Exhibits found in museums and cultural institutions provide valuable educational opportunities. The first section of this paper describes the best practices for constructing educational exhibits, and details criteria relevant to preservation. The second part of this paper focuses on the creation of *From Organism to Molecule*, an historical exhibit chronicling the first 100 years of the Department of Biology at the University of North Carolina at Chapel Hill. Located in the lobby UNC-Ch's Wilson Hall, the exhibit is composed of artifacts, images, and text presented in a largely static format.

Headings:

- Exhibits and displays
- Educational exhibits
- Historical exhibits
- Museums
- Cultural institutions
- University of North Carolina at Chapel Hill-Department of Biology
THE WILSON HALL EXHIBIT: THE MAKING OF AN EDUCATIONAL EXHIBIT

by

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Best Practices in Building Educational Exhibits

About Exhibits

Exhibits such as those found in museums and cultural institutions are very much woven into the fabric of Western culture. Increasingly, exhibits are seen primarily for their educational value and, from this perspective, exhibits succeed when they educate their viewers and they fail when they do not (Lord & Lord, p.15). This marked change in presentation, which once was rooted in stoically static displays with little in the way of instruction, has seen museums and cultural institutions take a proactive stance in communicating the information contained in their collections (Dean, p.5). The value of exhibits lies in their extraordinary power to communicate visually, invite curiosity, and lead the user forward. They provide unique perspectives and novel means for teaching material that might otherwise go unnoticed if presented in conventional contexts. “If we consider the fundamental visitor experience of encountering a successful museum exhibit – a work of art, an artefact or a specimen in a case, an interactive device or a multimedia screen in any of which the museum visitor may find meaning – we begin to appreciate the essentially transformative experience that a museum exhibition uniquely makes possible. Where there appears to be merely an object or a group of objects, the successful museum visitor grasps some new level of meaning,” (Lord & Lord, p.16). Additionally, exhibits provide spaces in which visitors are free to move about and
explore at their own pace, giving them license to linger on what strikes their interest and simply bypass the elements that do not ((Belcher, p.39). The strength of an educational exhibit lies in the visitors’ ability to approach it on his or her own terms, interact with it in a personalized way, and visit with any particular aspect for as little or as long as is desirable. From the institutional standpoint, exhibits are ideal as a forum of free expression, “based upon the tangible evidence of the cultural and scientific progression of humankind” (Dean, p.7). If museums and cultural institutions are our cultural memory banks, visitors and these institutions are working in symbiotic fashion to address and disseminate these memories across a broader stage of civilization.

But what makes a successful exhibit? We know that, “...as a medium of communication, the possibilities afforded by exhibitions are boundless – limited only by imagination, practical skills, physical possibilities and budget” (Belcher, p.37). So there is practically no limit to the means by which exhibits might be designed, but there must surely be criteria by which an exhibit can be judged. Miles addresses the issue when stating that a good display should attract a visitor, hold their attention, help them recall knowledge, present them with information, illicit a response, and provide them with feedback (Miles, p.78-80). Engaging the viewer is crucial, but even beyond that there are many hurdles in securing a successful educational exhibit. In this paper, I wish to discuss merely some of the major issues that should be taken into account when attempting to build an educational exhibit. From the initial planning stages to the preservation of exhibit objects, the study of educational exhibits allows us to utilize the lessons of our cultural past in a
proactive and interactive context for the benefit of visitors and viewers in the present as well as the future.
Planning and Development

The first step of any successful exhibit is the planning stage. Once an idea has been introduced, it is necessary to determine the intended life span of the exhibit, as it will surely have an impact on all decisions regarding the design and content. An exhibit can be either permanent or temporary. In the context of exhibits, “permanent” is generally regarded to imply roughly ten years. Not all exhibits are meant to be permanent as some might require frequent updates to information and/or content, thus making the idea of a permanent exhibit impractical. Some exhibits, however, do lend themselves to long-term viewing. Historic collections, for example, are often candidates for permanent exhibits (Belcher, p.44-5).

Once the pre-planning phase is over, it is time to construct what many texts concerning exhibition development refer to as an exhibition brief, which serves to outline the many issues relevant to the exhibit such as the principal aim and concept of the exhibit as well as a basis for planning, scheduling, and development (Miles, p.43; Belcher, p.83; Lord & Lord, p.356). Lord & Lord propose a model for the exhibition brief which contains the following:

- **The core idea** – articulates a thesis or question that the exhibition will address and explore.

- **Thematic framework** – identifies topics and themes for the exhibition.

- **Thematic structure** – illustrates how the themes relate to one another.
- **Storyline** – expresses the most important messages of the exhibition.

- **Resource plan** – identifies the objects, specimens, materials and information available for use in the exhibition.

- **Public program plan** – proposes secondary activities or products useful in supporting and enriching the viewer experience (Lord & Lord, p.356-6)

Once the exhibition brief is in place, Miles stresses that, “one of the fundamental tasks is to take the conceptual plan of the brief and transform it into an overall plan for the gallery” (Miles, p.56). With this in mind, Dean offers a cyclical outline of exhibition development that flows through the Conceptual, Developmental, Functional, and Assessment phases before returning to the Conceptual phase. The Conceptual phase is concerned with assessing the needs and expectations of the community as well as determining the available and potential resources that will be utilized in the production of the exhibit. In short, it is the “idea gathering” phase. These ideas are fleshed out and realized through the Development phase. This phase involves two important processes – the Planning stage and the Production stage. The Planning stage should ideally result in a plan of action that should address the many aspects of actually creating the exhibit and, therefore, provides a blueprint for the next step, the Production stage. At the end of the Production stage, there should exist a finished exhibit, an understanding of the methods that will be used to properly care for and maintain the exhibit, and, hopefully, functional programs that can be implemented in order to draw the public to the exhibit. Now that the exhibition is open to the public, the Functional phase begins. This phase is
comprised of yet another two components – the Operational stage and the Terminating stage. The Operational stage is concerned with accomplishing any educational objectives set during planning as well as ensuring that no objects in the display incur any appreciable damage or deterioration. As the name would suggest, the Termination stage involves dismantling the exhibition, documenting the return of objects and artifacts to storage, and clearing the display space for the next exhibit. Finally, the Assessment phase involves a reflection of the previous phases in order to understand how best to improve the product and process of the next exhibition, which, in itself, feeds into the Conceptual phase once again (Dean, p.9-18). From here, it’s back to the primary ideas and the creation of a new exhibition brief.
Exhibit Design

Before discussing the actual contents of an exhibit, it would be worthwhile to address some general concepts for the design of exhibitions. “Design should begin with a sense of purpose and all those involved in designing educational exhibits should define the purpose of an exhibit with clear and agreed objectives” (Miles, p.56). Knowing what is expected to be accomplished by the exhibit will play a key role in determining the design – how much space is needed as well as how that space will be utilized. If space is at a premium, it might be beneficial to reassess the scope of the exhibition. It would be far better to comprehensively represent one aspect of an idea than to have space constraints prohibit a bigger idea from being fully realized. And, when working with the external features of the design space, Serrell warns that, “exhibit developers should resist the temptation to add visuals and physical structures just for the sake of ambiance, because visitors cannot easily sort out ambiance-only elements from message-bearing elements in the exhibit” (Serrell, p.149). In essence, a clean design that accentuates the information inherent to the exhibit rather than the exhibit space itself will result in greater message transference to the audience, which is ultimately the purpose of any educational exhibition.

Thoughtful implementation of the key elements of design – value, color, texture, balance, line, and shape – can make the difference between an exhibit that
looks cluttered and confusing and one that is attractive to the eye and lends itself to prolonged and effective viewing (Dean, p.32). Essentially, the design of an exhibit is the first noticeable element a potential viewer might perceive. Good design can make a visitor interested in the exhibit before he or she even knows what it is about. In speaking to design, Belcher envisions exhibitions as a form of sculpture – “three-dimensional compositions which recognize the importance of solids and voids and strive for satisfactory spatial relationships” (Belcher, p.41). Successful designers should aspire to promote exhibits that find a harmony in the objects and the negative space between them.

Even after the space to be occupied by objects is delineated, there is still a balance to be struck between the objects and the information that represents them. Miles warns of the hazards that can result in both underinterpretive and misinterpretive displays. Underinterpretive displays rely on objects speaking for themselves to the extent that only a specialist with previous subject knowledge will be able to understand the message of the exhibit. Misinterpretive displays frequently offer too much sensory stimulation and a poverty of information (Miles, p.65-6). Finding the right balance of specimens and information can take a good deal of planning and practice. Belcher quotes G. Brown Goode (1891) in saying that, “An efficient educational museum may be described as a collection of instructive labels, each illustrated by a well-selected specimen” (Belcher, p.156). This understanding has endured for many years and is certainly representative of a number of present day exhibits. Many contemporary exhibits, however, adopt a more dynamic approach, which moves beyond simple didacticism. While the elements in an exhibit
remain the same, modern exhibits attempt to acknowledge the viewer, invoke
questions, and tell stories so that the narrative and, therefore, individual
interpretation, of the display is highly variable. Successful exhibits result when
creative design allows all elements to complement one another. That said, we will
now discuss the theories behind objects and the text that accompanies them.
Object Selection

Choosing the right items for display in an exhibit is important in delivering the core idea. With each piece that goes into an exhibit, you should ask yourself, “How does this object contribute to the goals of the exhibition?” and, “What evidence or concept would the exhibition lack without this item?” It is also important to keep the exhibition visitor in mind. When selecting the media that will inhabit the exhibit, it is, “better to look first at what the visitor is expected to do and then at what the exhibit can do with or without the involvement of the visitor.” Some exhibits require that the viewer take an active part in exploration of the subject by asking questions or otherwise involving cognitive skills to interpret what is being displayed. Other exhibits require less involvement from the part of the viewer. The level of involvement expected of visitors can determine which items are most appropriate for the exhibit (Miles, p.81).

Sometimes an exhibit designer may want to show something that is impractical, whether due in part to the natural size of an item or the complexity of it or both. In this situation, models can prove an ideal substitute by allowing for three-dimensional structures to be viewed in an easily digestible context when the original might be microscopic or so large as to be unmanageable to the naked eye. Miles presents the example of a molecular model that may be incomprehensible to
the layman in photographic form, but easily comprehended when represented by a model (Miles p.83).

There are times when an exhibit requires that an animal be displayed, but it’s generally not feasible to have a live animal in an exhibit. Mounted animals can offer a solution and the designer should make efforts to communicate to the taxidermist what he is trying to express with the figure. Taxidermists can mold the form of the animal to mirror a teaching point, such as wingspan, in order to make the display more effective or attractive (Miles, p.84).

Finally, it must be stressed that it’s better to have a multitude of items to choose from than to have just enough to fill the exhibit. The designer should not look at a wealth of items as a luxury, but rather a necessity. It’s not uncommon for exhibit builders to include a piece with text simply because it is available and without regard for whether it is actually the best fit for the display. It is recommended that developers over-research as well as over-collect for each project so that the best items can be found and worked into the exhibit (Serrell, p.149).
Object Placement

Dean lists a number of intrinsic characteristics that help determine the manner in which objects should be arranged in an exhibit:

- **Visual impact** – the overall strength and power of an object
- **Visual weight** – the manner in which the values, textures and colors contribute to feelings of lightness, heaviness, or degrees in between.
- **Visual direction** – qualities of the object that move the eye and affect the object’s directionality.
- **Visual balance** – the factors contributing to whether the object appears unsettling (imbalance) or produces a feeling of being at rest (balance).
- **Visual mass** – elements that determine the degree to which an object appears to be solid and opaque.

These visual qualities invite the user to understand the overall purpose of the exhibit. They are important for creating a display that can engage the viewer and accomplish the educational goals set forth during the planning phase of the exhibition (Dean, p.56). It would, however, be rare for an exhibit to be composed of a single object; we must therefore strive to understand how objects relate to one another. Miles sets forth the following example: “If we put an object on a plinth of behind glass, it suggests some degree of value and, if we place another object beside it, we have to consider whether its plinth should be of the same height or colour,
behind it, or in front of it, and so on. Whatever we do will communicate something to our visitors and we should endeavour to understand what it is we are actually saying as well as what we think we are saying” (Miles, p.66). In addressing object arrangement, Dean notes that how objects are seen in relation to the viewer, the environment, and other objects is pivotal in determining whether or not the viewer will be attracted to the object in any significant and engaging context (Dean, p.55).

Aesthetics aside, there are other reasons for considering the placement of objects. The visitor wants to view the items on display with as much ease as possible. “Unless the items to be regarded are well positioned, neck and back ache may result” (Belcher, p.40). Exhibits, especially those that require significant time to take in, should keep the physical comfort of the visitor in mind. According to Linda Jacobson, displays should be arranged at eye-level for a person roughly 5’2” in height (Jacobson, 2007). The easier and more comfortable it is for visitors to view an exhibit, the greater the chance they will stay longer, learn more, and possibly return for multiple viewings.
Text

Text is essential to the success of any exhibit. It has the power to inform, instruct, explain, persuade, and entertain. To this extent, successful text should be developed alongside the design of the exhibit (Miles, p.99-100). There is a great deal that can be said about the text. Without it, visitors are left to interpret, or misinterpret, the intended message of the exhibit. Or, as Belcher puts it, “It is frustrating for the visitor if objects are placed on display and are not identified. Arguably all objects exhibited in a museum should be afforded this treatment, even if the prime purpose of the exhibit does not require it… Having invited visitors to take an interest in certain objects by exhibiting them, it should at least reward their curiosity and attention by saying what the objects are” (Belcher, p.149). Still, given poorly conceived text, the results can be just as disheartening, if not worse. Text can be found on labels for the description of objects, but it can also be located prominently about (usually above) a display in order to give a potential viewer clues as to what they are approaching. Serrell reports that good exhibits can be summed up with a “big idea” – a strong sentence or statement that tells what the exhibit is about as well as implying what it is not about (Serrell, p.1). Needless to say, it is important to make sure that visitors can assess the nature of the exhibit at a glance. The understanding that visitors will get from the initial text they encounter will
drive their expectations of the exhibit and, sending the wrong message up front will result in a visitor that is disappointed or confused or both.

Concerning descriptive labels, providing the best information is not always as easy as simply describing what is known about the object. It can be said that, “in respect of any object there is an enormous amount of information which can be provided, particularly when it extends to background or contextual information. But because not every known piece of information about an object will be relevant to the theme of an exhibition, and because, for practical reasons, it is neither possible nor desirable to attempt to communicate more than a few facts through a maximum of a few hundred words (depending on the medium of communication), selectivity is essential” (Belcher, p.150). To further this line of thinking, Serrell states that, “good labels are guided by a strong, cohesive exhibit plan – a theme, story, or communication goal – that sets the tone and limits the content” (Serrell, p.1). She goes on to say that exhibit designers should consider what amounts to a holistic approach to creating text – one that results in images and words working in tandem throughout the exhibit. This allows the graphic look and feel of the exhibit to, “harmonize with the total big idea” (Serrell, p.149). In essence, labels should be adapted to a format that makes it possible for any of the labels to be viewed out of order while still being relevant and consistent to the whole of the exhibition.

To the extent that labels compliment the uniform design of an exhibit, they should also engage the visitor and give them insight beyond mere fact. By point of illustration, we know that, “images created by three-dimensional objects are the most powerful attractors. Labels next to an object will be read more often than
labels next to a photo, or a label alone on a wall. But, the visitors’ experience will not be complete or memorable if, once attracted by the object, their interests or questions (even just casual curiosity) are not addressed by the label” (Serrell, p.147). Good labels should challenge the visitor to attempt a deeper understanding of what they are viewing. With this in mind, Serrell speaks of “Interpretive Labels” – labels that provide more than just cursory data on the objects they seek to illuminate, they engage the viewer to think about what is being seen by telling a story, contrasting view points, presenting a difficult issue, or working to change attitudes. As Serrell tells it, interpretive labels, “…are narratives, not lists of facts. Any label that serves to explain, guide, question, inform, or provoke – in a way that invites participation by the reader – is interpretive” (Serrell, p.9). Because interpretive labels require more than just a basic knowledge of what is being described, it is critical that the most appropriate member of the design group provide the text for each item. Belcher also reminds us that, while label writing has traditionally been the task of the curator, unless he or she is an expert communicator when working in this type of medium, it should, “be undertaken by a specialist, writer or an editor” (Belcher, p.157).

An effective caption should begin with a phrase, in present tense, directly related to the item to which it corresponds. Furthermore, the language should be appropriate for a broad age group and important ideas should be divided into logical portions, either through distinct paragraphs, bullets, or some other mechanism. Varying the length of descriptions, depending on the intrinsic value of the piece, is also a good idea. The most important items certainly deserve more of
the viewers’ attention than items that only partially relate the greater theme of the exhibit. But, as a general rule, all labels should be made to be as short as possible while still imparting information crucial to the interpretation of the exhibit (Serrell, p.26-31). After text has been composed, it is important to determine how easily the majority of visitors will be able to properly ingest the information. There are a number of formulas and methods for quickly analyzing and evaluating the character of a piece of text. Some of these include *The Fry Test, The Forecast Method, The Smog Method*, and *The Cloze Method*. In each of these procedures, a calculation is produced which is useful in determining the readability of a given piece of label text (Belcher, p.165-6).

Beyond the creation of suitable descriptions, there are still other factors to consider with regard to text. For instance, how does the text look and feel to viewers? According to Serrell, “typography affects both the mood and the message; therefore, label writers and designers must agree on how the type will look in the final production” (Serrell, p.189). Belcher advises that descriptive text be printed in an *sans serif* font at no less than 24 points in size (Belcher, p.160-1). There are, however, many typefaces that are easily read by the general public because they are common in the media. These include *Times Roman, Century Old Style, Optima*, and *Clarendon*, to name but a few (Serrell, p.193). Besides choosing a proper font, the formatting of text can also send messages to the reader. For instance, bold type is more appropriate for titles while regular type is best fitted for the body of text. And, if printing on non-white material, make a note of contrast and make sure that the lettering stands out because reading text on a dark background can be more tiring.
to the eyes than the reverse (Serrell, p.195). We are also told that, because readers can have a hard time keeping their place in moving line to line when the text is particularly long, it is important to limit each line to somewhere between 50 and 65 characters per line. In the interest of flow, however, efforts should be made to break lines where the natural phrases come to an end rather than by character count because viewers tend to scan rather than immerse themselves in reading as if they were reading a book (Serrell, p.201-3). Inconvenient breaks in the text can sometimes result in confusion.

Finally, with finished text in hand, the next step is to arrange the text cards about the display in a logical and purposeful manner. Belcher states that, “the location of the label in relation to the object should be a logical one, so that the visitor may easily gain the information he/she seeks, and relate it to the object without any likelihood of making a mistake” (Belcher, p.162). Also, if labels become confusing, such as when the labels are larger than the objects they represent, it’s quite common to have objects numbered with a corresponding universal label located outside of the display so that viewers can match the number on the label with the object in the case (Miles, p.67).
The purpose of lighting in an exhibition is to, "enable things to be seen by creating contrasts within the object and between the object and the background... Visitors should not be aware of lighting beyond an appreciation of the ambience it creates" (Miles, p.68). Visitors are concerned with viewing the objects and items in an exhibit, not to be dazzled by lighting effects. We will later see how lighting can have negative effects on the objects themselves, but we must first come to understand how lighting can have positive or negative effects on the viewer.

Improper lighting can result in discomfort glare and disability glare – essentially obscuring the display either fully or partially. Furthermore, if the exhibit features multiple types of lighting of various levels of intensity, the eye can suffer visual fatigue as a result of adapting to many different degrees of illumination. This is frequently the case when an exhibit is large enough to occupy multiple rooms. If each room contains drastically different levels of light, the eye is constantly adjusting in order to make out the objects (Miles, p.69).

Because the human eye is naturally attracted to light sources, the designer can use lighting to his or her advantage. For instance, an object lit by an external, diffuse light source will look different than if it is back-lit (Miles, p.69). Given the visual characteristics of objects discussed previously, there will generally be a number of lighting approaches that could be implemented for any given item.
Careful consideration should be given to all lighting decisions, both with respect to the object itself as well as the other lighting choices that have been made throughout the exhibit.
Conservation and Preservation

Because many objects found in exhibits are valuable and sometimes irreplaceable, one of the most important functions of museums and cultural institutions is the active preservation of items so that they may be viewed and valued by future generations (Lord & Lord, p.110). The process of exhibition can frequently be distressful to the objects and artifacts on presentation. Belcher notes that it is not uncommon to find exhibit environments in which, “light levels are too high, ultra-violet light is not adequately filtered, and both temperature and humidity levels fluctuate greatly” (Belcher, p.40). While it is true that all matter is destined to decay over time, we know that temperature, humidity, pollutants, biological organisms, reactivity of materials, and light all play significant, if not controllable, roles in the destruction of objects. Deterioration cannot be stopped entirely, but there are many activities that can be undertaken in order to slow the process (Dean, p.67). Unfortunately, due to the very nature of showing objects as well as the financial constraints that are a part of every exhibit, it’s not always possible to realize the ideal environment for objects on display. Often, compromises are made in which the curatorial and design teams weigh the potential damage done versus the benefit of creating the exhibit (Lord & Lord, p.111). Following is a brief inventory of preservation factors and problems pertinent to objects on display.
**Humidity and Temperature**

A large part of designing exhibitions involves creating and enclosing new environments and it is therefore important to have an understanding of the design space’s heating, cooling, and ventilation systems. One of the main functions of collection care involves monitoring the environment and an array of instruments are available to gauge temperature and relative humidity in order to ensure that objects are being displayed in optimum environmental conditions (Dean, p.70-2). Materials such as paper, wood, and textiles can react to humidity by expansion, which can further result in cracking or fracturing. Ideally, exhibit spaces should be air-conditioned and remain somewhat cool because humidity increases relative to temperature. A device such as a hygrometer, which records humidity across time, can also be employed to determine if humidity is a problem. Where there is no air conditioning, humidifiers and dehumidifiers can be used to create a more appropriate environment. Finally, in extreme situations, chemical desiccants such as silica gel can be effectively harnessed to draw unwanted moisture from the air (Belcher, p.116-7).

**Airborne Pollutants**

Dust and airborne pollutants have the capacity to be composed of any number of damaging materials, from plant and animal fibers to industrial wastes and combustion by-products. For this reason, it is important for display cases to be sealed against outside contaminants and, in the case of open displays, air filtration, whether through fiber filters or an ionization process, is recommended. And, as if it should even be stated, smoking should never be allowed in any exhibition setting.
Furthermore, the use of high voltage electrostatic air filters should be discouraged due to the risk of ozone generation, which in itself is damaging to materials (Lord & Lord, p. 119).

**Living Organisms**

A number of living organisms threaten collections; measures should be in place both to react to ongoing infestations and to proactively detect and prevent their presence. Objects going into or coming out of an exhibit should be thoroughly examined for signs of harmful organisms and, if detected, appropriate measures should be taken to minimize damage (Dean, p. 76-77). If the exhibit contains natural materials such as bark, thatching, matting, or plants, each should be checked to make sure that they do not contain any insect life that might prove harmful to other items on display (Belcher, p.118).

**Construction Materials**

Often, the materials used in the construction of an exhibit can be as harmful as anything found in the outside environment. Many construction materials can release harmful vapors in a process called off-gassing. Certain woods, particle board, paints, finishes, and plastic products have the capacity to off-gas and it is crucial that designers have a working knowledge of the materials that go into the creation of an exhibit. The danger is particularly strong for items stored in cases because gases can build up without proper ventilation (Dean, p.77). Lord and Lord suggest that multi-layer laminated vapor barrier films are effective for lining display cases in order to keep gases from either getting in or getting out. Also, activated charcoal, which
absorbs gaseous pollutants, can be placed inside a case for extra protection (Lord & Lord, p.120-1).

**Light**

Light is an essential ingredient to viewing an exhibit, but prolonged exposure to many kinds of light can have irreversible damaging effects of many materials. Hair, feathers, silk, leather, ivory, and dyes can all be particularly susceptible to light damage (Dean, p.79). In fact, light has damaging properties to the extent that, “only items of stone, metal and ceramics are normally unaffected by it” (Belcher, p.117). There are steps that can be taken to reduce the amount of light damage incurred by items on display. Simply limiting the time of exposure to light is one of the most basic measures that can help eliminate needless damage (Dean, p.79). Should an exhibit be lit by fluorescent lights, filters should be put in place so as to block the ultraviolet radiation emitted by fluorescent tubes (Belcher, p.117). It is also worth mentioning that fiber optics have been developed that can provide visible light without the ultraviolet and infrared frequencies that typically accompany it (Dean, p.79). Lord & Lord, however, caution against the use of fiber optics as the principal means for illuminating objects on display as fiber optics do not enhance color rendering and actually tend to impart a greenish hue. There also appears to be a number of situational limitations to which fiber optics do not provide an ideal solution to the problem of lighting an exhibit. For instance, lighting a large area with fiber optics can produce pools of light with a scattered appearance rather than a singular illuminated space (Lord & Lord, p.211-2). The benefits associated with reducing UV and infrared frequencies, however, do make fiber optics an attractive
option in instances where it is practical. Finally, light-emitting diodes, or LEDs, have also become a viable lighting option thanks to recent price drops. LEDs give off little heat and require far less energy than traditional lighting. LEDs also have a very long lifecycle, making them well suited to long-term installations.
**Conclusions**

There are numerous issues to consider when building an educational exhibit. The potential for teaching and instruction are great, but there is also room to falter when designers fail to consider the viewer and the environment. Simply providing objects for public display is not enough to capture the minds of today’s museum and cultural institution visitors. We must actively aspire to create exhibits that provoke mental and emotional responses from the audience while creating a sense of harmony and balance with the space’s environment. Furthermore, for the sake of future exhibits, every effort should be made to preserve the items on display from the wear and tear of public display. This paper merely scratches the surface of the literature available on building education exhibits, but it is hoped that many of the important lessons to be learned are sufficiently represented. As Belcher tells us, “The production process of a major exhibition is normally complex, extensive and resource-intensive, drawing, in particular, on specialists’ time and skills” (Belcher, p.39). Given the right tools, resources, and, most of all, information, a good designer can see a successful exhibit from the planning stages through to termination and assessment and then begin anew.
The Wilson Hall Exhibit

Introduction

For the past year, I have worked to help create an historical exhibit entitled “From Organism to Molecule: A Centennial History of the Biology Department at the University of North Carolina at Chapel Hill.” This exhibit is meant to trace the Department of Biology starting with its inception in 1891, its 1908 split into the Department of Botany and the Department of Zoology and, finally, the merger of the Department of Botany and the Department of Zoology in 1982 to form the new Department of Biology. The exhibit is housed in a display case that is approximately 77” high by 138” wide and 21” deep. The case is divided into three equal sections, each with its own door and an adjustable glass shelving structure. The exhibit can currently be viewed in the Wilson Hall lobby and there are tentative plans to create a virtual museum using the existing elements of the exhibit along with artifacts and texts that were not included.

The Wilson Hall Exhibit has its origins in February of 2005 as discussion concerning the upcoming renovation of Wilson Hall caused William Burk, head librarian at John N. Couch Botany Library, to inquire as to the fate of artifacts and collections held in several display cases. As efforts to preserve the artifacts and
specimens got underway, Neil Fulghum of the North Carolina Collection Gallery announced in a May 26 email to UNC Historic Collection Curator Anne Douglas that he would like for the two identical, large display cabinets in Wilson Hall to be given accession numbers and physically tagged as historic property. Wilson Hall underwent renovations during 2006 and reopened in January of 2007 with the two large display cases flanking the east and west walls of the lobby. On February 6, 2007 Burk contacted SILS professor David Carr for help in identifying students possibly interested in working to develop education and historic exhibits in the two cases. Hearing of the opportunity, I contacted Burk on February 7 and expressed my interest in helping develop the exhibits. After meeting with Burk, I officially joined the project on February 21, 2007.

In our earliest meetings, Burk explained his plans for the two exhibit cases. The first case (on the eastern wall), which I would be working on, was to be outfitted with a permanent historical exhibit celebrating the first 100 years of the Department of Biology at the University of North Carolina at Chapel Hill. The second case would be used for short-term exhibits showcasing themes important to the Department of Biology. Initially, it was unclear as to whether I would be working on any of the short-term exhibits, but, as we began working on the historical exhibit in earnest, it became clear that I would not have sufficient time to dedicate to another exhibit.¹

¹ While William Burk and I are principally responsible for the design and implementation of “From Organism to Molecule,” the exhibit could not have been completed without assistance from the following: Linda Jacobson, Susan Whitfield, Brian Nalley, Steven Matson, Jeffery Beam, and Barbara Stegenga
Preliminary planning

In the very early stages of the process, Burk and I were both quite new to the idea of creating exhibits of this size and scope. I, especially, was naïve as to the amount of time and effort that would be required to make a final product that would satisfy the both of us. The preliminary planning did little to inform me of the long road ahead as we simply laid out a number of seemingly straightforward tasks that would need to be accomplished before we could begin the installation. These tasks included:

- Prepare the exhibit space
- Identify potential artifacts and images
- Create timelines/historical narrative
- Write text/create exhibit labels

Given the unassuming nature of each of the items on the list, I anticipated having the exhibit finished by the end of the current semester (Spring 2007). Had I known the entire process would take a complete year, I might have walked away from it early on. In that regard, I am rather thankful of my naivety because the process was rewarding in ways that could have never foreseen.
Preparing the Exhibit Space

When I first inspected the exhibit cases, I saw that they were old, but fairly sturdy. They each had a layer of dust in the bottom and the glass could use a cleaning. The inside of the cases were an unfortunate color that may have once been Carolina Blue, but was not rather dull and faded and did not reflect in any positive way the greater color scheme of the room housing them. The cases also needed new locks and, presumably, new lighting as the fluorescent light fixtures currently in the case had seen their wiring snipped, most likely during the renovation of Wilson Hall. Finally, the outside of the cases, while largely acceptable, would need some staining near their bottoms due to years of scuffing.

The first order of business was to get the locks changed. The Wilson Hall physical crew took care of this rather quickly. Six identical locks were installed – one in each door. Each party that had an interest in the cases was given a key.

Next, I labored to clean out the bottom of the cabinets and lay the groundwork for painting the interiors. With my hand, I scooped out most of the larger pieces of dirt. Then, using cotton cloth and de-ionized water, I scrubbed the bottom of the cases until I was satisfied that they were clean.

Now it was time to consider painting the cases. We liked the idea of matching the interior of the cases with the white that covered most of Wilson Lobby. In speaking with the physical crew, who had painted the lobby during renovations, we
learned that the color we were interested in was called "antique white." Being conscious that traditional paints will offgas, we contacted Sherwin Williams and learned that they do produce a paint in the color we wanted, but that would not produce gases harmful to the artifacts we hoped to put in the cases. The paint was purchased along with various brushes (including a roller, which proved invaluable), painter’s tape, and a tarp for the floor and I began the process of painting. This meant taking the glass shelving and the shelving structure out of one case and placing it in the other while I painted. Once one case was painted and dry, the process was repeated for the other case.

The next hurdle meant tackling the issue of lighting the case. We were not sold on the idea of rewiring the existing fluorescent system even though we could buy filters to block any harmful rays. William Burk mentioned that he had seen some display cases recently installed in D. H. Hill library on the campus of North Carolina State University and that he had been impressed with the LED lighting they had used. I contacted Kevin Schlesier, the Exhibits and Outreach Library who is largely responsible for the exhibits in the east wing of D. H. Hill. We spoke about LED lighting and he said that he was very happy with the lights in his exhibit cases, but that they did give off a subtle blue tint. Next, I made an appointment with Eastern Electronic, the North Carolina distributor for LEDtronics – an LED manufacturer from California. They showed me the various models that they had and let me know that the newer models gave a light the more closely resembled natural sunlight (and no longer gave off the blue-ish hue). After reporting back to William Burk, it was decided that we would go ahead and purchase the LEDs, despite the fact that they
were rather expensive. The idea was that, because the display that we were currently working on was going to be more or less permanent, we might as well use the LEDs because of their long life (about 10 years according to LEDtronics) and their energy efficiency. We ordered a dozen two-foot LED strips, a dozen mounting brackets, two power sources, and enough inter-connectors to link up six strips in each case. Unfortunately, the inter-connectors only come in 4” increments. This made it difficult to propose a workable plan for installation and our original goal of having two strips on top, two strips on the bottom, and two strips along the inside of the door divides for each case was completely ruled out. The UNC-CH electrical staff, however, managed a good solution and put three strips across the top and bottom of each case along with an on/off switch inside the case so that only those with keys could control the lighting. Before we turned on the lights, I was a bit afraid because LEDs generally don’t give off the brightest over distance. The interior of the cases being six feet from bottom to top, I was worried that there wouldn’t be enough light to illuminate the middle, but I was pleasantly relieved when I saw that the LEDs filled each case with a warm, natural-looking light. I would not, however, recommend using this type of LED to light a large area as they are simply not that powerful when compared to traditional light sources. For our purposes, they more than filled the need.
Exhibit content

Choosing the content of the exhibit was one of the most arduous aspects of the process. Burk and I felt that it was important to have a mixture of both items and images, with the items being artifacts that are either indicative of methods used in the department or symbolic of areas of study and the images consisting of photographs of important personages and buildings or photos illustrative of departmental activities. Furthermore, it was important to create a sense of balance within the three sections of the exhibit and much consideration was given to the numbers and types of content that would be included in each.

Items

William Burk and I began collecting items almost immediately after our initial meetings. The Botany Library did not have possession of any historical items of value to the exhibit and it was, therefore, necessary to reach out to various UNC staff and faculty in order to obtain a sufficient quantity of items so that a selection process could be set in motion. Among those who contributed items were the North Carolina Collection Gallery, the Biology Department’s Illustration and Photography Facility, the UNC Herbarium, as well the Biology Department’s teaching lab supervisor, Barbara Stegenga. Because many of the items had been in storage for several years, some of them were dusty or otherwise in need of cleaning. Soft cotton cloth, Q-Tips, and de-ionized water were used for cleaning. Ultimately, thirteen
items were chosen for placement inside of the exhibit cases. The items chosen are as follows:

- **A binary microscope** – Provided by the Biology Department’s Illustration and Photography Facility, this Bausch & Lomb FS-7 School Microscope was likely produced circa 1920 and purchased by the Botany Department for use in student labs.

- **Two wax models of mushroom species**– Courtesy of the UNC-CH Herbarium, these two models were produced by celebrated model maker Paul Marchand, most likely in the early 1940s. The models were originally used for instructional purposes.

- **A plastic model of a plant cell**– Manufactured by the Carolina Biological Supply Company, this model was originally part of a set, which included a model of a typical animal cell. Used for instructional purposes, the model was likely acquired by UNC-CH in the late 1960s. This item comes courtesy of Barbara Stegenga, Biology Department teaching lab supervisor.

- **A wooden camera**– This large camera, the Eastman View No. 2, was produced by the Eastman Kodak Company between 1921 and 1950. Early Botanists at UNC-CH used this particular camera in the botanical investigations, especially when creating images for publication. The camera is provided courtesy of the Biology Department’s Illustration and Photography Facility.

- **Two preserved sponge specimens**– Sponges played an important role in the early years of research in the Biology Department. Henry Van Peters
Wilson made significant discoveries about cellular re-aggregation using sponges and, as such, these preserved specimens provided by the North Carolina Collection Gallery are meant to represent that seminal research.

- **A model of a crayfish**—This teaching aid was produced by Chicago’s General Biological Supply House and consists of two enlarged models representing both the external and internal features of a crayfish. This model likely dates back to the 1930s and comes courtesy of the North Carolina Collection Gallery.

- **A model of a bullfrog**—Manufactured by Carolina Biological Supply Company, this model was used for instructional purposes and illustrates the biological systems found inside a typical frog. The model comes courtesy of Barbara Stegenga.

- **A model of the DNA double-helix**—This model is the one item on display that was purchased expressly for the exhibit. The colorful model was chosen to represent the Biology Department’s increased focus on research dealing with unlocking the molecular secrets of life. The model was purchased from Carolina Biological Supply Company.

- **A preserved bird specimen (Rufous-sided Towhee)**—While much of the current research at UNC-CH is rooted in genetic and molecular biology, there is still much important work being done at the organismal level. This specimen, courtesy of the North Carolina Collection Gallery, is meant to represent the valuable research performed in ecology, evolution, and behavioral studies.
• **A gel electrophoresis chamber**–This item was provided by Professor Jeff Dangl's lab and is meant to illustrate an important method employed by researchers at UNC-CH. Gel electrophoresis is a technique that facilitates the separation of DNA, RNA, and various proteins via the application of an electric current.

• **A spectrophotometer**–Spectrophotometers are used in Biology labs to measure light as it is either transmitted or absorbed in photosynthesis and enzyme experiments respectively. This item was provided by Barbara Stegenga and is meant to represent current instructional methods used in introductory Biology labs.

It is worth noting that several additional items were provided by various sources that did not end up in the final display. Some of these include a field camera, an enlarged model of an acorn, a model of typical animal cell, and a binary microscope. Some of these, such as the field camera and the microscope, were omitted because similar items were chosen for display. Others, like the acorn model, were victims of space constraints.

**Images**

Included in our exhibit are a number of images. For obvious reason, we wanted to make sure that the important personages were somehow represented in order that we might pay tribute to and raise awareness of their accomplishments. We also felt that it was crucial that we make mention of the campus buildings that housed the Botany, Zoology, and Biology Departments over the years. Finally, we used a number of images to illustrate certain concepts that could not be adequately
summed up in an object, but that we believed to be an important enough to warrant mention in the exhibit. The images in the exhibit are as follows:

- **Portrait of William Chambers Coker** W. C. Coker was the head for the Department of Botany when it originally split from Biology in 1908. His mycological work brought international acclaim to the university. This image was provided by the North Carolina Botanical Garden.

- **Portrait of John Nathaniel Couch** An acclaimed mycologist, John N. Couch was a distinguished member of the Department of Biology’s faculty and the John N. Couch Botany Library, from which this image originates, bears his name.

- **Portrait of Alma Leonora Holland (Beers)** Alma Holland was the first woman botanist at UNC-CH. As should be noted, William Burk and I have made a conscious effort to represent women and minorities in this exhibit to hopefully shed light on the inclusive nature of the department(s). This image was acquired through Margaret Adams, who is Alma’s niece.

- **Portrait of Earlene Atchison (Rupert)** Earlene Atchison was the first woman faculty member in the Department of Botany at UNC-CH in 1948. She later became a professor at Clemson University, from which we obtained this portrait.

- **Portrait of Henry Van Peters Wilson** H. V. P. Wilson headed the first Department of Biology and was present in 1908 when the Department of Zoology was formed from the split of Biology into Botany and Zoology. He was internationally acclaimed for his work in embryology and developmental
biology and, in particular, his pioneering work with sponges. This portrait was provided by the North Carolina Collection.

- **Portrait of Robert Ervin Coker**
  R. E. Coker joined the Department of Zoology in 1922 and served as chair from 1935 to 1947. He developed the curriculum and fostered research in his areas of expertise – ecology and developmental biology. This portrait was reproduced from *Journal of the Elisha Mitchell Scientific Society*.

- **Portrait of Ezda May Deviney**
  Ezda Deviney was the first woman to receive a doctorate in zoology at UNC-CH in 1934. She later joined the faculty at Florida State University for Women (now Florida State University) from which we obtained this portrait.

- **Portrait of JoAnn White (Lloyd)**
  JoAnn White was the first African American appointed to the Department of Zoology (later Biology) at UNC-CH in 1974. She later returned to the University of Chicago, where she received her Ph.D. She currently practices law in New Orleans. This portrait was obtained through JoAnn White, but was arguably the most difficult to acquire, as Dr. White had subsequently entered the practice of law and moved away from her former academic circles. After significant efforts, we were able to receive a suitable portrait.

- **Portrait of Lawrence I. Gilbert**
  Lawrence Gilbert has served in several administrative posts at UNC-CH, not the least of which being the chair of the Department of Zoology when it merged with the Department of Botany to form the new Department of Biology in 1982. Due in large to his efforts, the
Department of Biology enjoys the largest population of undergraduates of all departments at UNC-CH. This portrait comes courtesy of the Department of Biology.

- **Portrait of Steven W. Matson**  
  Steven Matson is the current chair of the Department of Biology and, without his patronage and support, this exhibit would have never been realized. This portrait was provided by the Department of Biology.

- **Picture of Coker Hall**  
  Named after W. C. Coker, this building housed the Department of Botany until the merger in 1982. This image was acquired from the North Carolina Collection.

- **Picture of Wilson Hall**  
  Originally named The Wilson Zoological Laboratory after H. V. P. Wilson, it was later shortened to Wilson Hall. It housed the Department of Zoology until the merger in 1982. This image comes courtesy of the North Carolina Collection.

- **Picture of Fordham Hall**  
  Dedicated in honor of former UNC Chancellor Christopher C. Fordham III, this building uniquely unites researchers from the College of Arts and Science and the School of Medicine and highlights the collaborative spirit of research on the UNC-CH campus. The building is considered part of the Department of Biology. The picture is courtesy of David Miller from the Illustration and Photography Facility.

- **Picture of a botany laboratory**  
  This image was selected in order to illustrate the practical coursework that would have typified
• **Picture of a zoology laboratory** Again, we chose to illustrate lab work in the Department of Zoology so that the viewer might see what a typical lab looked like in what appears to be the 1950s. We were careful not to include an image that portrayed vivisection of any kind. While that was surely a part of the curriculum at the time, we felt that it would be politically dangerous to promote such an image in the present climate.

• **Picture of a biology laboratory** In large part because we had laboratory images in the other two sections of the exhibit, we felt it would create balance to include an image from a current biology lab. There were no images currently available for our purposes and we enlisted the help of Brian Nalley from the Illustration and Photography Facility. First, we needed to produce a waver form that students could sign so that we could use their images. Then Brian coordinated a time with Barbara Stegena to come to one of her labs and take some photos. After that, we were given 14 images to choose from and developed a consensus as to which was the best fit.

• **Picture representing biological field work** We were interested in showing some of the practical, hands-on experience that students can receive in the Department of Biology. This image shows Garrick Skalski, now an Associate Professor in the Department of Ecology and Evolutionary Biology at the University of Kansas, sampling benthic invertebrates in New Hope Creek. This image is courtesy of Professor Seth Reice.

• **Composite picture of model organisms** This image is a combination of four images, each representing one of the model organisms used in genetic
research. I created the composite using PhotoShop. While I claim no practical skill in using the program, I was able to make a useful image that conveys an increasingly important facet of the Department of Biology. The image of a fruit fly (*Drosophila melanogaster*) was taken by Welcome Bender III of Harvard University and is used with his kind permission. The three other images were sourced from the Internet. Naturally, we felt the urge to simply use the images without giving credit, but a certain sense of integrity compelled us to attempt to track down the owners and obtain permission.

- **Composite picture of research areas** This is another amalgam of images that I put together – this time to show the many research areas covered by the Department of Biology. The original idea, as well as some of the images, came from the Department of Biology homepage. The images on the homepage, however, proved too small for our purposes and we decided to ask the Department of Biology for the original images, which we hoped would be of a larger size. This actually proved more difficult than it would seem. Credit should go to Jeff Sekelsky for providing many of the images, but the problem remained that he did not have ownership of most of them. After contacting a number of faculty and staff, I was able to determine ownership and receive permissions for the majority of the images. Concerning the final image, that of Darwin’s Finches, I was unable to determine ownership with any certainty and I chose to simply credit the website I pulled the image from, Darwin-online.uk.org.
Acquiring the images and obtaining permission to use them were merely two of the challenges in this process. The images needed to be printed and mounted on foamcore if they were going to be suitable for display in the exhibit. Each image was given to Brian Nalley in the Illustration and Photography Facility and he printed them on special matte paper. We were given the choice between matte and glossy and chose matte to reduce any glare that might occur from the exhibit’s lighting. Next, I took the images to the North Carolina Collection Gallery where Linda Jacobson assisted me in mounting the images on foamcore. The idea is to cut out the image leaving a bit of white space around the image to work with. Next, the image is laid face down and sprayed with adhesive (we used 3M spray mount, but there are other brands available). The image is then placed on foamcore and carefully smoothed out so that there are no wrinkles or bubbles beneath the paper. Using a straight edge and an Exacto Blade, I cut out the image making an effort to create a beveled edge that is roughly 45-degrees directing inwards. More than one image was ruined due poor technique in cutting. Others were damaged or smudged as a result of having residual spray adhesive on my hands.

As with the items, there were images that we considered using, but did not for various reasons. These include photographs of Davie Hall, New East Hall, and the UNC-CH Arboretum. Davie Hall and New East Hall were taken off the table because we felt it would be germane to let the focus rest solely on the three main departmental buildings in Wilson, Coker, and Fordham Halls. The Arboretum was a casualty of space restrictions.
The text writing process began as soon as the first items were identified for inclusion in the exhibit. Each item was researched in order that we might explain its significance within the context of the Biology Department. Certain items lent themselves quite readily to the writing process. For instance, explaining the importance of DNA’s double-helix in the context of the Department of Biology is rather easy and a great deal can be said that will engage the reader in a significant way. Suitable ideas for this text can be found in most any introductory Biology textbook or on any number of Internet sites. Other items, however, offered far more challenges to creating descriptive and informative text.

When faced with trying to write something substantial about the binary microscope, we were forced to examine our intentions when including it in the exhibit. Would it be enough to simply state that the microscope was important for students in their lab work or should we attempt to personalize the item by finding information specific to that particular microscope? Ultimately, we decided that it would be best to give more detailed information and attempt to bring out the uniqueness of the item. The process, however, was anything but simple. We were able to determine the manufacturer, Bausch and Lomb, of the microscope from the item itself but we also wanted to include some information about the model and perhaps the year(s) that it was likely in production.
I performed a number of image searches on through Google in an effort to find similar looking Bausch and Lomb microscopes. While some of the results offered pictures of what essentially appeared to be identical items, historically relevant information was not found. At this point, we chose to look at the company itself with the hope that Bausch and Lomb had some manner of historical agency within their ranks. The company’s website offered nothing to this effect and an email of inquiry was then sent. A company representative confirmed that Bausch and Lomb does not have an archive of their products from the era that we were working with. Knowing that the company is located in Rochester and has a close relationship with the University of Rochester, we decided that it might be wise to look at that school in order to see if they had any historical data on the company. This, too, turned up nothing of interest.

The next step was to attempt to locate books or publications within the UNC library system that might have information about either older microscopes or the Bausch and Lomb corporation, if not both. A publication, by Edward Bausch, concerning the use and care of microscopes was found to be in UNC’s library storage, that item was requested, but, upon inspection, it proved to be of no use to our endeavor. Finally, a search in WorldCat yielded several Bausch and Lomb catalog publications in various US institutions. Using interlibrary loan, some of these catalogs were obtained. These catalogs eventually resulted in our having fairly accurate historical data about the particular microscope in our display. While most of the item descriptions were the result of much less tedious research than that of
the microscope, it is easy to see that producing text that is both accurate and relevant is a time-consuming process.

Actually producing quality writing in order to give meaning to the content of the exhibit proved to be only half of the text equation. The text must somehow be integrated into suitable labels that can be placed in proximity to the items and images that they describe. This was accomplished with the assistance of Linda Jacobson of the North Carolina Collection Gallery. With her guidance, I was able to create labels through a series of steps.

The first step was to design the look of the labels using Adobe PageMaker, a desktop publishing program that is somewhat analogous to PhotoShop, but utilizing and manipulating text instead of images. Using this program, text written for each item or image is imported into the program and placed inside a text box that can then be modified in the dimensions of width and height. As the dimensions of the text box are changed, the text conforms to the new shape of the box. Certain settings within the program then allow the user to further enhance the look of the text to create a stylized and uniform feel to the text. For instance, I chose to have each line justified so that the text took on a clearly defined and squared-off shape. Further, I was able to choose whether or not to allow hyphenation (I chose against it). Next, I could change the width and height of the text box in order to get the text to conform to rules both laid out by Serrell in “Exhibit Labels: An Interpretive Approach” and explained to me by Linda Jacobson. The purpose is to manipulate the text box so that each line contains approximately no more than ten words, excluding articles.
This in itself is not entirely difficult, but there are some secondary rules that should also be heeded.

For instance, it is bad practice to allow the final word in a sentence to fall the beginning of a new line as this damages the flow of the text. Likewise, one is also discouraged from allowing the final word in a piece of text to occupy its own line as this not only disrupts sentence flow, but it also creates a look of unbalance to the entire piece. It takes some creative use of spacing, tabs, and kerning (the adjustment of the space between individual characters) to overcome these pitfalls and create texts that have a sleek and professional look them. In looking at several of the text boxes that I created, I began to notice that some looked slightly different from the majority. This was a result of the fact that William Burk and I had each written a number of the texts and had inadvertently used different fonts – *Century* for Burk and *Times New Roman* for myself. We discussed the matter and decided that *Century* looked much better, but I then needed to change the texts in *Times New Roman*, which completely changed the way the existing text fit into the box. This caused me to resize several pieces of text. While doing this, we also noticed that we very much preferred the hyphen form *Times New Roman*. Therefore, I went through every piece of text and changed each hyphen, of which there were many, to the preferred font.

PageMaker is a very versatile program, but the ability to customize can easily lead to endless revision.

Creating good-looking text boxes is the first step in the PageMaker process. The next step is to make an attractive border to surround the text. This is accomplished by creating another text box and filling it in with the color of your
choice. For each piece of text, I created a larger text box and positioned it so that it surrounded the first text box in a manner where each side is roughly equidistant to the corresponding side of the first box. Next I would use the “fill” function from the menu options and turn the new box into a solid color. This results in the original text box being obscured by the new, larger box. Because each box is treated as a different layer (think of various pieces of paper being placed on top of one another), I would then need to select the original text box and place it on the top of the other layers, thus creating the effect that the text is surrounded by a colorful border.

PageMaker does not come equipped with a wide array of colors to choose from, but it does allow a user to create colors. The color that we eventually settled on for all of our borders was custom made by Linda Jacobson by manipulating the various elements (red, yellow, cyan, and black) provided by the program. The color, which Jacobson named “clay,” was chosen because it best fits the brown tones of the display case as well as the walls of Wilson Hall, but it is light enough that it does not overpower the text or items in the display.

Once text was completed in PageMaker, the file was saved as a PDF and sent to Brian Nalley in the Biology Department’s Illustration and Photography Facility. Brian would then print the text out on matte paper and the texts would then be mounted on foamcore using spray adhesive in the manner previously described for mounting images, but with one exception. Whereas the portraits of important personages were placed in easels and the pictures of buildings were mounted on the back wall of the exhibit case, the captions would need to have some sort of backing that would allow them to stand on their own. Furthermore, it came to my attention
that captions placed on the lowest level of the case would need to recline at a
greater angle than those placed on the upper level, or closer to eye level, in order to
facilitate reading from someone who would be looking down at it. Captions placed in
the middle level of the case would need to be reclined at an angle approximately in
between that of captions on the upper and lower levels. It was at this point that I
realized that I would need to make a definitive diagram of where each item would
be located in the exhibit.

Using manila folders, I cut out a mock exhibit with each piece of folder
roughly shaped and sized to represent an item in the exhibit. I went about placing
these mock items in the exhibit case and formulating a rough plan of where
everything should go. Unfortunately, we had yet to completely flesh out all of the
content of the Biology portion of the exhibit so items such as the spectrophotometer
and gel electrophoresis chamber were not considered in this process. The Botany
and Zoology portions of the exhibit, however, could safely be mapped. After making
a list of each of the known items and which level of the exhibit they would inhabit, I
headed back to the North Carolina Collection Gallery to add supports to the backs of
the captions.

Using leftover foamcore, I fashioned various triangles and, using a hot glue
gun, I affixed two triangles to the back of each caption. I had to pay special attention
to make sure that both triangles were approximately the exact same size and glued
at the same height. I also had to ensure that the same process was repeated for each
caption across each level to maintain a consistent angle for viewing. I won’t pretend
to have a scientific method for determining the resultant angles, but I did make an
effort to use equilateral triangles glued across the hypotenuse created a nice 45-degree angle for those captions on the lowermost level. I tried as best as I could to get the captions on the middle level to recline at about a 65-degree angle and those on the top level to be near 80-degrees. I found that I was able to cut better triangles using a retractable blade knife as opposed to an Exacto Blade. The blade knife offers a bigger handle for better control and, while it might not give as clean a cut as the Exacto Blade, that is not a bad thing since the triangles will not be placed where a viewer might see them. The problem with using an Exacto Blade for this process is that it is easy to accidentally cut in a way that bevels the edge of the triangle and this results in triangles that, when glued to the captions, stick out at odd angles as opposed to being perpendicular. This can, in small ways, change the angle at which the captions reclines.
Timelines

Arguably the most grueling and certainly the most scrutinized process in creating the exhibit involved the timelines of departmental history, the creation of which spanned almost the entire year of the project. In all three separate timelines were created – one for each section of the exhibit case.

Obviously, in creating an historical exhibit, timelines are a crucial component in conveying important benchmarks as they happened chronologically. In dealing with a subject as broad as the history of the Department of Biology at UNC-CH, the first problem to arise was that of scope. Certainly a great deal had happened over the last 100 years and narrowing the most important aspects down to a manageable set of bullet points and controlling the overall scope took a lot of consideration and a fair amount of compromise. For instance, there have been a great many awards given to faculty and, in some cases, we were asked to include certain of these in the timelines. Space being at a premium, we had to decide which awards made the most sense to recognize. Ultimately, we decided that, in the scientific world, there are a few societies whose awards signify the most distinguished of honors and the most notable of those is the National Academy of Sciences. Any professor being recognized by this organization would be certain of making the timeline, but other awards were simply too numerous to list.
Another dilemma to producing the timelines is the fact information provided by academic departments is not always clearly understood. Burk and I came to the conclusion that we would like the timeline to reflect the establishment of departmental curricula, but not programs, as the former represent more structured areas of study. Some of the departmental literature, however, uses the terms “curriculum” and “program” somewhat interchangeably. Deciding what constitutes and curriculum versus a program was often a matter of doing a good deal of research that could have been avoided had the department adopted a more controlled vocabulary.

Sorting through conflicting information was, on the whole, much easier than dealing with information that was simply unavailable. A great deal of the information for the timelines came directly from the departmental annual reports, which recorded a great deal of the significant facts and statistics we wanted to convey. The printed reports are available as part of the university archives. The reports, however, were only printed up through the academic year of 1998/1999 and, currently, they are produced so that only department chairs and administrative assistants have access to them. This meant that we would have to do a little more research or request information through alternative sources in order to find consistent facts and figures for the later half of our timelines.

Of course, having the information for the timelines did not make them complete. Burk and I, and sometimes Jeffery Beam, labored over the best wording for almost every entry. There was much discussion about how to arrange simple sentences so that the correct aspect received the most attention. For example, in
1999 Tom Petes was elected to the National Academy of Sciences. We questioned whether it was correct to say, “National Academy of Sciences elects Tom Petes as member” or if we should write, “Tom Petes elected to the National Academy of Sciences.” We chose the latter because we decided that the focus of the entry should be on the person being rewarded, not the Academy itself. The point being that choosing the correct sentence subject can make a big difference in how an entry is perceived by a potential reader.

There was also a great deal of attention paid to consistent wording. Whenever possible, we tried to use the active voice, though there were instances where no suitable active version could be composed. Further, we wanted to make sure that similar entries read similarly. In mentioning the many important women in the department, we made a concerted effort to use the word “woman” as compared to “female.” For instance, Alma L. Holland is listed as the “department’s first woman botanist” and Velma D. Matthews is the “first woman student to earn an advanced degree in botany.” Such strict adherence to language might seem tedious, but we felt it important to represent each entry in a way that was consistent with every other entry.

As the wording for each timeline was completed, the text was sent to Linda Jacobson who used Adobe InDesign to create the timelines as they would be printed. We provided Jacobson with images relevant to the field being documented (plants and leaves for the Botany timeline, molecules for Biology, etc.) and she incorporated those images into the background of the layout. Once the timelines were finished, Linda sent them to Brian Nalley who printed them out. They were then mounted on
foamcare in the same manner as the portraits and text labels. Originally, we split each section’s timelines into two long rectangles with the assumption that they would be placed one above the other and the timelines could span the majority of the left margin of each section of the exhibit case. This proved to be a mistake as the lower piece of each timeline was invariably obstructed by objects and further rendered unreadable by the glare of the glass shelf above it. The timelines were then reconfigured into squares that could be placed entirely above the topmost shelf in each section.
Public dissemination

Given that the exhibit is located in the lobby of one of the most heavily trafficked buildings in the Department of Biology, Burk and I feel very confident that our efforts will not go unnoticed. We did, however, feel that our work would resonate with certain groups beyond the Department of Biology students, faculty, and staff who frequent Wilson Hall. In an effort to raise awareness with these groups, Burk and I undertook a few measures to promote the exhibit. Burk contacted a number of his librarian colleagues and arranged to have a group meeting in order to view the exhibit. Likewise, retired faculty members were also contacted and a viewing group was assembled. We also composed some text to announce the opening of the exhibit and, with the assistance of Steven Matson, arranged to have a link to the announcement present on the Department of Biology homepage. As of this writing, we have contacted and are waiting to hear from UNC-CH affiliated newspaper The Daily Tar Hell in the hope that either it will choose to feature an article on the exhibit.
Lessons learned

In addition to the obstacles and solutions visited in the above descriptions, I find it necessary to reflect on some of the more salient lessons that I learned as a result of this yearlong project.

- **Find good sponsorship:** Burk and I were very lucky to have Department of Biology Chair Steven Matson as a sponsor. In addition to approving generous funding for our endeavors, he was pivotal in helping us to maintain our momentum. On more than a few occasions, we needed work completed on the cabinets (changing of locks, additional staining, light fixture installation) and Matson was able to motivate the physical crew to prioritize these tasks over other works. Similar entreaties from our end were usually dismissed by the physical crew. I would, therefore, conclude that it is important to have a sponsor that is not only supportive of your efforts, but that has some degree of influence in the areas where your work is not entirely self-sufficient.

- **Proofreading is critical:** This project entailed the creation of a great deal of text and, as a result, there were many syntactical and grammatical errors that needed to be corrected. Each piece of writing received scrutiny from several different sources and, yet, errors still found their way into what should have been finished copy. I do feel, however, that we greatly reduced the number of late changes by having people outside of the project examine the text. It is
• quite possible to gloss over errors when you are intensely working on a project and the eyes of a third party can often find mistakes that would go unnoticed by someone who is acutely aware of how the text should read.

• **Be open to change and compromise:** It would be unrealistic to imagine that a project of this nature and scope could see completion and implementation exactly as it was laid out nearly a year prior. Along the way, there were a number of changes and compromises conceded on the part of both Burk and myself. There were occasions where he and I had differing opinions on aspects of the exhibit and how they should be represented and a willingness to compromise was important to reaching a resolution. Similarly, voices from outside of the exhibit sometimes asked that the content reflect their interests and, depending on who was asking, change and/or compromise might have been considered.

• **Expect criticism and suggestions once everything is in place:** If our experience is anything to go by, it would be safe to conclude that most interested parties will not pay a great deal of attention to your work until it is nearing completion (or worse, once it is complete). While Burk and I did make an effort to include relevant faculty and staff in the review process of our timelines and text, the feedback we received at the earlier stages was rather spare. It wasn’t until we were confident that our final versions were in place that the call for revisions became a force. As the exhibit is seen by more and more people, I would expect that we will hear the opinions of others along with requests for insertions and/or corrections. Some comments
certainly warrant additional efforts, but, at some point, the exhibit needs to be considered finished.

- **Perfection has its price:** This is meant to further the last point in that, while every exhibit will likely have some aspect that can be improved upon, it is important to reach a stopping point. Just as pressure from the outside can ask that additional work be completed, internal pressures and a desire to make everything “perfect” can keep the exhibit from ever being completed. One thing I struggled to come to terms with is the fact that I will always be far more critical of the exhibit than any person who casually views it. I invested a great deal of time and effort and I expect that the result will be a flawless display, but that is far from realistic. Learning when to say, “good enough” is important.


**Bibliography**


