to the other and hence created a link. Our project group had created a working database by this point. Next, our team had to work on other aspects such as a user-friendly design and search capabilities.

Microsoft Access refers to searches as "queries." A query looks through all of the information found in the tables in order to filter out only the records that would be of interested to the current user. Our IQP team created ten main queries for this database, namely *Advanced (And) Keyword, Advanced (Or) Keyword Date, Description, Exact Phrase, Keyword, Negative Number, Related Works, SubCategory,* and *Title*. These queries all search through the field corresponding with their query

name except for the multiple *Keyword* and *Exact Phrase* queries. These queries searches through the *Date, Description*, *Related Works*, *Subcategory*, and *Title* fields. The *Advanced (And) Keyword* query allows the user to input two words that both must be found in any of these four fields. The *Advanced (Or) Keyword* query also allows the user to input two words, but in this case the query is looking for either of those two words within the four mentioned fields. Finally the *Exact Phrase* query searches for only the words for the complete phrase that is entered. For example, if 'cat' is that word that is entered, descriptions with the word 'category' will not display as a result because it is not the word 'cat' alone. Our team, influenced by information received in interviews and user evaluations, decided that listed queries would be most effective for this specific catalogue.

When designing a query, our group found it most effective to use the "Create query by using wizard" command. This command prompts the administrator for most of the essential information needed to build a query. First, the screen requests a list of fields that will be included in the query results. This list can be taken from either a table or another query. Next it asks whether the administrator would prefer the results to be displayed in a detailed or summarised form. We chose the detailed form for this catalogue and recommend that future administrators do the same. The following screen has a space for the name of the query. Finally, it asks at this point whether the administrator wants to open the query or adjust it in *Design View*. Our team decided to adjust the query in its *Design View* because it would still need to be refined.

The *Design View* of the query contains a table of important information. Each column contains a row for the *Field*, *Table*, *Sort*, and *Show*, and multiple rows for the *Criteria*. The *Field* row contains the field name. The *Table* row references the table that contains that field. The third row, named *Sort*, contains a pull-down menu that

lists the ways that the results can be sorted, namely ascending, descending, or not sorted. The next row, *Show*, contains a box that either remains empty or holds a checkmark, indicating whether this field will be viewed in the results. Finally, the *Criteria* rows determine which fields the queries will be directed towards and the manner in which the records will be filtered. Our group members used an expression builder that assists in the relationship between the query and the field that it will be searching. The *Criteria* row allows the administrator to define an expression that requests the user to enter a certain keyword or search phrase. For example, we used the expression builder to create the command *Like "*" & [Enter Keyword] & "*"* in the *Description* query. The part of this expression within the brackets means that when the user selects the *Description* query, a small box will appear that says "Enter Keyword" and displays a small text block for the user to do just that. The expression acts as an internal code that assigns the word, which the user had entered, to the phrase "Enter Keyword." The rest of the expression means that the query will search for a record that contains the whole word that was assigned to "Enter Keyword." The "*" signs ensure that the word can be anywhere within the phrase whether there is something before or after it. This expression aspect of a query makes it one of the more difficult aspects of creating the database.

After creating the tables and queries, the more technical parts of the database creation had passed and the user-friendly design came into play. The forms and reports make up this user-friendly section. In this case, user refers to both administrative and researching individuals. Our WPI team directed one form, for data entry, towards the administrator. Another form, the switchboard, was intended for both the administrator and the catalogue users. Then, our team members directed the reports towards the catalogue users.

Our team members found that when creating a report, one must focus on its design. The reports within this database serve the purpose of displaying query results. Therefore, when creating the report design, our project team tried to have the most information that could be displayed in a readable layout. We found that if the information was placed correctly, three records could be displayed on one page. Once the dimensions of the record were decided upon, our team had to decide which fields this record would contain. Our group members omitted some fields, such as *RecBy* and *RecDate*, from the report because they are of no relevance to a catalogue user who is looking for a specific photograph. The type of information in these fields was directed towards the administrative side of the database. While deciding on which fields to include, our team members were simultaneously testing dimension size for the image that would be within the record. We thought it necessary to make the image as large as possible because it cannot be enlarged through a report. Also, we designed the report with the expectation that it would be printed. Therefore, if a user wanted to print query results, the image should be large enough that the printer wouldn't make the image too blurry.

The report may be composed using the *Wizard*, the *Design View*, or a combination of the two. The first step in either case entails choosing which fields will be entered into the report. From this point, the administrator must design an efficient layout. The fields must be entered so that many can fit into a small place, but at the same time they should be spaced out and easy to read. This may be a time consuming task, but if performed correctly it will be worth the time. In our case, we used the same layout for all of the reports because our primary design fulfilled the requirements we were trying to meet.

Our IQP group considered two options for displaying query results. Both forms and reports may be used for display purposes. Forms allow information to be presented in a more stylish format, but can only be viewed one at a time. On the other hand, reports allow the user to view three records at a time, can hold almost as much as a form, and have a printable format. Through testing by the team and five test users, we came to the conclusion that reports provide a much better display for the user.

Our team members still utilised forms for data entry and menus. The data entry form allows the administrator to tab through a form to enter all of a photograph's information on one screen. The menu's form is also referred to as the switchboard. This form appears when the database opens. It gives the user multiple options for moving through the database. Each selection links to another display within the switchboard. It allows for back and forth movement as well.

Forms may be compiled using the *Design View* or the *Wizard.* As with the reports, the creator's focus lies with the design. Our project team included Visual Basic codes with the forms as well. We dedicated a good deal of effort to the *New Entry* form. Our student team constantly used this form and therefore frequently made adjustments to increase its efficiency. Due to the size of the collection being inputted, any small issues that slow down the data entry can add greatly to the overall input time. We additionally created Visual Basic codes to prevent future mistakes which will be discussed later in the paper.

Similar to other sections, when creating a form, the administrator must begin by determining which fields to include in the design. In the case of the *New Entry* form, our project group included everything from both tables. This decision allowed for the *New Entry* form to be the centre of information collection. A large problem

arose when we arranged the fields within the form. Not only did all of the fields have

to fit into a small screen space, but they had to be in an order that made them easy to

enter, and arranged so that the most important information available was easily

observed. The final design can be viewed in Figure 8.

Figure 8: New Entry Form Screenshot

In order to make the entries easier to move through, our team members arranged the

fields a certain way. The information gained from the back of the photograph, such as

Date, was inputted in the first half of the form fields and the information taken from

the front of the photograph, such as *Condition*, in the second half. The only exception

to this rule involves the *Description* field. Due to the size of this field, it must be

placed at the bottom of the form, so that it does not interfere with any other fields.

This does not completely vary from the format though, because the administrator

enters comments about both the front and back of the photograph into the description field. For another format feature, we designed the form so the administrator never needs to move the mouse, but instead can move through all of the fields using only the keyboard. Our team entered the settings that allowed this feature by right-clicking on the form and filling in the necessary properties for the fields.

The form also contains Visual Basic code to make it more user friendly. We felt that the correspondence between the *Category* and *SubCategory* fields (*Portraits*, *Topography*, *Illustrations* and *Miscellaneous*) looked confusing within the form. The design also made it rather easy to enter information wrong. Therefore, one of our team members wrote a Visual Basic function that corrected these problems by controlling which subcategories could be viewed within the form. This, in turn, restricted entering information into the wrong field. For example, when the form first loads, the administrator cannot see any *SubCategory* fields. As the administrator fills in the form and chooses a *Category*, from the field's pull down menu of four options, only then will the corresponding *SubCategory* field appear. This alteration prevents the administrator from choosing the *Topography* field then entering information into the *Illustrations SubCategory* field. The code can be viewed in Figure 9.

```
Private Sub Category_AfterUpdate()
        If Category = "Portraits" Then
            Me.Portraits.Visible = True
            Me.Topography.Visible = False
            Me.Illustrations.Visible = False
            Me.Miscellaneous.Visible = False
        Else
            If Category = "Topography" Then
                Me.Portraits.Visible = False
                Me.Topography.Visible = True
                Me.Illustrations.Visible = False
                Me.Miscellaneous.Visible = False
            Else
                If Category = "Illustrations" Then
                    Me.Portraits.Visible = False
                    Me.Topography.Visible = False
                    Me.Illustrations.Visible = True
                    Me.Miscellaneous.Visible = False
                Else
                    If Category = "Miscellaneous" Then
                        Me.Portraits.Visible = False
                        Me.Topography.Visible = False
                        Me.Illustrations.Visible = False
                        Me.Miscellaneous.Visible = True
                    End If
                End If
            End If
        End If
End Sub

Private Sub Portraits_BeforeUpdate(Cancel As Integer)
        Me.Category.Enable = False
End Sub

Private Sub Topography_BeforeUpdate(Cancel As Integer)
        Me.Category.Enable = False
End Sub

Private Sub Illustrations_BeforeUpdate(Cancel As Integer)
        Me.Category.Enable = False
End Sub

Private Sub Miscellaneous_BeforeUpdate(Cancel As Integer)
        Me.Category.Enable = False
End Sub

Private Sub Condition_Change()
        Me.Portraits.Visible = False
        Me.Topography.Visible = False
        Me.Illustrations.Visible = False
        Me.Miscellaneous.Visible = False
        Me.Category.Enabled = True
End Sub
```

Figure 9: *New Entry* **Form Code**

In order for this code to work, each of the *SubCategory* fields must have the *Visible* option in its properties set to *No*. The first *If-Then* statement within the code says that if the *Category* is set to *Portraits* after it has been updated, then the *Portraits SubCategory* field will be visible in the form and all of the other *SubCategories* will be invisible. The following *If-Then* statements follow in the same manner until the *End Sub* command. The next four command sets disable the *Category* field when the *SubCategory* field is in use. This prevents the category from being changed. The final set of commands depends on the *Condition* category. When the *Condition* category changes, all of the *SubCategory* fields become invisible and the *Category* field becomes active in order to prepare for the next record. The Visual Basic code for this form mainly serves the purpose of preventing future problems.

The switchboard is a menu that allows for easy navigation throughout the database. We designed our switchboard so that the user will not have to interface with any confusing aspects of the database. The switchboard manager is located within the tools menu and is where an administrator can create and edit switchboard pages. The administrator can define what command will be executed on each switchboard page when the user chooses an option. The switchboard allows the administrator to customise the number of items and the order of those items in the menu. The buttons for *New*, *Edit*, *Delete*, *Move up*, and *Move down* allow for the easy manipulation of the order of the items on the switchboard pages. *New* will add in another item, *Delete* will remove the highlighted one, and the *Move* buttons will change the order that the items will appear on the page. Choosing *Edit* will allow for the administrator to change the properties of each item. There are three possible options in the *Edit* menu: *Text Box*, *Command*, and then a variable selection. The first option allows the administrator to type in the text that will appear on the

switchboard to describe the item. And example would be *Begin Querying* to describe how clicking the button will bring the user to the switchboard page containing the various queries. The command line consists of a pull-down box that allows for a certain action to be executed when the user chooses the item. Our database used some of the following example commands: *Exit Application*, *Go to Switchboard*, *Open Report*, and *Run Macro*. Once a command has been chosen, the associated third field is displayed. For example, if the command *Open Report* is clicked, the third field will create a drop down menu listing all of the possible reports that can be displayed. A walkthrough of how to edit the switchboard will be shown in detail in the administrative manual, but first our team will provide an explanation of our switchboard.

The first switchboard page is the "Welcome to the DHM Photography Catalogue" screen. From this page, all the other related pages can be accessed. Our main screen contains three possible items for the user to click on: *Begin Querying*, *Add a New Entry (Restricted)*, and *Exit the Photography Collection*. The first item, *Begin Querying*, is a command that opens another switchboard page, "Basic Query."

The second item on the main page is used to add a new entry into the database. This option is a command that references another switchboard page; only an administrator will have access to this option. The final item is to *Exit the Photography Catalogue*, which executes the command *Exit Application*. The complete listing of the switchboard and menu items within our database can be seen in Figure 10.

Welcome to the DHM Photography Catalogue
Begin Querying
Add a Entry
Exit The Photography Collection

Basic Query
Keyword Query
Date Range Query
Negative Number Query
Exact Phrase Query
Advance Querying
Go Back to the Welcome Screen

Advanced Queries
Advanced (And) Query
Advanced (Or) Query
Description Query
Related Works Query
SubCategory Query
Title Query
Go Back to Basic Querying
Go Back to the Welcome Screen

Add a New Entry
Add a New Entry
Go Back to the Welcome Screen

Figure 10: Listing of Switchboards and Menu Items

We divided the searching options into two categories: basic queries and advanced queries. Each switchboard has the option to go back to the welcome screen, thereby providing a way to navigate out.

4.4 Final Digitisation Procedure

In order to obtain the best possible results, we designed a three-phase systematic approach to digitisation of the photographs. Our team designed the procedure to meet the specific needs and available resources of the Dickens House Museum. The following section reviews the process of capturing the image using the Kodak digital camera. Our WPI group members designated a specific area of the library for the capturing of the photographs. The following supplies were used during

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the capturing process: digital camera, power cord, power adaptor, Jessops tripod

stand, gloves, visible light, working area (table), and the photographs. The use of the

supplies can be viewed in Figure 11, which illustrates the capture set-up.
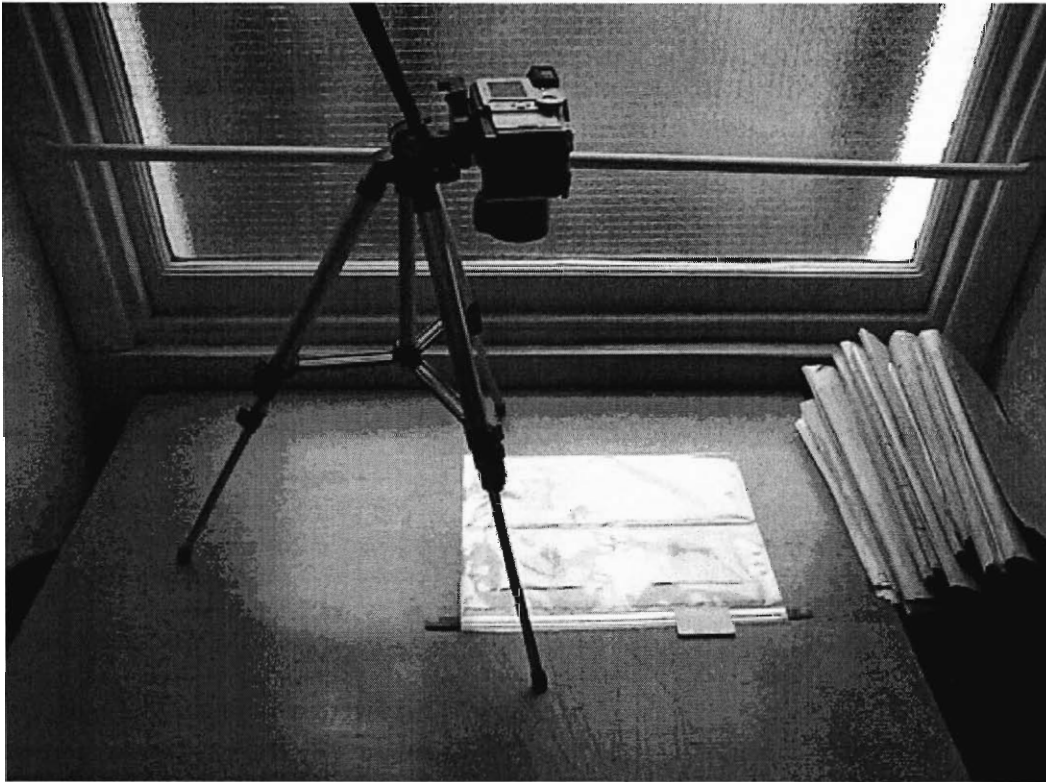
Figure 11: Set-up for capturing during the digitisation process.

The first phase involved obtaining a batch of transparent wallets containing

the photographs. They were taken out of the filing cabinets where they are stored and

placed on the table in preparation for capture. Each wallet was then positioned

horizontally such that the camera could capture each image individually. Once the

team member had focused on the image and was satisfied with the preview displayed

on the camera screen, the image was captured. An example of the original digital

image, after the photograph entitled "The Late Charles Dickens" was captured, can be

seen in Figure 12.
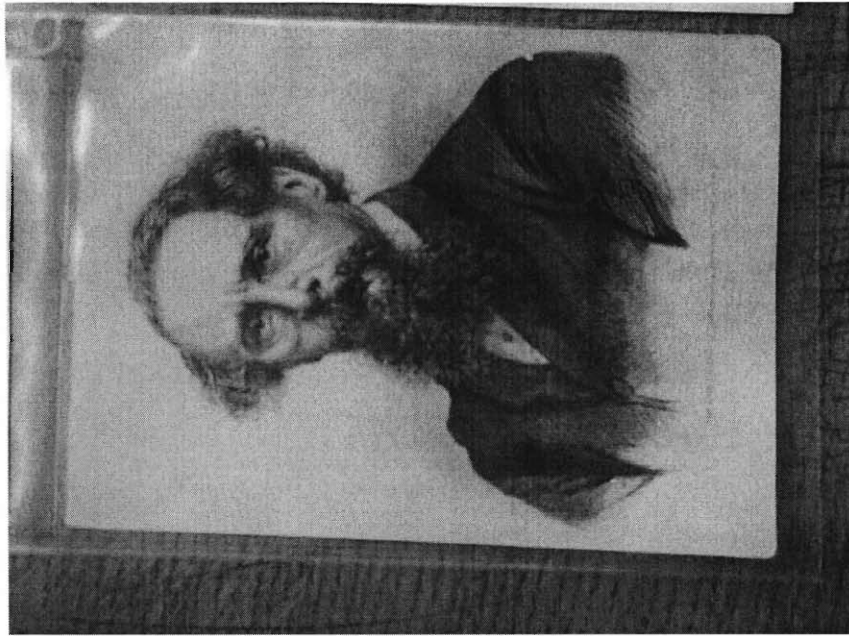
Figure 12: Original digital image of photograph.

The camera takes approximately ten seconds to store the image into the memory of the camera as a file; during that time the next image in the transparency was positioned for capture. As soon as a batch was completed, the images advanced to phase two.

The second phase involved the downloading and the editing of the digital images. The digital camera was connected to the laptop computer via its ninepin serial port. The images were then downloaded and saved onto the computer. When the digital images were first saved, they were stored with a file name designated by the digital camera, a preset auto number. The next stage was the editing of the images. This stage included cropping, rotating, changing format type, resizing, and compression. Once an image was opened, it was cropped to cut out the excess background, as shown in Figure 13.
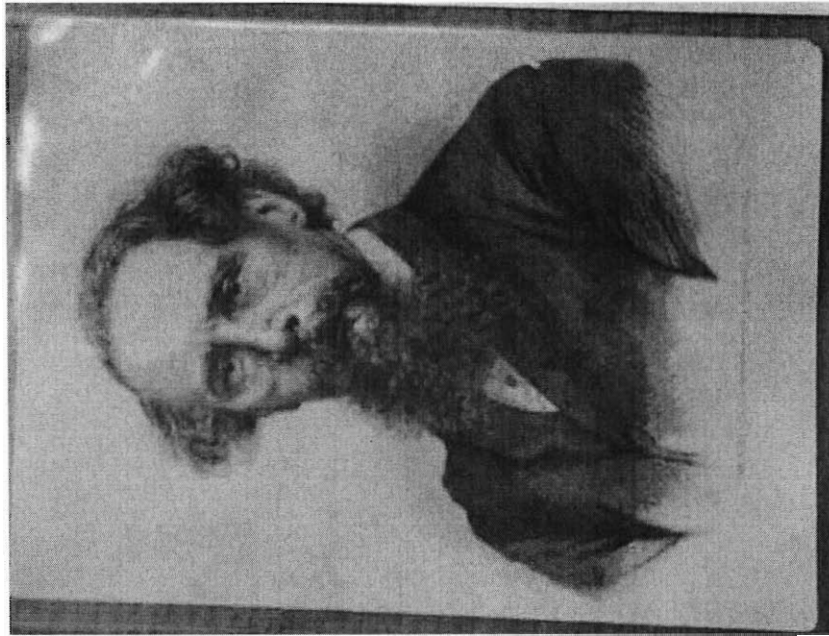
Figure 13: Image after it has been cropped to reduce background area.

The image was then rotated in order to align the image to the correct position, whether it was horizontal or vertical (see Figure 14).
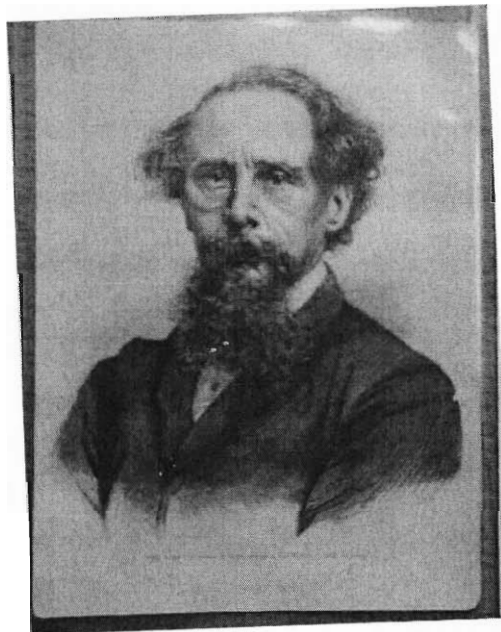
Figure 14: Image after it has been rotated to its correct orientation.

After the image was rotated, it was cropped again so that the photograph took

up the entire area, see Figure 15.
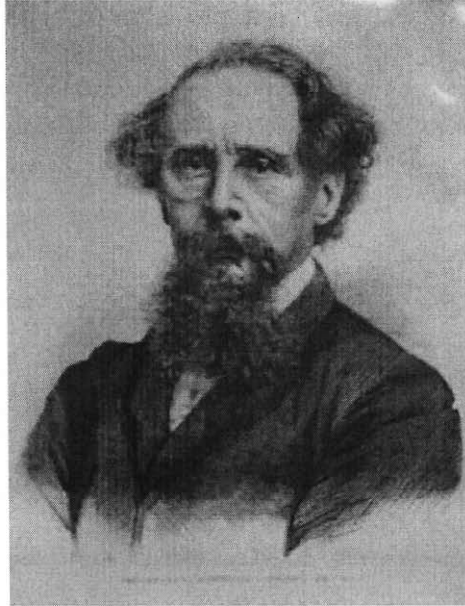
Figure 15: Image after final cropping.

Figure 16 illustrates how our team changed the image to a greyscale to reduce

the file size.

Figure 16: Image after converting to greyscale.

Then, the image size was reduced so that it is no greater than 5 inches at its longest edge, as shown in Figure 17.
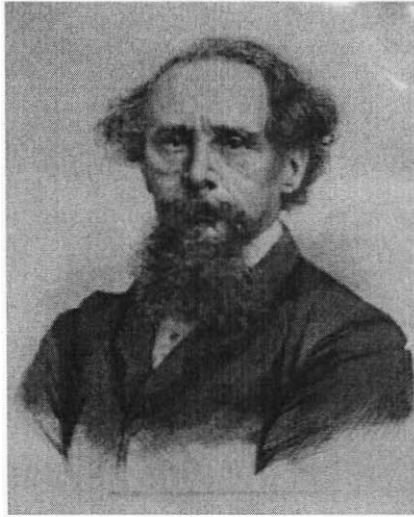
Figure 17: Image after changing the size to 5 inches.

Finally, we saved the image as a Jpeg, with the lowest compression option available, see Figure 18.
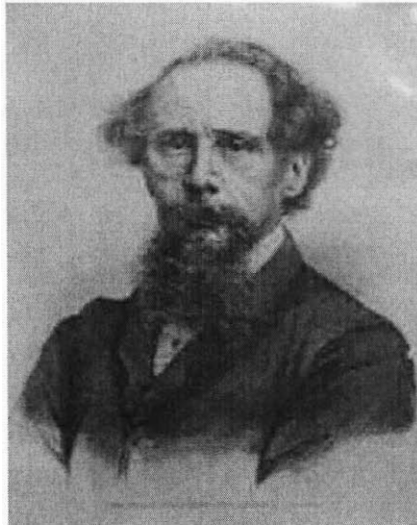
Figure 18: Image after saving it as a compressed Jpeg file.

As can be seen in Figures 17 and 18, the appearance of the image does not change by saving it as a compressed Jpeg file. Each step decreased the file size and

therefore made the digitisation project more feasible; the file sizes of the sample images can be seen in Appendix O.

Previous to editing the images, they were numbered according to our naming scheme. The image file was saved using the following system: cdxxxxxx, where the x represents the image number, and the cd stands for Charles Dickens. An example is image cd000123, which represents image number one hundred and twenty-three. During the naming stage, we examined the original photographs for duplicate images so that the database would not contain redundant entries. Before the digital images were named, a post-it note with its number was placed on the transparency over the photograph. The dimensions of the original photograph were taken in millimetres using a ruler and this information was written on the post-it underneath the number. The notes remained on the wallets through out the rest of the procedure in order to keep the photographs organised and decrease confusion about photograph information. This number was used for the naming scheme of the digital images and later to double check the accuracy when a new record was being created. This step of creating the new database record was step three, data entry.

The third phase consisted of deciphering and manually inputting the photograph data. We found this to be the most time consuming portion of our project. The handwritten information, found on the back of every photograph, contained the necessary details to complete many fields within the database record. We often found this information difficult to determine due to the age and the scrawled handwriting present on a majority of the photographs. In addition to the previously mentioned characteristics, deciding which information to input consumed a large amount of time as well. This included finding any problems with the condition of the photographs to record in the *Condition Remarks* field, thinking of an appropriate title, and producing

a full description for the photographs. We determined most of this information through the examination of the front and back of the photographs. Then, one of our team members reviewed any additional information, which either could not be deciphered or was unavailable, with our liaison every one to two days in order to complete as many of the database fields as possible for every photograph record.

Our project team used this three stage procedure to completely record the Dickens Portraits section of the Museum's photography collection. These six hundred fourteen records consisted of images of Dickens throughout his life. This section included portraits, cartoons, and photographs of sculptures of Dickens. The majority of the photographs were black and white from the middle 1800s. Herbert Watkins was a primary photographer of Dickens and is found frequently within the completed section.

4.5 Results of User Evaluations

The user evaluations helped redirect our database toward the end user. Our project team designed a user evaluation, consisting of six comprehensive questions, which is shown in Appendix P. We asked the potential users to evaluate the ease of navigation and effectiveness of the database features, and to provide us with suggestions for improvement. Our group members' goal of the evaluations was to receive feedback concerning which elements of our database were good and which areas needed improvement. Specifically, we wanted to improve the areas that were lacking in the users' requirements. Several points covered in the evaluation included the design and accessibility of the database, the user's inclinations towards various features, and the user's more subjective response and candid ideas. The potential exists for a user to have his or her personal requests or preferences for the database.

For example, one user may want to be able to search by date of the photograph, while another user may want to just search by keywords. Therefore, we had an array of individuals from different backgrounds, ranging from an information technology specialist to a Dickens scholar, test our database and complete the user evaluation forms.

The results of the evaluations were helpful in determining that our database was lacking in the following areas: And/Or queries, viewing the results of a query, and browsing by image. These topics are just some of the possible features that the user potentially would like to see. We revised the database to accommodate some requests, while other requests were simply not feasible. Overall, the users who performed the evaluations were very satisfied with the capabilities of the Access database. The results of the individual evaluations can be seen in Appendix Q. Due to our foresight and extensive research and interviews when initially designing and troubleshooting the database, many of the major issues were corrected prior to any user interaction.

Some information added into the database was not listed within the evaluation form; however, we watched and recorded observations and issues that occurred while the users conducted their evaluations. Mainly these were errors or minor points within the database that related to protecting the security of the data which needed to be fixed. Our team did not heavily secure the database form before the user testing; therefore, users were able to easily change information. This issue was corrected for the final database product because we initiated measures insuring that only those with password access can alter any information in the database.

Our WPI team also performed our own assessment of the images and information within the photography catalogue. Using the National Archives and

Records Administration (NARA) guidelines, mentioned in Chapter 2 and illustrated in Appendix G, we evaluated the digital images and their respective information within the database. Our findings can be found in Appendix R. We discovered that the majority of the images met the criteria outlined by the NARA, those that did not however, still met the requirements of a clear and accurate low- resolution image.

5.0 Analysis of Results

The raw results presented in the Data Results chapter were strictly the data we received from all the various research, testing, and methods we implemented during the entire project. That chapter contains some information concerning how and why certain decisions were made; however, the Analysis of Results chapter goes more in depth into our reasoning and justification for the various decisions made during the IQP. We discuss how the results influenced our choices and analyze the project methods.

5.1 Analysis of Project

After completing the project, we evaluated the results in order to determine which aspects we considered high-quality and which were lacking. Sections 5.1.1 and 5.1.2 contain our team's analysis of the two portions of our project, the database design and the digitisation process. Section 5.2 discusses what troubleshooting the project team conducted in order to correct the problems that arose.

5.1.1 Database Design

Our WPI student team designed the database based on a variety of factors including the needs of the Museum, the needs of the user, the suggestions and recommendations from various sources, and of course our own abilities. We believe that the end result of the database displays the best possible design achievable by this team and during this time period. There were several issues and problems that arose, which are discussed in the Troubleshooting section, Section 5.2; however, for the most part, the database met or exceeded all expectations and requirements of both the advisors and the liaison.

The decision to use Microsoft Access as the database program suited the project well; though another program may have been better for this type of project, Access provided all the features necessary for the Dickens House catalogue. It contained forms, queries, reports, and a switchboard, all key elements of a comprehensive database. The forms allowed an "administrator", or our project team in this case, to input data into the program, thereby creating or editing records to contain valuable information concerning each photograph. The forms also contained the ability to have an image linked to these data, a necessary and integral part of the project. The queries allow users to search by a variety of methods, as discussed in the previous chapter, and the results are displayed in a report. As mentioned, we considered two methods for the results display. Though a form was an option, the outcome of our user evaluations as well as our own preference determined that the results should be displayed in a report. We felt that using the report cut down on a lot of unnecessary work for the project team, minimized potential user and administrator errors, and best fulfilled the users' preferences. The switchboard allowed for easy navigation of the database for both users and administrators and provided clear paths for accessing the necessary elements. The team members felt that as many queries as possible should be included in the design of the database; therefore, we spent a couple weeks defining, creating, and adjusting these features to make them as user-friendly and accessible as possible.

Deciding what information should be included in all these database features, as well as actually creating them, were both critical processes. The results of interviews, user evaluations, and research and discussions with our liaison led to the determination of which fields would be necessary for the user to access and which fields should be for the administrator only. These fields are described in the Results

chapter; however, any information not currently accessible or included in the database can always be altered depending on the changing needs of the Museum or user.

The digital images proved to be the key element within the database. We found it difficult to decide upon a method for including and viewing the images in the Access database. These issues will be discussed in more depth in a later section. However, we believe that the final procedure of embedding the images, though increasing the database size greatly, was the only method that would allow for the images to be viewed while decreasing the potential of errors due to excessive Visual Basic code. As will be mentioned later on, the database can be modified or upgraded easily by someone who has experience and time to create code for the feature.

Ultimately, the design of the database, on which our team worked diligently, was the best possible result achievable. We provided manuals for use and upkeep of the material after our team leaves. Also, since we used Microsoft Access, someone knowledgeable in Access and/ or Visual Basic can upgrade all the features contained in the database. When designing the database, we kept in mind not only what was currently necessary and available, but also considered what may be necessary for future applications, such as the ability to add in more entries or to easily make the database accessible on the internet.

5.1.2 Digitisation Process

Our WPI student team consisted of three members, all of whom had specific jobs during the digitisation process. The final, third phase of the procedure, as detailed in the Results Chapter, consisted of one of our team members capturing images, one editing images, and one entering data into the Access database. This procedure worked well for our project, since everyone had a specific task to complete and we could all go at our own pace. However, towards the end, all of our group

members had to work on data entry, as this was the most time-consuming part of the process. Initially, when we tried to start at the same point and complete our individual tasks, confusion and inefficiency arose. If the images had not been captured, they could not be edited, and therefore, data could not be inputted. Once the procedure of having at least 50 completed images between each phase was implemented, we could do our work independent of the progress of our fellow students. Also, once one phase was completed, the group member who was previously working on it could then switch tasks and help with the data entry, speeding up that final process.

The three digitisation phases worked well for our project team. Some issues that had arisen will be discussed in the Troubleshooting section; however for the most part the procedure flowed smoothly. Several choices came about when our team was deciding on a digitisation procedure. The testing that occurred led to the use of the digital camera is discussed in both the Methodology and Results chapters. After deciding upon equipment, we examined the location for image capture. A table by the window allowed for the use of natural light, thereby reducing glare, a flat surface upon which to take the pictures, and an isolated place so that there were no interruptions either of the photographer or of anyone working in the library. Since the member of our team who photographed the image used a stand, the camera stayed steady at a constant height, reducing individual discrepancies in the images. Our student photographer used gloves in case a picture needed to be removed from the wallets in order to be digitised. This procedure, out of all the available ones considered, offered the most efficient, clearest, and most accurate digital images.

Once this step was completed, the editing began. Since the team member who edited the images would also be naming the files, our team decided that that student

would also look through the wallets for duplicates and then number all the photographs. This allowed for a more efficient and accurate order and reduced the number of errors and corrections made when editing and inputting data. Though it may have been easier to have just one record per photograph, the Museum required a minimal number of duplicates in the database so that a query would not bring up multiple copies of the same image. Therefore, labelling duplicate photographs allowed for only one image to be included per set of multiple photographs and for all the information relating to that set to be included in the record. Our team felt that this was the most efficient way to respond to the Museum's request.

Our team member who was inputting data also found this method useful, as it reduced the input time. Since all the photographs were clearly marked with either the file or duplicate number, the individual could see how to input the information about each photograph. The duplicate number consisted of D (standing for duplicate) and then a number referring to the original photograph ID and a number designating how many duplicates exist. This method will also be discussed in the Troubleshooting section, as it was a key decision made by our team. However, in our analysis of the project, we believe that the methods we employed allowed us an efficient means of completing the digitisation using the resources and skills available.

5.2 Troubleshooting

We believe that our final project design was the best possible implementation given the existing abilities and time. As expected, a multitude of errors and issues arose that had to be dealt with. Each problem, major or minor, is strongly interrelated to many other aspects of the database application: changing one aspect can have a strong effect on a completely separate feature. After brainstorming possible

troubleshooting techniques to answer specific issues, we tested those ideas. The two main areas in which our team had to troubleshoot were database design issues and the digitisation set-up process.

5.2.1 Database Design

The first major issue in our design was the structure in which we set-up the database relationships. Originally, we tried to structure the database with three tables and created links to connect various fields. Our group faced the task of having the entire subcategory name within a drop-down table, within the main category drop down table. For example, a drop-down box would show the main four categories, and then once one was chosen, the drop down box would expand allowing for the administrator to click on the subcategory all within the same field. From testing, we realized that this option was not possible. Therefore, our team created four other categories as separate fields and combined those fields into the main table of the database.

Another complication of querying involved determining the correct expression in order to prompt a user during a query. We wanted to design our queries so the user could enter a keyword that he or she was searching for and the query would find it whether it was a partial or whole word. Our initial attempts to query for a portion of a word failed. In fact, the query was returning abnormal results; it would return records only if they ended in the same character as the entered keyword. After multiple expression adjustments, the coding issue was resolved. The following code solved the problem of searching for partial words, *Like "*" & [Enter Keyword] & "*"*.

Another problem that our team resolved involved the viewing of the query information. The issue arose when the report contained too many fields and not enough room was allotted for the image if three records were displayed. Therefore,

our project group agreed to display a larger image and to remove from the report less important fields such as who recorded the record. The database still contains that information; it is just not displayed in the query results report.

The form also needed some protection from poor or accidental data entry. Our group created code that would allow an administrator to enter only the correct information into the *SubCategory*. For example, one cannot enter the *SubCategory* "London" under the *Portraits* category. The only available options would be Dickens, Dickens's Family, Dickens's Associates, and Miscellaneous. Only the proper fields would be displayed, thus resolving this issue.

Another major problem with the database design was the viewing of images. The oversight that caused this problem involved the manner in which Microsoft Access displays images. The stored Jpeg images were being converted to Bitmap format, thus the size greatly increased. For example, an image, saved as a 6.4kb Jpeg, is uncompressed to a 60kb Bitmap format, which is approximately 10 times larger. After linking 100 images in the database, the database file size was 27.7 Mb. Therefore, we were concerned with how large the database files would be after 5000 images were inputted into the database. According to our calculations, the database could reach approximately 1000 Mb, or 1 Gb, for 5000 images. As a result, we examined other avenues for displaying the images. One option examined and tested was the use of Visual Basic code to display the image within a form. Our group was successful in having the image able to be read in the form, using the code shown in Appendix S. Although we did find errors using this code, one positive aspect was its ability to quickly load an image. However, if a viewer were to move quickly through records, the image could not be displayed, an error would occur in Microsoft Access and the application would automatically close. Yet, the application would not

properly close and would instead remain in a locked recording mode. The database file could be reopened, but for unknown reasons, the file size of the database would increase by approximately 100kb. This issue occurred every time the database inexplicably closed. However, the database could be recompressed and repaired using a function located within Access.

The other issue surrounding the Visual Basic code used to display the image was that it did not function correctly in a query report. A user could do a query and in the results report all of the images would be blank. We tried to create code that would correct this, but we did not succeed. We attempted to look at another route of displaying query information, in a form instead of a report. The difference between form and report formats is that in the form you can only view one image at a time. After succeeding in creating a query that would display in the form layout, we found yet another problem. The problem was that Access was now more likely to crash when using the form to display the query results. Steve Frank, our fellow WPI student who has ten years of experience with Visual Basic programming, attempted to figure out these issues of errors in viewing images in reports. He determined that the Visual Basic code caused unusual errors. After this trial and error procedure, we determined that embedding the images was the best way to proceed, despite its negative points. If any further issues arose with having a large database, then the database could be divided into four separate databases based upon the four main categories: *Portraits*, *Topography*, *Illustrations*, and *Miscellaneous*.

5.2.2 Digitisation Process

The digitisation process requires a specific set-up and capturing method for the photographs. Slight variations in the set-up procedure can produce skewed results. One variation that our project team came across was the issue with lighting.

Improper positioning or warped wallets reflected light and thereby produced glare. The camera captured this glare and generated a lesser quality digital image. Our project team solved the issue of glare in two ways: different positioning of the wallets and digital editing. Our student photographer changed the position of the wallet so that the glare was created on a photograph not being digitised at that moment. However, despite all our team's efforts, sometimes the improper lighting conditions remained. These negative effects on the digital image could be edited using Adobe Photoshop. If the glare was strictly in a monotone background area, the glare could be filled in with the background colour and then any boundaries could be softened and blended. If the glare was over a key feature of the photograph two methods were employed. Either the photograph was retaken at another time or in a manner which produced less glare, or else the brightness and contrast was adjusted to minimise the effect of the glare while still maintaining a clear and accurate image.

We also created a feasible way to deal with the issue of downloading the images from the digital camera to the computer for editing. The computer took approximately 10 minutes to download a set of approximately 150 images then 30 seconds to save each one. Therefore, for 150 images it would take about one and a half hours to download. This process of downloading and saving the images took up a lot of the system's resources and would slow down the computer. The slower system adversely affected our production rate. Therefore, our group proceeded to capture the images in large batches during the day and downloaded the images at night. This freed up system resources on the computer and improved our ability to accomplish tasks.

The organisation of the photographs also needed some troubleshooting help. The duplicated images within the photograph collection produced problems. Our

liaison did not want to have exact duplicate information contained within the database. Therefore, we had to determine which images were duplicates and only include one entry for the set. Our liaison gave us guidelines on how to determine which would be considered duplicates. These guidelines included checking the photographs for similarity, comparing the negative numbers, and determining whether the photograph type appeared to be the same. If two images were deemed duplicates, one was called the original and numbered while the other(s) were given letters to designate how many duplicates exist. Only one digital image was edited for the database and all the information found on each photograph in the set was included in the one record. Our WPI team thus created and organised a structured method to handle the images.

6.0 Conclusions and Recommendations

6.1 Database Usage and Population

6.1.1 Administrative Manual

Due to the time restrictions on this project, our team found it necessary to provide a method for continuation of the digitisation of the photography collection after we leave London. We believe that the optimum approach was to create an administrative manual that would explain how to update and change the database, how to carry out each step of the digitisation process, and how to troubleshoot common problems. This manual includes database design, an explanation of the current Visual Basic code, image capture, image editing, and data input. A copy of the administrative manual can be found in Appendix T.

Design of the database comprised the first section of the administrative manual. Despite our team's effort to create the best design for the database, there may be changes that the Museum would like to make in the future. Therefore, the manual includes a full explanation of the code currently used in the database and how to make design changes to tables, queries, forms, and reports.

The first subsection in the database portion of the manual addresses the subject of tables. A table, in its *Design View*, consists of three major columns: *Field Name*, *Data Type*, and *Description*. The manual includes an explanation about creating a new table, editing an old one, and specifically a complete description of each of the previously mentioned columns and suggestions for the insertion of a new row of information. At the end of the table section, the manual presents the methods for linking tables.

After the discussion of tables, the manual addresses the subject of queries. The manual demonstrates how to create a new query. Information related to the query

includes how to create the proper expression to prompt the user for an input, how to choose which information to display, and how to change the order in which the queried information is displayed. These functions outline the basis for querying information within our database.

Next, the manual addresses the subject of forms. The most important part of creating a form is deciding which fields to include and how to display these fields. Our database contains two important forms, the switchboard and the entry form. The manual discusses methods for the alteration of these forms, along with an explanation for creating a new form. An explanation for the most important modification options is explained in the manual. Our IQP team decided to include an explanation of the Visual Basic code currently attached to the entry form. Yet, a short manual, such as ours, cannot include a full explanation of a topic as broad as programming and therefore does not include it. However, our team does include a suggestion for the administrator to use Microsoft Access and Visual Basic Help commands if he or she feels the need to include additional programming.

Finally, the design section of the manual addresses the subject of reports. When planning a report, one must focus on creating a user-friendly design. We suggest that one first decide which fields will be included within the report. This includes working out which query's results will be presented. Next, the administrator must decide how large a display should be represented within each report. Finally, the administrator must combine these two aspects to create a well-formatted report that contains all of the necessary information.

The other major section of the administrative manual comprises the digitisation process. This section includes image capturing, image editing, and data inputting. Despite the potential reduction of labour force after our departure, we still

suggest that the Museum follow a method similar to our own. In our case, all three of our team members could simultaneously work on each section of the digitisation process; this most likely is not a future option for the Museum. Instead, one person will have to work on each step of the process, which will therefore be more time consuming. Fortunately, the general procedure for each step basically stays the same whether performed simultaneously or individually.

The manual initially focuses on the capturing of images. Through our research and testing, we found that the best method, in the case of the Dickens House Museum, involved the use of a digital camera. As a result, the manual describes the set-up for the workspace to use that digital camera. The administrator places the photographs on a board that is flat on the table near the window in the library of the Museum, in order to receive natural light from outside. This prevents most of the glare that unnatural light imposes. Above this board, there is a stand that steadily holds the camera above the photograph.

The manual next focuses on the editing of images. The step-by-step procedure is demonstrated within the manual. Processes such as file format conversion and image sizing are included. A novice administrator will be able to follow the step-by-step procedure in Adobe Photoshop to edit an image without prior knowledge of the application.

Within the digitisation section, the manual focuses on data input, explaining the fields carefully. Some fields are self-explanatory while others require some clarification. For example, the *Category* field requires little explanation because it has four major options that are distinct and found in a pull-down menu. On the other hand, the *Conditions* field must be explained because one person's opinion of a photograph in good condition can be very different than another person's opinion of

the condition of the same photograph. Since there may be multiple administrators, a set criteria for the determination of photograph's condition was necessary to include within the manual. Along with the condition criteria, the manual includes a list of key descriptive words for use in the *Condition Remarks* field.

Finally, the manual discusses solutions for troubleshooting common problems. There were some errors that have occurred multiple times while we worked with the database. The Troubleshooting section includes both problem preventions and solutions.

6.1.2 User Manual

Our project team felt the necessity to create a user manual for the visitors to the Dickens House Museum. The patrons who visit the Museum may not be familiar with databases or even computers. Consequently, a step-by-step manual would be extremely useful to them. This manual explains each aspect of the photography catalogue database, including a detailed description of the main switchboard, the different queries, the report display, and instructions for printing. The user manual can be found in Appendix U.

The manual begins with a brief description of the purpose or reasoning behind the database and the photography collection. The Museum sponsored this database project in order to conserve their photographs, to make it easier for users to search for the photographs they need. The database includes several key fields that provides helpful information, as well as methods for searching. We expect that the field that will be most utilised will be *Description*. This field contains the most information and provides a full explanation of each photograph.

One very important aspect of the database is that once the user searches through the catalogue for a photograph, the results that he or she receives will include

a low-resolution image of the corresponding photograph. The user will therefore often find it unnecessary to view the actual photograph. Instead, the user can order a print from the negatives, whose numbers are located within a database record. The negatives actually account for a reliable copy of a significant number of photographs located within the Collection. The correlation, between photographs and negatives, makes it frequently unnecessary for researchers to handle the actual photographs. The Photography Collection contains a large compilation of Portraits, Topography, Illustrations, and Miscellaneous items related to Charles Dickens. Since Charles Dickens lived during the 1800's, a majority of the photographs are old and fragile. Therefore, any handling that can be prevented adds to their conservation.

Next, the user manual addresses the switchboard, the first item that appears when the user opens the database. The switchboard contains three beginning options, two that branch to other options and a third that gives the option of closing the database. The first option says *Begin querying* and the second says *Add a New Entry (Restricted)*. Our project group intended the second alternative for an administrator and therefore has restricted access. In order to choose an option in the switchboard, the user clicks the left mouse button on the grey box on the side. The user can clearly navigate throughout the switchboard to utilise the appropriate search method.

The user of the database will usually choose the first option in the switchboard, *Begin Querying*. This links to a screen containing six additional choices. In this screen, the user views four choices, *Keyword Query, Date Range Query, Exact Phrase Query,* and *Negative Number Query*, which are basic, user-friendly searches. The fifth choice, *Advanced Querying*, links to yet another screen with more search methods. This linked screen includes *Advanced (And) Keyword Query, Advanced (Or) Keyword Query, Description Query, Related Works Query,*

SubCategory Query, and *Title Query*. The seventh option in this screen links back to the *Basic Querying* screen. Both the basic and the advanced query screens have a last option for returning to the "Welcome Screen."

The user manual contains a brief description of the capabilities of each type of query to aid the user in deciding which option best suits his/her needs. Once the user chooses a specific query from one of the query screens, a pop-up box prompts the user to enter a keyword or phrase for which to search. The result of the query displays in a report presenting three records at a time. After reviewing these results, the user may desire to print a group of records. The manual explains the process for printing from the photography catalogue. After viewing the records, the user may continue searching by looping back to a previous step using the switchboard or may conclude the query session.

6.2 Updating the Database

As previously mentioned, our team's time constraints prevented the completion of the digitisation. Therefore, we assume that the Museum will assign someone to continue the project. The WPI team focused on finding the best options for the construction of a database, carrying out the production, and troubleshooting errors. This focus should prevent any large problems for a Museum staff member who continues the maintenance of the database. However, due to the time spent on the above-mentioned aspects of the project, the completion of the digitisation process proved impossible.

The IQP team recommends that the Museum assign at least one person to continue the database project. The Dickens House Museum often sponsor interns; continuing this practice will likely be the best option for the completion of the

digitisation of the collection. The digitisation process requires no training apart from reading the administrative manual. Also, interns are generally unpaid. Due to these two major factors, hiring an intern would be the best option for the Dickens House Museum. In addition to an intern, the assistant curator, who will be joining the Museum staff in May 2002, may commit some time to the completion of the digitisation process. He will be able to provide knowledge of Dickens and of the photographs so that the most comprehensive information available can be included in the database. There should also be a technical consultant as the third member of this continuation committee. This third person will be available to assist with any problems that arise outside of the common troubleshooting solutions outlined within the administrative manual. This person need not be available on a daily basis, but more as a resource in case any technical problems arise.

6.3 Proposal for Online Options

A future option for the Dickens House Museum could be the conversion of the existing database to an online version. The first objective of the continuation of the project should be to complete the digitisation of the Museum's photography collection. This will be a time-consuming task. Yet, when the collection is completely digitised and in full working order within the Museum, there may be a desire to move the database online for a multitude of reasons. Putting the database online would not only allow the Museum to reach Dickens enthusiasts around the world but also other people with an interest in the collection. This also has the potential of creating more revenue for the Museum to sell prints of their photographs. It would allow more people to increase their interest in Charles Dickens.

Within a Microsoft Access database, a page can be created, which can easily be converted to a webpage. From this point, the database can be converted to an online format through the use of some HTML code. This will require more technical expertise than the digitisation aspect. It is advisable to hire an information technology specialist to carry out the online conversion of the database. Another alternative would be to propose this as a Major Qualifying Project (MQP) for either a Computer Science or Management Information Systems student at Worcester Polytechnic Institute. This would allow for another source to complete some of the data entry. Sponsoring a MQP would not only be a nearly cost-free source for online conversion, but would also build a continuing relationship with WPI.

6.4 Other Recommendations

We recommend that any information not contained in either the administrative manual or this report with respect to Microsoft Access can be obtained though other resources. These resources include some online web sites, the Microsoft Access help menu, or hard copy books similar to those listed in our References section (81-83). The help menu contained within Access can be a valuable tool for finding information. Another option is that any further extreme difficulties may be answered by one of our group members, through the contact information listed in Appendix U.

We found that during our work on the digitisation project, many of the photographs were either filed in the wrong location and/or contained incorrect information on their reverse sides. This caused problems while trying to catalogue the images. We recommend that the Dickens House Museum review the filing of the photographs and try to organize the collection. Also, a more standardized system for both the photographs and the negatives would greatly aid in the cataloguing and

archiving of the photographs as well as increasing the efficiency when accessing the negatives.

An additional recommendation is the further analysis of the Photograph Collection, specifically with respect to the negative images. The Museum could potentially look into the application of placing the photographic catalogue online and restructuring the archival set-up of the negative images. Creating an automated process for obtaining requested images could be a worthwhile investment. In conclusion, we have provided the basic framework for the digitisation of the Dickens House Museum photography collection for the conservation of these precious materials. As technological and societal requirements change, the improvement and possibilities for further development of more digitally advanced systems exist.

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Appendices

Appendix A: Mission of Agency

The Dickens House Museum, located at 48 Doughty St in London, is "a museum dedicated to the life and works of Charles Dickens" (Dickens House Museum). Charles Dickens owned the house between 1837 and 1839; while there he penned *The Pickwick Papers, Oliver Twist,* and *Nicholas Nickleby.* The Dickens Fellowship purchased it in 1923 to preserve the building. The Fellowship, based at the Dickens House Museum, is dedicated to the safeguarding and continual improvement upon the collection of Dickens works. The Museum, opened in 1925, houses a collection of books by the author and other materials related to his life and times, including over 5000 photographs. The general public, Dickens scholars, and Fellowship members visit this site. There is an adult admission fee of £4 to gain entrance to this location. The house is divided into two sections. The first is a historical representation of Dickens's living quarters. The second is a library containing his works and related paraphernalia. A virtual tour of the house is available to the public at the Dickens House Museum website (www.dickensmuseum.com).

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Appendix B: A Brief History of Charles Dickens

Charles Dickens was born on February 7, 1812 in Landport, Portsmouth. His family moved to fifteen different houses by the time he was fifteen years old (Allen x) (See Appendix C). They were often in debt since his father, John Dickens, was not careful with the family's money. In early1824 the entire family, except for Charles, was put into prison. During this imprisonment, Charles, who had already been working in a boot-blacking factory, was the only member allowed to remain "free" in order to help pay off the debt (Allen 81-3). The work was difficult and Charles grew very depressed as time wore on. Once the family was released from prison later that year, Charles hoped to end his work at the factory. His mother, however, pushed him to stay at the terrible job despite Charles' pleading. John Dickens, against the wishes of his wife, sent his son back to school (Allen 102-3). The hard job and especially the anger at his mother scarred him mentally and emotionally; it also contributed to the hardships he created for many of the young characters in his novels. His early life led him to be more concerned about society and the less fortunate. He advocated social reform and had a special consideration for unfortunate children (Perdue).

In 1830 while a free-lance reporter for the Doctor's Commons Courts, he courted Maria Beadnell, but their relationship ended in 1833. Dickens, who wrote 15 novels, numerous short stories, and gave many orations, began his serious writing career with "Sketches by Boz" in 1836. Later that same year he wrote the series "The Pickwick Papers," which was later turned into one of his most popular novels (See Appendix D). Also in 1836 he married Catherine Hogarth (Cody). His novels were originally written and printed in a serial form; the chapters were sent out as a magazine and then at the end of the series they were bound and sold as a "collection." Years later they were published as cohesive novels. From 1837 to 1839, during his

residence at 48 Doughty Street (which later became the Dickens House Museum), Dickens wrote *The Life and Times of Nicholas Nickleby* and *Oliver Twist* (Forster 83). Dickens continued writing, publishing *The Old Curiosity Shop* and *Barnaby Rudge* both in 1841.

In 1842, Charles Dickens set off to tour Canada and the United States. He advocated international copyright laws, denounced slavery, and continued with his interest in social reform. During his trip, he visited "prisons, hospitals for the insane, reform schools, and schools for blind, deaf, and dumb children" in most of the cities he toured (Perdue). He wrote a book, *American Notes*, in which he condemned several aspects of American culture. Although this drew criticism from the United States, the majority of Americans continued to read his serials (Perdue).

On his return to England he continued to write his novels in serial form, such as *Martin Chuzzlewit* and *A Christmas Carol* in 1844. He authored several short stories until returning to writing serials in 1847 with *Dombey and Son* and then *David Copperfield* in 1849. He also acted in several amateur theatre plays during this time. *Bleak House, Hard Times*, and *Little Dorrit* were all written and published in monthly serials in the early 1850s. In 1858, Dickens and his wife officially were separated and shortly afterwards, his relationship with Ellen Ternan, an actress, began. This relationship was kept mainly private since Dickens was loyal to his children and still advocated family values (Cody). Dickens moved his family to Gad's Hill in Rochester, in 1860; owning this estate had been a dream of his since childhood. He wrote some of his most widely read novels during the 1860's while residing at Gad's Hill. *A Tale of Two Cities, Great Expectations,* and *Our Mutual Friend* were all written at this time, as well as *The Mystery of Edwin Drood*. This final story he began as a serial in 1869. He died, before it was completed, on June 9, 1870 slightly after 6

o'clock in the evening; he had an inflammation of liquid around his brain and

laboured breathing for the previous 24 hours (Forster 416). Charles Dickens was

buried in Westminster Abbey in Poet's Corner with a simple tombstone stating:

"Charles Dickens
Born February the Seventh, 1812
Died June the Ninth, 1870"
(Forster 418).

Appendix C: Listing of Charles Dickens Residences

Feb. – June 1812	Mile End Terrace, Portsmouth
June 1812 –Dec 1813	Hawke Street, Portsmouth
Dec.1813 – Dec 1814	Wish St, Southsea
Jan.1814 – Dec 1816	Norfolk St, London N.22
Dec 1816- April 1817	High St, Blue Town, Sheerness
April1817 – April 1821	Ordnance St, Chatham
April 1821 – June 1822	St Mary's Place, Brook, Chatham
Jun 1822 – Sept 1822	Giles' School, Best St, Chatham
Sept 1822 – Dec 1823	Bayham, Camden Town, London
Dec 1823 – April 1824	Gower St (North), London
April 1824 – May 1824	Little College St, Camden Town
May 1824	Lant St, Southwark, London
May 1824 – Sept 1824	Little College St, Camden Town
Sept 1824 – Dec 1824	Hampstead
Dec 1824 - 1827	Johnson St, Sommers Town
Mar 1827	The Polygon, Sommers Town, London
	Bentinck St, Manchester Sq.
	Selwood Terrace Brompton, London
Dec 1834 – April 1837	Furnivals Inn, Holborn, London
April 1837 – Dec 1839	48 Doughty St, Holborn, London
Dec 1839 – Nov 1851	Devonshire Terrace, London
Nov 1851- 1860	Tavistock House, London
March 1856 - 1870	Gad's Hill Place, Rochester

(Allen x; Perdue)

Appendix D: Listing of Charles Dickens Major Works

1833 - Dickens's first story, *A Dinner at Poplar Walk*, published in *Monthly Magazine*
1836 - *Sketches by Boz*
1837 - *Posthumous Papers of the Pickwick Club*
1838 - *Oliver Twist*
1839 - *Life and Adventures of Nicholas Nickleby*
1841 - *The Old Curiosity Shop*
1841 - *Barnaby Rudge*
1843 - *A Christmas Carol*
1844 - *Life and Adventures of Martin Chuzzlewit*
1845 - *Cricket on the Hearth*
1848 - *Dombey and Son*
1850 - *David Copperfield*
1853 - *Bleak House*
1854 - *Hard Times*
1857 - *Little Dorrit*
1859 - *A Tale of Two Cities*
1861 - *Great Expectations*
1865 - *Our Mutual Friend*
1869 - Dickens begins writing *Edwin Drood* (never completed)

(Perdue)

Appendix E: Dickens Timeline

1812 - *Feb 7* Dickens born in Landport, Portsmouth
1812 - *Jun 24* John Dickens moves family to Hawke Street, Kingston, Portsmouth
1814 - John Dickens transferred to Somerset House, London
1815 - Catherine Hogarth, Dickens's future wife, born
1817 - John Dickens moves family to Chatham
1821 - Dickens starts school at William Giles School, Chatham
1822 - John Dickens transferred to London, moves to 16 Bayham Street, Camden Town
1824 - *Feb* John Dickens imprisoned at Marshalsea for debt
1824 - *Feb* Dickens leaves school, employed at Warren's Blacking House
1824 - *Jun* Dickens leaves blacking factory, returned to school
1825 - John Dickens retires with small pension
1827 - John Dickens evicted from home, Dickens removed from school
1827 - Dickens begins work as solicitor's clerk, Ellis and Blackmore, Gray's Inn
1828 - Dickens working as a reporter for the *Morning Herald*
1829 - Dickens becomes a freelance reporter at Doctor's Common
1831 - Dickens reporting for the *Mirror of Parliament*
1832 - Dickens reporting for the *True Sun*
1833 - Dickens's first story, *A Dinner at Poplar Walk*, published in *Monthly Magazine*
1834 - Dickens meets Catherine Hogarth, 8 more stories published in *Monthly Magazine*
1836 - Dickens marries Catherine Hogarth, begins writing *Pickwick*
1836 - *Sketches by Boz* published
1837 - *Posthumous Papers of the Pickwick Club* published
1838 - *Oliver Twist* published
1839 - *Life and Adventures of Nicholas Nickleby* published
1841 - *The Old Curiosity Shop* published
1841 - *Barnaby Rudge* published
1842 - Dickens first visit to America
1843 - *A Christmas Carol* published
1844 - *Life and Adventures of Martin Chuzzlewit* published
1845 - Dickens writes *Cricket on the Hearth*
1848 - *Dombey and Son* published
1850 - *David Copperfield* published
1853 - *Bleak House* published
1854 - *Hard Times* published
1857 - *Little Dorrit* published
1858 - Dickens and Catherine are legally separated
1859 - *A Tale of Two Cities* published
1861 - *Great Expectations* published
1865 - *Our Mutual Friend* published
1867 - Dickens second American visit
1869 - Dickens begins writing *Edwin Drood* (never completed)
1870 - Dickens dies, buried in Poet's Corner, Westminster Abbey

(Perdue)

Appendix F: Kodak flowchart

FLOWCHART FOR IDENTIFICATION GUIDE

From Care and Identification of
19th-Century Photographic Prints
by James M. Reilly

How To Use The Flowchart
Choose Between Photomechanical and True Photograph
For True Photographs, Choose One-, Two-, or Three-Layer Structure, Then Choose Individual Characteristics
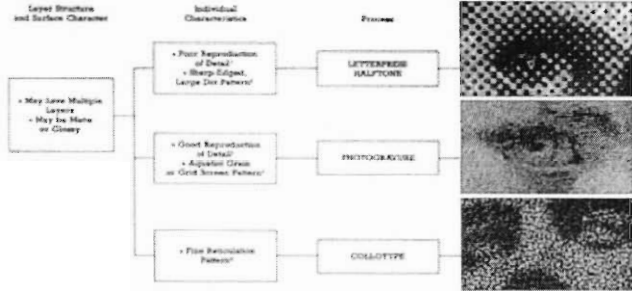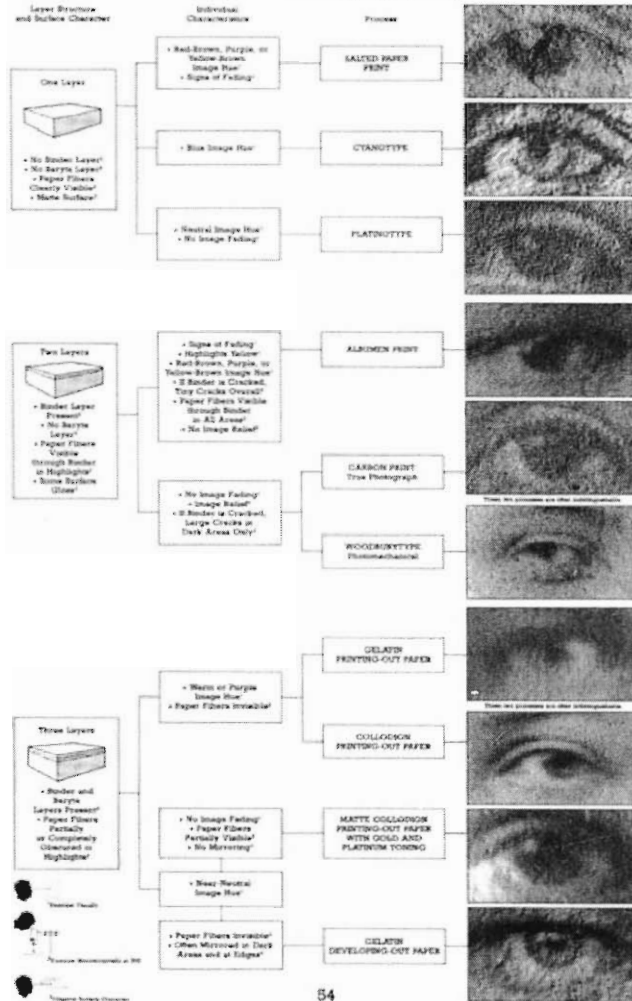
Organizational flow-chart for *IDENTIFICA-TION GUIDE* to 19th-century photographic and photomechanical prints. The full-size flowchart can be found inside the back cover. Extra copies of the organizational flowchart (KODAK Publication No. G-2Sa) are available.

Reverse side of the flowchart shows examples of the major 19th-century photographic and photomechanical print processes with their approximate dates of use.

Appendix G: National Archives and Records Administration Inspection Checklist For Digitisation Projects

- Image not the correct size
- Image not the correct resolution
- Incorrect mode, color image is a grayscale
- Incorrect bit depth
- Loss of detail in the highlights or shadows
- Uneven tonal values or flare
- Overall too light or too dark
- Overall too low or too high contrast
- Interference patterns (Newton's rings)
- Lack of sharpness
- Excessive sharpening, including unnatural appearance and halos around dark edges
- Improper image orientation, such as backwards, up-side down, side-ways, etc
- Excessive noise, usually noticeable in the darker portions of the image
- Misalignment of color channels in RGB images
- Incomplete or cropped images
- Excessively large border area
- Image not centered or skewed images
- Missing scan lines or dropped-out pixels
- Image processing and scanner artefacts, such as extraneous lines, noise, banding, etc.
- Dithering on master files or poor quality dithering on access or thumbnail files
- Poor quality interpolation on small access files and thumbnail files
- Overall color case and inaccurate color balance
- Improper file name
- Incomplete or incorrect header information

(Puglia 16-17)

Appendix H: Interview Questions

The following questions are a sampling of those asked during the team's interviews. The questions were adapted for the particular individual and more questions were asked depending on the response and to follow-up on key points that the interviewee may have made. The team used an open-ended interview format that best allowed for the most information to be received while still maintaining a professional and directed approach. The results of the interviews can be found in Appendix I and more about the interviews and our results can be found within the various chapters of the report.

Sample Questions for Users of the Catalogue:

1. What is your connection to the Dickens House Museum?

2. What is your occupational field?

3. For what purpose are you visiting the photography collection (both topic and how it will be used)?

4. Did you find what you were looking for?

5. Was it difficult to search through the images?

6. How frequently do you use the collection?

7. How do you usually search for a photograph? (examples: photographer, location, engraver, connection to a work)

8. Do you have any suggested key fields for the categorization of the photographs?

9. If you used an electronic catalogue, what would you like to be able to do?

Sample Questions for Database/Digitisation Experts:

1. What is your occupational field/job title?

2. Do you have any experience with databases (digitisation projects)?

3. What types of software/hardware have you had experience with?

4. After learning about our project would you recommend any particular software package (piece of hardware)?

5. Could you provide us with any suggestions concerning what you would want to see or be able to do if accessing a system such as ours?

6. Do you have any other suggestions concerning any aspect of our project?

7. Do you have any suggestions on who else we may want to talk to or any resources that you think we would find helpful?

Appendix I: Interview Results

All interviews were conducted with at least 2 team members present, one person led and the remaining members took notes. The interviews were set up by appointment through email, and the interviewee understood that the meetings were conducted as research for the IQP project. All interviews were conducted in an open-ended format; the interviewee was allowed to continue on a train of thought as long as the interviewer felt was relevant. The interview began with a brief summary of our IQP project and a few statements of why the interviewee was selected (expertise, recommendation, etc). The following pages record the responses to the questions and any other statements made that were relevant.

I.1: Debra Babineau

4 February 2002

Interview conducted: With Debra Babineau (WPI Computer Trainer)
By David Campbell,
With Alison Burkart and Kathryn Lambert taking notes

- She recommends Microsoft Access for a couple reasons:
  o "Free" since most computers already have it installed
  o WPI offers Tech Support
  o Numerous reference materials
  o It is a relational database
  o Can put a "front end" or "switchboard" on it to make it user-friendly
  o Should use Access 2000
- Access offers:
  o Tables to store data
  o Front-end to search (queries)
  o Switchboard (forms)
    ▪ Should check with the museum to see if a paper form exists already
- Using a hyperlink to the photographs (rather than embedding) lowers the file size
- She recommends low-resolution with a watermark if it is going to be available online.
- Monitor resolution is a factor in viewing the images.
- Recommends seeing someone in IMC about scanning, file sizes, etc.
  o Joe Kalinowski (jkal@wpi.edu)
  o Joe Kondrchek
- Recommends looking through the sample Northwind Database

I.2: Professor Lee Fontanella

5 February 2002

Interview conducted: With Lee Fontanella (WPI Department Head and Professor)
By David Campbell,
With Alison Burkart and Kathryn Lambert taking notes.

- Professor Fontanella will be at the Dickens House Museum on March 11, 12 to discuss options for connecting the Dickens House collection to other institutions.
- We must understand the storage and handling of the photographs before any scanning can be done.
    o Are they in plastic or Mylar sleeves? (The wrong material can cause damage)
    o How are they physically?
        ▪ Folded corners
        ▪ Cracks
        ▪ Faded
    o Must check with Andrew Xavier on how to handle the photographs:
        ▪ Example: if they have a folded corner should it be flattened or left?
        ▪ Any more handling (i.e. unfolding) can cause more damage.
- He aided in the V &A Museum's project
    o Contact Douglas Dodds for information about the software
    o They used Word Perfect (at museums request)
- Scanner light shouldn't affect the photographs (and definitely will do less harm than physical handling)
- Keywords to consider: Name, Date, Building/Subject, Photographers, Illustrator, Engraver
- Does Dickens House want to connect to other sources
    o I.E. link topography photos to a map database
- Perhaps offer a restricted collection
    o Control of high-resolution images
    o Interrelation with other databases with a fee or password
- How are the photos archived now?
    o Are they numbered in a system, front and back?
    o Are they marked and detailed in the same way?
    o Can use light pencilling to number photos when scanning so that it is easy to compare the scanned image with the original through the numbering.
- We could contact the Technology Departments at London Museums to find out what equipment they use for scanning.

I.3: Professor Joel Brattin

15 February 2002

Interview conducted: With Joel Brattin (WPI Humanities Professor)
                        By David Campbell,
                        With Kathryn Lambert taking notes

- The first discussion dealt with the topic of high or low-resolution images. There are reasons for and against both options, so the decision should be left to our liaison.

- Professor Brattin inquired about the available budget, but we are unsure of that information.

- Professor Brattin informed us that while there is a mailing list through the Dickens Quarterly, an email list for the Dickens Fellowship does not exist. He inferred that members of neither the Fellowship, nor the Dickens Society would be the type of people who would be interested in the Museum's photography collection. In fact it would be rather difficult to perform a survey of potential users because they are select and few.

- A focus should be placed on interviews, rather than surveys. A couple examples of people who would be interested in our project are a BBC producer doing a special on Dickens or writer looking for a picture for the jacket of their book about Dickens.

- Andrew Xavier will be an important resource for our project because he is a photography expert.

- In regards to the cataloguing of photographs, pay special attention to Dickens portraits, actors' names, and to which novel, if any, the image is related.

- The main points of interest in the collection are the pictures of Dickens and illustrations of his novels.

I.4: Joseph Kalinowski

15 February 2002

Interview conducted: With Joseph Kalinowski (WPI Senior Systems Administrator)
                     By David Campbell,
                     With Alison Burkart and Kathryn Lambert taking notes

- Two software options depending on usage:
    o One person accessing at a time -> Use Microsoft Access
    o Multiple people (web access) -> Use Oracle
- MySQL is also an option:
    o Can provide authentication functions forcing a password to access photographs and setting up a payment system.
    o However, it must be housed on a SQL server whereas Access files can be shared.
- When using Access: Embedded photographs create a much slower system
                      Hyperlink allows for a faster system.
- He recommends scanning at the highest possible resolution.
- A raw scan with a high-quality machine takes about 2-2.5 mins./scan
- Higher resolution scans are better, however take longer and have larger files.
- It was discussed how the scanning can be done during the day and then files can be transferred overnight in order to save time.
- He recommends meeting with Keith Babuszczak (keithb@wpi.edu) to discuss graphics and imaging.
- In order to approximate an image's file size, multiply colour depth * dots per inch * image measurements (length and width)
- Recommends looking at cdw.com for information about scanners: quality, pricing, and comparisons.
- Must consider scanning the photographs 3, 4, 5+ times for reproduction whereas scanning once at high-resolution and using that file for reproductions.
- Key concepts in digitisations:
    o Data Acquisition
    o Data Warehousing
    o Data Access

I.5: Professor Diane Strong

19 February 2002

Interview conducted: With Diane Strong (WPI Management Professor)
By David Campbell
With Kathryn Lambert taking notes

- Strong confirmed idea that Microsoft Access would be a viable option for our project, because it is both widely used and accessible due to its inclusion in Microsoft Office.

- Agreed that embedding images would make the database file huge.

- Hyperlinks can be used in another field within database. Photographs can only be viewed individually in applications such as Internet Explorer.

- Front end applications may exist that display multiple images, but did not know of any specific names.

- Setting up the key fields will be the most essential part of creating the database.

- She did not have any example databases that she could provide for us.

I.6: Andrew Xavier

18 March 2002

Interview conducted: With Andrew Xavier (Dickens House Museum Curator)
　　　　　　　　　　By David Campbell,
　　　　　　　　　　With Alison Burkart and Kathryn Lambert taking notes

- He looked over key fields to determine what was appropriate and what should be changed.
    - o He thought it looked complete so far.
    - o Fields concerning the creator of the image may be removed.
        - Data would be incorporated into the Memo/Notes field if searching function would work otherwise fields would remain
- Concerning the memo/descriptive field, Jacqueline may be able to offer some help.
    - o Andrew Xavier will be the one helping to populate the fields with other descriptive data.
    - o Depending on how things go, methods for this will be decided later on.
- He will also review the inputted data as the project continues to check for validity.
- Interviews:
    - o He has contacted the BBC and the producer is willing to meet with us
        - That interview will be set up in the near future.
        - BBC has requested several photographs and may offer insight into user preferences.
        - Producer can do sample queries as the database is being developed.
            - Troubleshooting procedure
            - Can offer advice concerning improvements.
    - o May set up interviews/meeting with some of the Trustees to go over possibilities of the database.
        - They have a more detailed knowledge of Dickens so may only be helpful in providing information to input rather than in setting up the database.
    - o Would like us to meet with the Museum's IT help person.
        - He could look over our database and offer advice concerning both the program and the Dickens information.
    - o We may be able to interview users about their preferences but more likely will only have them as testers.
- Testing/Evaluating the database:
    - o Producer of the BBC is willing to run sample queries as a troubleshooting mechanism.
    - o Actual users will be asked if they are willing to run sample searches as the database is being organized to test for problems or needed additions.
- Photos throughout museum should have copies in filing cabinet.
    - o Someone should go through and checklist all of the Museum's photographs to make sure that they are included – if not add them in.
- Usually about 10 photo enquiries per month.

- o Number increases if a special is being made or if a book is being published.
- Database will be backed up using the CD-R drive.
- Andrew Xavier's current computer can be used solely for storing and accessing the database if it can technically handle it.
    - o He will be getting a new computer soon.
    - o We need to look it over to determine its capabilities.
- Depending on time we will look into funding for digitising the negatives for high-resolution images.
- Photograph priority:
    - o Portraits of Dickens
    - o Portraits of Dickens's Associates
    - o Illustrations
    - o Dickens's Homes (Topography)

I.7: Jacqueline Cone

21 March 2002

Interview conducted: With Jacqueline Cone (Curatorial Assistant)
By Alison Burkart
With Kathryn Lambert taking notes

- Jacqueline is doing an internship at the Dickens House Museum as the curatorial assistant.
- She is currently a double major in English and History at Skidmore College, though her study-abroad program is through Regents College. She is looking to enter the editorial field.
- One of her tasks is to reply to requests – either through written answers or by finding certain requested material (such as photographs).
   o When requests for photographs are received at the Museum, she will search through the collection to find the needed image.
- She found it difficult to search for individual photographs using the current archiving system.
   o She has to physically sort through by hand.
   o She accesses the photograph collection on average at least 3 times per day.
   o Some people will ask for a specific photo (photographer, date, what it looks like), some aren't as specific.
- She felt that the key fields we had defined were fine.
- She mentioned that the Topography section would be hard to go through (and currently is the most difficult section) because the photographs are very disorganised.
- She hoped that an electronic catalogue could cut down on the time needed to search through all the photographs when looking for certain images.

I.8 Vermeer Project Team

27 March 2002

Interview conducted: With Sara Holt and the Vermeer project team
                             By David Campbell
                             With Alison Burkart and Kathryn Lambert taking notes

- The team was given a tour of the National Gallery's digitisation studio.
  - MARC camera system takes very high-resolution images (approximately 10,000 x 10,000 pixels) in several modes of lighting
  - Digital image saved to server and then edited
    - 4 different file types
      - VIPS (camera file type) (about 350 Mb)
      - High-resolution TIFF   (about 270 Mb)
      - Medium-resolution TIFF (about 30-50 Mb)
      - Low-resolution Jpeg   (about .3-.5 Mb)
    - Saved in 4 places
      - 3 copies on CDs (stored in various locations)
      - 1 copy on the server
- Digital imaging and inputting kept separate
  - Team inputs file information
  - Elsewhere the picture information is inputted into the record.
- Previously used Access, now use a different professional database
  - They are having a more difficult time inputting
    - 1 hour per image at times
    - Very detailed, some information that must be inputted is irrelevant
- They felt that inputting would take the most time and recommended that two of our three team members perform that aspect while the third person does digitisation.
- They provided us with a copy of one of their information booklets that contains information about the camera system and their digitisation project.

Appendix J: Scanner and Camera Specifications

For the project, there were three pieces of equipment available for the team to use: the Museum's scanner, the Museum's digital camera, and a team member's personal digital camera. In order to determine which piece would best suit our needs, we compared the official specifications for each digital tool. This information was taken from each of the respective websites and is shown in the following pages of this appendix. The Museum's scanner was a Plustek OpticPro 9636P while their digital camera was an Olympus C-2500L Digital Camera. The IQP team's camera was a Kodak Digital Camera DC210+.

J.1 Dickens House Museum's Scanner Specifications (Plustek)

Plustek OpticPro 9636P

Features	Specifications/Description
Optical Resolution	600 x 1200 dpi
Scanning Area	8.5" x 11.7"
Colour Depth	36 bits/ pixels
Greyscale	12 bits/ pixels
Black & White	1 bit/ pixel
Scan Method	Single Pass
Power Consumption	13W (in use), 2.5W (standby)
Weight	6.18 lb. (2.8 kg)
Lamp	Cold cathode
Connection	Parallel port
Dimensions	16.7" x 11.7"x 3"
Image Editing Software	Micrografx Picture Publisher
OCR Software	Xerox TextBridge
Other Software	Adobe PhotoDeluxe 2.0
Special Features	Transparency Adapter (TPA)
Full TWAIN compliant	512k on board memory
Supports 68 billion colours	Pixel by Pixel Technology

J.2 Dickens House Museum's Digital Camera Specifications (Olympus)

Olympus C-2500L Digital Camera

CCD Imager	2,500,000 pixel 2/3 in. progressive scan RGB CCD solid-state image pickup element with "TruePic Technology"
Lens	3x Olympus aspherical zoom
Aperture Range	Wide f=2.8 - f=5.6 Tele f=3.9 - f=7.8
Shutter Speeds	1/2-1/10,000 sec. automatic exposure 8 sec. To 1/10,000 manual exposure
ISO	Equivalent ISO 100, 200, 400
Recording Mode(s)	DCF/Exif 2.1 Jpeg or TIFF
Adjustable Resolutions	1712 X 1368 pixels (SHQ-TIFF no compression) 1712 X 1368 pixels (SHQ-Jpeg 2.3:1 compression) 1712 X 1368 pixels (HQ-Jpeg 8:1 standard compression) 1280 X 1024 pixel (SQ-Jpeg 8:1 compression) 640 X 512 pixel (SQ-Jpeg 8:1 compression)
Viewfinder	SLR TTL viewfinder with 95% centered view of image area
LCD	High-resolution 122,000 pixel 1.8 in. / 4.5 cm color TFT(HAST) LCD display
Focusing System	Quick Focus Mode: User selectable setting from 15 preset ranges: 12 in. to infinity Autofocus: TTL system autofocus with low-light illuminator
Focusing Ranges	0.8 in. - 24 in. Super Macro (Wide autofocus) 12 in. - 24 in. Macro (autofocus) 24 in. - infinity (autofocus) 12 in. - infinity (manual focus)
Exposure Control	Programmed auto exposure with +/- 2 step exposure compensation in 1/3 step increments Aperture Priority exposure with +/- 2 step exposure compensation in 1/3 step increments Manual exposure
Metering System	Center-weighted metering or 5% spot metering
White Balance System	Full auto TTL white balance 6-step preset manual: 3000, 3700, 4000, 4500, 5500 and 6500K white balance "One-touch" reference manual white balance
Flash	Built-in flash: Pop-up External flash: Standard hot-shoe design, accepts optional FL-40 dedicated flash
Flash Modes	Auto-flash (low light and back light) "Red-eye" reducing flash Fill-in flash 1st curtain slow-syncro flash

	2nd curtain slow-syncro flash Flash off (built-in flash)
Flash Working Range	12 in. to 12 ft. at ISO 100 built-in pop-up flash
Flash Charging Time	Approximately 8 sec.
Removable Media Card	Dual slot design for 3.3V SmartMedia™ 8MB (2MB, 4MB, 8MB, 16MB, 32MB, 64MB optional) and/or CF slot for optional memory (Compatible with 2, 4, 8, 16, 32 and 64MB SmartMedia cards)
Selftimer/Remote	Electronic self-timer with 12-second delay or 2 second delay with RM-1 remote control
Outer Connectors	Serial computer/printer connector AC adapter connector NTSC video out connector
Image Playback	One-frame Slide-show mode Index display mode (4 or 9 frames) 4X-image inspection close-up mode
Operating Environment	Temperature: 22° - 104°F / 0° - 40°C (operation); -4° - 140°F / -20° - 60°C (storage) Humidity: 20 - 90% (operation); 10 - 90% (storage)
Power Supply	Camera comes with 4-AA Ni-MH batteries and charger, and can use 4-AA Ni-Cad or alkaline batteries. C-7AU AC adapter optional. Ni-MH recommended for use.
Date/Time Calendar	Recorded with picture
Calendar	Up to year 2030
Size	4.17 in. (W) x 3.12 in. (H) x 5.05 in. (D) / 109 mm (W) x 79.5 mm (H) x 128.2 mm (D)
Weight	16.5 oz./ 468 grams (without batteries or SmartMedia card)
Number of Storable Photos	With 8MB SmartMedia Card: 1: SHQ TIFF 4: SHQ-Jpeg 13: HQ-Jpeg 24: SQ-Jpeg (1280 x 1024) 83: SQ-Jpeg (640 x 512)

J.3 WPI Team's Digital Camera Specifications (Kodak Digital Science)

Kodak Digital Camera DC210+

Features	Specifications/Description
Picture Pixel Resolution	High—1152 x 864 = 995,328 Standard—640 x 480 = 307,200
CCD Resolution	1160 x 872 = 1,011,520
Flash Range	Wide—1.6 to 9.84 ft.(0.5 to 3.0 m) Telephoto—3.2 to 8.8 ft. (1.0 to 2.7 m)
Colour	24-bit, millions of colours
Storage	External memory only ATA Compatible Compact Flash Card
Power	4 AA batteries
Shutter Speed	1/2 to 1/362 sec
Speed	9.2 sec
Weight (without batteries)	11 oz. (320 g)
Video Out	NTSC or PAL
Lens:	Optical quality glass
File Format	FlashPix or JPG
Focus Distance	Wide—1.64 ft. (0.5 m) to infinity Telephoto—3.28 ft. (1 m) to infinity Close up—8 in. (20 cm)
Sensitivity	ASA/ISO rating equivalent to 140
Accessory Lens Thread	37 mm
Tripod Socket	25 in.
Focal Length	2X zoom lens-4.4 to 8.8 mm; Actual is 29 to 58 mm Equivalent for 35 mm camera
Aperture	Wide—f/4 to f/13.5 Telephoto—f/4.7 to f/16
Viewfinder	Real Image
Dimensions	5.15 X 1.87 X 3.20 in. (131 X 48 X 82 mm)

Appendix K: Comparative Study Results of Scanner Vs. Digital Cameras

Plustek OpticPro 9636P Scanner:

Description	Time (Seconds)
Low-resolution Greyscale	40
Low-resolution Colour	85
High-resolution Greyscale	140
High-resolution Colour	600
Download Time	60
Editing Time	45

Olympus C-2500L Digital Camera

Description	Time (Seconds)
Low-resolution Greyscale	N/A
Low-resolution Colour	8
High-resolution Greyscale	N/A
High-resolution Colour	8
Download Time	30
Editing Time	45

Kodak Digital Science DC200/DC210 Zoom Camera

Description	Time (Seconds)
Low-resolution Greyscale	N/A
Low-resolution Colour	10
High-resolution Greyscale	N/A
High-resolution Colour	10
Download Time	30
Editing Time	45

Appendix L: Gantt Chart

	Task Name	10 Mar '02	17 Mar '02	24 Mar '02	31 Mar '02	07 Apr '02	14 Apr '02	21 Apr '02
1	Introduction							
2	Group Meeting with Liason							
3	Orientation							
4	Tour of Dickens Museum							
5	Setup Interview Appt.							
6	Examine the Photo Collection							
7	Conduct Interviews							
8	Database Implementation							
9	Define Fields/Relationship							
10	Populate w/ Sample Data							
11	Create Form							
12	Create Queries							
13	Create User Interface							
14	Create User Manual							
15	Testing							
16	Toubleshooting							
17	Presentation							
18	Write Up							

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Appendix M: Access DataType Property

You can use the **DataType** property to specify the type of data stored in a table field. Each field can store data consisting of only a single data type.

Setting

The **DataType** property uses the following settings.

Setting	Type of data	Size
Text	(Default) Text or combinations of text and numbers, as well as numbers that don't require calculations, such as phone numbers.	Up to 255 characters or the length set by the **FieldSize** property, whichever is less. Microsoft Access does not reserve space for unused portions of a text field.
Memo	Lengthy text or combinations of text and numbers.	Up to 65,535 characters. (If the Memo field is manipulated through DAO and only text and numbers [not binary data] will be stored in it, then the size of the Memo field is limited by the size of the database.)
Number	Numeric data used in mathematical calculations. For more information on how to set the specific Number type, see the **FieldSize** property topic.	1, 2, 4, or 8 bytes (16 bytes if the **FieldSize** property is set to Replication ID).
Date/Time	Date and time values for the years 100 through 9999.	8 bytes.
Currency	Currency values and numeric data used in mathematical calculations involving data with one to four decimal places. Accurate to 15 digits on the left side of the decimal separator and to 4 digits on the right side.	8 bytes.
AutoNumber	A unique sequential (incremented by 1) number or random number assigned by Microsoft Access whenever a new record is added to a table. AutoNumber fields can't be updated. For more information, see the **NewValues** property topic.	4 bytes (16 bytes if the **FieldSize** property is set to Replication ID).

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Yes/No	Yes and No values and fields that contain only one of two values (Yes/No, True/False, or On/Off).	1 bit.
OLE Object	An object (such as a Microsoft Excel spreadsheet, a Microsoft Word document, graphics, sounds, or other binary data) linked to or embedded in a Microsoft Access table.	Up to 1 gigabyte (limited by available disk space)
Hyperlink	Text or combinations of text and numbers stored as text and used as a hyperlink address. A hyperlink address can have up to three parts: *text to display* — the text that appears in a field or control. *address* — the path to a file (UNC path) or page (URL). *subaddress* — a location within the file or page. *screentip* — the text displayed as a tooltip. The easiest way to insert a hyperlink address in a field or control is to click **Hyperlink** on the **Insert** menu.	Each part of the three parts of a Hyperlink data type can contain up to 2048 characters.
Lookup *Wizard*	Creates a field that allows you to choose a value from another table or from a list of values by using a list box or combo box. Clicking this option starts the Lookup *Wizard*, which creates a Lookup field. After you complete the *Wizard*, Microsoft Access sets the data type based on the values selected in the *Wizard*.	The same size as the primary key field used to perform the lookup, typically 4 bytes.

Appendix N: Pull-Down Menus

The following pages of this appendix contain the listing of subcategories

found in each of the four main categories: *Portraits, Topography, Illustrations,* and

Miscellaneous. These subcategories are taken from the tabs dividing the pictures in

the filing cabinets and were put into pull-down menus in the database.

N.1 Pull-Down Menu for the Portraits Category

Portraits
Dickens Dickens's Family Dickens's Associates Miscellaneous

N.2 Pull- Down Menu for the Topography Category

Topography
London
Foreign Country-Australia
Foreign Country-Canada
Foreign Country-Egypt
Foreign Country-France
Foreign Country-Holland and Germany
Foreign Country-Ireland
Foreign Country-Switzerland
Foreign Country-Italy
Foreign Country-USA: prisons and misc.
Foreign Country-USA: views
ForeignCountry-USA
Counties-Avon and Bath
Counties-Berkshire, Eton
Counties-Winsor, Berrs
Counties-Cornwall
Counties-Devon
Counties-Cheeseborn, Dorset
Counties-Durham, Barnard Castle
Counties-Bowes, Durham
Counties-Essex
Counties-Hampshire
Counties-Hereford, Worcester
Counties-Hertfordshire
Counties-Kent
Counties-Leicestershire
Counties-Norfolk
Counties-Northumberland
Counties-Oxfordshire
Counties-Scotland
Counties-Shropshire
Counties-Somerset
Counties-Staffordshire
Counties-Suffolk and Blunderstone
Counties-Yarmouth
Counties-Warwickshire
Counties-South Yorkshire and Humberside

N.3 Pull-Down Menu for the Illustrations Category

Illustrations
Barnaby Rudge *The Battle of Life* *Bleak House* *The Chimes* *The Cricket on the Hearth* *A Christmas Carol* *Christmas Stories* *David Copperfield* *Domeby and Son* *Gone Astray* *Great Expectations* *Hard Times* *The Haunted Man* *Holiday Romance* *Lazy Tour* *Little Dorrit* *Life of Our Lord and Household Editions* *Children's History of England* *Master Humphrey's Clock* *Martin Chuzzlewit* *The Mystery of Edwin Drood* *Nicholas Nickleby* *The Old Curiousity Shop* *Oliver Twist* *Pickwick Papers* *Pickwick Papers: Italian Edition Illustrations* *Pictures from Italy* *Reprinted Pieces* *Sketches by Boz* *Sketches of Ladies* *A Tale of Two Cities* *Stratagems of Rozanza* *The Uncommercial Traveller*

N.4 Pull-Down Menu for the Miscellaneous Category

Miscellaneous

Homes-London Homes
Homes-48 Doughty St.
Homes-Outside of London

Playbills
Facsimiles
Misc. Facsimiles
Facsimiles of CD's M/S Books

Misc.-Contemporary Illustrations
Misc.-Contemporary Paintings and Drawings
Misc.-Comic/ Contemporary
Misc.-'Old Masters' - Various - Non-contemporary
Misc.-Paintings/ Etching
Misc.-Childrens Alphabet
Misc.-"Life of George Barnwall" G.F.
Misc.-Christmas Scenes by Buzz
Misc.-Circus, etc.
Misc.-Maps: London, Kent, etc.
Misc.-Coaching
Misc.-Medicine
Misc.-Military
Misc.-Monuments
Misc.-Workhouses and Factories
Misc.-Ships: Britannia etc.
Misc.-Trades
Misc.-Transport
Misc.-CD's 'Daily News'
Misc.-1907 Dudley Gallery's Pickwick Exihibition
Misc.-1970 Century of Dickens Exhibitions
Misc.-Window Displays on Dickens Theme
Misc.-Selfridges Window Display 1974
Misc.-Graves: CD, Family, and Misc.
Misc.-Poverty
Misc.-Punch and Judy
Misc.-CD's Pets
Misc.-Turnpikes
Misc.-Religion and Reform
Misc.-TV and Film Stills
Misc.-Dickens Stamps
Misc.-Crime and Punishment
Misc.-Prisons
Misc.-Schools
Misc.-Objects Owned by CD
Misc.-Street Signs
Misc.-London Clubs, Coffee Houses, etc.
Misc.-Knockers
Misc.-Markets
Misc.-Fellowship w/ Queen Mother

Appendix O: File Sizes for Editing Steps

File sizes for the figures contained in the report:

Figure	Description	File Size (kb)
12	Original Digital Image	120
13	Cropped to Reduce Background Size	24.6
14	Rotated to Correct Orientation	22.5
15	Cropped to Digital Image	17.1
16	Greyscale	16.0
17	Reduced to 5 inches	13.8
18	Saved as Jpeg	6.3

Average file sizes for each step:

Figure	Description	File Size (kb)
1	Original Digital Image	120
2	Cropped to Reduce Background Size	35
3	Rotated to Correct Orientation	30
4	Cropped to Digital Image	20
5	Greyscale	16
6	Reduced to 5 inches	13
7	Saved as Jpeg	8

Appendix P: User Evaluation Form

Dickens House Museum Photography Catalogue

Name:

Date:

Occupation:

Contact Information:

User Evaluation:

1. What were you searching for in the database?

2. Were you able to find the information?　　　Yes　　or　　No

    If no, please explain any difficulties.

3. Rate the database system on the following qualities (1 poor – 5 excellent):

    Layout　　　　　　_____

    Content　　　　　　_____

    Accessibility　　　_____

    Wording　　　　　　_____

    Navigation　　　　_____

    Search Capability　_____

4. Rate the following database elements (1 poor – 5 excellent):

Menus   _____

Queries   _____

Lists   _____

Reports   _____

Forms   _____

5. Please answer the following questions about your experience?
    a. What query(s) did you perform?

    b. What results did you receive?

    c. Were these satisfactory?

    d. Was there information missing?

6. Please use the following space to make any additional comments or criticisms about the database:

Appendix Q: User Evaluation Results

The following pages show the results of our IQP team's user evaluations. As shown in the previous Appendix (P), a form with specific questions was given to each evaluator to fill out during or after their assessment of the Dickens House Photography Catalogue Database. As several individuals only filled out sections of the forms or else did not fill them out properly, the information received from the evaluations is shown in detailed form along with the team's observations of each individual evaluation.

Q.1 Dr. Lindy Grant

Name: Lindy Grant
Date: 10 April 2002
Occupation: Photographic Archivist
Contact Information: Conway Library, Courtauld Institute, Somerset House, Strand London WC2RORN

Results of evaluation:

- She performed various queries and received results back for the majority of them.
- On a scale of 1(poor) – 5(excellent)
    o Layout, content, accessibility, navigation, and search capability were rated 4
    o Comment: Wording could be clearer
- Comments:
    o It is impossible to include every piece of information in a description
    o Difficult to decipher what is what in the description field
    o Suggestion for separate fields for photographers/artists

Our observations:

- The queries where she received no results were because there were no pictures inputted that would have satisfied her requirements.
- Security measures need to be put in place prior to any actual public use.
- Team needs to clarify some of the wording to make navigation easier.

Q.2 Phillip Ward Jackson

Name: P. Ward Jackson
Date: 10 April 2002
Occupation: Photograph Librarian
Contact Information: Conway Library, Courtauld Institute, Somerset House, Strand London WC2RORN

Results of evaluation:

- Performed queries for dogs and sculptures

- Found dogs, not sculptures

- Commented that he may not be the best person to test this database because he was not a Dickens expert

- Found content very interesting

- Menus need more clarification
    o Added that the user manuals we suggested may fix that problem

- Suggestion to note whether photograph's etiquette or embossed stamp is located on back of card de visite.

Our Observations:
- Some individuals are going to request information that is too detailed or specific to include.
    o We advised that the Museum consider what should and should not be included in the data entry.
- Again, we need to secure the database to prevent users from accessing or changing restricted data.

Q.3 Peter Retrov

Name: Peter Retrov
Date: 11 April 2002
Occupation: IT Field Engineer
Contact Information:

Results of evaluation:

- Was able to find information using keywords
- On a scale of 1(poor) – 5(excellent)
    - Layout received a 3
    - Content, accessibility, wording, navigation, and search capability received a 4
- The database and its contents look good
- Query ability is "fine"
- Concerns
    - Security
    - User being able to close database with "x" in top of screen

Our observations:
- Don't embed images, instead use code to bring in only the necessary images
    - Example: When a query is performed, the results can be viewed, including the image. Yet, the image never stored within the database. Instead, the picture that the user sees is linked to the image in its storage place in another application.

Q.4 Jacqueline Cone

Name: Jacqueline Cone
Date: 18 April 2002
Occupation: Student/Curatorial Assistant – Dickens House Museum
Contact Information:
Regent's College
Inner Circle
Regent's Park
London, NW1 4NS

Results of Evaluation :

- She was able to find photographs of Dickens by the photographer, Watkins
- On a scale of 1(poor) – 5(excellent)
    - Layout and Search Capabilities were ranked 4
        - She commented under Layout that some photos were cropped
    - Content, Accessibility, Wording, and Navigation were ranked 5
        - She commented that Navigation was "very easy!"
    - All of the database elements (Main Menu, Queries, Lists, Reports, Forms) were also ranked 5
- Her experience:
    - She did a Basic Keyword Query for "Watkins" and an Advanced (And) Keyword Query using the words "Watkins" and "1859"
    - She found several results using the Basic query and two portraits using the Advanced query
    - She found the results satisfactory without noticeably missing information.
- She especially found the Description Query very helpful.

Our observations:
- We need to include the Date field in the Keyword queries

Q.5 Susie Goldring

Name: Susie Goldring
Date: 18 April 2002
Occupation: Assistant Producer, BBC 1
Contact Information:
>07970 787 035
>susie.goldring@bbc.co.uk

Results of Evaluation :

- She searched for and was able to find cartoons of Dickens, copyright information, date, credit, browsing

- On a scale of 1(poor) – 5(excellent)

    o Queries, Layout, Content, Navigation, and Search Capability were rated 4

    o Main Menu, Reports, Accessibility and Wording were rated 3

        ▪ Copyright information would have been helpful in the Reports

- Her experience:

    o She used Keyword, Date, and Advanced queries

    o Some results were full and but all were satisfactory

- Additional Comments:

    o It should be clearer that search results must be closed before starting a new one

    o Copyright Information should be included in reports

    o A browsing function would be useful

    o Multiple queries should be allowed

Our observations:

- The *Copyright* field should be included in reports.

Appendix R: Results of the WPI Team's Evaluation

Our team conducted an evaluation of the images and information within the Access database based on the guidelines of the National Archives and Records Administration (NARA). Ten percent of the images, or 60 images for our sampling, were examined for quality and accuracy. The majority met the guidelines for the clarity of the image, correct information, correct dimensions, and proper format. Some of the images were blurry or slightly darker or lighter than the original photograph; however, due to the Museum's requirements for only a low-resolution image, these slight alterations were not critical. Also, any images that were deemed as being to distorted or unclear were recaptured and then edited for proper quality. Since the images were all converted to greyscale, issues with colouring were not applicable. There were a few guidelines from the NARA which also were not relevant.

Appendix S: Visual Basic Code for 2nd Read-In Option

```vb
Option Compare Database
Option Explicit

Private Const NoImage = "C:\Photography_Catalogue\Images\imagedisplay.bmp"

Private Sub LoadPic()
   Dim objname As String
   Dim objtype As String
   Dim fname As String
   Dim fso As New FileSystemObject

   ObjectType.SetFocus
   objtype = ObjectType.Text
   ObjectName.SetFocus
   objname = ObjectName.Text

   fname = "C:\Photography_Catalogue\Images\" & objname & "." & objtype
   If fso.FileExists(fname) Then
      Image4.Picture = fname
   Else
      Image4.Picture = NoImage
   End If

End Sub

Private Sub Form_AfterInsert()
   Image4.Picture = NoImage
End Sub

Private Sub Form_Current()
   LoadPic
End Sub

Private Sub Form_Load()
   Image4.Picture = NoImage
End Sub
```

Appendix T: Administrative Manual

The administrative manual, contained in the following pages (with a separate numbering scheme), is dedicated to the upkeep of the photography collection catalogue. It illustrates the step-by-step methods needed to perform the digitisation procedure and the creation or maintenance of database elements. It is designed to provide a more advanced and detailed procedure than what is contained in the report, however, it cannot contain information for every procedure or problem that may affect the database so a troubleshooting section for getting further assistance is also included.

Welcome to the Dickens House Museum
Photography Collection

<u>Administrative Manual</u>
for the
Photography Collection's Access Database

Goal of this Administrative Manual: This document is designed to provide a computer literate administrator with the information needed to maintain the Dickens House Photography Collection electronic database.

Topics Covered in this Manual:

Created by Students of WPI on 26 April 2002

1.0 Database Design

1.1 Opening the Database

To access the Database double click the Shortcut on the Desktop

Photography_Catalogue.mdb.LNK

After double clicking the Shortcut a Logon Screen will be displayed

Under Name, Type in "Administrator" on the Keyword

Then Type in the Password: *******

The Database first opens to the Switchboard as seen below:
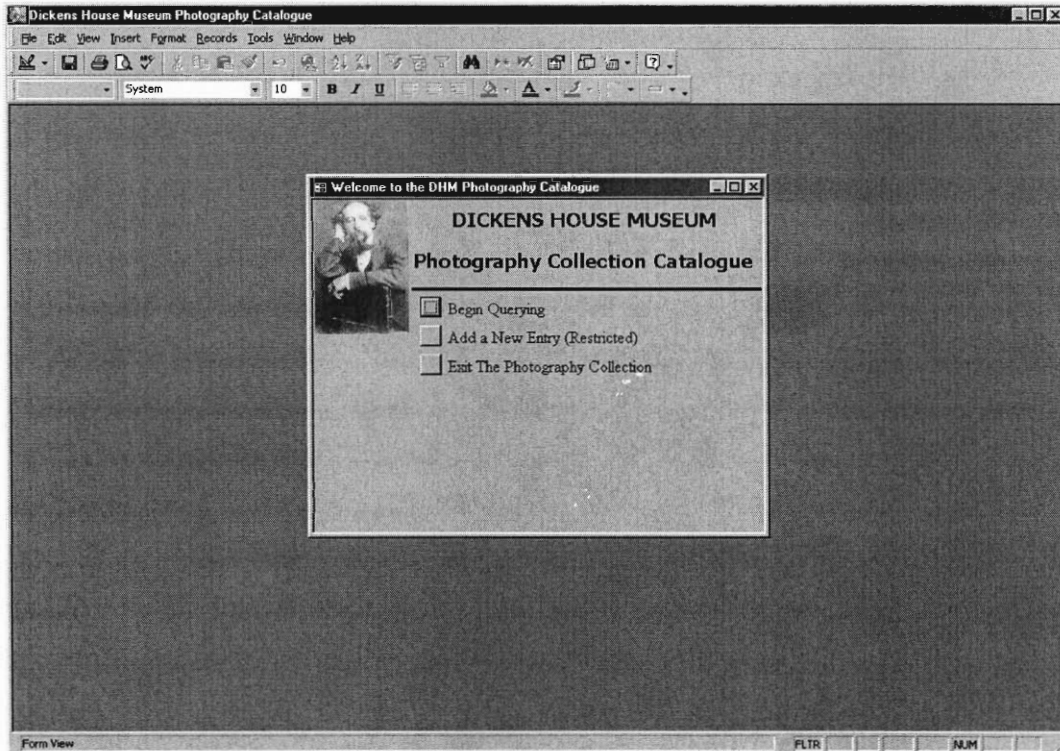
To gain Access to the Objects Window Click on Window then, Unhide...

Window	Help
Tile Horizontally	
Tile Vertically	
Cascade	
Arrange Icons	
Hide	
Unhide...	
Size to Fit Form	
✓ 1 Welcome to the DHM Photography Catalogue	
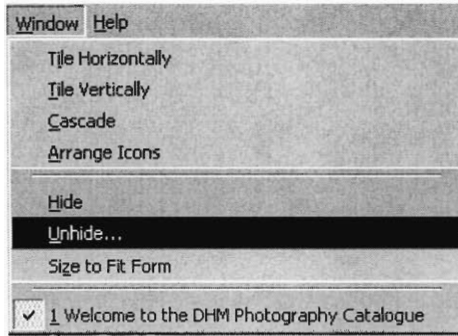
The Unhide Window will then appear. Choose the Photography_Catalogue : Database and Click OK.

Unhide Window

Window:

Photography_Catalogue : Database

OK   Cancel

The Objects Window is shown below

Photography_Catalogue : Database

Open Design New ✕

Objects		
Tables		Create table in Design view
Queries		Create table by using wizard
Forms		Create table by entering data
Reports		Image_Info
Pages		Main
Macros		Switchboard Items
Modules		

Groups
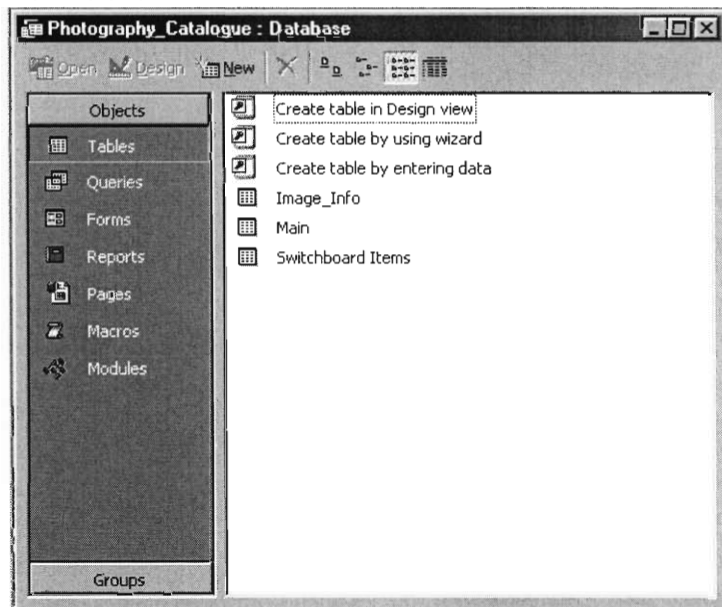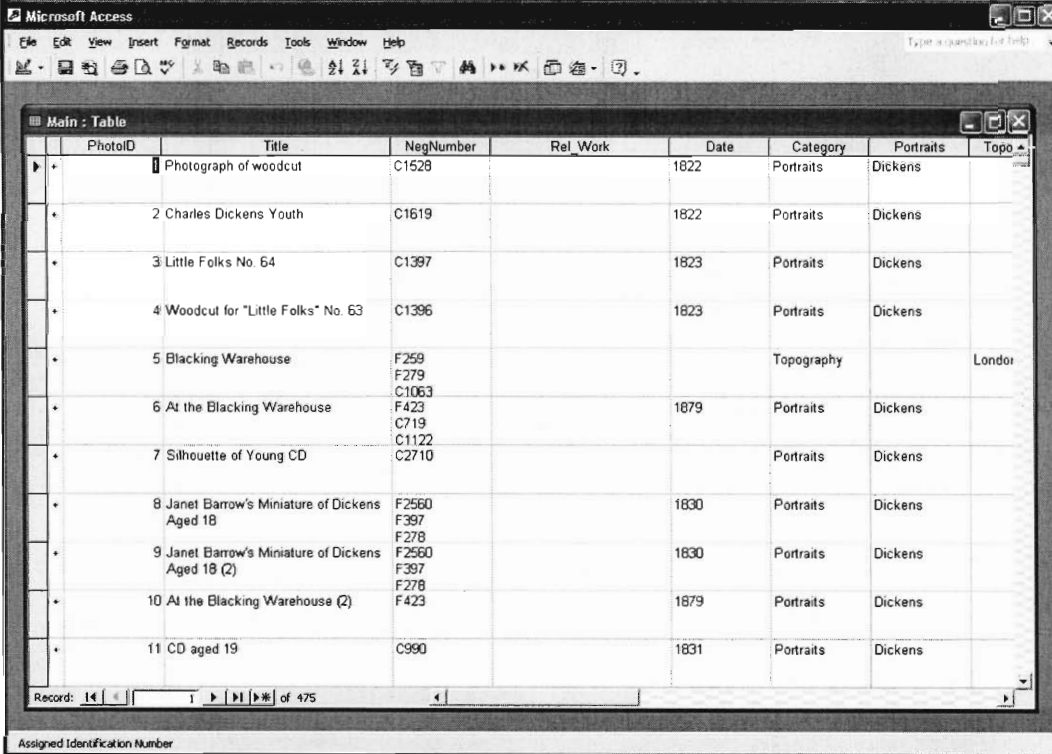
1.2 Tables

The Photography Collections Database Contain 3 Tables:
Switchboard Items, *Image_Info*, and *Main*.

1.2.1 Opening and Viewing a Table

A Table can be viewed in 2 ways: *Open* and *Design*

If the *Main Table* is Doubled Clicked it will open as shown below

To View a table in a *Design Mode* Click on the *Design* Button
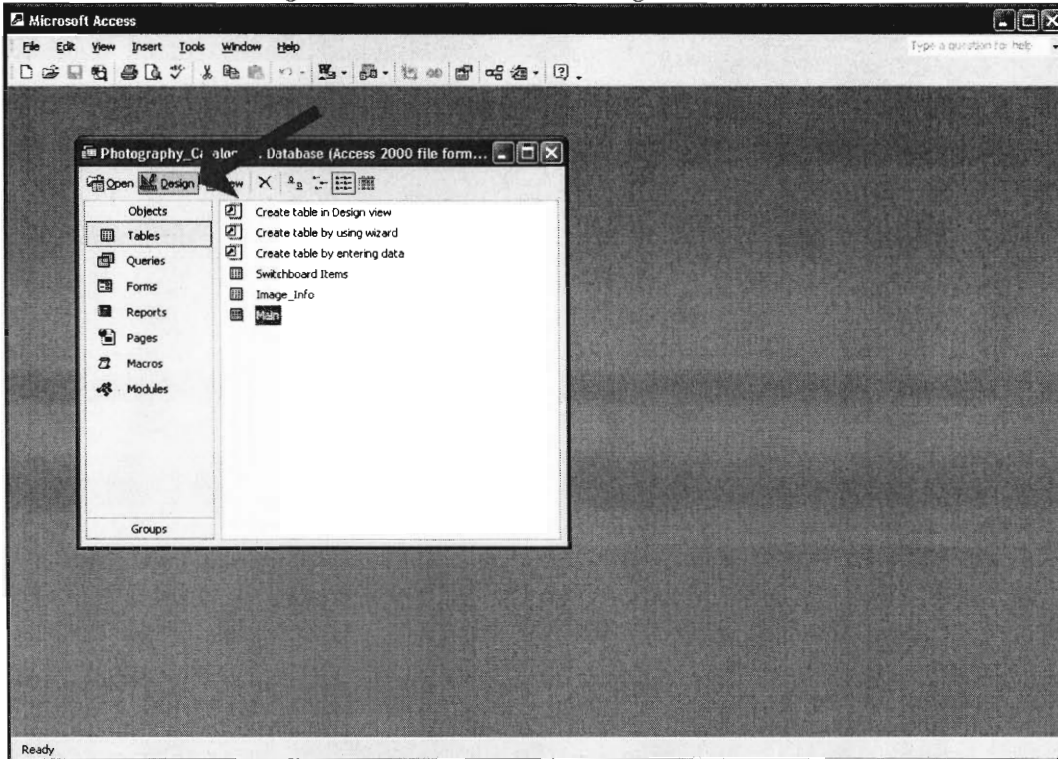
The *Design View* will display as shown below
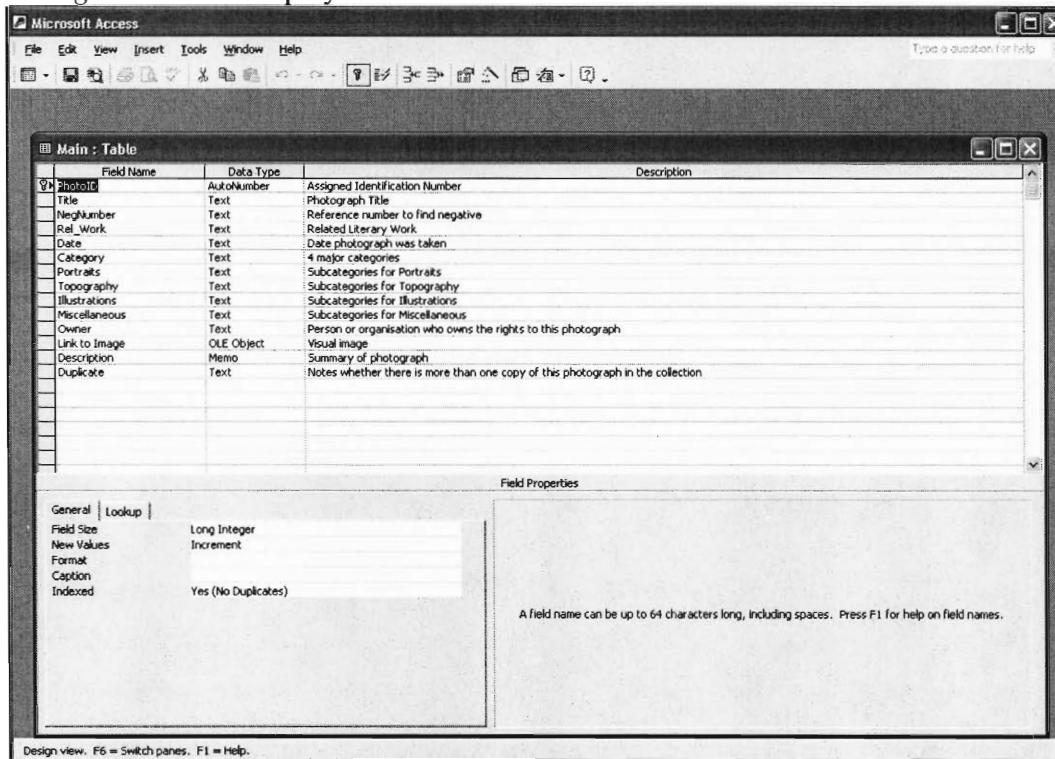
The *Design View* shows the *Field Name*, *Data Type*, and *Description*

When a Field is selected the *General Information* is displayed in the Lower Left-Hand Corner. The details of the each field are shown in the *Fields Properties* in the lower right hand corner.

This is where the Field information can be adjusted. Each *Data Type* has different Properties listed under the General Tab. For example, you can specify how many Characters are available in the Field Size.
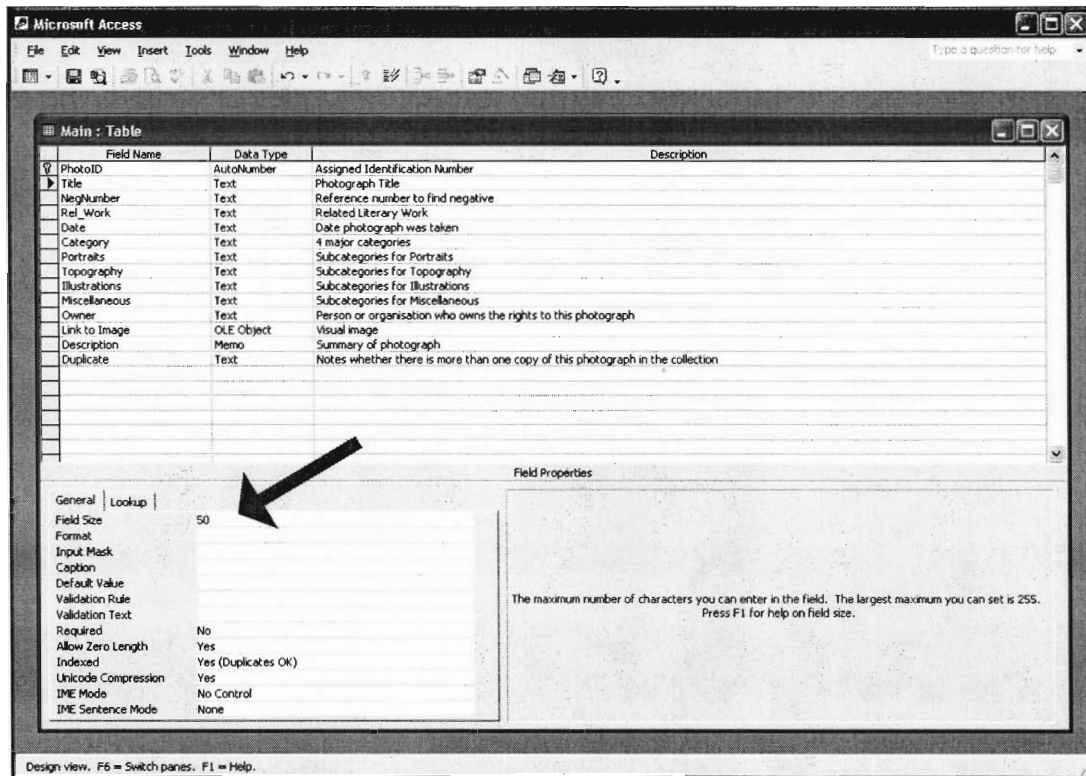
Also if the *Field Size* is Shortened and information is contained outside of those character limits, then the information will be lost. For example, if the Field size is 5 and the Field contains a 5 letter word, David, and then the field is decreased to 2, the 5 letter word is now only 2 characters, Da.

1.2.2 Changing Data Types

Some *Data Types* cannot be changed once Data has been inputted into the Database. Keep in mind to **Back-Up** the Database before making any adjustments to the Table structure. This is mainly the *Key Field*, denoted by the Key Symbol to the Left of the *Field Name*.

Click on a cell in the *Data Type*. A Drop-Down Menu will appear.
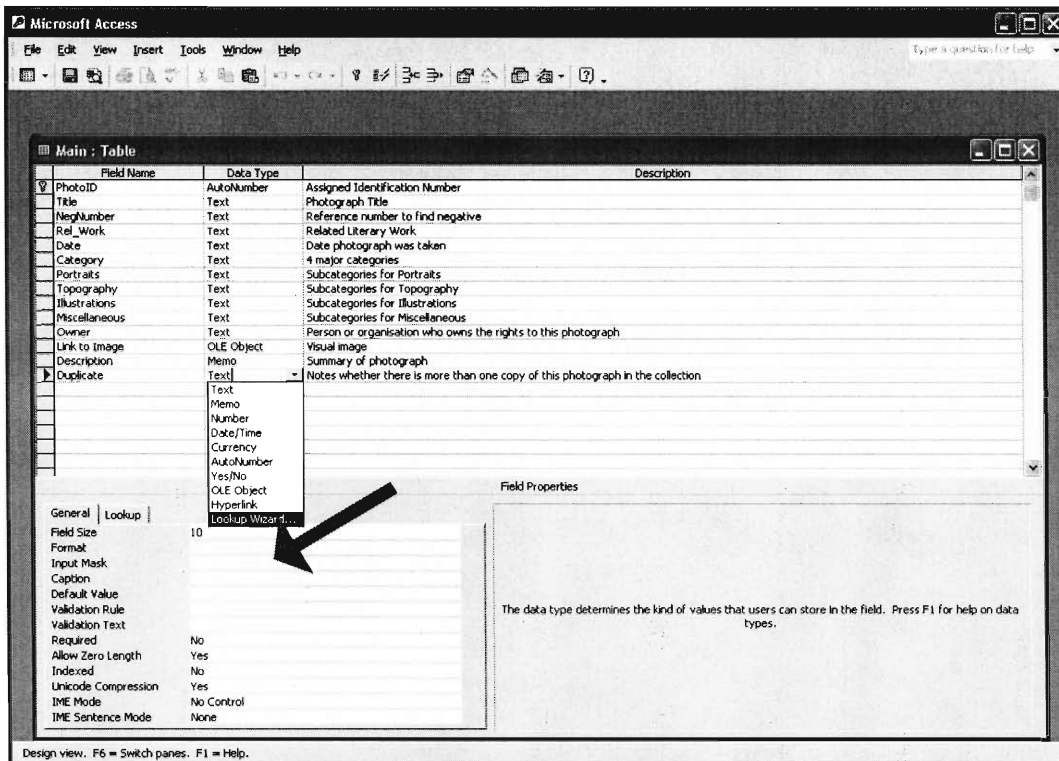
For Example, *Create a Lookup Wizard* becomes an option instead of the default *Text* under *Data Type*.

After Clicking *Lookup Wizard,* the following prompt is displayed
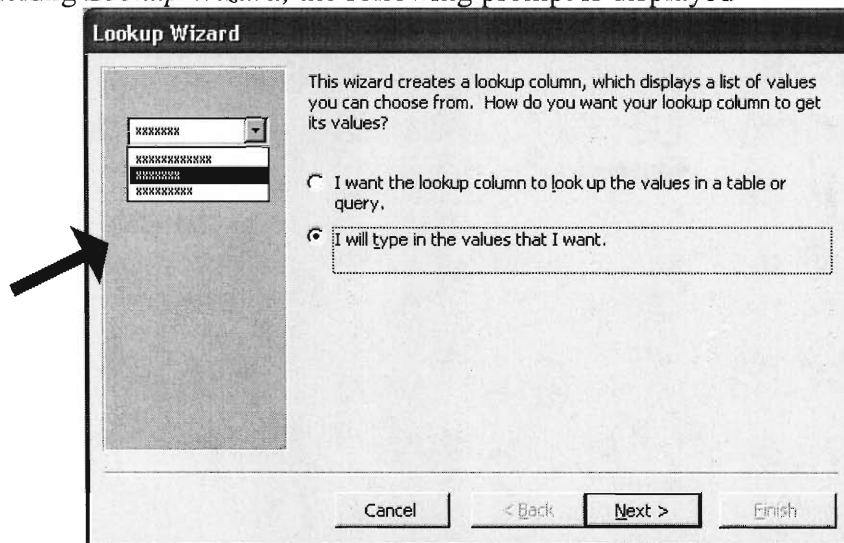
Choose the 2nd Selection. Click Next.

Enter in the Options for the Field. In this example, Type Yes and No. Lastly Click Finish
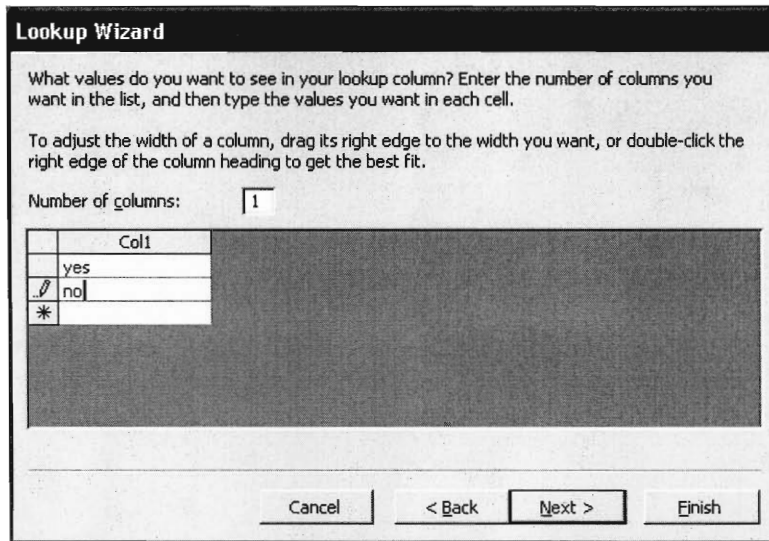
To verify the *Lookup Wizard* worked, Click on the *Lookup* Tab. The Yes No should be displayed in the *Row Source* Field.
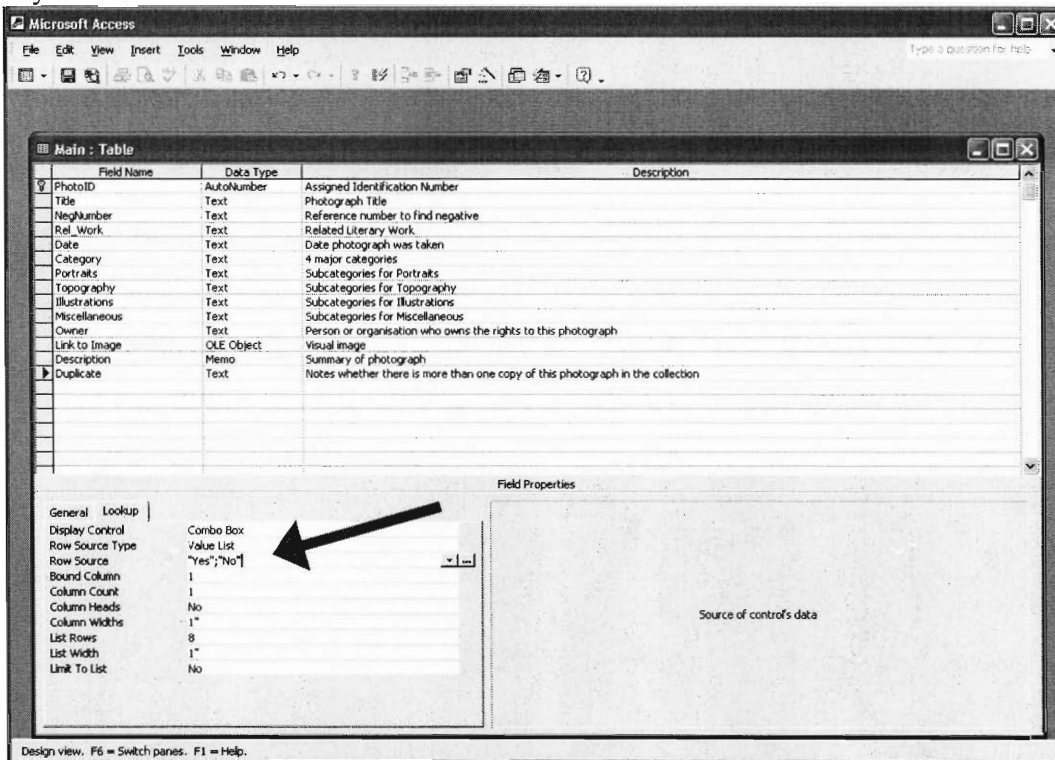
1.2.3 Creating a New Field

To Create a New Field, enter in a Field Name, Choose what sort of *Data Type*, and lastly Give a Description.

1.2.4 Linking Tables

To link a table, Click on the *Relationship* Button in the Toolbar, as shown below
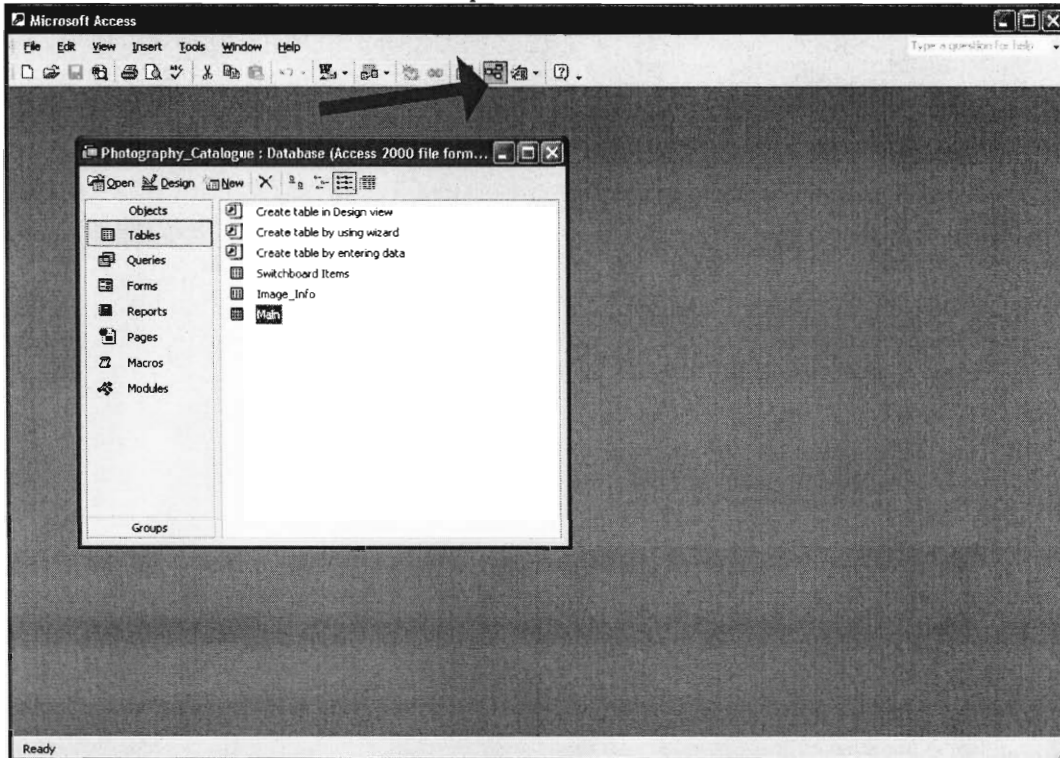
A new window will display the Relationships.
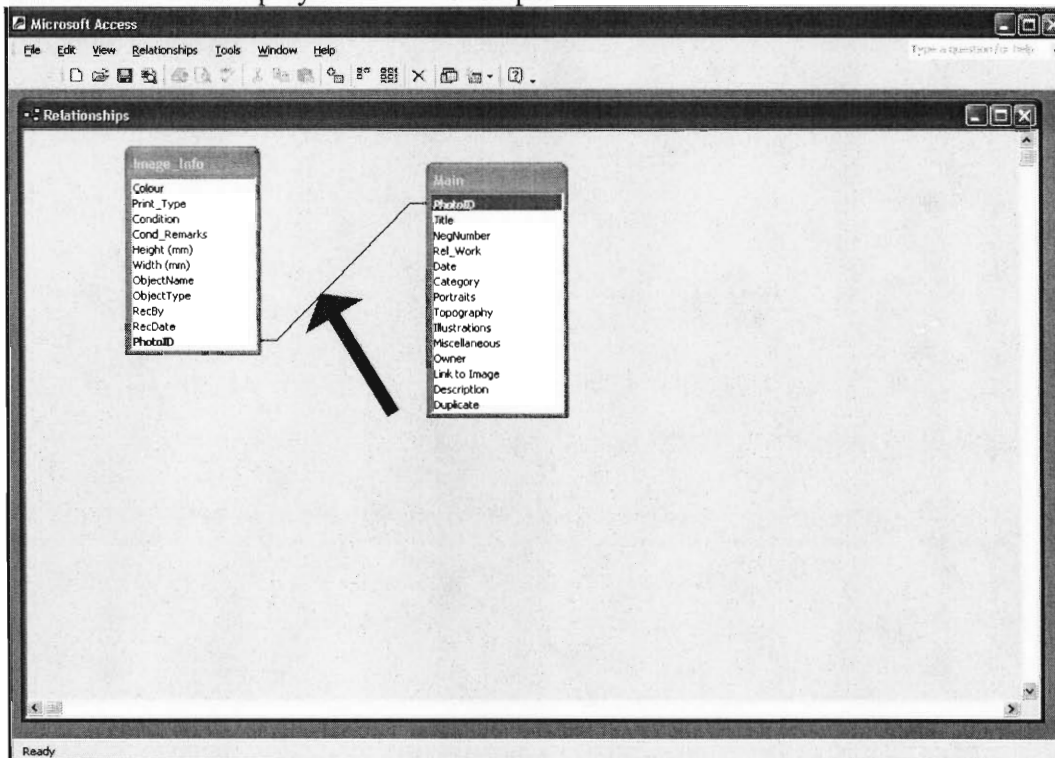
By Double Clicking on the Black Line (Link), the properties for the Link will be displayed.
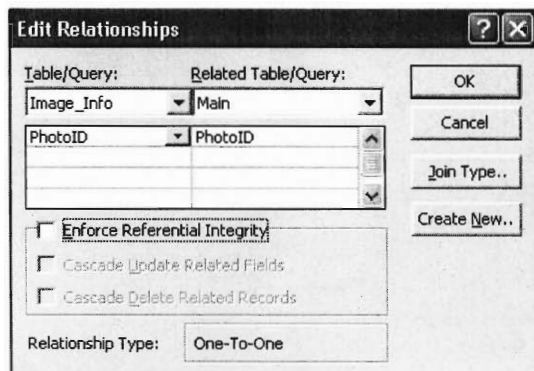
This *Relationship* links the 2 Tables together.

To Link additional fields with other tables, first Choose which Table you would like to link. Click on the *Show Table* Button as shown below.
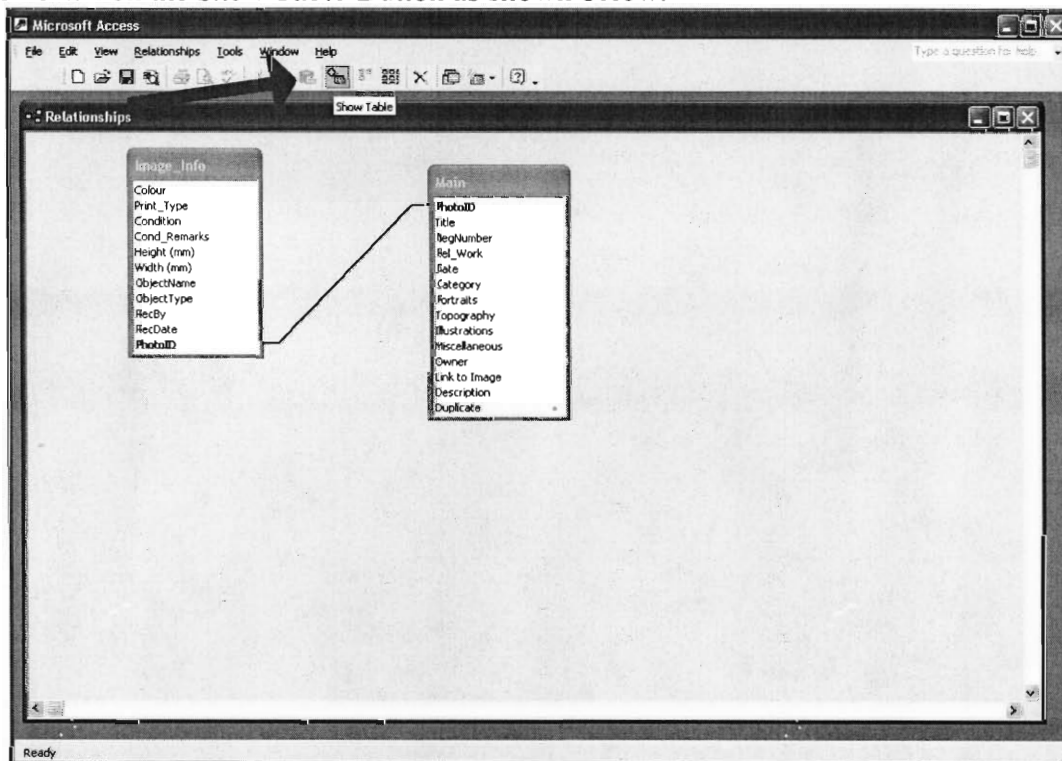
 A window will display all available Tables. Choose the appropriate table. Then, Drag and Drop the Field from one table to the other. However, Both Tables **MUST** contain the same field.

1.3 Queries

To view the Queries, Click on the Queries Object.
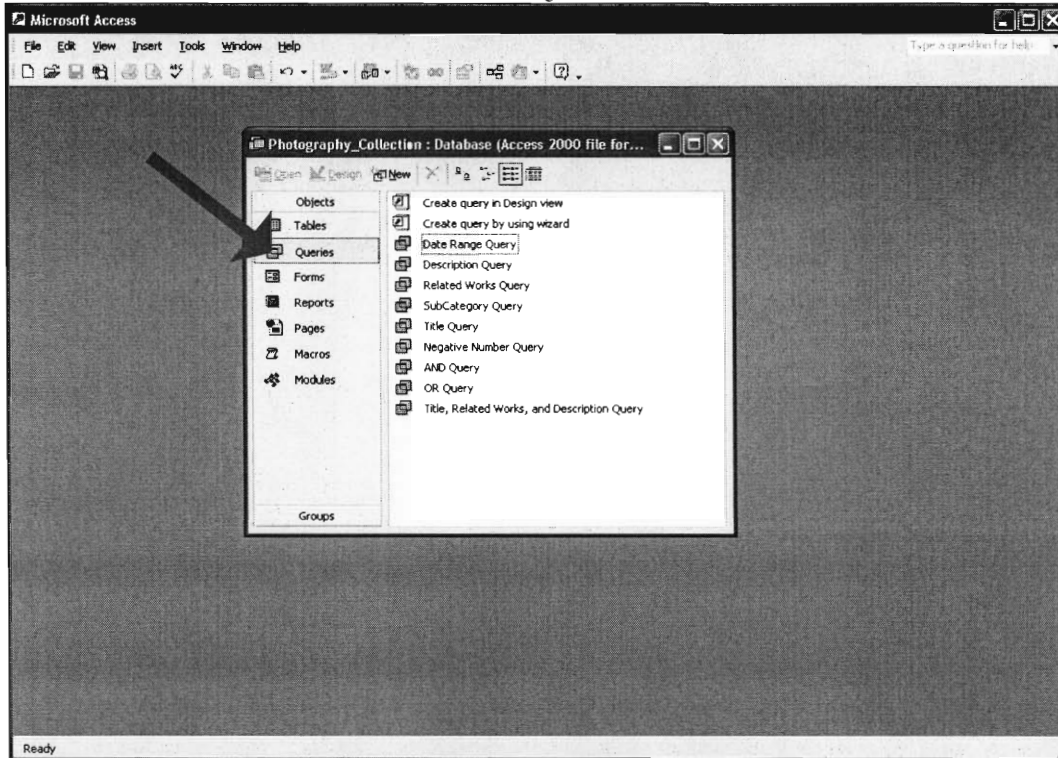
The database consists of 9 different Queries. Queries, similar to the Tables, can be viewed in 2 ways. Open, which runs the Query, and Design View. In Design View, the Query information is specified and filtered.

The best way to explain a Query is to demonstrate how one is created.

1.3.1 Creating a New Query

Click on the *Create query by using wizard* icon as shown below
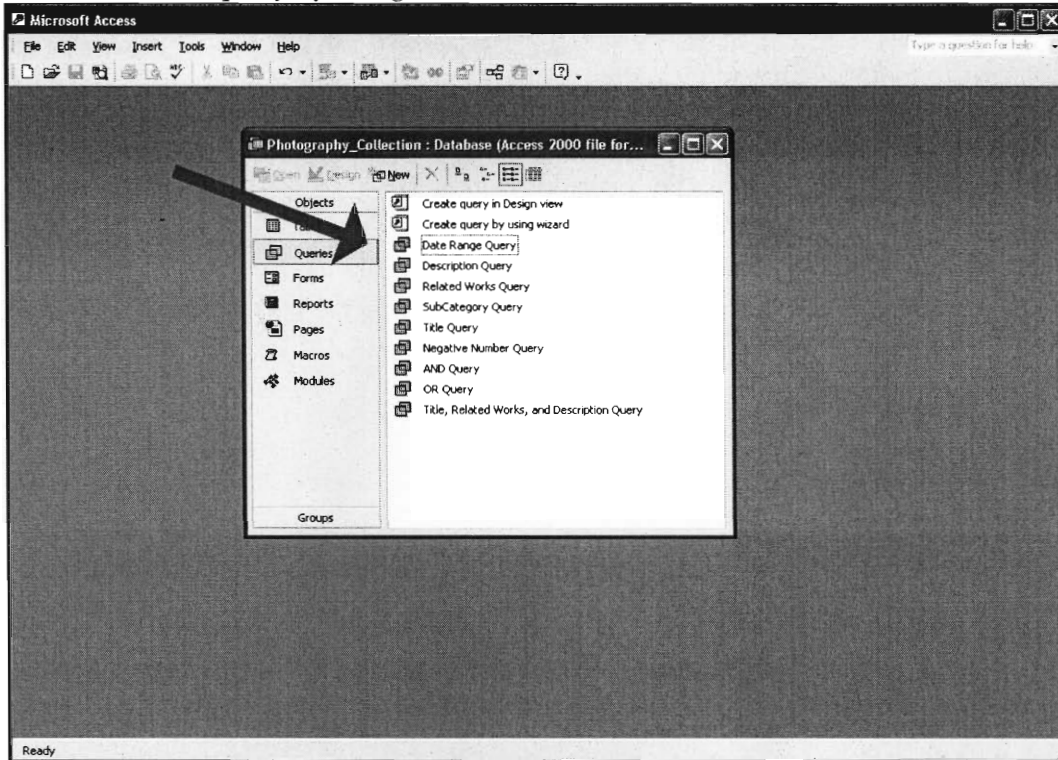
The Wizard will appear and look like this:
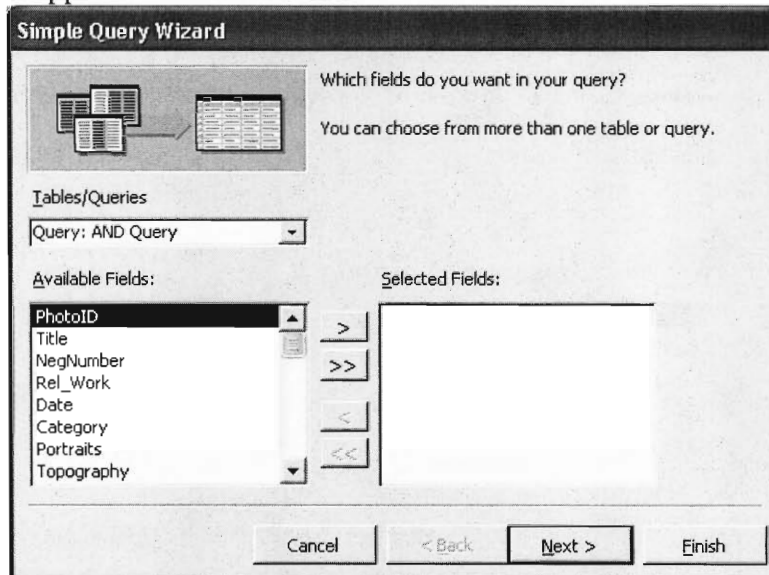
For this example, a New Query that Searches the *Height* Field is created. To do this, select the *Main* Table and add the entire field into the *Selected Fields* column. Use the pull-down menu to select the *Main* Table then Press the >> Button.

The Wizard should look like this:
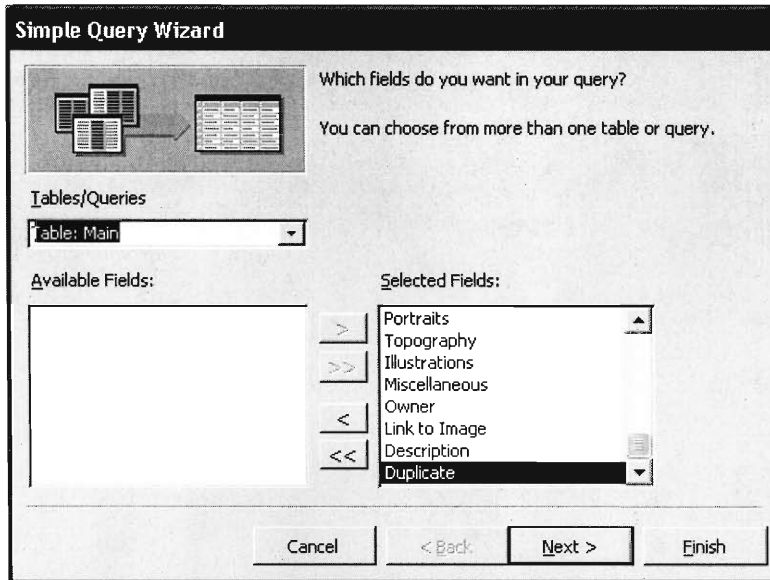
Now change the Table to *Image_Info* and add all of the Available Fields to the Selected Fields. The Selected Fields should now contain all the Available Fields from both Tables. Click Next.
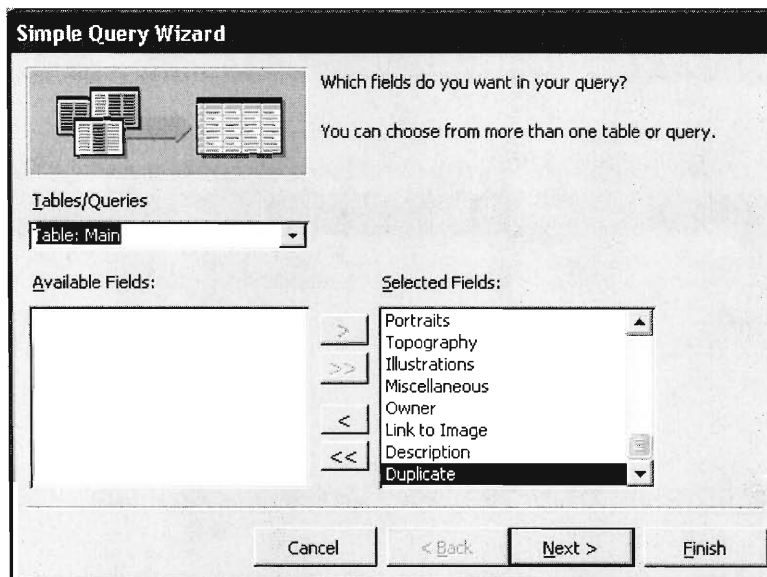
The Default *Detail* is an acceptable option. Click Next
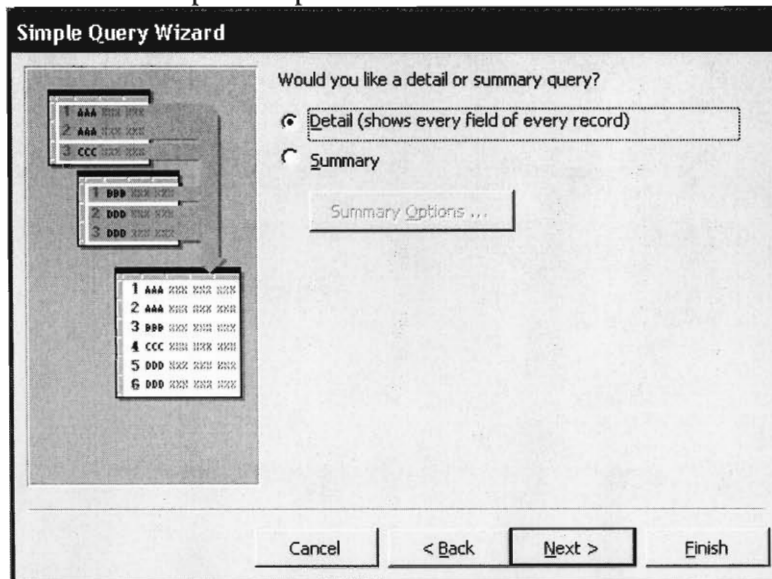
The next screen will automatically assign a name to the Query. Change the Name to something that describes the query. Also, Select "Modify the query design". Then, Click Finish
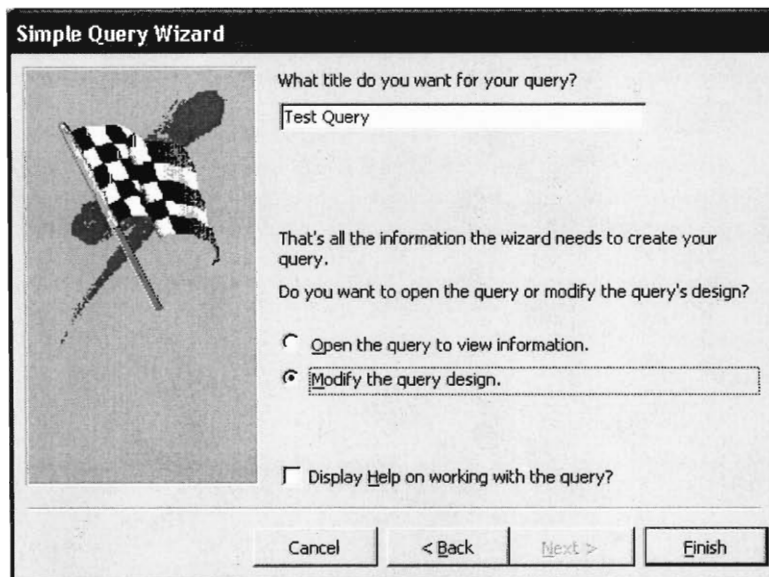
The Query will display in Design Mode

The *Design Mode* is shown below
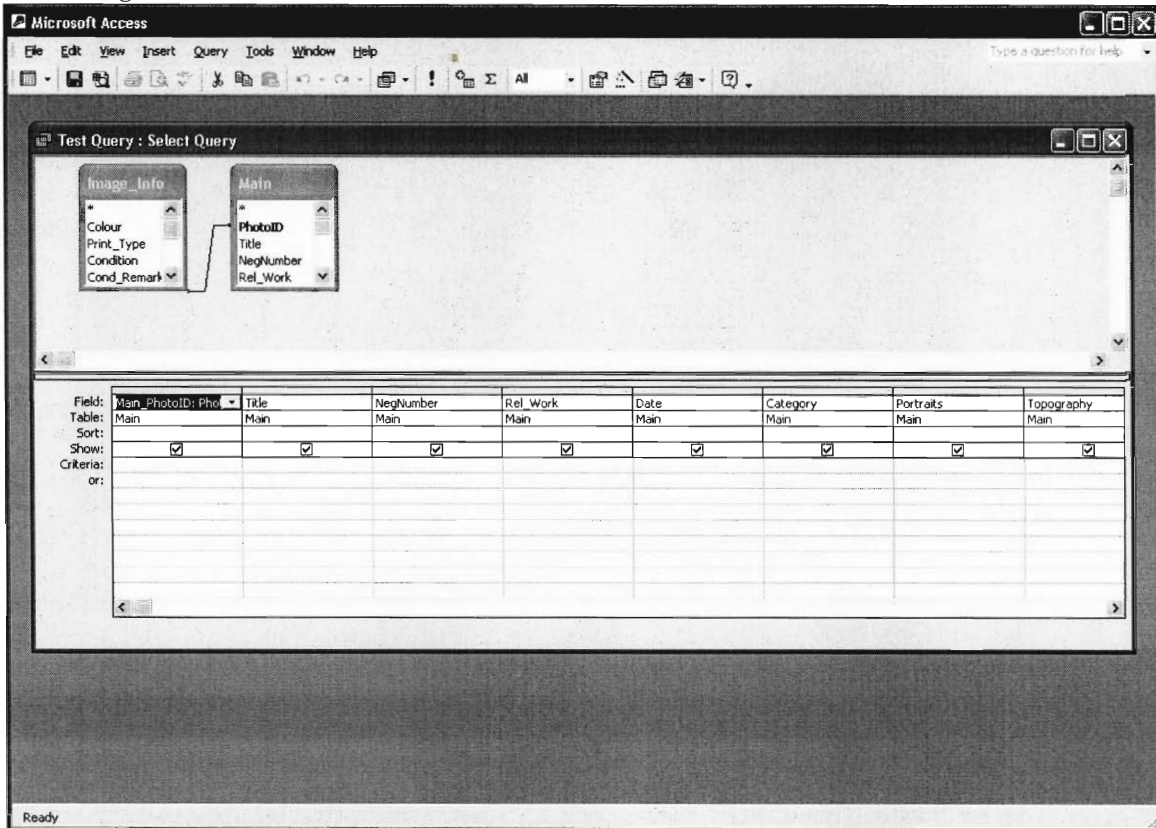
Each Field can be customized. For this example, a Query that searches the Height field for a specific value will be created. Go to the Column that has the Height Field and Right Click in the Criteria Row.
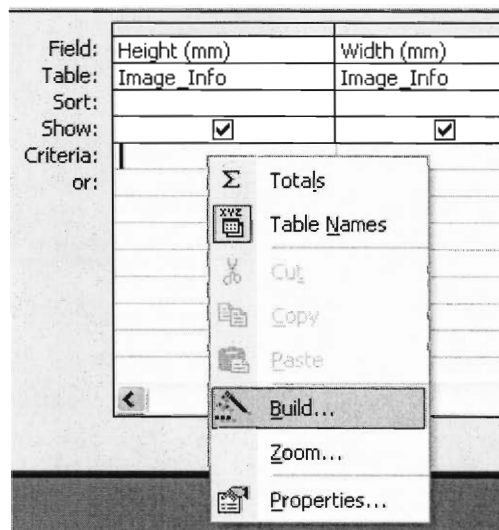
Choose *Build* and the following window should open
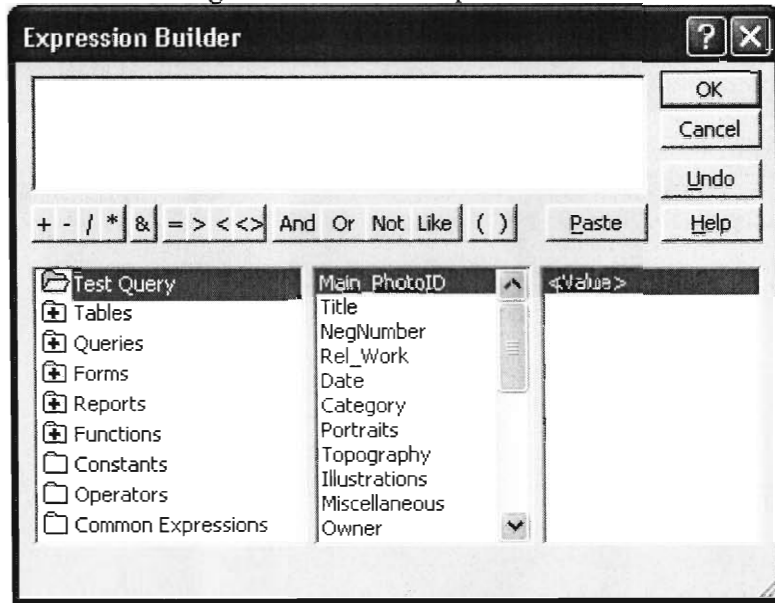
This is where the *Expression* is created.

1.3.3 Creating a User Prompt

To create unique Queries, one can use a variety of different coding options. For this example, the user will be prompted to enter a specific height range (two different heights that will become the limits of the query).

The following String was typed into the text box at the top:

Between [Enter First Height in the Range] And [Enter Last Height in the Range]

The Brackets are what prompts the user for Input. When the query is run the Prompt is shown below.
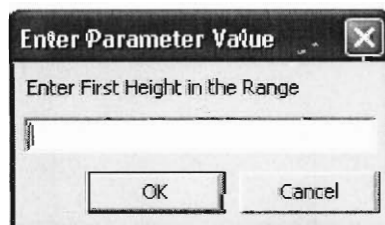
This Query allows a Range of Heights to be entered using 2 Prompts.

After entering in the String and creating the Expression Click Ok. Close out of the Query and Save changes.
All of the Queries, query different information; therefore, view the expression for each query to get a better understanding about how the database works.

1.4 Forms
1.4.1 Open an Existing Form

Click on Forms in the Object Window
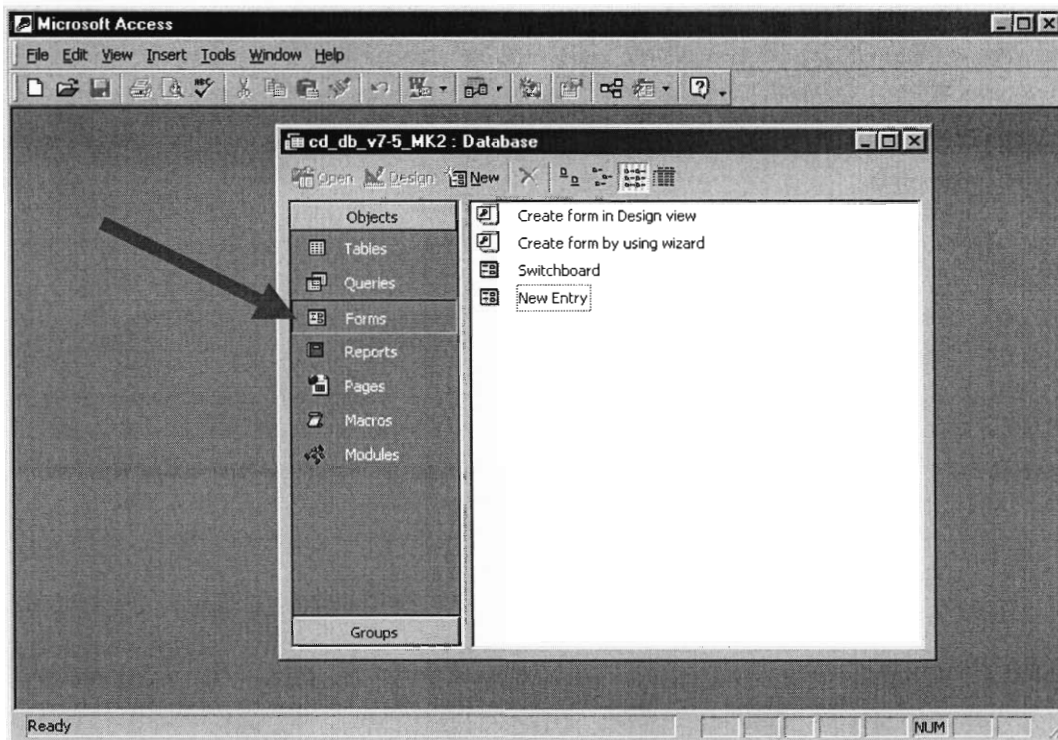
In the Form Window, there are two forms: Switchboard and New Entry.

When opened, these Forms will automatically display in *Form View*, unless specifically opened using *Design View*.

1.4.2 Switchboard

The Switchboard Form View is shown below:
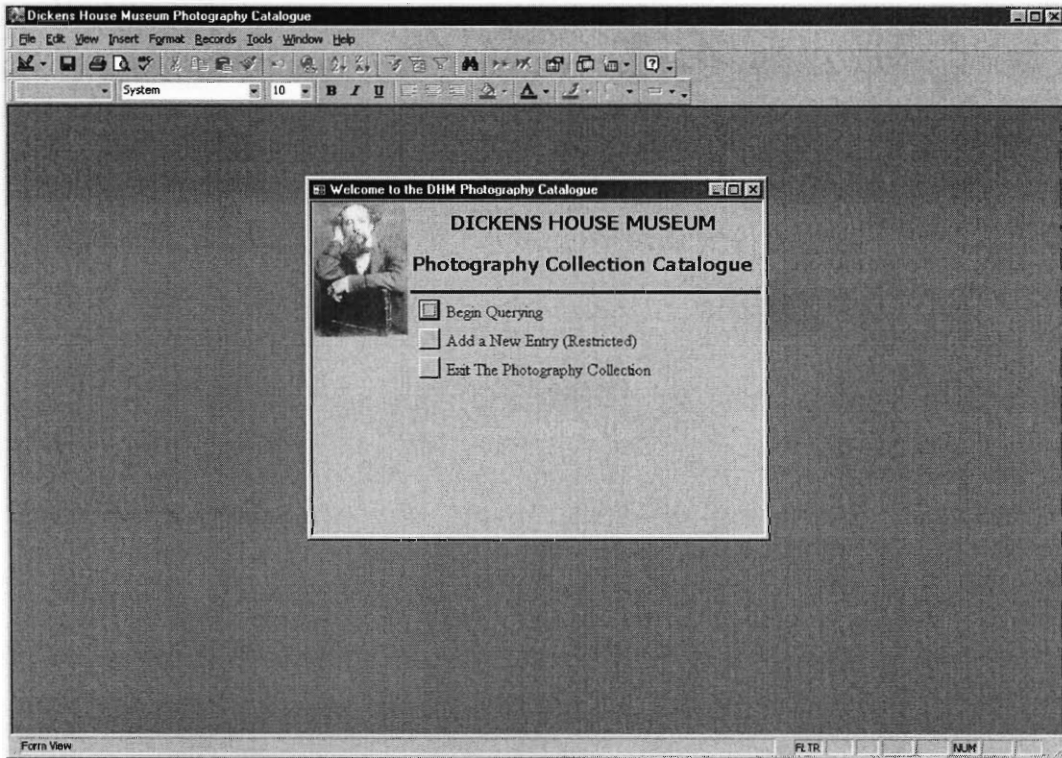
The Switchboard Design View is shown below:
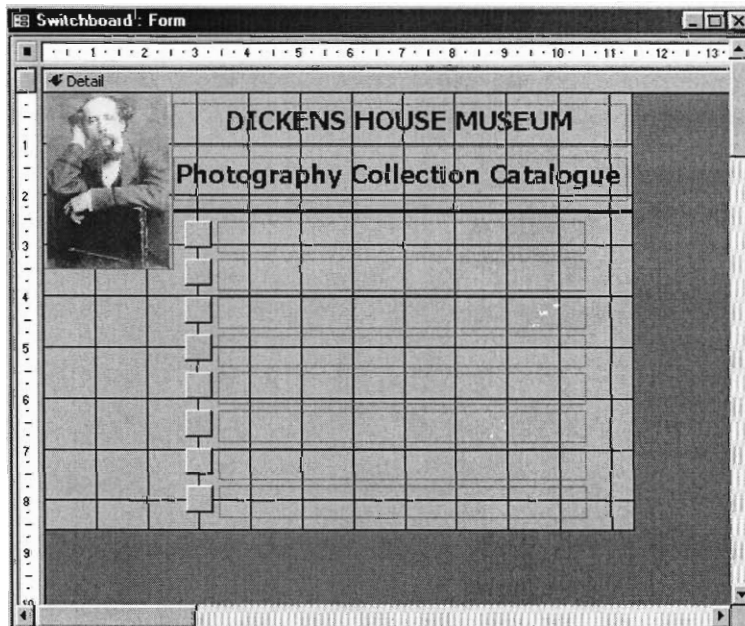
The above previous was Created using the *Switchboard Manager*. This command can be found by Clicking on Tools, then Database Utilities and finally *Switchboard Manager*.

The Switchboard Manager prompts the creation of a Switchboard if one does Not Exist.
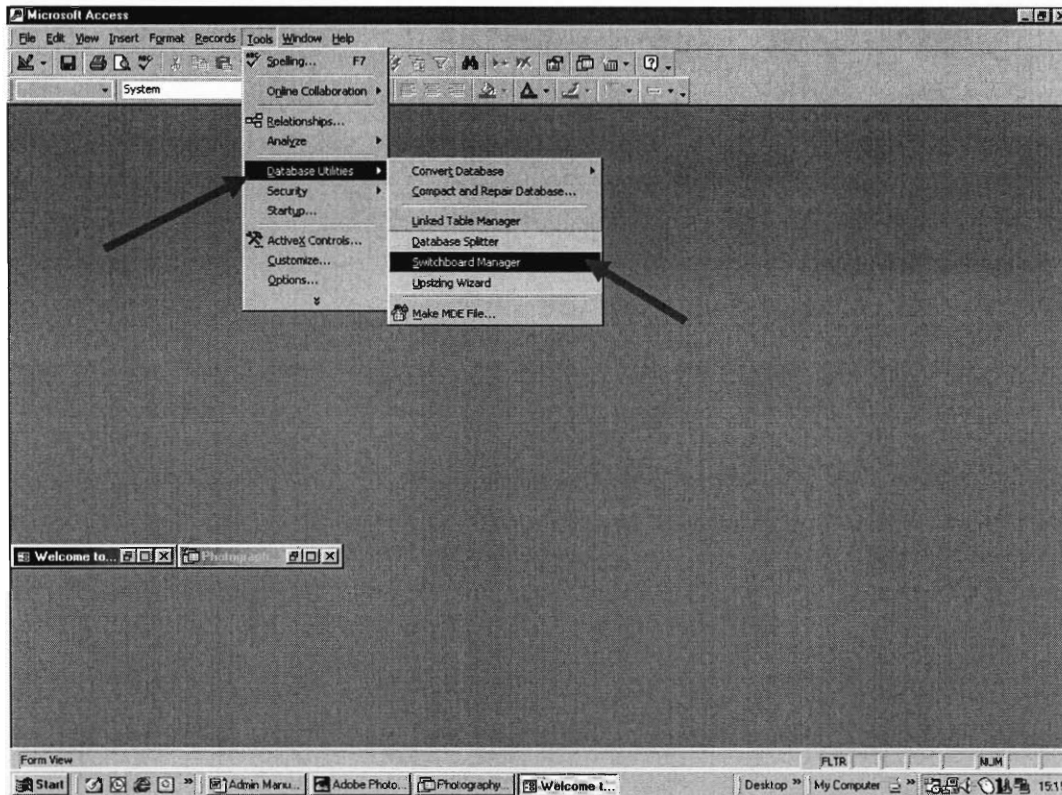
Otherwise, the manager allows the user to Edit the existing Switchboard.
The user can Click on a Button to chose various options.
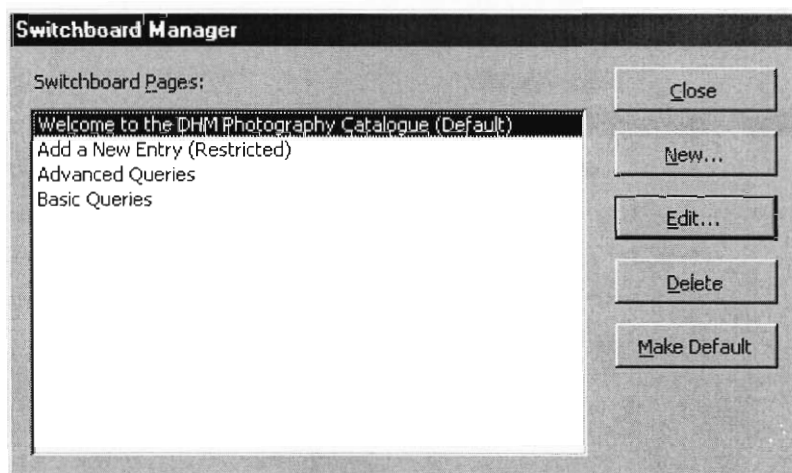
The New… Button allows the user to Create a new page in the Switchboard.
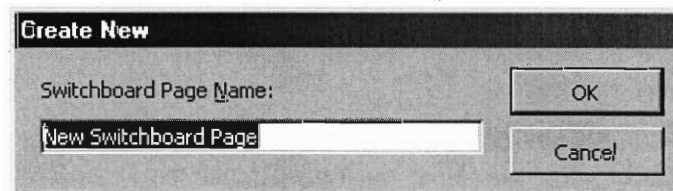
The Edit Button allows the user to Edit an existing page by bringing up another window.

Edit Switchboard Page

Switchboard Name:

Welcome to the DHM Photography Catalogue

Items on this Switchboard:

Begin Querying
Add a New Entry (Restricted)
Exit The Photography Collection

Close

New...

Edit...

Delete

Move Up

Move Down
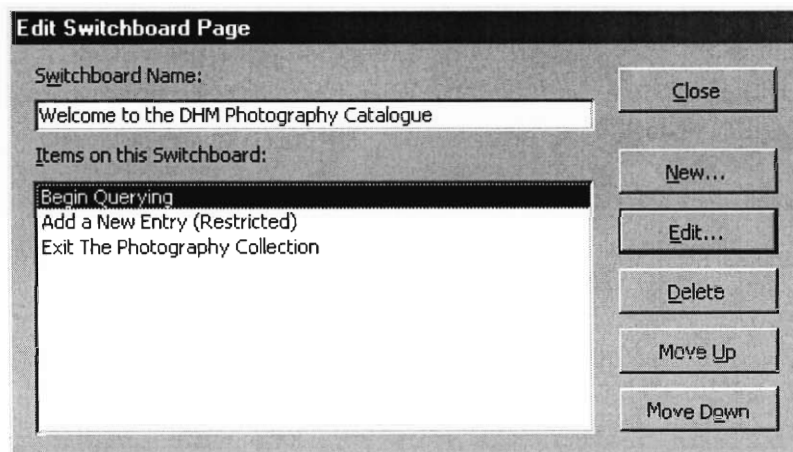
In the Previous Window:
The New… Button allows the user to create a New item in the chosen Switchboard page.
The Edit… Button allows the user to Edit an existing item in the chosen Switchboard page.

Both of these options present similar screens with the main options of: Text and Command and Switchboard (both pull-down menus)

Edit Switchboard Item

Text: New Switchboard Command

Command: Go to Switchboard

Switchboard:

Go to Switchboard
Open Form in Add Mode
Open Form in Edit Mode
Open Report
Design Application
Exit Application
Run Macro
Run Code

OK

Cancel

Edit Switchboard Item

Text: New Switchboard Command

Command: Go to Switchboard

Switchboard:

Add a New Entry (Restricted)
Advanced Queries
Basic Queries
Welcome to the DHM Photography Catalogue

OK

Cancel

The information Entered into the Switchboard Manager is also placed in a Switchboard Table.

SwitchboardID	ItemNumber	ItemText	Command	Argument
1	0	Welcome to the DHM Photography Catalogu		Default
1	1	Begin Querying	1	5
1	2	Add a New Entry (Restricted)	1	3
1	3	Exit The Photography Collection	6	
2	0	Advanced Queries	0	
2	1	Advanced (And) Keyword Query	4	Advanced (And) Keyword Query
2	2	Advanced (Or) Keyword Query	4	Advanced (Or) Keyword Query
2	3	Description Query	4	Description Query Report
2	4	Related Works Query	4	Related Works Query Report
2	5	SubCategory Query	4	SubCategory Query Report
2	6	Title Query	4	Title Query Report
2	7	Go Back to the Basic Queries	1	5
2	8	Go Back to the Welcome Screen	1	1
3	0	Add a New Entry (Restricted)	0	
3	1	Add a New Entry	7	New Entry Macro
3	2	Go Back to the Welcome Screen	1	1
5	0	Basic Queries	0	
5	1	Keyword Query	4	Keyword Query Report
5	2	Date Range Query	4	Date Range Query Report
5	3	Advanced Queries	1	2
5	4	Go Back to the Welcome Screen	1	1
*	0			

Record: 1 of 21

Finally, after setting specifications in the Switchboard Manager, the Form should be examined in *Design View* in order to make any additional, minor, aesthetic changes.

1.4.3 New Entry Form

The Second Form in the Database is the New Entry Form shown below in its *Form View*.

The New Entry Form in its *Design View* is shown below.

1.4.4 Form Design

There are two Options for creating a Form, either by starting in *Design View* or Using the *Wizard* to aid in its design, which will eventually lead to viewing the form in *Design View*.
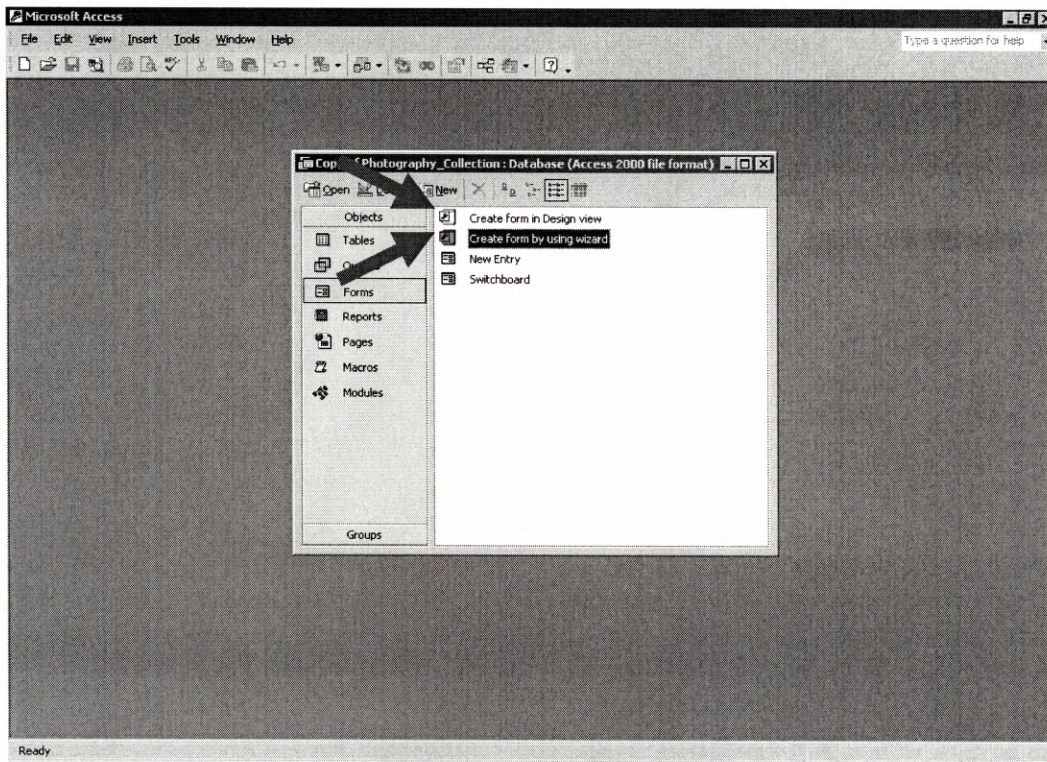
The *Design Wizard* was used in the creation of the New Entry Form.
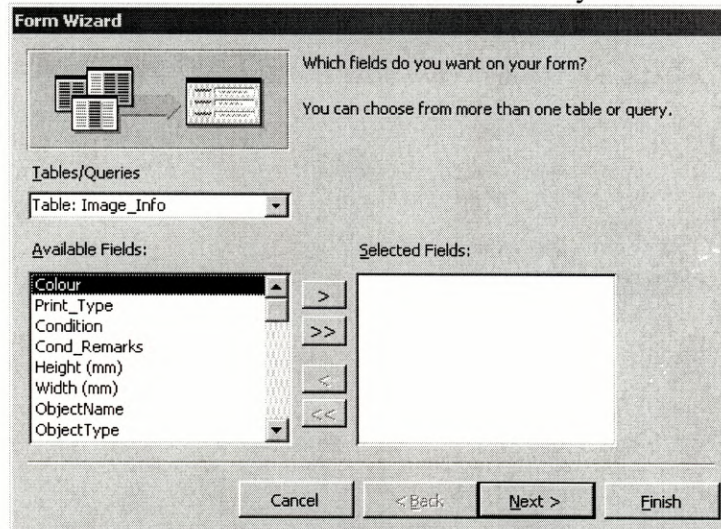
The First Step is to decide which Table/Query to base the new form upon. The Options are listed in a Pull-down Menu.

In the New Entry Form, information was taken from the *Image_Info* and *Main* Tables.
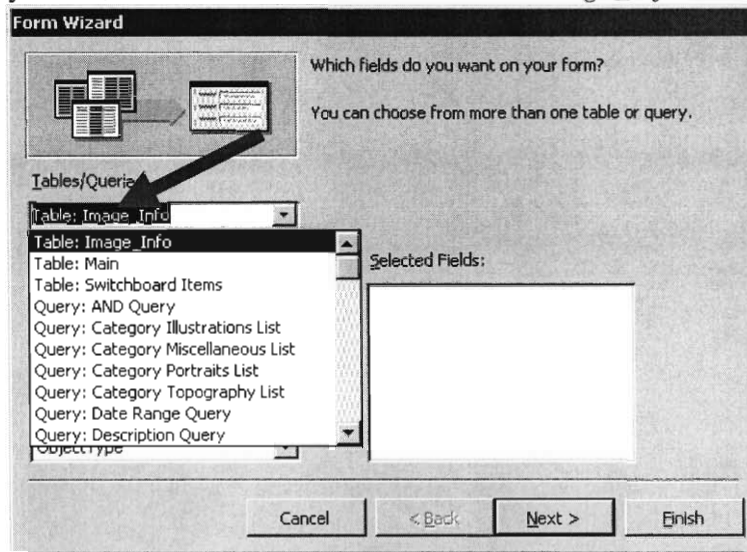
After selecting the Table/Query, Select the Fields from that Table/Query that will be included in the Form using the Buttons in the centre.

The New Entry Form used all fields in both of the chosen Tables.
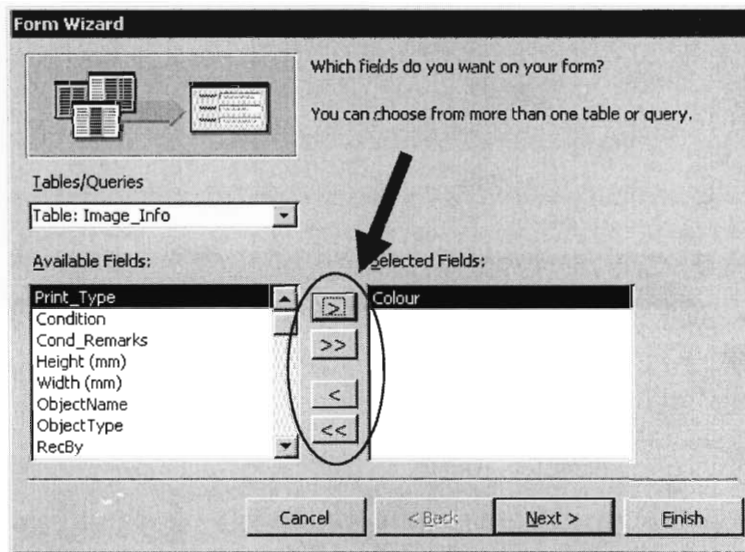
Click the Next Button to move onto the following Screen.

In this Window, Select the desired Form Layout. *Columnar* was used for the New Entry Form.
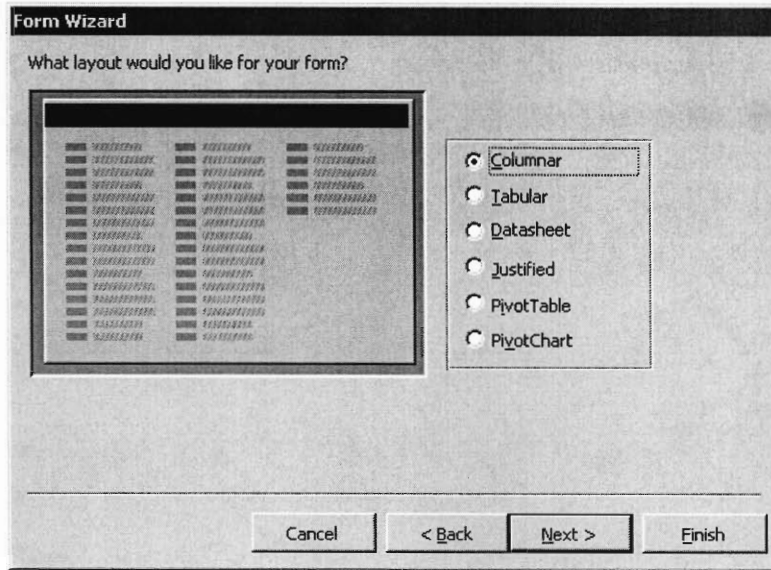
Click the Next Button to move onto the following Screen.

In this Window, Select the Layout's aesthetic style. *Expedition* was used in the New Entry Form.
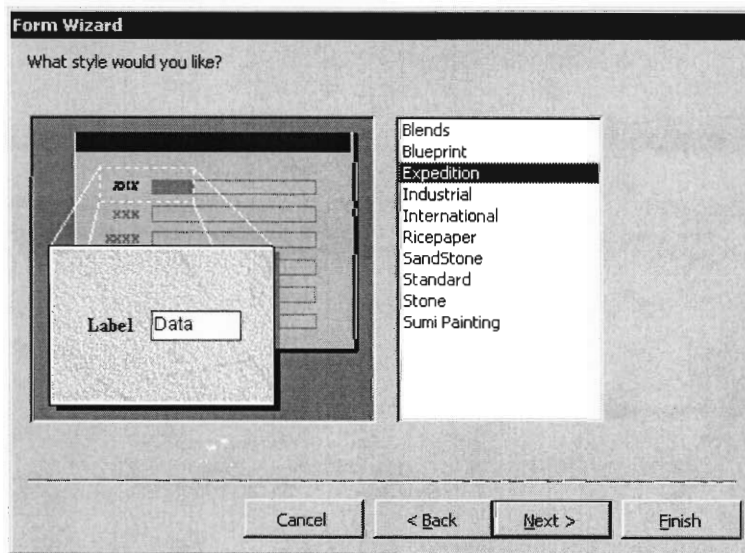
Click the Next Button to move onto the following Screen.

Name the New Form in this Window.
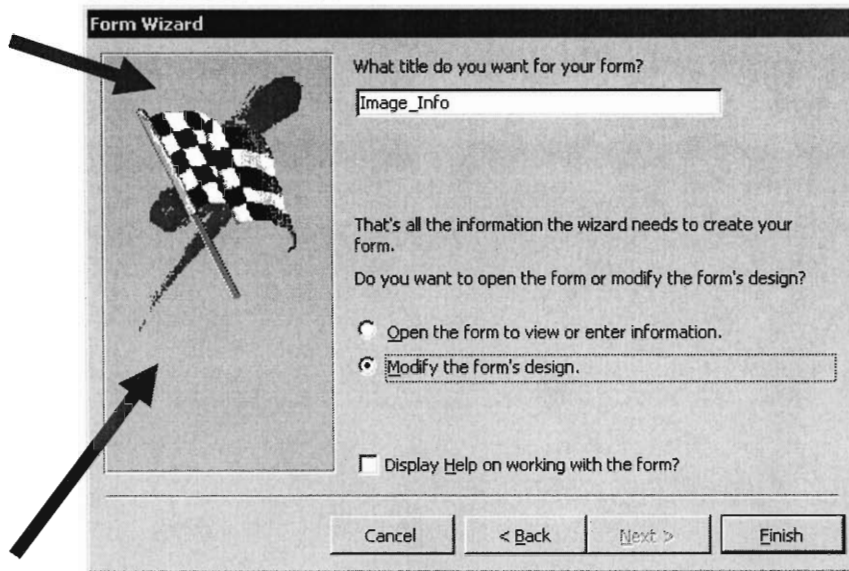
Then there is an option to "Open the Form to View or Enter Information" Or "Modify the Form's Design."

It is recommended to open the Form Design to check for alterations that may be necessary.

After Completing both of these tasks, Click the Finish Button.

The Following figure is an Example of a New Form after using the *Form Wizard*, but without any user modifications.
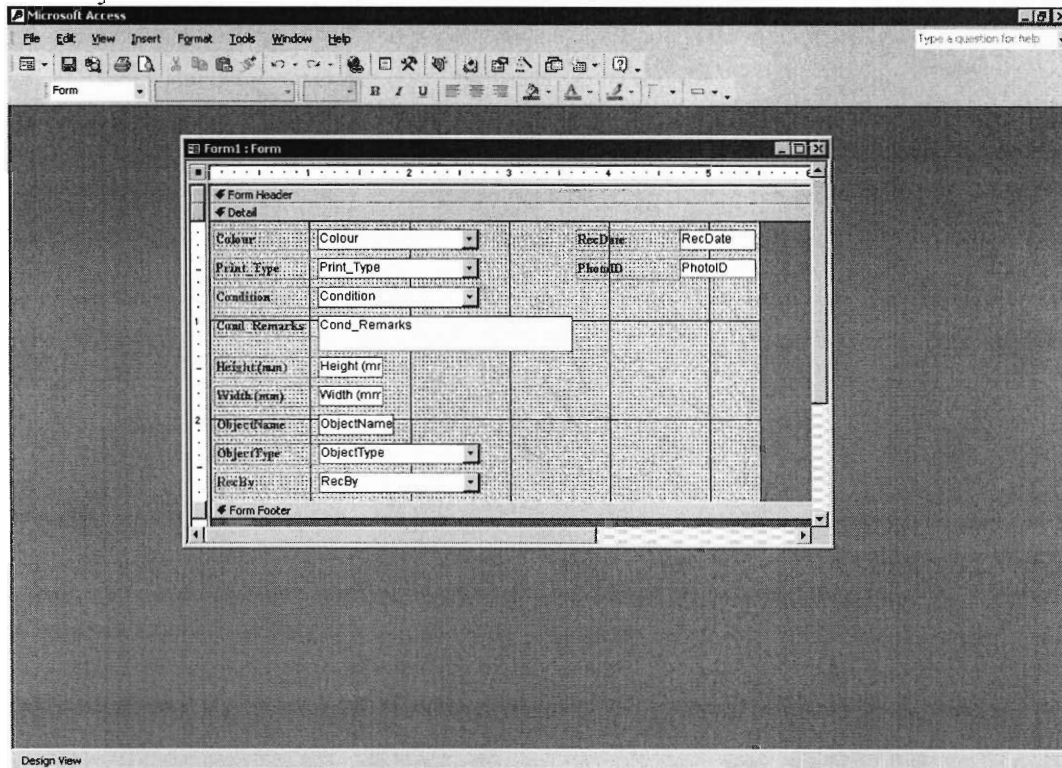
This is an acceptable design, but most likely does not meet the user specifications. At this point, each Field's individual Properties may be Entered, the Fields may be arranged in a sensible Order with an aesthetic Design, and more difficult Specifications may be Set using Visual Basic Code.

1.4.5 Visual Basic Coding

Visual Basic Coding is a complicated addition to a database. It is a method for creating design specifications that cannot be set using the properties provided by Access. The Code used in the New Entry Form is an example of a situation where coding is necessary. It can be viewed below, along with a step-by-step explanation.

Option Compare Database

```
Private Sub Category_AfterUpdate()
If Category = "Portraits" Then
Me.Portraits.Visible = True
Me.Topography.Visible = False
Me.Illustrations.Visible = False
Me.Miscellaneous.Visible = False
Me.Portraits.Enabled = True
Me.Topography.Enabled = False
Me.Illustrations.Enabled = False
Me.Miscellaneous.Enabled = False
Me.Category.Enabled = True
Else
If Category = "Topography" Then
Me.Portraits.Visible = False
Me.Topography.Visible = True
Me.Illustrations.Visible = False
Me.Miscellaneous.Visible = False
Me.Portraits.Enabled = False
Me.Topography.Enabled = True
Me.Illustrations.Enabled = False
Me.Miscellaneous.Enabled = False
Me.Category.Enabled = True
Else
If Category = "Illustrations" Then
Me.Portraits.Visible = False
Me.Topography.Visible = False
Me.Illustrations.Visible = True
Me.Miscellaneous.Visible = False
Me.Portraits.Enabled = False
Me.Topography.Enabled = False
Me.Illustrations.Enabled = True
Me.Miscellaneous.Enabled = False
Me.Category.Enabled = True
Else
If Category = "Miscellaneous" Then
Me.Portraits.Visible = False
Me.Topography.Visible = False
```

```
Me.Illustrations.Visible = False
Me.Miscellaneous.Visible = True
Me.Portraits.Enabled = False
Me.Topography.Enabled = False
Me.Illustrations.Enabled = False
Me.Miscellaneous.Enabled = True
Me.Category.Enabled = True
End If
End If
End If
End If
End Sub

Private Sub Description_AfterUpdate()
Me.Portraits.Visible = False
Me.Topography.Visible = False
Me.Illustrations.Visible = False
Me.Miscellaneous.Visible = False
Me.Category.Enabled = True
Me.Portraits.Enabled = False
Me.Topography.Enabled = False
Me.Illustrations.Enabled = False
Me.Miscellaneous.Enabled = False
End Sub

Private Sub Condition_GotFocus()
Me.Portraits.Enabled = False
Me.Topography.Enabled = False
Me.Illustrations.Enabled = False
Me.Miscellaneous.Enabled = False
End Sub

Private Sub Portraits_GotFocus()
Me.Category.Enabled = False
End Sub

Private Sub Topography_GotFocus()
Me.Category.Enabled = False
End Sub
Private Sub Illustrations_GotFocus()
Me.Category.Enabled = False
End Sub

Private Sub Miscellaneous_GotFocus()
Me.Category.Enabled = False
End Sub
```

- In the above code Private Sub is the manner in which each section of code begins. Each section ends with the line End Sub.

- Next, within the same line, follows the *General_Declaration.*
  In this part of the section the *General* either refers to the field, piece of the form, or the entire form, depending on what this particular section will be dealing with. Then, the underscore (_) is necessary. After that, the *Declaration* refers to the conditions, of the *General*, with which this section will be dealing. Some example Declarations are AfterUpdate, BeforeUpdate, Change, and Click.

- Much of the above code involves If-Then-Else Statements. Each of these subsections begins with *If.* Next, on the same line, a condition, such as x=y, is given, followed by *Then.* The body of the statement provides directions for cases where x=y. After that, *Else* often follows. The *Else* introduces directions for cases where x does not = y. After the body following *Else*, every If-Then-Else statement concludes with *End If.*

- It was necessary to Set the Portraits, Topography, Illustrations, and Miscellaneous Fields to Not Enabled and Not Visible in order for this code to perform properly. The Category Field was Set to be Enabled and Visible.

- Within the Visual Basic Code for the New Entry Form, the first line says:
  Private Sub Category_AfterUpdate()
  This means that the following section, up to the line that says End Sub, is dependant on the Category Field After it has been Updated.
  o This section is composed of a series of If-Then-Else Statements giving directions for the Properties of the Portraits, Topography, Illustrations, and Miscellaneous Fields depending on the selection made in the Category Field.
    ▪ It opens with an If Statement for the Condition where the Portraits option has been selected in the Category Field.
      • The Body instructs that in this case that the Portraits Field be Visible and Enabled.
      • The other three Fields with instructions are Not Visible and Not Enabled.
    ▪ An Else Statement follows the If Statement.
      • If the Category Field was not filled with the Portraits option, the Code checks to see if the second condition, of Category = Topography, under the Else is true.
        o If this Condition is true then the Topography Field will be Enabled and Visible. The other three Fields will Not be Enabled and Visible.
      • If the past two If Conditions are false, the Code continues to the next Else Statement and follows the same convention.
      • After the third Else Statement, there are No more Options available, so the body closes with an End If Statement.

- Three more End If Statements follow to conclude the previous If Statements.
- Finally the Section ends with an End Sub commands.

- The next section begins with the following Statement:
  Private Sub Description_AfterUpdate()
  This means that the following section is dependant on the Description Field after it has been Updated.
  o This Section instructs that the Portraits, Topography, Illustrations, and Miscellaneous Fields be Not Visible and Not Enabled, and that the Category Field be Enabled after the Description Field has been Updated.

- The following Section begins with:
  Private Sub Condition_GotFocus()
  This means that the dependence is upon when the Focus comes to the Condition Field.
  o This Section instructs that the Portraits, Topography, Illustrations, and Miscellaneous Fields be Not Enabled.

- The next four Sections depend upon the Focus each of the four SubCategory Fields, namely Portraits, Topography, Illustrations, and Miscellaneous.
  o When the Focus is placed upon any of these Fields, the Category Field is Not Enabled.

- There was specific reasoning behind each section of Code.
  o The first Section with the If-Then-Else Statements controls the visibility of the SubCategory Fields for aesthetic purposes. If these instructions were not included within the database, the form would display space for all four SubCategory Fields even though only one of the four can be filled at once.
    This Section also controls whether the Field is Enabled. This is to prevent the user from Entering information into the wrong Field. For example, if the Category chosen is Portraits. Then the user can only chose a SubCategory in the Portraits Field, not the Topography or other SubCategory Field.

  o The following Section was created so that none of the SubCategories are Visible or Enabled when a new Record within a Form is created. The Category Field has not been Set so it is unknown which SubCategory Field should be viewed, therefore they are all hidden.

  o The Next Section Disables all of the SubCategory Fields. This was chosen to be Dependant upon the Condition Field because it automatically follows the SubCategory Field in Tab Order. The

Command was put in place to further prevent entering information into the wrong SubCategory Field.

o Finally the last four Sections Disable the Category Field after the Focus is placed on a SubCategory Field. This is the last preventative measure to keep the user from entering information in the Category Field that does not correspond with the SubCategory Field.

1.4.6 Editing an Existing Form

In order to Edit an existing Form, Open it in *Design View* as previously shown.

Once in *Design View*, new Fields can be added, existing Fields can be modified, and the Layout can be changed.

Click on the Field List in order to Display a table of optional Fields to Add.
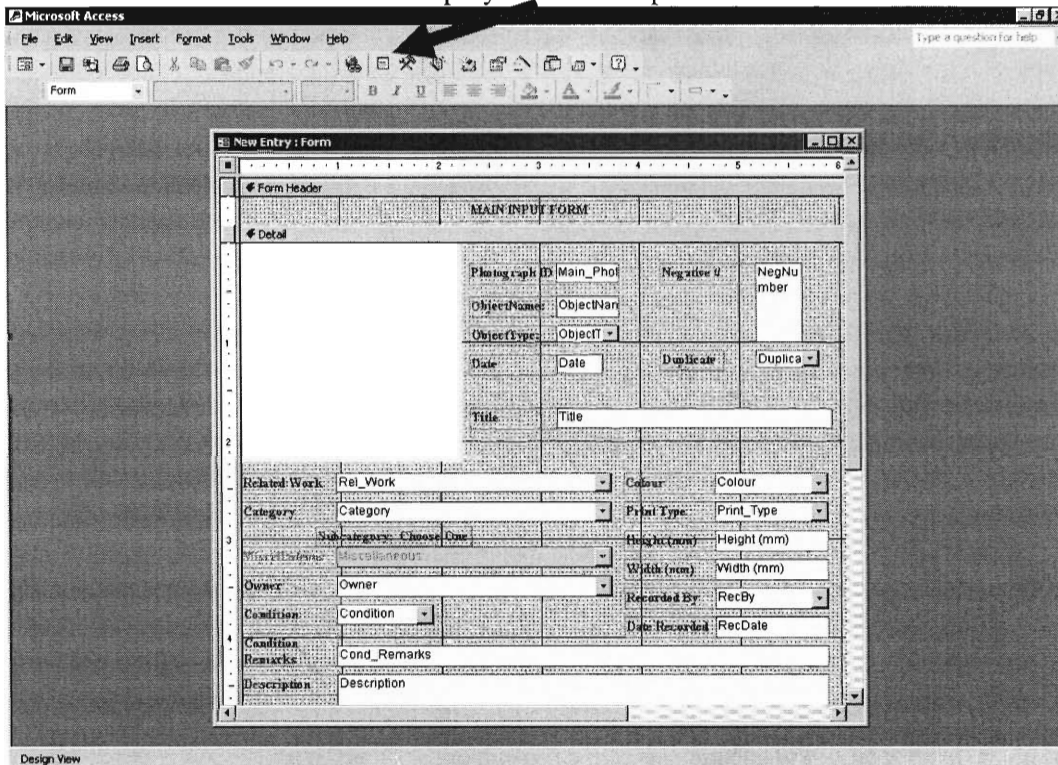
After Displaying the List, Choose a Field by Clicking on it and Dragging it into the Form Display.
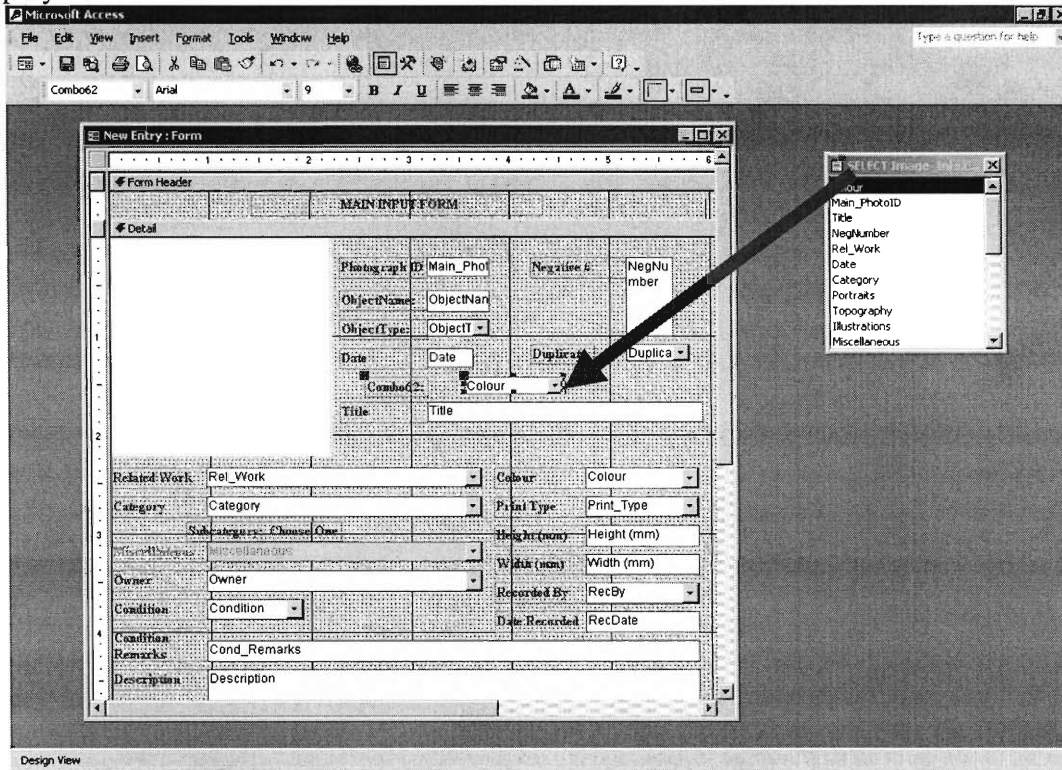
Once this Field has been brought into the Form, Adjust it's the size and placement using the small black boxes surrounding the Field.

To Change the Properties of the entered Field or of an existing Field, right click on that Field. From this Menu, choose Properties. At this point a Table with 5 tabs will Display.
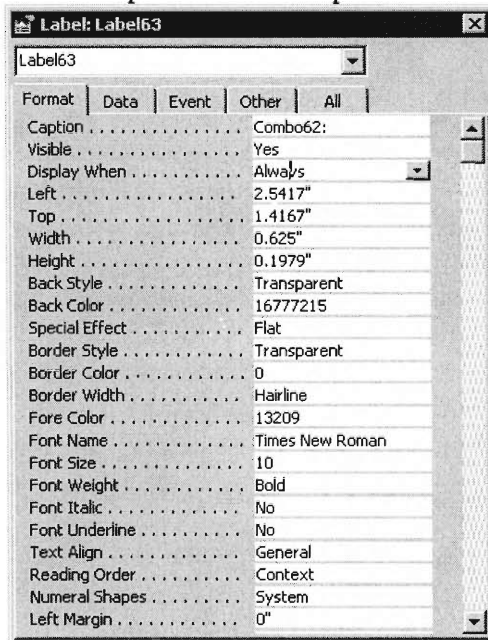
The Properties are separated into the four Groupings, which the four Tabs represent. Then the last Tab, All, contains all of the Properties. Each Tab does not always have information listed below. The Properties found in this Window are different for each Field.

1.5 Reports

The Following is an example Report.
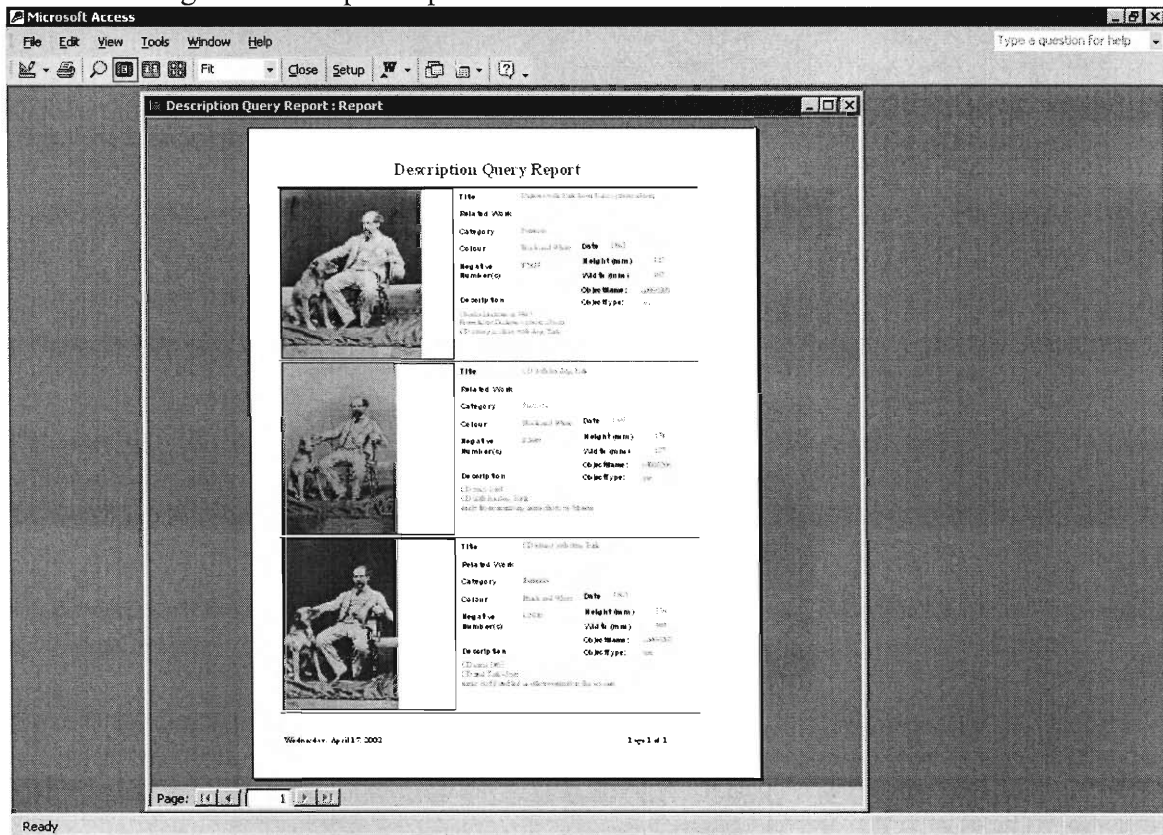
The Reports in this Database were created using a combination of the *Report Wizard* and the *Design View*.

The First Step is to Open the Wizard. Its First Screen is the same as the First Screen in the Form Wizard (See Section 1.4.4)

Use this Screen in exactly the same manner. Choose which Query/Table to base the Report upon. Then Choose the Fields that will be in the Report. Remember that the Report will only be Dependant on the Chosen Fields from the Query and/or Tables Selected.
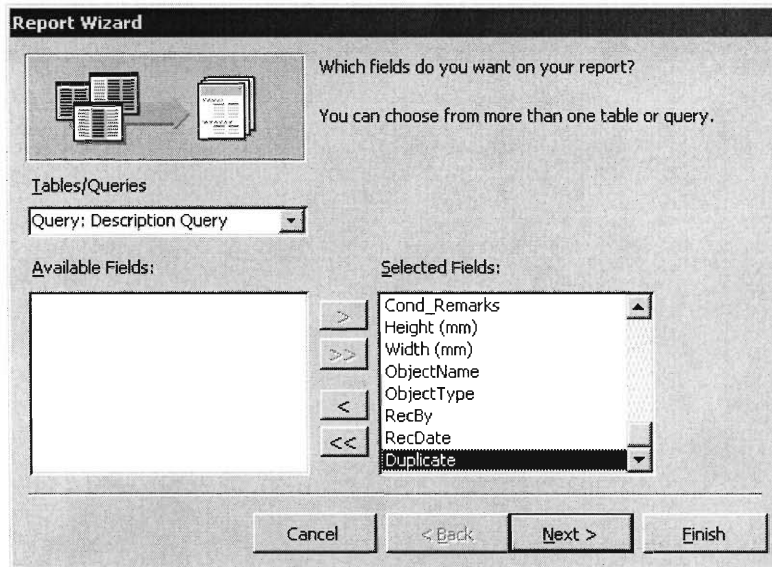
At this time, Instead of Clicking the Next Button, Click the Finish Button.

Now open the New Report in Design View.

The following is an example of a Report in it's *Design View*.
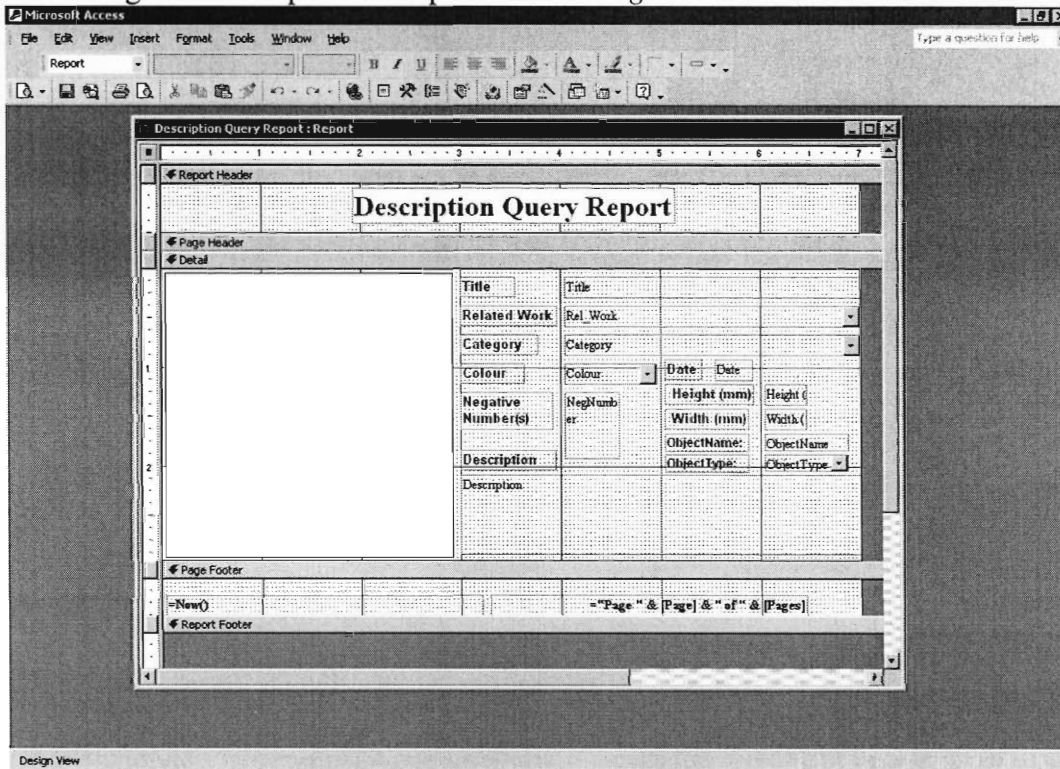
Here the Report can be edited in a similar manner to the Form.

When creating a Report similar to one that already exists, do the following:
1. Delete the Fields from the Design View of the Report.
2. Open an existing Report with the desired format.
3. Select All of the Fields and Copy them.
4. Paste these Fields in the New Report

Properties of the Fields found in the Report can be changed in the same manner as Properties are changed in the Form (see 1.4.2)

2.0 Digitisation

The Digitisation section is an important section for the continuation of this project. The first step in this process is capturing the photograph.

2.1 Capture

Retrieve the Camera and the Camera Stand. Setup the Camera on the little desk next to the window. See below
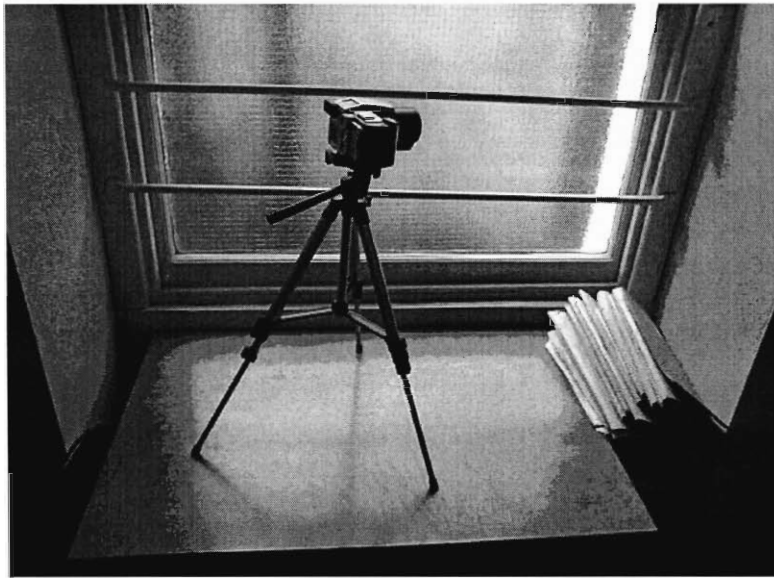
Next Remove the wallet that contains the photograph that is going to be captured. Place a Marker (Pink Card) in the filing cabinet of the location in which the wallet was removed.

Next position the Camera to capture the single photograph in the wallet.
Turn the Camera On to the correct settings (Dial Turned to P). Capture the Image.
See below.
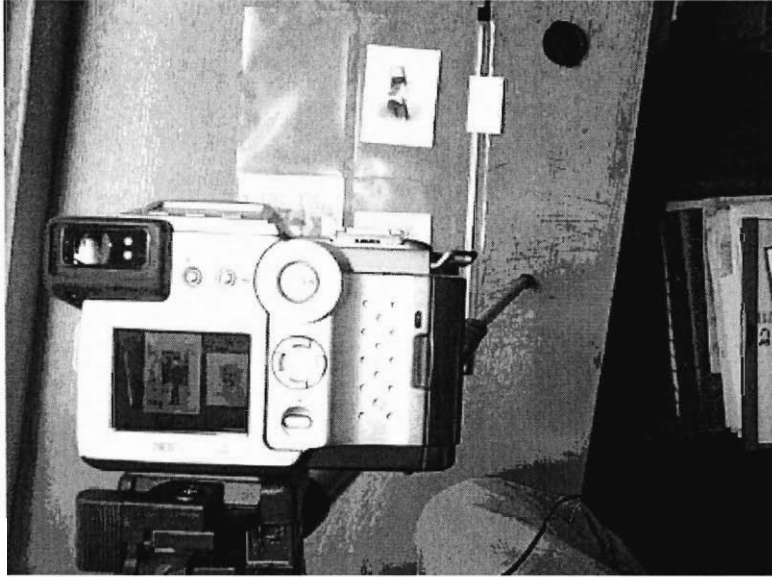
Repeat this process for the other photographs.

Once done capturing a batch of photographs, download the images to the Computer.

Connect the serial cable shown below to the Camera and the computer.
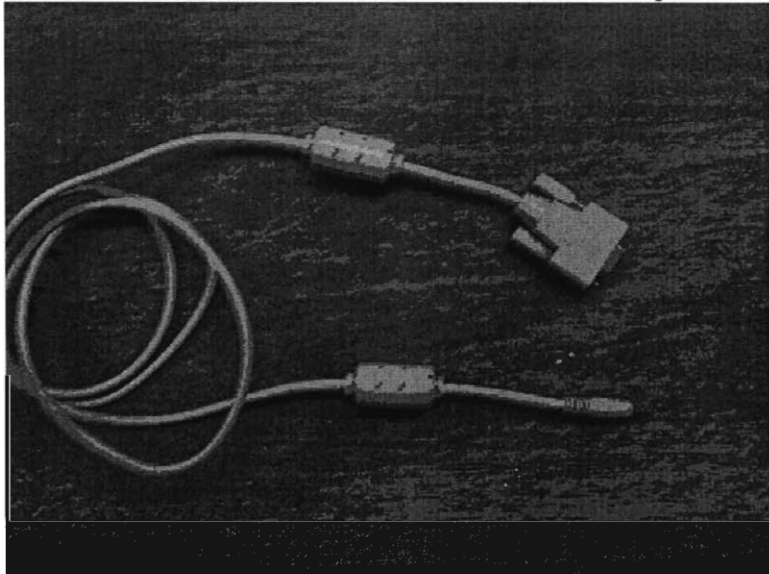
Click on the download application icon on the desktop

CAMEDIA Master 1.2.lnk

Once that application opens, open the Camera in the file menu.
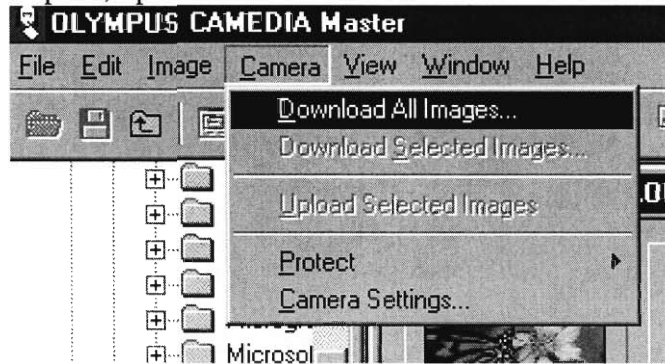
Choose to download all images to the a new folder in Original Folder located in C:\Photography_Catalogue\

Name the New Folder Batch ###. Then Click Ok and Save the images with that newly created folder. Once the images have been saved close the application.

2.2 Editing the Image

Open Adobe Photoshop. A shortcut icon is located on the desktop.

Adobe Photoshop 4.0.lnk

Open up an original image by opening the File menu and clicking Open.
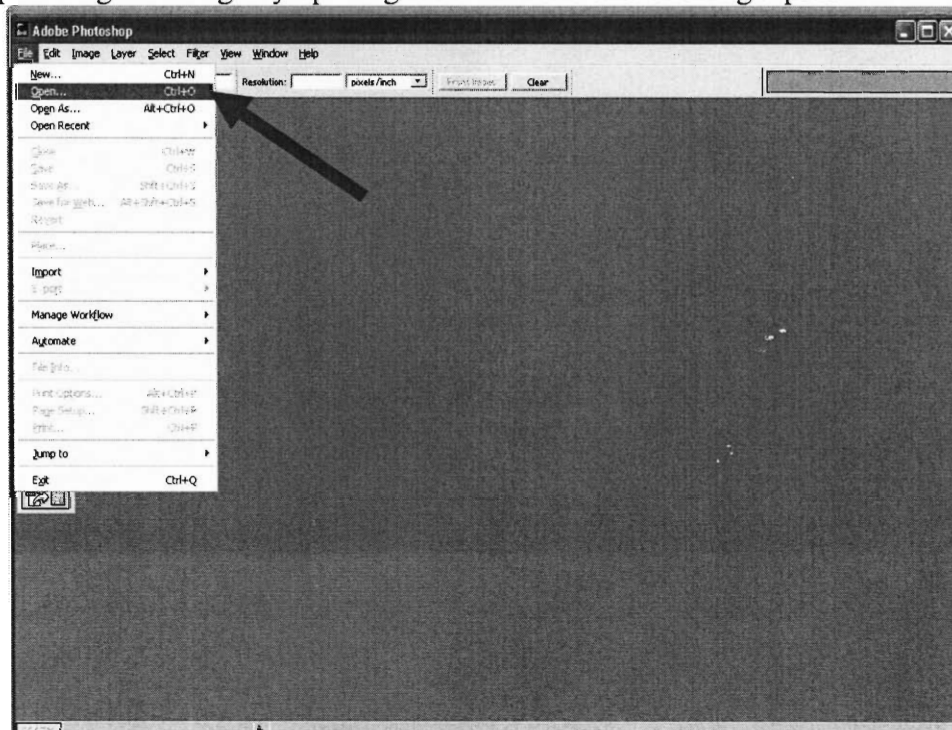
Select the correct batch and file then Click Open or hit the Enter key.
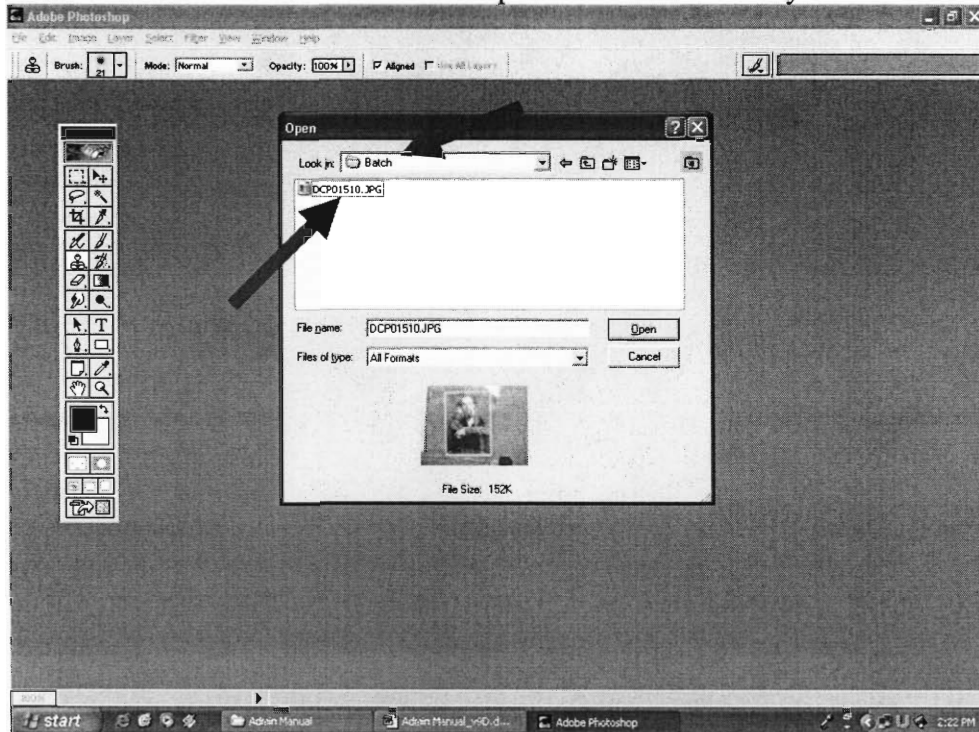
Crop the Image to reduce the amount of background area:

First Select the Crop tool
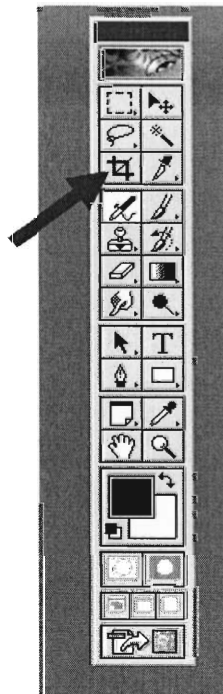
Then using the Crop tool Select a smaller area around the image.
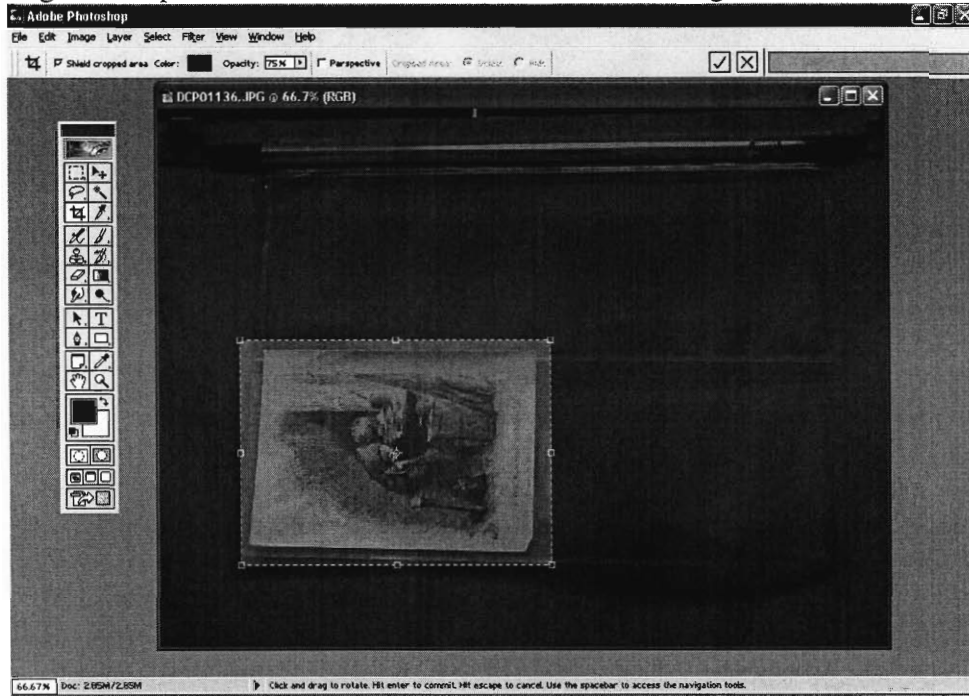
Double click on the lightened area and the picture will be cropped. Using the small boxes around the border of the cropping section, you can increase or decrease the area to be cropped.

Once the image has been cropped it can be rotated:
Go to Image, Rotate Canvas, and then Select the type of rotation you need.
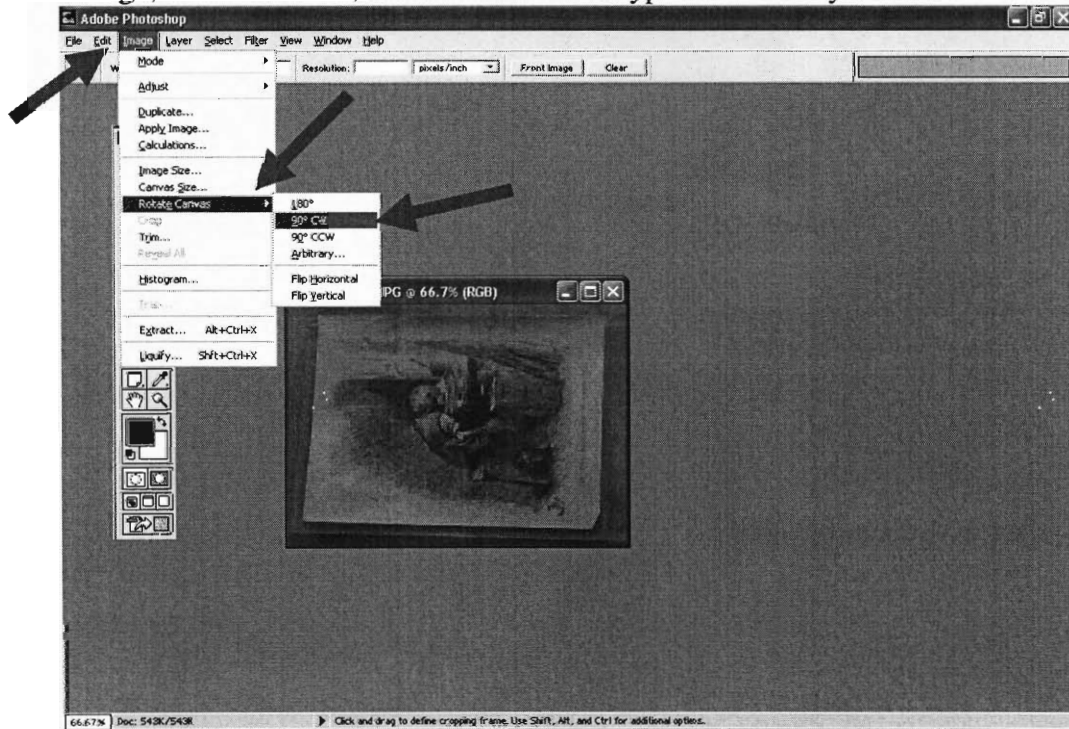
You may have to adjust the image by rotating at small Arbitrary degrees till the image is at the correct orientation.

Crop the Image to delete all the background using the same method as before.
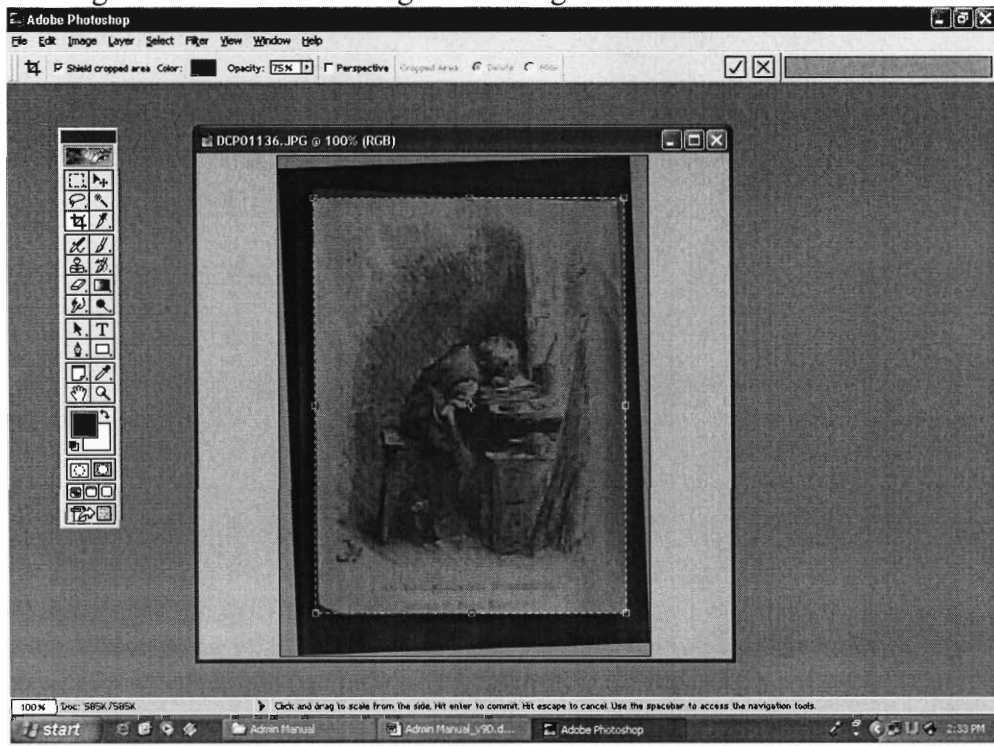
Now change the Image to Greyscale by going to the Image Menu, Mode, and then clicking on Greyscale as shown.
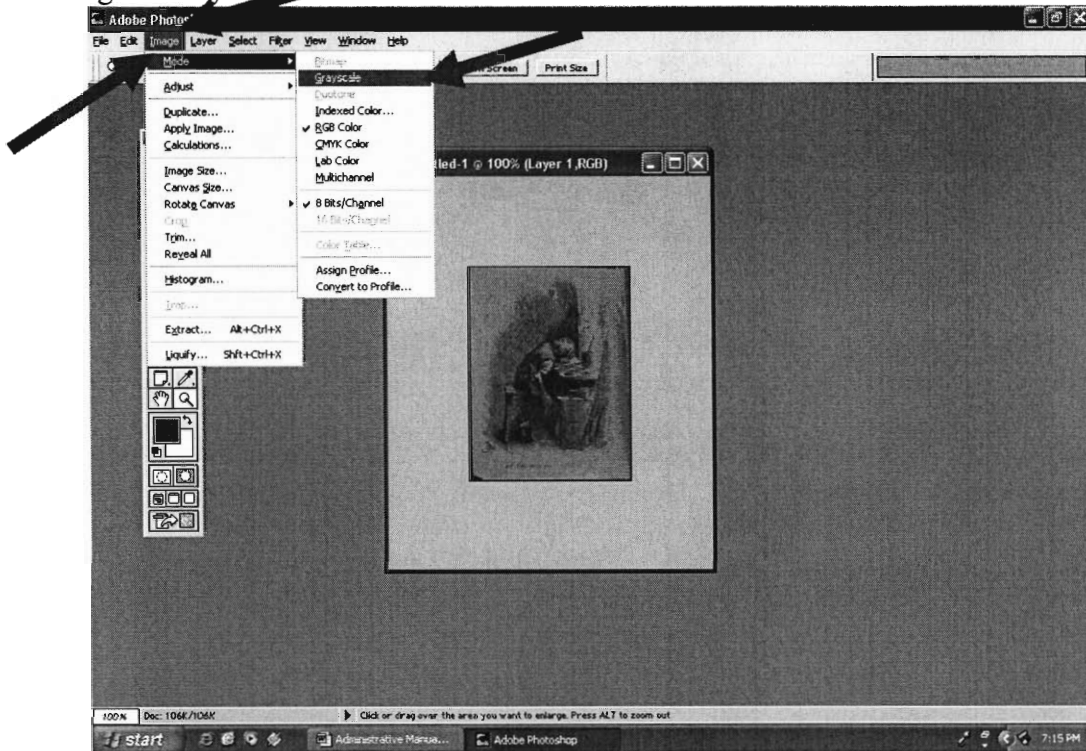
The program may prompt about either flattening the image or discarding colour information. Click OK or hit Enter for either of these.

Next reduce the image so that the largest side is 5 inches.

To do this choose the Image menu, click on Image Size
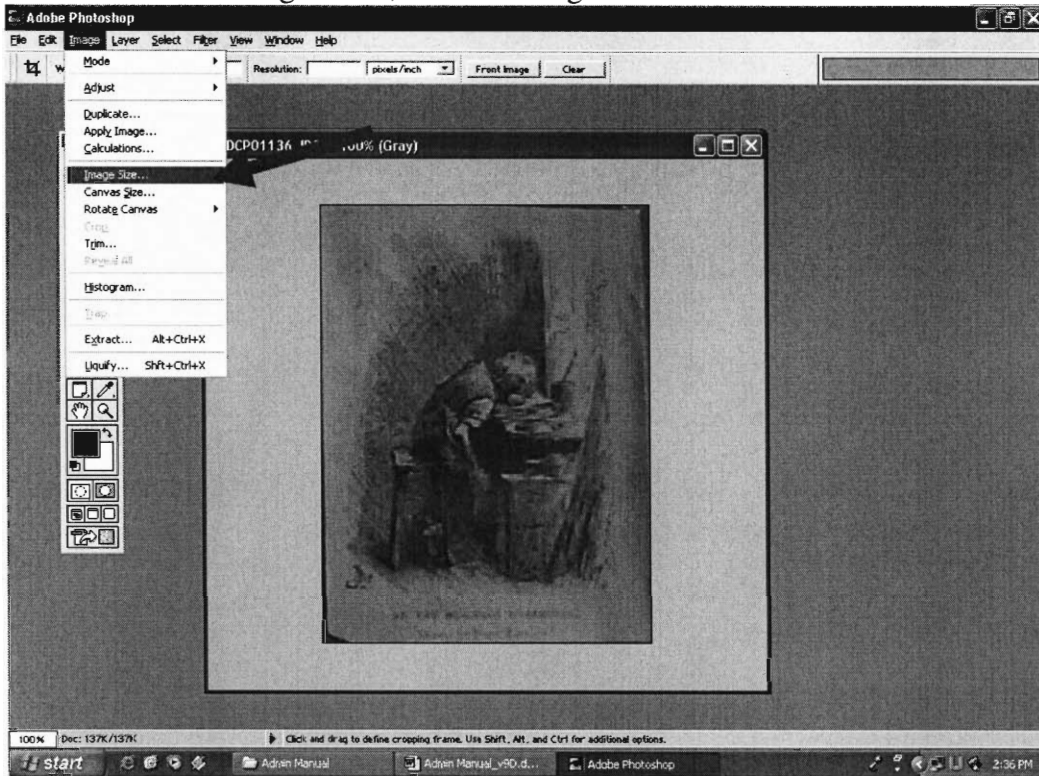
Change the largest field (Height or Width) in the Document Size Section to 5. Click OK or hit the Enter key.
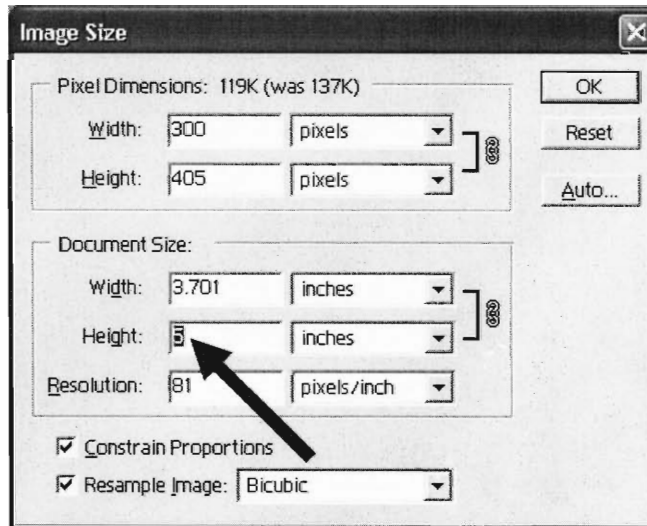
Finally save the Image for the correct file name and as a JPEG.

Go to the File Menu and Click Save As.
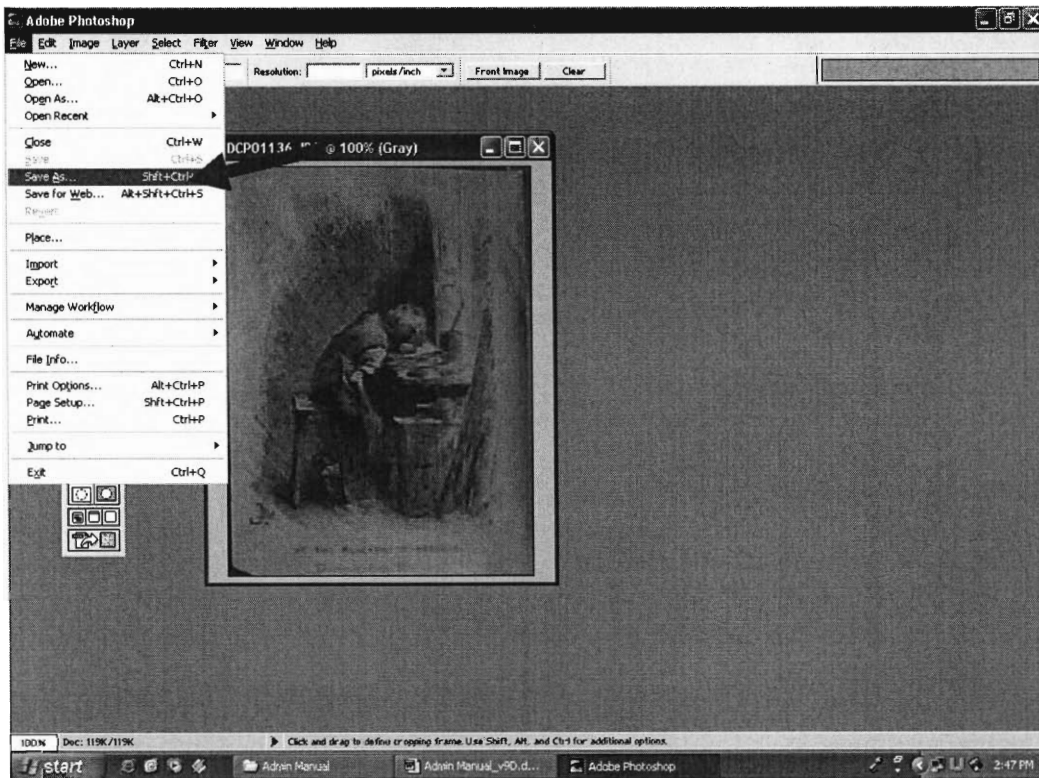
Save to the Images folder in the succeeding sequential file name (example if the last image is cd000614 then save this one as cd000615). Make sure that it is saving as a JPEG (*.JPG; *JPE). Then Click Save or hit Enter.
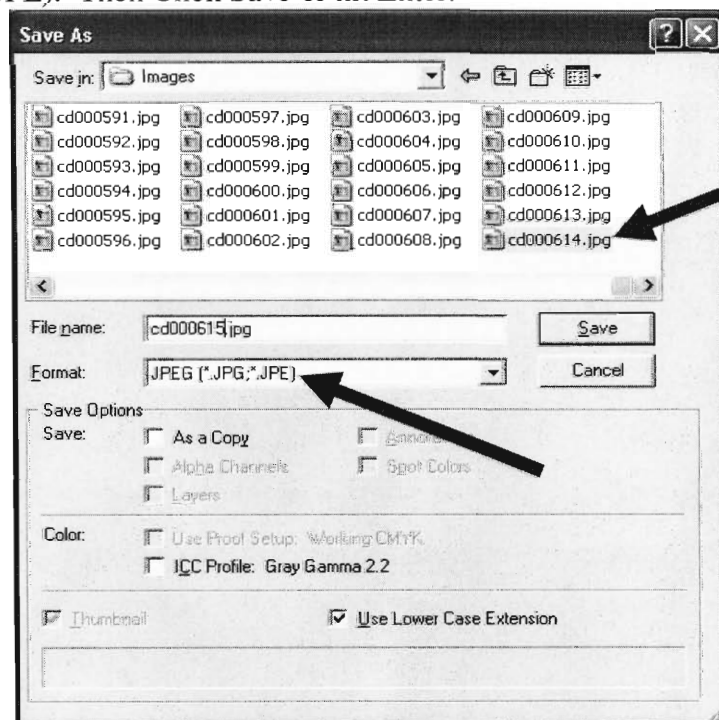
A window may open prompting you to define some variables. Make sure that the Quality is set to 1 and the Format Options is Baseline. Click OK or hit Enter.
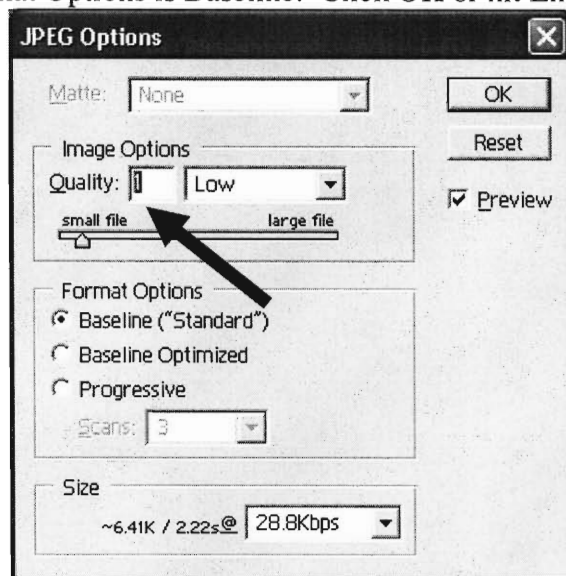
2.3 Input

Data Input is performed using the New Entry Form.

The Form is completed in the following order:

    1. Link To Image (Large White Box)

In order to Link the Image, first Right Click on the Box. Chose Insert Object...

This will bring up a new Window to aid in obtaining the correct Object.

First Choose Create a New File.
Then Choose Microsoft Photo Editor from the List.
Click OK.
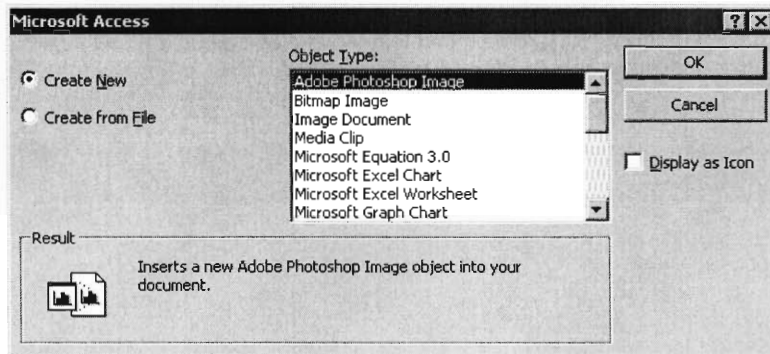
Select Open an Existing File, then Click OK. (See above)
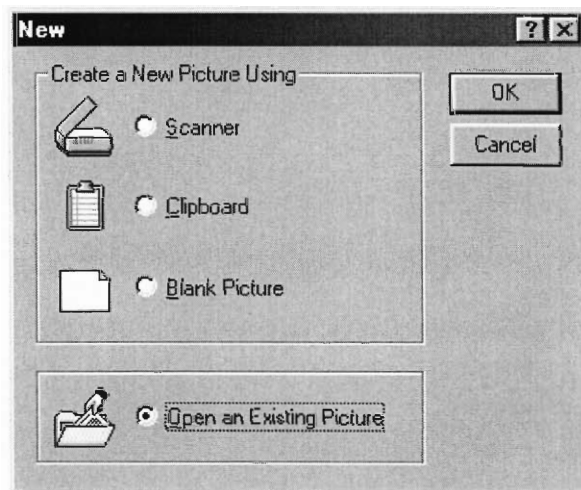
Locate the Photography_Catalogue Folder. Then locate the Image Folder within the previous Folder. Finally Select the correct File Name (cdxxxxxx.jpg).
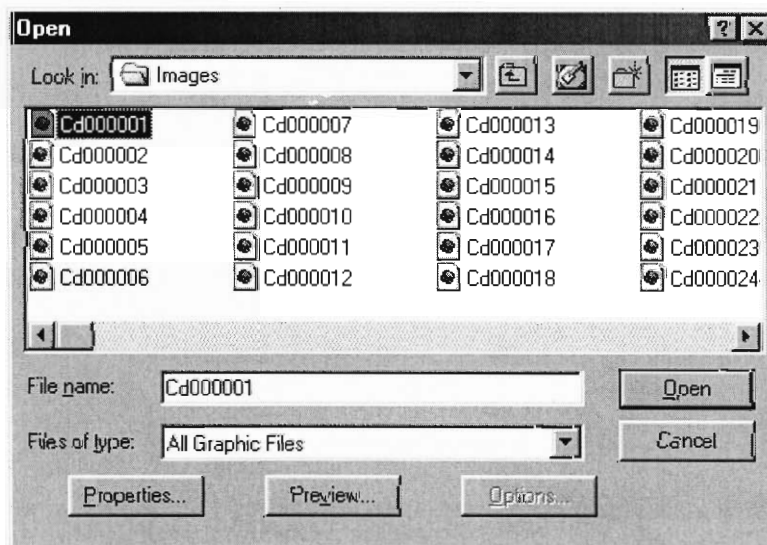
2. Photograph ID
This number is automatically entered into the form.

3. ObjectName
Enter the Image File Name, which is cdxxxxxx.jpg, with "x" representing a numerical digit.

4. ObjectType
Enter the type of Image File. The entry is usually "jpg" and is therefore located in the pull-down menu.

5. Date
Enter the Date related to the Photograph.

6. Negative #
Enter all Negative Numbers associated with the photograph. The Negative Numbers start with C, F, or NS and are located on the Reverse side of the photograph.

7. Duplicate
If there is a Duplicate of the current photograph, Enter Yes. If there is no duplicate, Enter No. These Options are located in a Pull-down Menu. If there are Multiple Duplicates, Enter Yes (x) with "x" being the number of duplicates.

8. Title
Create a short, descriptive Title for the photograph.

9. Related Work
Enter the Dickens Literary Work that relates to the photograph if applicable. Many options are found in a Pull-down Menu.

10. Category
Enter one of the four main Categories found in the Pull-down Menu.

11. SubCategory (Portraits, Topography, Illustrations, Miscellaneous)
After Choosing a Category in the last Field, one of the four SubCategory Fields will appear. Enter a SubCategory from the Pull-Down Menu provided or Type in one that is Not Listed.

12. Owner
Enter the Owner of the Photograph. In Most cases, the Owner is the Dickens House Museum (DHM), listed in the Pull-Down Menu.

13. Condition
Rate the Condition of the Photograph using Good, Fair, or Poor (listed in Pull-Down Menu). In General, if there are little to no remarks (entered into the Following Field), the

Condition is Good. If there are a few remarks, the Condition is Fair. If there is a great deal wrong with the photograph, the Condition is Poor.

14. Condition Remarks

List any damage to the photograph. The following is a list of keywords used:

> Upper, Lower: for the Top and Bottom of the photograph
> Right, Left: for each side of the photograph
> Corner, Edge: self-explanatory sections of the photograph
> Creased: describes a place where the photograph either is or was folded
> > over and creased
> Bent: rounded corners
> Ripped: a tear in the photograph
> Ripped Off: a section that has been torn off of the photograph
> Worn: Tattered
> Indented: self-explanatory, example is if a paperclip made a mark
> Spotted: small spot marks are scattered over the photograph
> Marked: black marks, especially pen marks
> Yellowed: the photograph has a yellow from age
> Discoloured: change in colour other than just yellowing from age

15. Colour

Enter either Black & White or Coloured from the Pull-down Menu. If an object is yellowed but was obviously previously Black & White, enter Black & White.

16. Print Type

Enter the type of Print for the photograph. A Pull-down Menu contains Gloss, Matte, Card de Visite, and Cabinet Card Options, but if a photograph does not fit into any of these categories, type in that information

17. Height (mm)

Enter the height dimension in millimetres.

18. Width (mm)

Enter the width dimension in millimetres.

19. Recorded By

Enter the Initials of the Person filling in the Current Record.

20. Date Recorded

Enter the Date that the Current Record is being filled in.

21. Description

Enter a full Description of the photograph. Any information that is legibly written on the reverse of the photograph should be included, along with a description of what is in the photograph, what it looks like, and any additional known information.

Buttons with Arrows, that allow for navigation through the Form, are located at the bottom of the Window (as shown below).

C

Record: |◄ | ◄ | [1] | ► | ►| | ►* | of 615

A
B
D
E
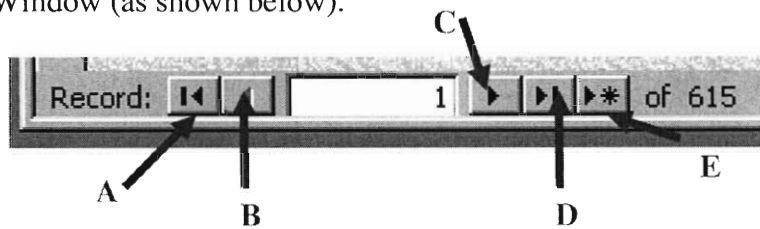
If you Click on these Buttons, they will
      A. Bring the User to the First Entry
      B. Bring the User to the Previous Entry
      C. Bring the User to the Next Entry
      D. Bring the User to the Final Entry
      E. Make a New Entry

3.0 Securing the Database

The Database has already been secured for 2 types of users: Administrator and Guest

The Administrator has full Access to Change and Edit the database.

The User only has Access to View the tables, Run reports and queries
The User Cannot Change or Delete records along with distorting the design of the database.

These Security features were Setup by using the Security Wizard in the tools menu
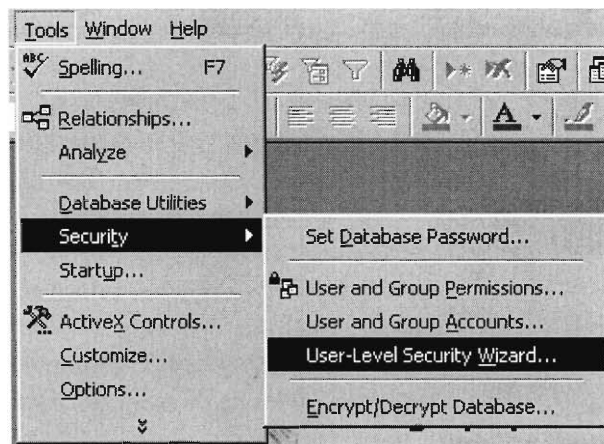
The database Shortcut on the Desktop actually is the only was to Access the database.

View the Shortcuts' properties by Right Clicking. You will notice that the Target file actually calls 3 different items.

They are as follows:

"C:\Program Files\Microsoft Office\Office\MSACCESS.EXE"
        This Calls Microsoft Access Program

"C:\Photography_Catalogue\Photography_Catalogue.mdb" /WRKGRP
        Calls the Photgraghy Database

"C:\Photography_Catalogue\Secured.mdw"
        The Secured.mdw file contains the appropriate permission to access the database.

If the Database is Moved from one Directory to another at a later time, these Links may have to be Edited according to where the database is Located.

4.0 Backing Up the Database

Before Changing the Structure of the database it is recommended that a Backup Copy be Created.

This can be done in Two ways one using the Replication option under the Tools menu.

The first step is to Right Click on the Photography_Collection.mdb Icon.
Then Click Copy
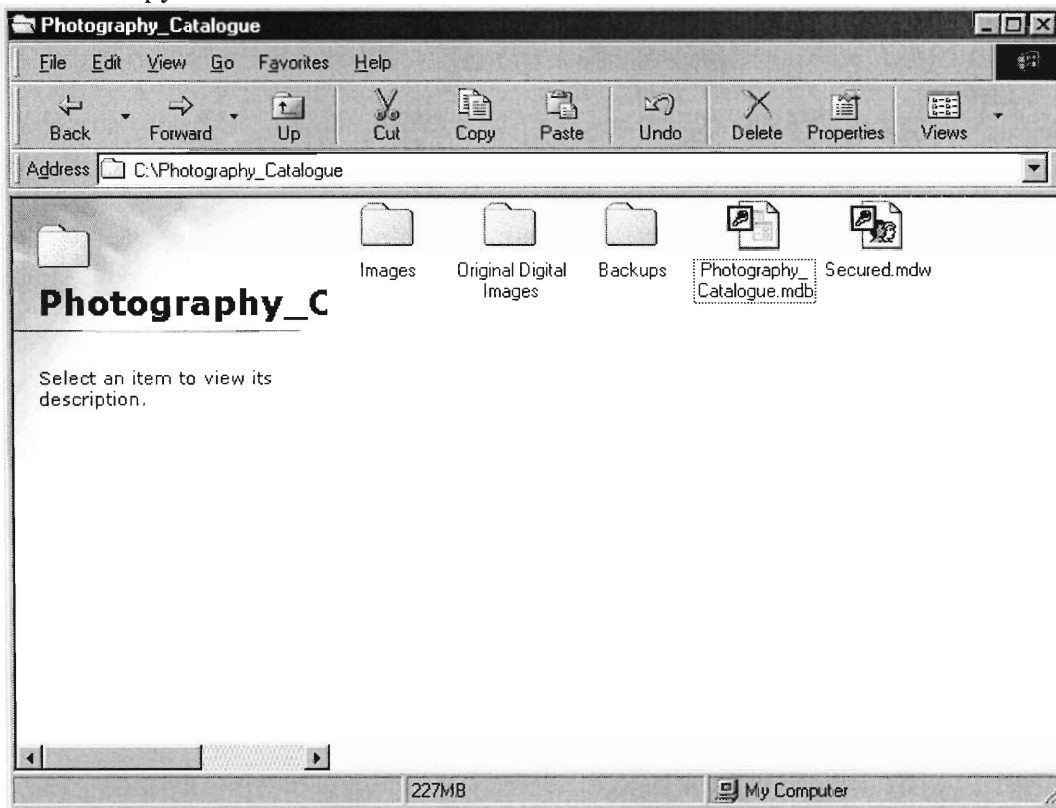
Next Right Click on Open Space within the backups folder and Click Paste.

The Copy will automatically be named Photography_Catalogue.mdb.
Click on the Text Name of the Icon.
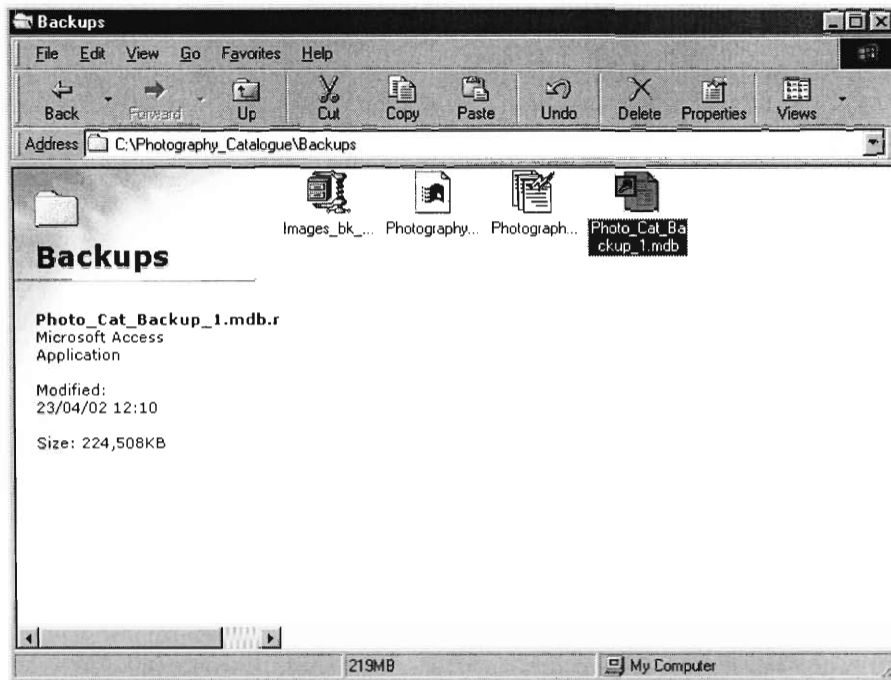
At this point type in a new name for the Database, such as
Photo_Cat_Backup_1.mdb

If the Hard Drive does not have enough Room, use another Hard Drive if available on the computer.

Another options is to use a CD and burn a Backup copy to disc using Adaptec Easy Cd Creator

Easy CD Creator.lnk

We would recommend Burning a Backup once every 2 weeks or as needed.

Always have a working Backup version on a Disc just in case anything ever happens to the Computer.

We have provided the initial Backup disc as of 25-4-02

5.0 Troubleshooting

Advice for Troubleshooting

- 1st make a backup copy before making any changes to the database. Once you have confirmed a change within the database it is difficult to change back and in some case it is impossible.

- If a form, query or table is accidentally deleted, it can be restored by importing a it from a backup copy.

- If an Error occurs retry the same procedure that cause the error and see if it happens again. Then troubleshoot and try to fix the problem.

- If an Error arises from the database being to large. Divide it into 4 different database correlating to the 4 Main sections of the Catalogue

- Use the Help Menus within Access to figure out any difficult aspect not covered within this manual. Also try online.

Appendix U: User Manual

The user manual, contained in the following pages (with a separate numbering scheme), was created to aid a user in accessing and querying the electronic photography collection catalogue. It illustrates the step-by-step methods needed to perform the key procedures such as querying the database, viewing reports, and printing results. It is designed to provide a basic procedure that any user could follow.   It cannot contain information for every procedure or problem that may affect the database so a troubleshooting section for getting further assistance is also included.

Welcome to the Dickens House Museum
Photography Collection

User Manual
for the
Photography Collection's Access Database

Goal of this User Manual: This document is designed to provide a visual step-by-step process for using the database and querying information on the photographs.

Brief Background of the Collection and Database: The Photography Collection consists of 5000+ photographs, mainly black and white images. Constant use by researchers was causing the deterioration of the images within the archive. Students from an engineering college, Worcester Polytechnic Institute (WPI) in Worcester, Massachusetts, USA, designed and partially populated an Access database.

Topics Covered in this Manual:

How to:

Created by Students of WPI on 26 April 2002

1. Open the Access Database

Step 1: Locate Shortcut on Desktop
- The Red Arrow points to the Shortcut entitled "Photography_Collection".
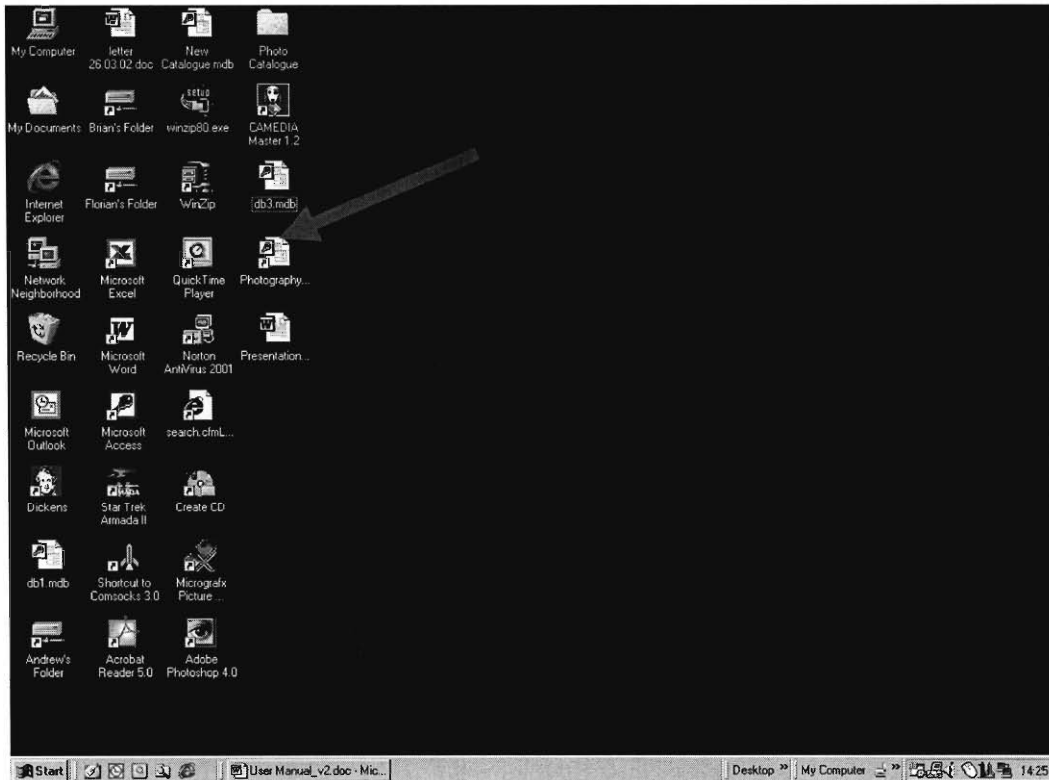
Step 2: Double Click the Icon using the Left Mouse Button.

Photography_Catalogue.mdb.LNK

Step 3: The Database will open to a Logon Screen (see below).
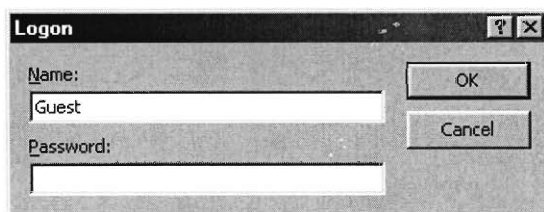
Step 4: At the Prompt, Type in "Guest" on the Keyboard and Click OK (There is no Password).

Step 5: The Database will then open to the Main Screen.

2. Navigate Throughout the Main Screen (Switchboard)

Step 1: Left Click the Begin Querying Button (See Red Arrow).
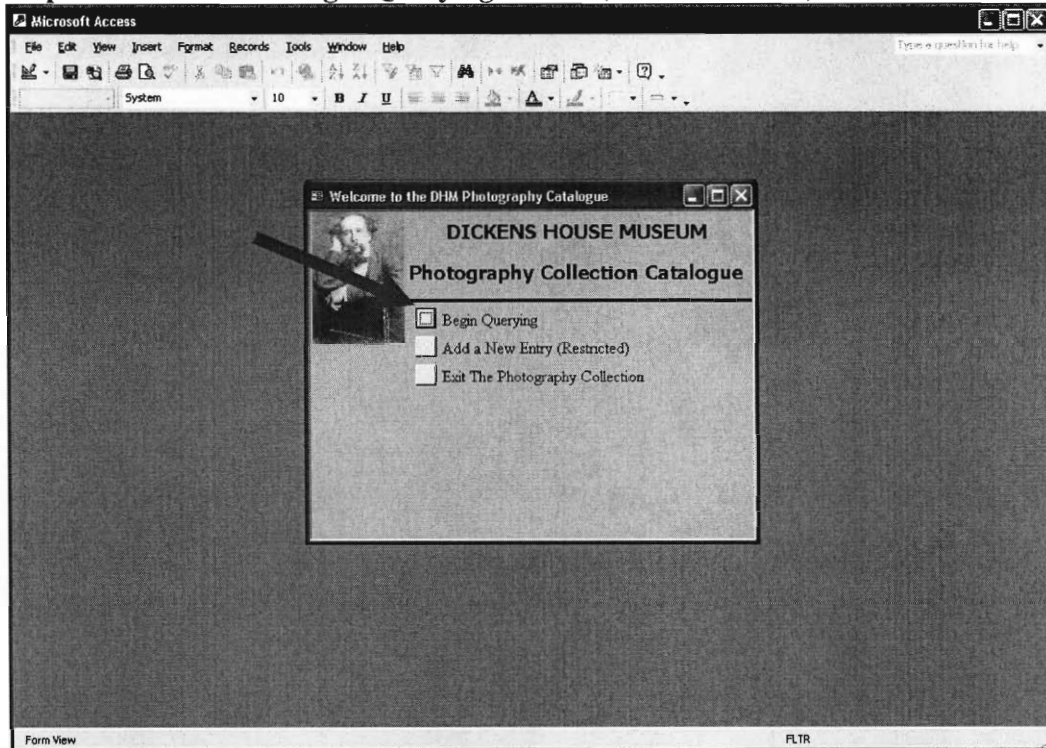
Step 2: The Basic Queries Window will Display.
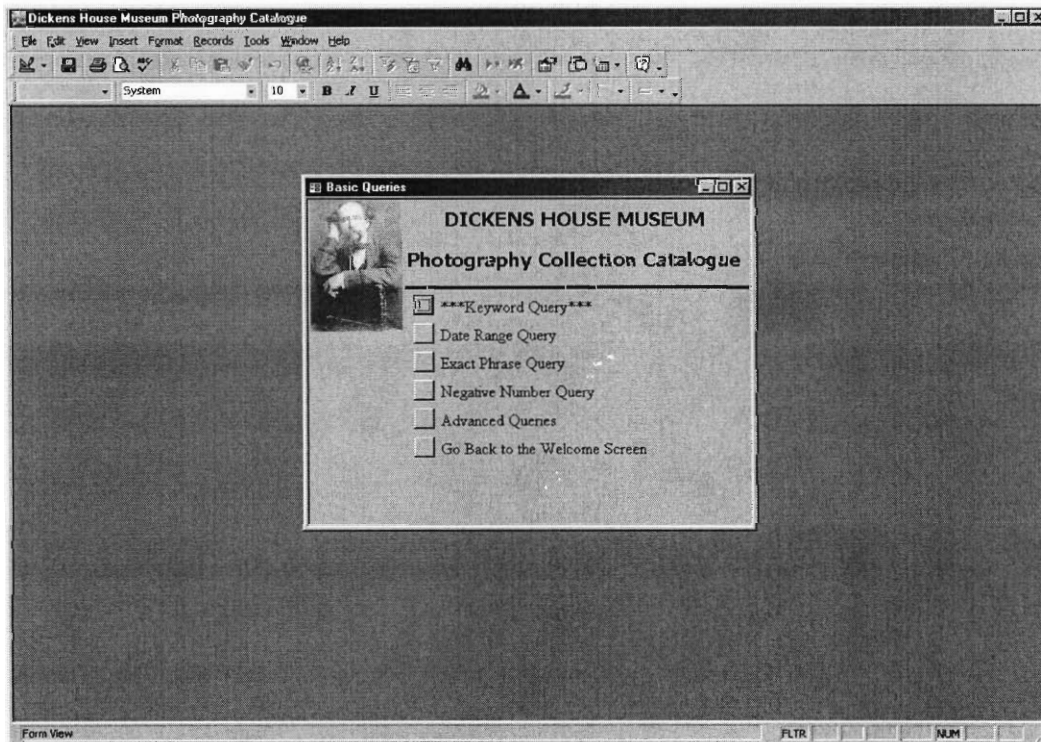
3. Conduct a Basic Query

This Screen shows 6 Different Available Options.

The First 4 Options, Keyword Query, Date Range Query, and Exact Phrase Query, Negative Number Query are the Basic Search Options.

The Keyword Query Searches through 7 Different Categories for a Single Keyword. At the prompt type in a single keyword of something that is of interest.

The Date Range Query Searches for all dates between two specified years. The query will have 2 prompts so don't place both years in the initial prompt. For the year please Enter the earlier year 1st then Enter the later year 2nd. You may also enter the same year twice (Example: instead of 1829 to 1830, You can input 1829 to 1829).

The Exact Phrase Query filters out any unwanted results. For example, if "cat" is inputted into the query, it will only return the records containing "cat". Whereas, the Keyword query will pick up other words such as Catherine. This query should help in reducing the number of unwanted results.

The Negative Number Query prompts you for a negative number. This query should be used only if you know the exact negative number. Also, you do not need to input any letters before the negative number. For example negative C1234 is a glass negative, however, you only need to input 1234 to display the proper results.

The 5th Option allows for more Advanced Queries. These further options will be discuss in a later section of this manual.

Finally, the last Option allows the user to go back to the Main Menu.

We will demonstrate step-by-step How to Conduct a Keyword Query.

Step 1: Left Click the Keyword Query Button (See Red Arrow).
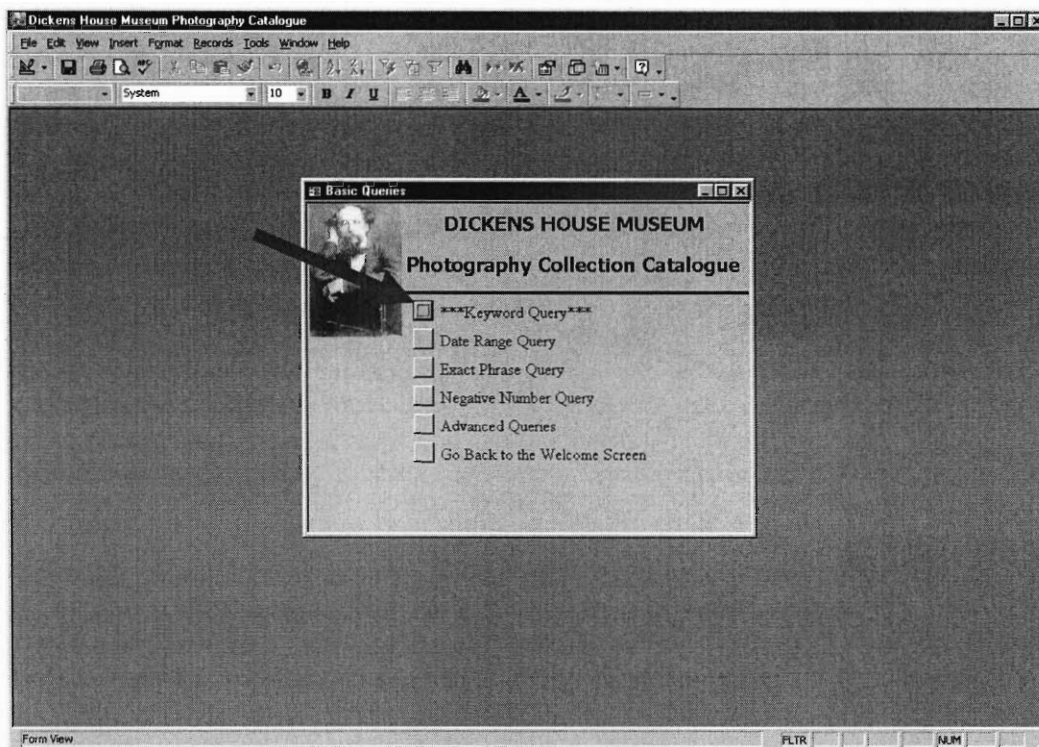
Step 2: A Command Prompt will appear.
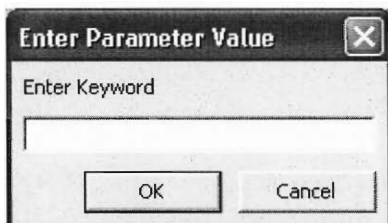
Step 3: Enter in a Single Keyword of whatever Topic you are querying for in the Collection. (Example Turk, Dickens's dog). The Query is <u>Not Case-Sensitive</u> so words and phrases can be either in Lower or Uppercase.

**Note: When Querying for Charles Dickens use CD for the Keyword. **
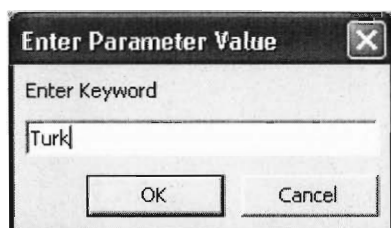
Step 4: Left Click the OK Button or Press the Enter Key on the keyboard (See Red Arrow).
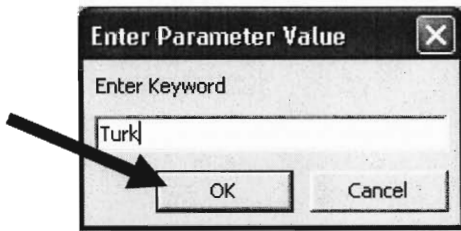
Step 5: A Report with the Records Matching your Query will Display (See Below).
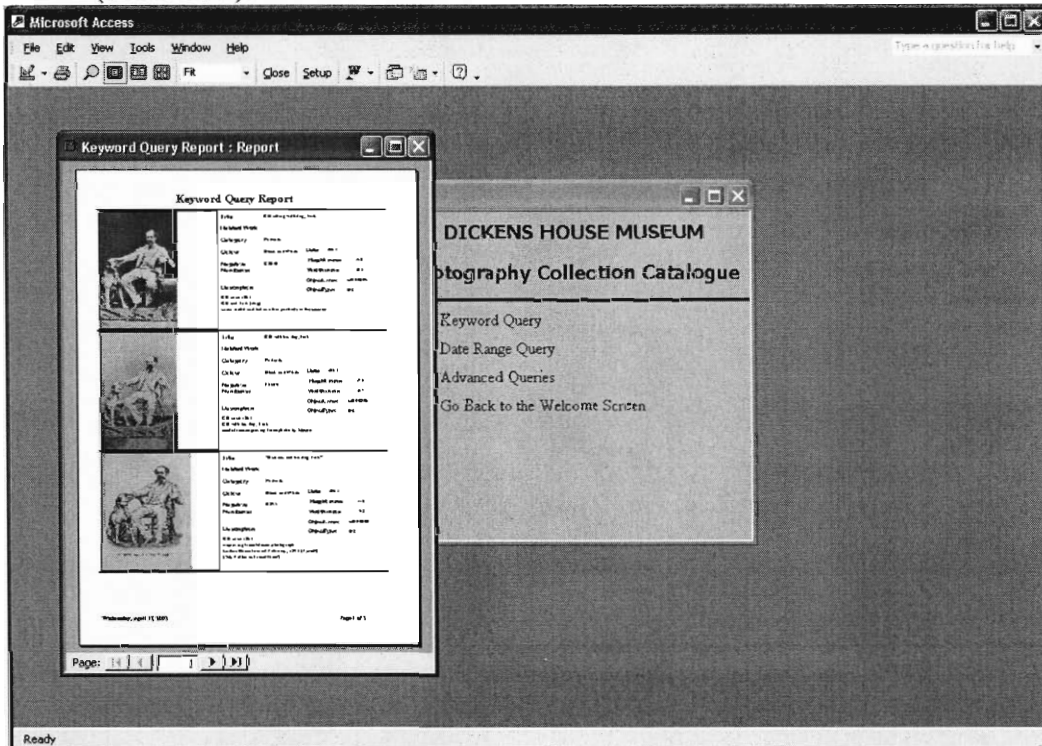
4. Display Results in a Report

Step 1: Maximize the Report to Easily Display the Image. Click on the Maximize Button (the middle button illustrating a box) in the Top Right Hand Corner of the Report.
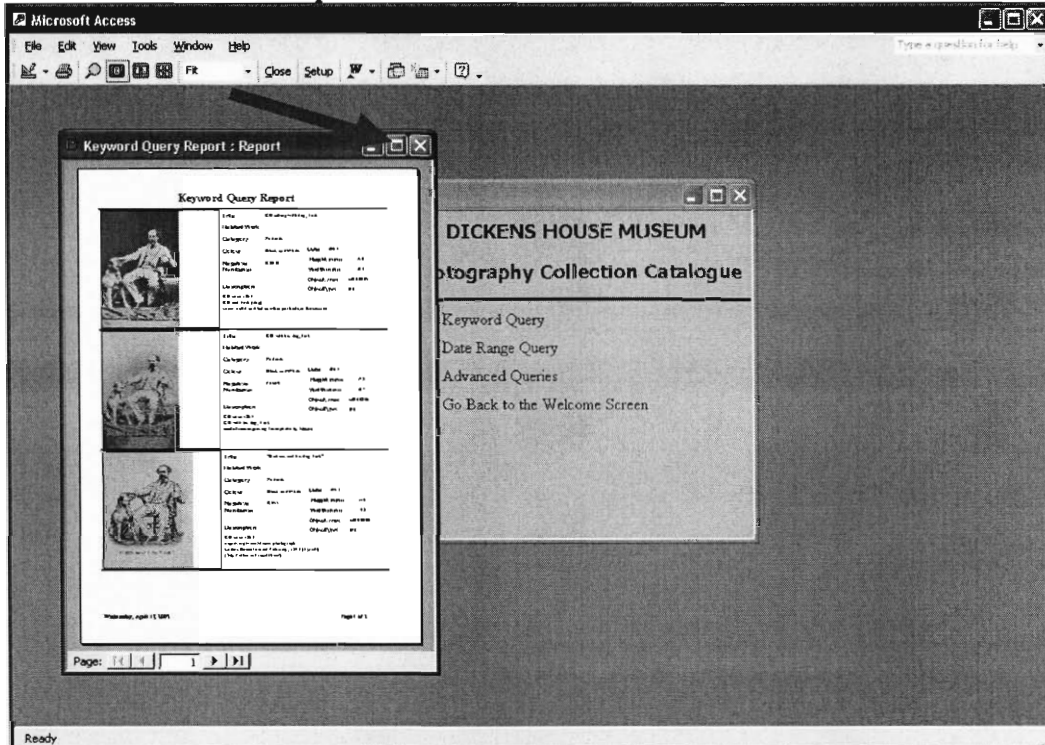
Step 2: An Expanded View will appear.
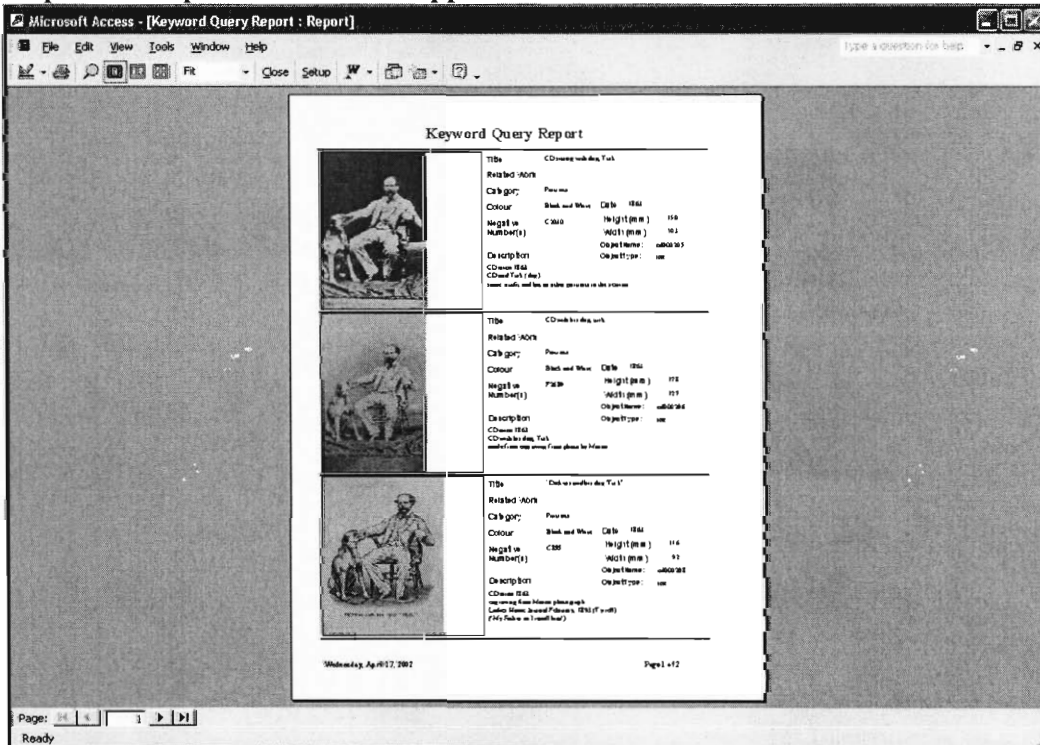
Step 3: Zoom In to View a single Image. Right Click anywhere in the Report to Zoom In. The Report should now look like this.
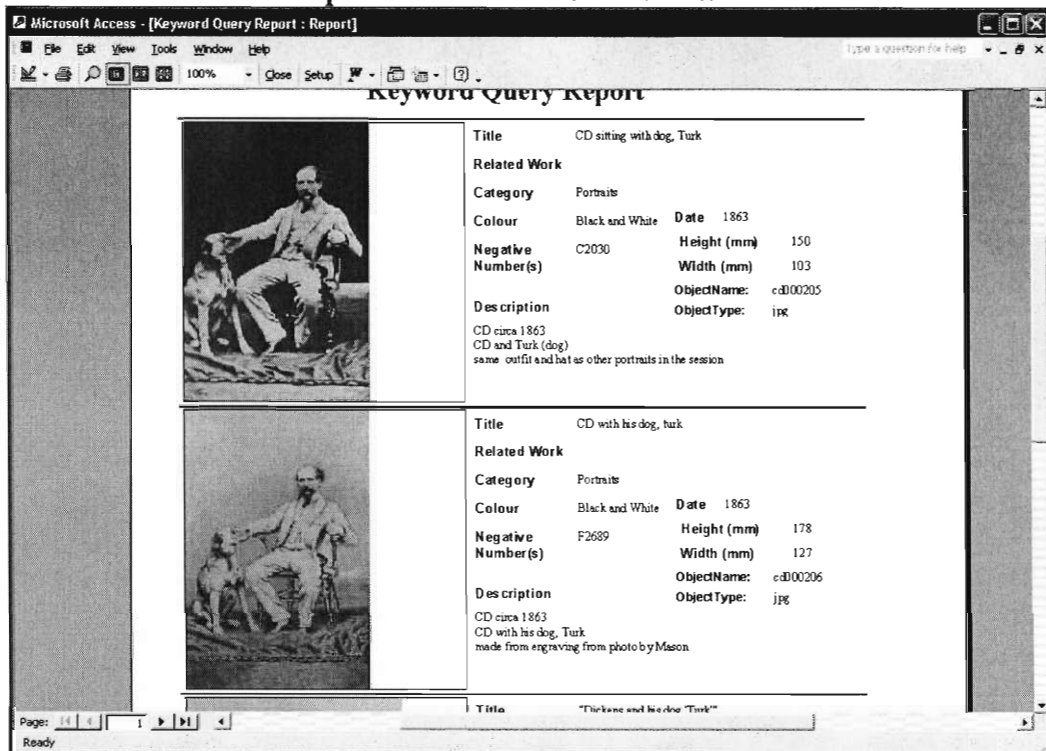
Step 4: Search Through the Results by Clicking on the Page button down in the Lower Left Hand Corner. See the Red Arrow Below.
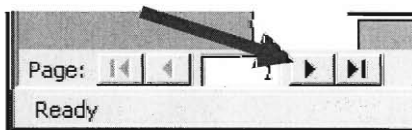
To Return to the Beginning of the Results Press the Reverse Arrow Button with a Line. See Below.
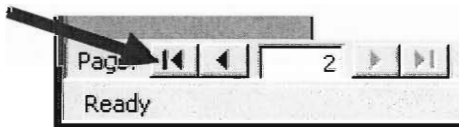
Step 5: Zoom Back Out on a Record on Another Page. Left Click on the area you would like to Zoom Out on.
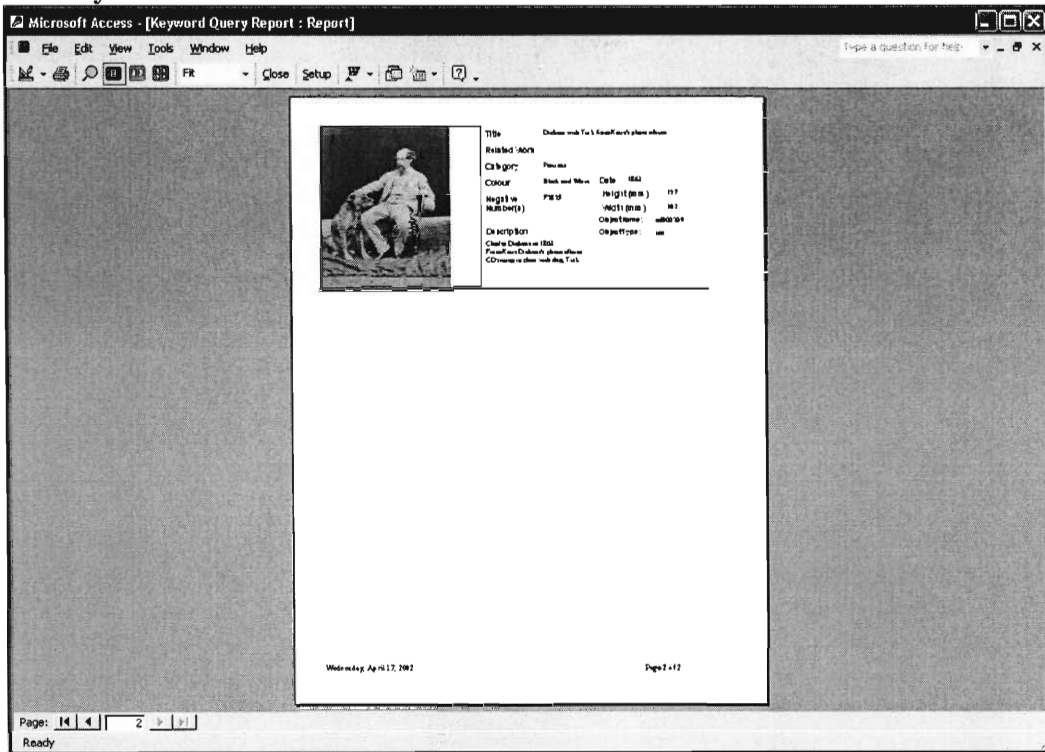
Step 6: (Optional) Further Enlarging the Record. Go to the Pull Down Menu and Type in 125% on the Keyboard. (See the Red Arrow)
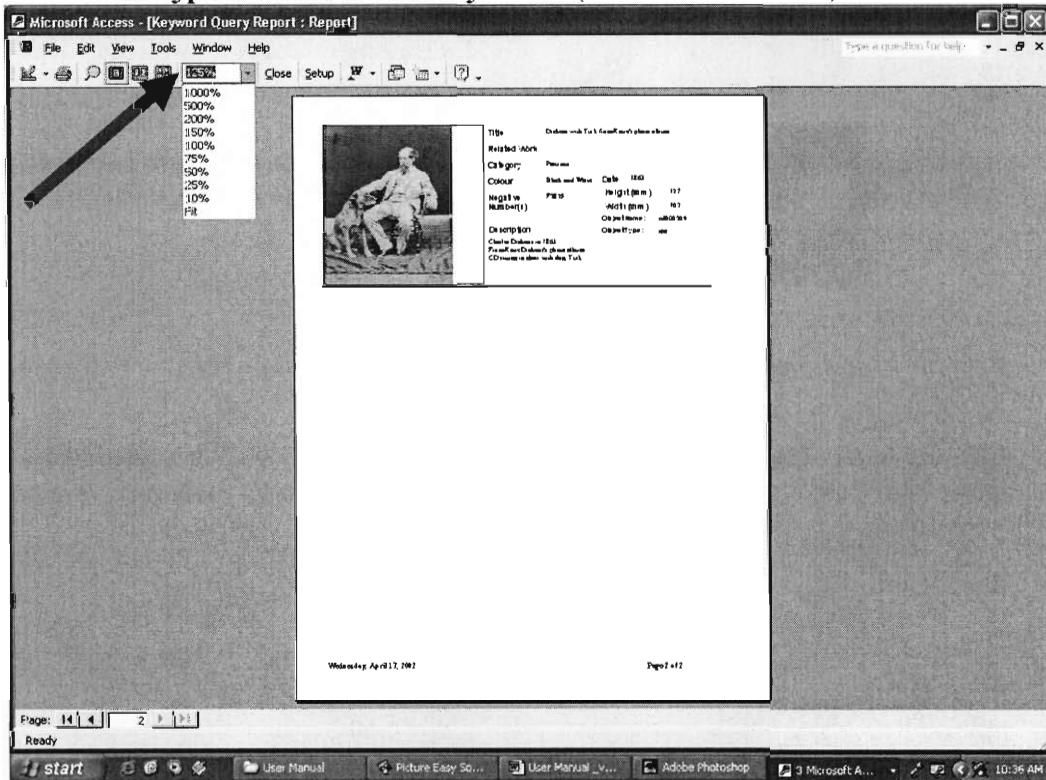
Step 7. The Image should now look like this

5. Print a Report

Step 1: Once the Image you want has been found, you may want to Print that Page.

***NOTE DO NOT CLICK THE PRINT BUTTON IN THE TOOLBAR. ***
***YOU WILL PRINT THE ENTIRE RESULTS. ***

Step 2. Notice which Page you want to Print. That Information is shown in the Lower Right Hand Corner of the Report. (See Below)
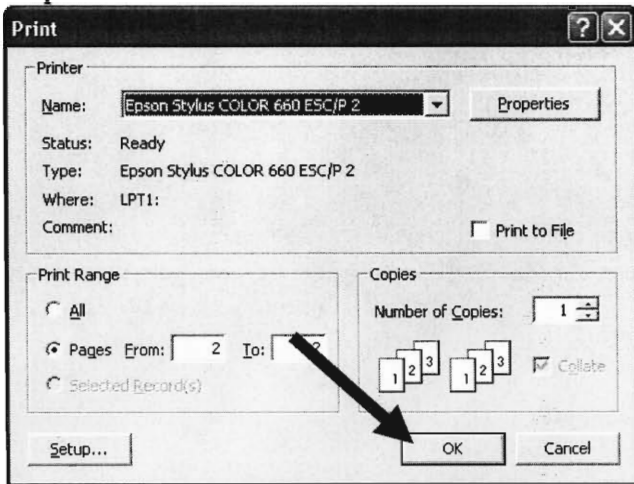
Page 1 of 2
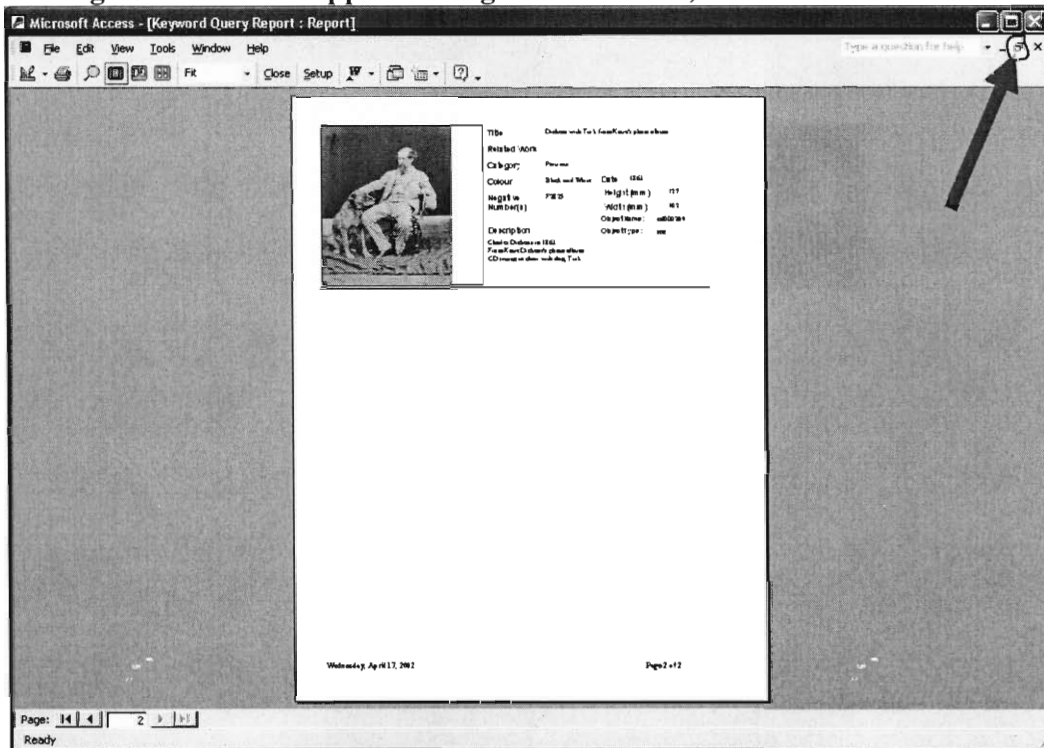
Step 3. Click File, Print, and then the Print Window will Open.
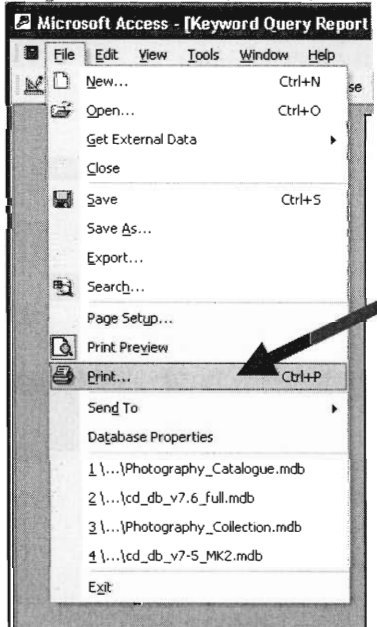
Step 4. Select Pages and Type in which Page Number you would like to Print.
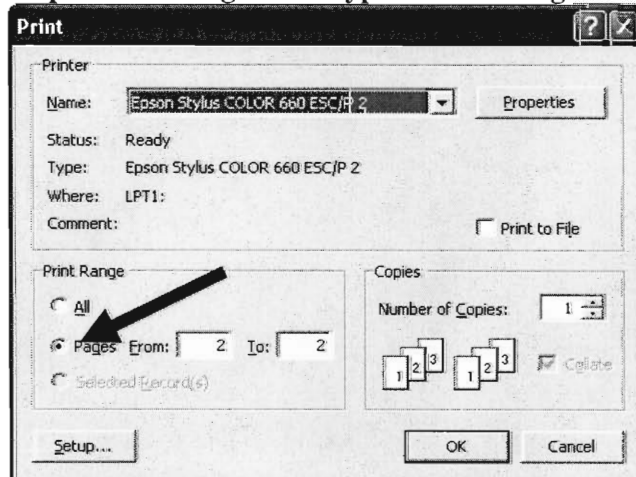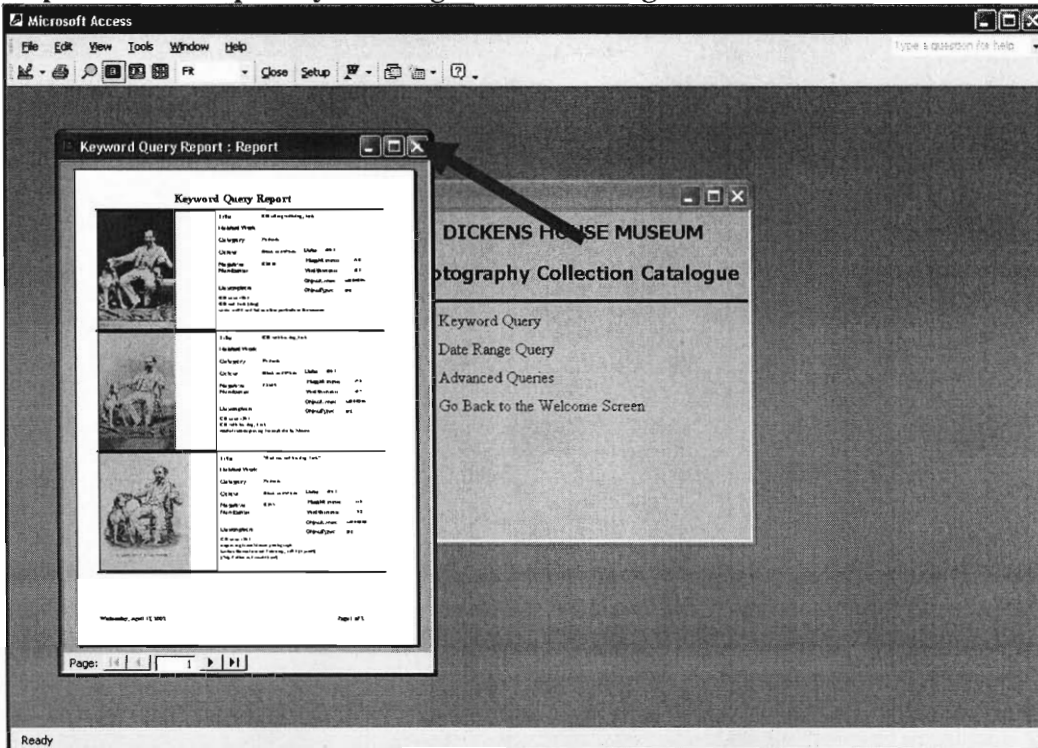
Step 5. Left Click OK.

Step 6. Restore the Report Window. (Be Careful NOT to Close the Database by clicking on the X in the uppermost right hand corner)
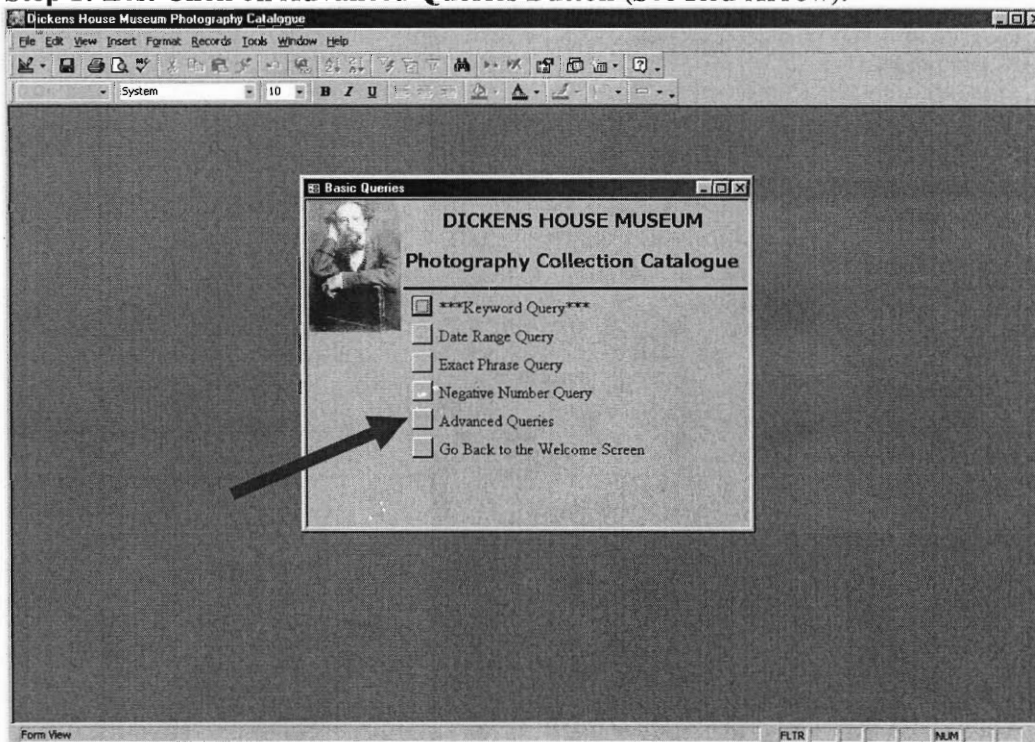
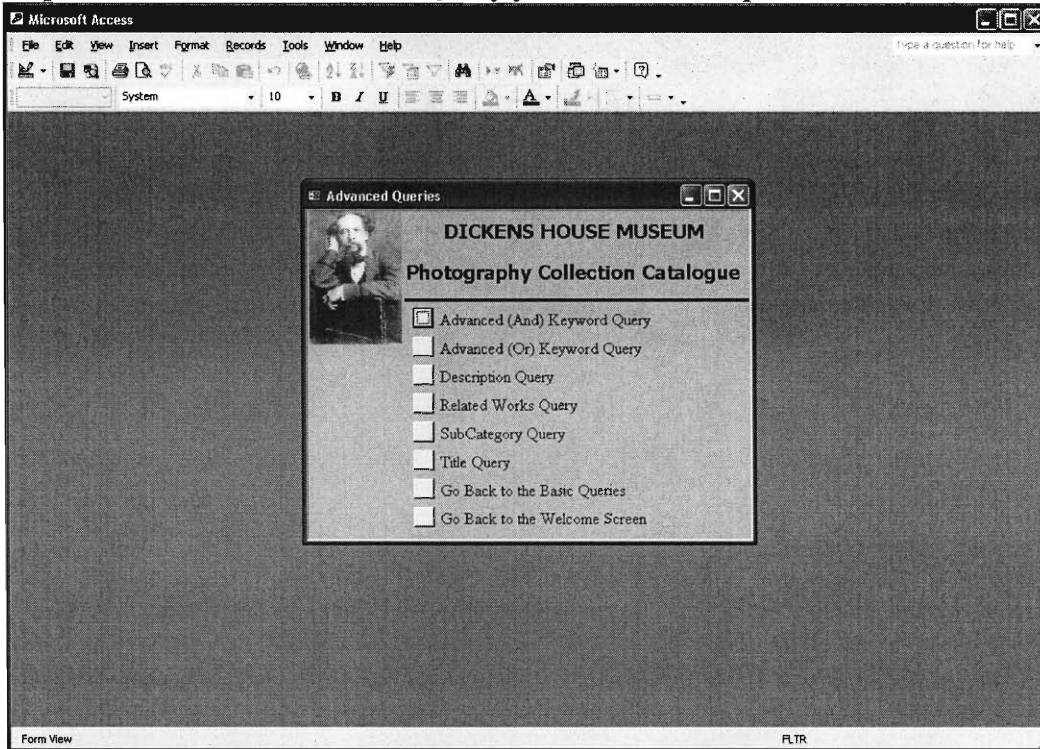## Step 7. Close a Report by Clicking the X in the Right Hand Corner.

6. Conduct an Advanced Query

Step 1: Left Click on Advanced Queries Button (See Red Arrow).

Step 2. Choose which Advanced Query you would like to perform.

The Advanced Queries Page contains 8 different Options.

The first 2 options are Keyword Searches that allow for 2 words to be queried AND / OR together. These options allow for expanding or contracting the number of returned results.

The next 4 Options: Description Query, Related Works Query, SubCatergory Query and Title Query all narrow down the Keyword Query by individual Fields, to reduce the number of results. These 4 options are all single word queries.

Finally, the last 2 Options are to Go back to different Menus.

The Advanced Queries are conducted in the same manner as the Basic Keyword Query as shown in the prior Example.

7. Exit the Database

Step 1. Left click the X in the Right Hand Corner Or Click the Last option in the Main Menu "Exit Photography Collection".
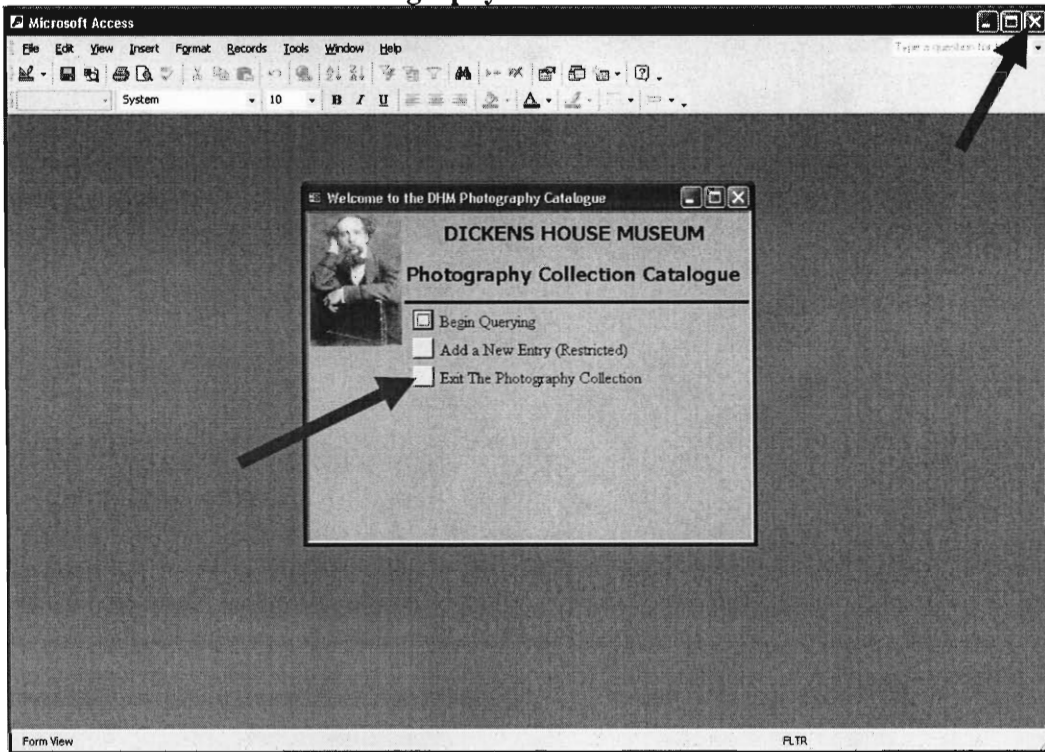
8. Problems

If any problems arise, try closing and reopening the Database. If that does not work, Please contact a member of the Dickens House Museum staff.

Appendix V: WPI Team Contact Information

The WPI team consists of three students from Worcester Polytechnic Institute in Worcester, Massachusetts. We were juniors when working on the project, with expected graduation in May 2003. Alison Burkart, from Trumbull, Ct, was a Biotechnology major. David Campbell, an Electrical Engineering major, is from Lynn, Massachusetts. Kathryn Lambert, from Cumberland, Rhode Island, was a Mechanical Engineering major. This project was a graduation requirement for the three group members and was completed during a seven-week period. Below is the contact information for the students until 2003.

Alison Burkart
WPI
Box 967
100 Institute Rd.
Worcester, Ma 01609
USA
alisonb@wpi.edu

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Kathryn Lambert
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100 Institute Rd.
Worcester, Ma 01609
USA
klambert@wpi.edu

Appendix W: Glossary of Terms

Administrator – Individual who is creating or maintaining parts of the database.

Adobe Photoshop – Software program used for graphical imaging

Application – A computer program

CD - Charles Dickens

DHM – Dickens House Museum

Embedded Object – An image that is stored within the database

Form – User-friendly aesthetic design that displays information

Image – A digital picture

Jpeg - A type of compressed digital image

Kilobyte (kb) – 1000 bytes

Linked Object – An image that can be viewed within the database, but is stored in a separate folder

Macros - A set of actions that performs a particular operation

Megabyte (Mb) – 1000 kilobytes

Microsoft Access – Software program used to create databases

OLE Object – An image that is either embedded or linked

Query – Retrieves data from a table by using specified criteria

Relationships – Association established between tables

Reports - Displays information in a print preview mode

Switchboard – A menu that allows for easy navigation between throughout the database

Table - A collection of data about a specific topic. (i.e. photographs)

User – Any individual who accesses the database to run queries rather than making any modifications

User Manual – Manual created to aid the user in accessing the photograph collection

catalogue and running queries.

Visual Basic – Code language used in Microsoft Access to perform more in-depth and technical alterations to the database.

WPI – Worcester Polytechnic Institute (University in Massachusetts)