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The Sophie Digital Library of Early Women's Research: A Blueprint for Mentored Undergraduate Online Research

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THE SOPHIE DIGITAL LIBRARY OF EARLY WOMEN'S RESEARCH:

A BLUEPRINT FOR MENTORED UNDERGRADUATE ONLINE RESEARCH

by

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German Department

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Advisor: Dr. Michelle Stott James   Honors Representative: V. Stanley Benfell

Signature: _____   Signature: _____

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My parents deserve my gratitude more than anyone both for the support they gave me as a child in preparation for college, as well as the encouragement they give me as a student. My father has been the most influential educator in my life; he has always pushed me to excel and pursue academic excellence. He never let me believe that I deserved less than the best grades and the best education. My mother continues to inspire

me by her example as one concerned with lifelong reading and learning. She also implements the principles that she learns more than anyone I have ever known. My parents deserve credit more than anyone else, perhaps more than I do, for my success in my education.

Lastly, I want to thank my wonderful wife Robin for her incredible support in my academic pursuits. My plans for education are taking us across the country into the heart of New York City, and she has never complained about distance from family and expensive cost of living. In deciding on a graduate school I was able to look at schools objectively and decide on the best school for me because of the support of my wife for my goals. I am very grateful for that support.

TABLE OF CONTENTS

ABSTRACT

THE SOPHIE DIGITAL LIBRAY OF WOMEN'S RESEARCH:
A BLUEPRINT FOR MENTORED UNDERGRADUATE ONLINE RESEARCH

The ongoing problem of providing undergraduate students the real experience of research to prepare them for graduate school and careers has found a possible solution in mentored research. Additionally, online dissemination of research provides opportunities for mentored research to reach a wide audience without the barriers of traditional publishing. Important in this process is assuring the relevance of student research which requires a topic the student both enjoys and excels at. Students benefit from this research with a customized curriculum, where they are able to contribute to academia and strengthen their resume. Through my work on the Sophie project, I was able to benefit in these ways through my preparation of texts written by early female German authors. I also worked heavily on the development of the project, designing the sites for the expanded sections of the site focusing on different areas of women's research. I implemented my research on the technical efficiency of the website, which has produced amazing results.

I. Introduction

Research opportunities come few and far between for most undergraduate students. The few "select" students at the top of each class are given work as teaching and research assistants where they work closely with faculty and take part in experience that will prepare them to excel in either graduate school or their career. For the rest of us, we will enter graduate school having completed a few research papers, which are almost exclusively commentary on work done by a number of professors at other universities with *their* teaching and research assistants. We will be thoroughly unprepared.

The reason for this problem is clear: money to pay professors for extra hours to spend with students or for extra professors to allow smaller class sizes is difficult to find when universities are already under-funded and overpriced. One professor I have spoken to says he needs two undergraduate students to accomplish the same amount of work as one graduate student. This coupled with the pressure for professors to "publish or perish" in a fiercely competitive academic milieu leaves little time for meaningful relationships with students.

A possible solution to this problem is being piloted at a number of universities, notably at BYU—mentored research. Here students take part in projects supervised by professors where they are engaged in actual research, not just commentary. Professors train students and then delegate portions of the project for which the students get credit. This helps professors produce scholarly material and contribute to academia; it also gives students invaluable opportunities to contribute and to be closely involved with the kind of research they will see in graduate school or the kind of projects they will be given in their careers.

6

The problem of how to disseminate the research accomplished by the professor-student team is also being solved by the explosion of Internet use in research. The Internet usually requires no start up costs for publishing—most professors have free access to some web space. Academics all over the world can easily find and use the published research. This way the research done by students does not have to wait for a publishing opportunity; they can simply publish it on the Internet and help others find it.

The *Sophie Digital Library of Women's Research*[1] took on this form of mentored research in the fall of 2001 when Dr. Michelle Stott James and Dr. Robert McFarland accepted several student researchers to help speed up the progress of the project—a comprehensive library of texts by early women writers, principally in Germany. Doctors James and McFarland have continued to work closely with students on the project, receiving the coveted mentored research grant from the Office of Research and Creative Activities (ORCA) the last two years. Their experience has proven to be very successful and offers much to others interested in similar projects of mentored research. My explanation and analysis of my experience with the project should serve as a sort of blueprint for others seeking to undertake similar projects.

II. Relevance of Research

Although the sole act of researching provides the student invaluable experience, doing relevant research that will contribute to the worldwide academic community gives students a sense of accomplishment and contribution that far transcends doing meaningless projects that go unnoticed. The example of the Sophie research project

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[1] http://humanities.byu.edu/sophie/home.htm

7

illuminates some important points that are necessary to a successful mentored research project.

I think most important to deciding on relevant research to pursue is deciding what one as a researcher can really offer. What is a researcher's competitive advantage? It may mean that a person has spent a significant amount of time in a certain country whose experience is of particular interest to academia. Perhaps throughout a certain student's undergraduate education, he or she has focused on a certain political theorist that is not widely known. Perhaps someone is of a particular minority and therefore can make better sense of a phenomenon affecting his or her culture. Whatever the case may be, in order to offer something as a researcher, the student must find a point of distinction that makes him or her qualified to pursue a research topic.

I felt qualified to pursue my chosen part in the Sophie project because of my background as an Information Systems major coupled with my German skills. I began the project as a researcher, using my German skills to do the work of inputting and glossing texts. Much of the research was in German and particularly in the old German script that a non-German speaker would not have been able to work with. But the contributions that I have been most excited about have been those where I have been able to stand as a sort of bridge between the technology on one end and the academy on the other, two groups who often have a hard time understanding each other. In this position I am able to adapt the demands and ideas of technology to the needs and goals of the academics. Here I feel that my experience in German and in the humanities coupled with my in-depth understanding of technology and web publishing in particular give me a competitive advantage and a set of skills with which I have been able to contribute.

My second point on the relevance of research would be the necessity of choosing a research topic that is interesting to the researcher. Any meaningful research requires in-depth analysis and thousands of pages of reading and processing to the point where the researcher knows every detail, source, and school of thought on the subject. For most people, that limits the number of research projects that it would be feasible to undertake.

I have thoroughly enjoyed my involvement with the Sophie project because of the dichotomy of my responsibilities. As one who is very much concerned with the learning of the humanities and the search for deeper understanding of history and the human experience, I have been able to help tell the stories of female authors and artists who have very different and meaningful insights to offer a history written principally by men. It has taught me a great deal about the ideas of Women's Studies and the need we have at the University to seek greater understanding not only of the human experience in general, but specifically of the female experience. I have also been able to adapt my love for technology and belief in its ability to propel our ability to learn. I am convinced that technology is essential to the efficient and effective transmission of learning and knowledge, and I have been able to put that into practice with Sophie.

III. Benefits of Mentored Research

I believe that mentored research is the solution to the ongoing problem of how to prepare undergraduate students for the rigors of graduate education, business, and careers. It offers students a custom-fit education that can supplement regular studies and prepare students far better to enter graduate school and the heavy research to which they will be introduced. My experience with Sophie illuminates some excellent benefits to mentored research.

9

Mentored research offers students a chance to customize their education and explore things outside of the classroom. BYU cannot offer everything to everyone and invariably leaves students graduating without everything they wanted out of their education. We take classes and explore different topics but never get to research in as much depth as we would like because of the realities of graduating and either pursuing graduate studies or entering the workforce.

Rather than taking opportunities from professors, mentored research frees up a lot of professors' time so that they can focus on more important aspects of a project. The *Sophie Journal* had been on hold along with several other aspects of the project until Dr. James began employing mentored research for much of the workload of the project. Since students have been doing the inputting, proofreading, and glossing on the texts, Dr. James put together the peer review team that will be reviewing articles submitted to the *Sophie Journal*. Through the contributions I have made to the project, I have allowed Doctors James and McFarland to expand the project in ways that would not have been possible without the help of student researchers.

Mentored research also allows students to contribute to academia. Perhaps this sounds trivial, but students go through their undergraduate education for the most part taking notes and writing exams only to graduate with a grade point average that reflects how well they were able to regurgitate what their professors told them. They do not create anything; they do not make the university better except for the tuition they pay. Mentored research gives students the opportunity to use the skills that they have been taught. They can then enter the work force or graduate school with experience in what they have done. The philosophical benefit is the same as that of an internship, which is

why internships are so coveted by students and respected by employers. Employers and graduate school admissions realize that the record of an undergraduate student does not completely tell how well they will perform when they are the ones performing the tasks they were taught.

Showing published research to graduate school admissions and showing hands-on internship experience to employers has the same effect of showing that students can implement the things they learned as an undergraduate and contribute. It empowers students and prepares them in a way that regular undergraduate coursework cannot.

IV. My Experience

The Sophie Project has been an excellent example of how opportunities of mentored research can benefit undergraduate students and give them tools, opportunities, and experience that will prepare them for graduate school or for entering the work force. I was first introduced to Sophie in September 2001 in my German Cultural History class. Dr. McFarland announced that there was some grant money left over and that some students who were interested in the research would be invited to work a few hours each week helping prepare texts to be published on the website. I immediately recognized the opportunity to get research experience and knew both how important and beneficial such an opportunity would be, as I was planning on applying the following year for graduate school.

I began working as a researcher, inputting the texts and proofreading them and then glossing them so that they were ready to be published on the Internet. I enjoyed the research even though as an Information Systems major I was not especially gifted with research about women's literature. I do, however, speak German and enjoyed using that

skill in the research. I learned to read the old German script and learned a lot about the older German language—how different it could be and how hard it often was to decipher.

During Fall Semester of 2001, I worked on the text from Theresa von Bacheracht, *Novellen, 1. und 2. Theil*. I struggled with this text partly because I was in charge of only a piece of the massive text, which left me without the big picture of the story. My section of the story told of a man named Oran, an aristocrat, who meets a less than noble woman and falls instantly in love. He goes to much effort to create a past and heritage for this woman so that it will be respectable for him to marry her. He feels always distant from her, knowing that she has loved someone else and insists that she will never be able to love another, but he pursues her after receiving permission both from her and from her mother. In correspondence between the man and his estate, one of his servants, Müller learns of his master's new wife and that she is his long lost love. He struggles with what to do. As his master Oran arrives with his new wife, Müller leaves a note and departs. The text is a wonderful story of irony and love.

Inputting the text was far from easy in the old German script where the "s" and the "f" look practically identical. It was a slow process becoming comfortable typing the text at a reasonable rate. But the text became easier to read and by the time I was proofreading, I was able to read it quite comfortably.

Glossing this first text is where I learned the most about real research. I went through the text and looked at every word or name or place that I thought an undergraduate researcher would not recognize. I say it was "real" research because I could not take my list of words into Dr. James and ask her to translate them. These words were not normally used, were not in the regular modern dictionary, and they

12

required considerable research to decipher. I often spent several hours looking for the definition and use of a single word. I then wrote the definition and use of the word in a concise, one-sentence definition to be published with the text on the Sophie Library website.

Dr. James was awarded the ORCA mentored research grant and the project expanded at the beginning of 2002. She hired on several new researchers, and we were all offered more hours. I went to work on a text entitled *"Dulden" Aus der Lebensbeschreibung einer Armen* ("Enduring" Out of the Biography of a Poor Person) by Dr. Hedwig Bleuler-Wafer. The text is a story about the life of a poor girl named Kathrin from the industrial working class and the struggles she has growing up in an environment with an abusive and alcohol-ridden father. We learn about Kathrin's experience in school and working in the local factory. She and her sister struggle with their father, finding their only relief in the arms of their mother. When she dies, the sisters leave the father to work in another town's factory. There, Kathrin gets pregnant only to give birth to a lifeless child. We read about her pain trying to keep the pregnancy and birth quiet for fear of resentment from her neighbors and friends.

Kathrin continues to struggle with abusive boyfriends until she gets married to a man who resembles her father. He does, however, quit drinking at Kathrin's insistence. The overarching theme and lesson from the story are summed up by the author in the epilogue, *„Wenn der Vater gewesen wäre wie die Mutter, so wäre es nie soweit gekommen mit mir, das ist so wahr, als ein Gott im Himmel ist."* (If the father had been like the mother, it would have never come this far for me; that is as true as there is a God in heaven.)

Dulden provides incredible insight into the life of women during the industrial revolution and the hardships they faced. It is unclear as to who the author is, but most suspect that Dr. Bleuler-Wafer wrote it as an autobiography. This story is a perfect example of the value of these writings of female authors that show insight in ways that male-authored literature cannot.

During this time I also worked on two bibliographies[2] for the project. I researched the topic of Women and the French Revolution. I searched for books and references on how the revolution affected women at the time and how it has since been a catalyst to movements of feminism and social reform. My second topic was attitudes towards gender, which was far broader. This bibliography has references to books about more abstract topics concerning the roles that society has historically given to men and women. I found some very interesting material on the idea of gender as a cultural creation rather than a biological classification. Gender has been different during different eras of history and there has been quite a bit written on the topic.

The work with bibliographies taught me much about research and how to use the library. I looked up several books in the Lee Library and perused them to gather the general idea of the book and scope of the topic. I then looked through the books' bibliography and did the same with the references listed. It was fascinating to find the overlap in use from the different authors and thereby determine what the most quintessential works were on the different topics.

With the new money and scope of the project, Dr. James needed help coordinating efforts and accounting for the research that was being accomplished and

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[2] These have not yet been published on the website. See Appendix C

how the money was being spent. It was here that I began to contribute what I was good

at and what my major was training me to do. I developed spreadsheets to account for

what each researcher was earning; I began tracking the traffic to the website; I did some

research into finding out how widely Sophie was being used at universities all over the

world. Doctors James and McFarland had no idea they could find out how many other

sites on the internet were citing or linking to Sophie. They were amazed to see how

widely their hard work in research was being used.

I then brought up issues of search engine optimization and other problems with

the website, which I had seen and knew I could learn how to fix. First, the website

contained many broken hyperlinks that needed to be fixed. I did a huge overhaul on the

website, checking every link and fixing those that were broken. Since the overhaul on

the website, I have worked closely with Doctors James and McFarland on the

development of the new projects and additions to the website. My role has become less

and less involved with the inputting and researching of the texts and more on the macro

level, where I am helping with the more broad development of the project. I have

continued to do research, working on a text by Luise Le Beau entitled

"Lebenserinnerungen einer Komponistin" and a creation drama by Inge von

Holtzendorff, but my biggest contributions continue to be my development of the

website.

Project Expansion

As the Sophie Library has become better known, particularly at BYU, researchers

and professors in other disciplines have become increasingly interested in how to

incorporate more aspects of Women's Studies into the library. With the help of Doctor

Ruth Christensen, we have launched *Sophie's Daughters: A Digital Library of German Women's Music*; we have added a section on female Journalists and Feuilletonists; we have recently begun *Sophie: Stage and Screen*—a study of female dramatists and screenwriters. We are especially excited about the *Sophie Journal*, for which a peer review team has been assembled and will begin preparing articles. With these new areas that have been added to the website and the growth that we are experiencing, the project is beginning to take in numerous areas of women's research and is growing to become one of the leading resources of German women's literature on the internet.

Sophie's Daughters[3] began with a concert put on by a group of student and faculty performers in the fall of 2002. Several students spent time in European archives while on Study Abroad in Vienna and put together an ensemble of pieces from early female composers, which under the direction of Doctor Ruth Christensen from the School of Music was prepared as a concert in October 2002.

The stated purpose of *Sophie's Daughters* is archival research; digitizing, editing, and glossing texts; public performances and recordings; and making music and related texts available to the academic community. We have put many of the recordings out on the website along with their lyrics and translations; we are working to put together more background information about the composers as well as preparing the scores to the pieces. Composers featured on the site include: Luise Greger, Josephine Lang, Luise LeBeau, Pauline Viardot-Garcia, Clara Schumann, Fanny Hensel, and Alma Mahler-Werfel. *Sophie's Daughters* is growing fast and becoming a strong resource in addition to the texts offered by the main site. It offers insight similar to that of the literary library

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[3] http://humanities.byu.edu/Sophie/Daughters/Index.html

on the work of female authors and serves to reshape our view of history and offer us a clearer picture of the time period by addressing the music of the women of the different time periods.

I did all the designing for *Sophie's Daughters*. It was interesting because it introduced the new aspect of audio on the website and encoding into an mp3 format that could easily stream through a web browser. I used a program called Audio Catalyst to encode the music. I designed the website, putting the general structure together and then encoding all the pieces from the concert and arranged them on the website. We had several problems in establishing the correct encoding, but it is now working. The website also offers information on the concerts the group is performing, as well as on the process of uncovering the pieces that are being performed.

I also designed the journalism page, titled *Women Unafraid of Criticism: Journalists and Feuilletonists for German-Language Newspapers*.[4] This is a collection of articles by authors such as Alice Schalek; French sports writer Susanne Lenglen; film correspondent Lilly Klaudy; historian Hermine Clöter; social activists Dr. Eugenie Schwarzwald and Gisela Urban; and literary authors and reviewers Karin Michaelis, Gabriela Reuter, Alic Schmutzer, and Elizabeth von Paulay. At the time these women were writing, women were normally relegated to a homemaking column in the *Neue Freie Presse*. The women in the Sophie library all wrote articles beyond these typical women's columns, side by side with their male counterparts.

The articles in this part of the project are still in progress because they were prepared by students in a class rather than Sophie researchers. I received most of the

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[4] http://humanities.byu.edu/sophie/journalists/index.html

texts in fairly rough shape, most only partially glossed. I designed the website and published all the texts, but we are currently in the progress of editing and proofreading them. Even though not all articles are fully finished, the site is an invaluable resource complementing the literature and music as a collection of articles and a genre largely unknown to the academic community.

I next designed the *Sophie Journal,*[5] which is beginning to take shape as well. Dr. James has contacted a colleague at Pacific Lutheran College to head a team of editors and peer reviewers who will select and prepare the articles that will be published in the *Sophie Journal*. Dr. James has already collected many possible articles, and we are excited for the beginning of this process. I have designed the website, which will include access to recent articles as well as searchable archives. I am also preparing a system through which researchers all over the world can submit articles to the peer review team so that the journal can gather talent and scholarship from researchers everywhere.

Sophie: Stage and Screen[6] is the newest development of the project, although it currently not the primary priority. Dr. McFarland already has some excellent material for the site including some scripts of dramas written by women as well as actual pictures of costumes and props designed by women. Those involved with the Sophie project are currently putting their effort into finishing texts, which are in their final stages of preparation. Thus, *Sophie: Stage and Screen* cannot currently receive very much attention. Once these texts are completed and made available under the primary texts

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[5] http://humanities.byu.edu/sophie/sophiejournal/index.htm

[6] http://humanities.byu.edu/sophie/stagescreen/index.htm

section, *Sophie: Stage and Screen* will grow and become an integral part of the project as a whole.

V. Technical Methods

A common concern for professors is a fear of and lack of experience with technology and the technical aspects of web publishing. Professors, especially in the Humanities, generally do not know how to use programming tools such as HTML and javascript to publish their research. As a result, the quality of the research often takes precedence over the professionalism and navigatibility of the website, but research websites are usually far inferior to other sites on the internet, making the research website technology outdated and hard to navigate. Although the quality of research is definitely more important than the more ancillary tasks of the presentation of the website, navigatibility and professionalism contribute greatly to how much and how effectively the research is used.

Professors also often struggle to "market" their research to the academic community on the monolith of the internet. Programming the research website to adhere to search engine protocol standards makes the research available to both researchers and professors all over the world. The techniques I used on the Sophie Digital Library serve as an excellent example of important aspects of the technology needed to develop a successful online research presence.

Navigatibility

The increasing complexity of the website has raised important questions about the navigation and organization of the website. Due to the problems associated with frames in HTML, we have chosen a frameless design for the additions to the project. The music,

19

journalism, journal, and theatre pages are all written in tables instead of frames, which is much more manageable when dealing with a number of different browsers and screen resolutions. Different browsers render the HTML in different ways, presenting problems especially with frames. Tables are far more manageable and are fairly uniform across different browsers. We have programmed the site to look good with the entire spectrum of screen resolutions with which users will be viewing the site. The smallest resolution of 800x600 will see the site without having to scroll horizontally while larger resolutions will simply see more background on the site.

We have also implemented the "three click rule" to help users get to the material they are looking for with three clicks or fewer. With such a complex site, it is easy to fall into the trap of complex and difficult-to-navigate structures that make it difficult for users to find what they want.

Currently the site is organized around the main literary works, which is the focus of the project. Future expansion of *Sophie's Daughters* and the *Sophie Journal* could warrant the reorganization of the site to better serve as a portal to the different research areas. But for now, we feel the best organization centers upon the literature as its main focus and strongest presence.

Professionalism

Perhaps the best way to gauge the level of professionalism in the particular industry to which the website is intended to appeal is to visit competitors' sites. I have spent a great deal of time on sites of other similar projects around the world, including the *Project Gutenberg* and the library at Brown University. I have also looked into which

projects are most cited by other publications. I have learned much from visiting their

sites and have incorporated the important points of their sites into Sophie.

I visited several other sites and checked to see how widely they were used.[7] I

found that the most widely used sites, like the *Project Gutenberg* are put together in a

very professional and fully searchable manner, and use new technologies such as

DHTML and javascript. Most of the sites were searchable, which the Sophie site only

partially offers. That is definitely something we want to do long-term, but currently we

do not have enough texts available to make this really necessary. All the primary texts as

well as music and journalist articles are clearly indexed.

Search Engines

The obvious question when developing online research dissemination is how one

is to make research available to the professors and students who need it. This

dissemination comes in a variety of forms—word of mouth, professor to student, and

probably most often: search engines. Search engines are the means by which users find

the websites they need. Through my work optimizing the web site and using the

techniques I will be discussing, I have more than tripled the traffic the site sees from

researchers around the country. These techniques should serve as helpful guidelines to

the optimization of any research site.

Registering

Rather than using spiders, directories such as Yahoo are organized by subject in

indexes. Most sites are suggested by users, making it necessary to register the site with

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[7] See Appendix A

the engine. Sites are placed in categories by Yahoo users, who visit and evaluate the suggestions of the submitter and decide where they best belong. To register with Yahoo, there are three important steps: checking to see if the site is already registered; finding the appropriate category; and submitting the site.

Sites are often already listed in Yahoo, which does some registering internally. Thus, the submitter needs to search for the site to see if it is submitted and assigned to a category.

If it is not already submitted, it is necessary to find the most appropriate category for the site and submit it. The Sophie site was submitted to Yahoo under "German women's literature." It is important to note that even though the site is indexed under a category, it will still show up under a general search according to the information the submitter enters when submitting the site.

Spiders

Google uses what is called a "spider" when developing indexes of websites. When a spider is building its lists, a process called web crawling, the usual starting points are lists of heavily used servers and very popular pages. The spider will begin with a popular site, indexing the words on its pages and following every link found within the site. In this way, the spidering system quickly begins to travel, spreading out across the most widely used portions of the web.

Google began as an academic search engine with an initial system using multiple spiders, usually three at one time. Each spider could keep about 300 connections to web pages open at a time; when using four spiders at once, Google was able to crawl over 100 pages per second, generating around 600 kilobytes of data each second.

22

When the Google spider looked at an HTML page, it took note of two things: the words within the page and where the words were found. Words occurring in the title, subtitles, meta tags, and other positions of relative importance were noted for special consideration during a subsequent user search. The Google spider was built to index every significant word on a page, leaving out the articles "a," "an" and "the." Other spiders take different approaches.

These different approaches usually attempt to make the spider operate faster and allow users to search more efficiently. For example, some spiders such as Lycos will keep track of the words in the title, sub-headings and links, along with the 100 most frequently used words on the page and each word in the first 20 lines of text.

Other systems, such as AltaVista, go in the other direction, indexing every single word on a page, including "a," "an," "the" and other insignificant words. The push to completeness in this approach is matched by other systems in the attention given to the unseen portion of the Web page, the meta tags.

One problem we have seen with the Sophie project is that search engines do not index sites with frames very well. Because of the problems associated with this, we have designed all the new aspects of the site without frames to avoid such problems.

To be listed correctly in the search engines each page of the site we want listed needs to be optimized. Special attention must be given to keywords in META tags, keywords, title tags, page copy, and images' "alt" tags. Once the process of web crawling is understood, web developers can begin to use the process to their advantage

Meta Tags

Meta tags allow the owner of a page to specify key words and concepts under which the page will be indexed. This can be helpful, especially in cases in which the words on the page might have double or triple meanings -- the meta tags can guide the search engine in choosing which of the several possible meanings for these words is correct. There is, however, a danger in over-reliance on meta tags, because a careless or unscrupulous page owner might add meta tags that fit very popular topics but have nothing to do with the actual contents of the page. To protect against this, spiders will correlate meta tags with page content, rejecting the meta tags that don't match the words on the page.

Once the spiders have completed the task of finding information on Web pages, which is never fully accomplished due to the size and growth of the internet, the search engine must store the information in a way that makes it useful. The two key components involved in making the gathered data accessible to users are the information stored with the data and the method by which the information is indexed.

In the simplest case, a search engine could just store the word and the URL where it was found. This would obviously make for an engine of limited use, since there would be no way of telling whether the word was used in an important or a trivial way on the page, whether the word was used once or many times or whether the page contained links to other pages containing the word. That is, there would be no way of building the ranking list that tries to present the most useful pages at the top of the list of search results.

24

To create more useful results, most search engines store more than just the word and its URL. An engine might store the number of times that the word appears on a page. The engine might assign a weight to each entry, with increasing values assigned to words as they appear near the top of the document, in sub-headings, in links, in the meta tags or in the title of the page. Each commercial search engine has a different formula for assigning weight to the words in its index. This is one of the reasons that a search for the same word on different search engines will produce different lists, with the pages presented in different orders.

Regardless of the precise combination of additional pieces of information stored by a search engine, the data will be encoded to save storage space. For example, the original Google paper describes using 2 bytes, of 8 bits each, to store information on weighting—whether the word was capitalized; what its font size, position are; and other information to help in ranking the hit. Each factor might take up 2 or 3 bits within the 2-byte grouping (8 bits = 1 byte). As a result, a great deal of information can be stored in a very compact form. After the information is compacted, it is ready for indexing.

An index has a single purpose: It allows information to be found as quickly as possible. There are quite a few ways for an index to be built, but one of the most effective ways is to build a hash table. In hashing, a formula is applied to attach a numerical value to each word. The formula is designed to evenly distribute the entries across a predetermined number of divisions. This numerical distribution is different from the distribution of words across the alphabet, and that is the key to a hash table's effectiveness.

In English, there are some letters that stand as the beginning of many words, while others represent fewer. For example, the "M" section of the dictionary is much thicker than the "X" section. This inequity means that finding a word beginning with a very "popular" letter could take much longer than finding a word that begins with a less popular one. Hashing evens out the difference, and reduces the average time it takes to find an entry. It also separates the index from the actual entry. The hash table contains the hashed number along with a pointer to the actual data, which can be sorted in whichever way allows it to be stored most efficiently. The combination of efficient indexing and effective storage makes it possible to get results quickly, even when the user creates a complicated search.

The search engines now usually look at a combination of the best search engine tips to determine listings, not just metas; some do not even look at them at all. What this means is that pages should have a combination of the effective techniques, not just meta tags. That said, there are two meta tags that can help search engine listings: meta keywords and meta description.

Description Meta:

<META NAME="description" content="This is the description of what is on your page. The most important keyword phrases should appear in this description.">

Keywords Meta:

<META NAME="keywords" content="keywords phrase 1, keyword phrase 2, keyword phrase 3, etc.">

Keywords

The first principle to consider when putting together keywords is "specific keyword phrases" instead of just "keywords." Keywords that are very general like "women" and "German" will hurt the site in the rankings. Besides the increasing traffic, specific keywords will also generate more quality traffic because it will be targeted more specifically. We used phrases like "early women's literature" and "Clara Schumann" to target a better audience and rise in the rankings. This has definitely contributed to the increased traffic to the site. We have also added plurals to the tags. For example, Sophie has both "woman literature" and "women's literature" in the keyword meta tag to make sure it shows up in both searches.

Alternate spellings as well as misspellings should also be accounted for. Many of the authors in the Sophie Library have a number of spellings that potential users could be searching for. For example, Theresa Bacheracht is also sometimes spelled "Therese." Every possible alternate spelling should be included in the keywords. This will be especially advantageous if competitor sites do not do this, because the site that does will be the only one to show up in a search.

We have also tried to use keywords that we believed researchers would be entering in their searches. We used every possible search we could think of and employed feedback outside of the project to gain insights into what keywords different people would enter when looking for the various areas of research the site offers. It is easy to become myopic in the marketing of the project, and web programmers must stay somewhat objective and include the broadest possible offerings.

27

We also spent time examining similar sites in order to learn from their system of keywords. The Gutenberg project among others had an amazing set of keywords that we were able to implement into our project. Anyone can click on the "view" menu of the web browser and then click on "source." In the HTML file, the meta tags are near the beginning and show the keywords and descriptions used.

Title Tags

The title tag of the page is by far the most important factor to consider when optimizing the web page for the search engines. Most search engines and directories place high importance on keywords that are found in a site's title tag. The title tag is also the information the search engines usually use for the title of the site in the search results, which affects the click-through rate of how often people actually visit the site through the search engine. Title tags should be between 50 and 80 characters long including spaces.

The title should include multiple keywords, but not just keywords. If one uses nothing but keywords, the site appears to be a spam site that generates keywords as titles to attract unwary traffic. The keywords need to be located at the beginning of the title, so that if they are cut off, the searcher will still get the main idea of the site. The title should also be enticing so that even if it is not ranked at the top of the list, it will be clicked. If it isn't attractive, even a top ranking will not generate hits. Each title should have its own title tag that relates to its content.

I have gone through all of the pages on the Sophie site to add relevant title tags. The pages with the separate texts had titles like "Untitled Document" and "sophie home" which were not at all informative or enticing. The title tags now list the name of the texts

or the main idea of the content of the page. Searching for the sites now brings up the title, which seems to have had a significant impact on the increased traffic we have seen.

Page Copy

The copy on the page is also very important in order to achieve better search engine listings. This is the actual text read by a visitor to the site. The engine reads the site the same way a visitor would and picks out the keywords.

Each page should have at least 200 words of copy on it so that it will be read correctly. This text should include the most important keyword phrases, but should remain logical and readable.   It is important to use the same phrases used in the other tags like the metas and title tags. More copy on the pages is always better because it increases the subjects that search engines will associate with the site.

Optimizing Images' "alt" Attribute

Images can also help with listings and can introduce graphics on the site into image search engines, making your images available to researchers looking for images of the individuals being researched. Each image on your page can include a keyword phrase or two that relates to the image. This text will also show up and help those that may have their images turned off when visiting your site. This does not work for all engines, but definitely enough that it is worth the effort.

What it looks like:

<IMG SRC="ClaraSchumann.gif" width="10" height="10" alt=**"Clara Schumann"**>

The "alt" attribute can be added to any image on the page, but should not exceed a brief sentence or two. Many of the same keywords should be used, but they shouldn't be

crammed into the tag. Instead of just listing keywords, the most important task is to describe the image.

VI. Conclusion

Online publication of mentored research continues to grow as a solution to the problem of preparing undergraduate students for the very different work they will be doing either as graduate students or employees. My experience with the *Sophie Project* has been an excellent example of ways that can be accomplished. The principles and methods discussed in this paper should be addressed when embarking on such a project. Special attention should be paid to the relevance of the research being accomplished. In order for the research to be effectively disseminated over the internet, researchers should spend a great deal of time in the technical aspects of the website programming to ensure that the site can be found and used by researchers.

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Appendix A

Popularity Search Results of Similar Research Projects

Obtained with a popularity calculator (http://ineedhits.com/free/popularity.html), these numbers reflect the number of sites that have links to the selected libraries. The different search engines shown on the left of each table are used to search for the url address of the site and then determine how many instances there are on the internet where the address is cited. It is the best way to determine how widely a site is being used.

Sophie: A Digital Library of Early Women's Research

Results for http://humanities.byu.edu/sophie/home.htm

Search Engine	Links to Website
Yahoo	586
Northern Light	57
Lycos	72
Teoma	134

Brown University Project

Results for: http://www.wwp.brown.edu/

Search Engine	Links to Website
Yahoo	0

Northern Light	0
Lycos	333
Teoma	493

The Brown University Women Writers Online project is a database that institutions must purchase licenses in order to access. They have currently over 200 subscribing institutions signed up. The database is searchable and includes over 200 texts.

Project Gutenberg

Results for: http://promo.net/pg/

Search Engine	Links to Website
Yahoo	0
Northern Light	0
Lycos	57769
Teoma	8280

Project Gutenberg began in 1971 under the direction of Michael Hart. The library contains over 6,000 eBooks and is widely considered the largest database in the country. Project Gutenberg is fully searchable, which is definitely necessary due to the vast number of texts available.

Romantic Circles – University of Maryland

Results for: http://www.rc.umd.edu/

Search Engine	Links to Website
Yahoo	0
Northern Light	0
Lycos	838
Teoma	2040

Romantic Circles is devoted entirely to Romantic-period literature and culture. Although it is published by the University of Maryland, it is maintained by a community of editors and contributors all over the world. Romantic Circles is fully searchable and contains a lot of texts, although the exact number is unclear.

The Orlando Project - University of Alberta

Results for: http://www.ualberta.ca/ORLANDO/

Search Engine	Links to website
Yahoo	0
Northern Light	0
Lycos	88
Teoma	67

The Orlando Project is an international collaborative effort focusing around the scholary history of women's writing in the British Isles.   The library contains four main areas of research: biography, writing, events, and topics. It is not searchable and does not have much published yet. It is mostly useful as a chronology rather than a text database.

Victorian Women Writers Project – Indiana University

Results for: http://www.indiana.edu/~letrs/vwwp/

Search Engine	Links to Website
Yahoo	0
Northern Light	0
Lycos	1153
Teoma	875

The Victorian Women's Writing Project includes anthologies, novels, political pamphlets, religious tracts, children's books, and volumes of poetry and verse drama from British women writers in the 19th century. It is very similar in number of texts available to the Sophie library, offering around 40 texts, with the same amount planned for publishing. It is fully searchable.

The Project for American and French Research on the Treasury of the French Language (ARTFL) - the University of Chicago.

Results for: http://www.lib.uchicago.edu/efts/ARTFL/projects/FWW/

Search Engine	Links to Website
Yahoo	0
Northern Light	0
Lycos	7
Teoma	4

The ARTFL French Women Writers Project is a project at the University of Chicago focusing on French women writers. The French Women Writers Database is totally searchable and contains texts by 40 authors. There are 5.1 million words, 98,000 unique forms in 99 documents

British Women Romantic Poets Project – U.C. Davis

Results for: http://www.lib.ucdavis.edu/English/BWRP/

Search Engine	Links to Website
Yahoo	0
Northern Light	0
Lycos	243
Teoma	286

The British Women Romantic Poet's Project at the University of California at Davis is an online scholarly archive of E-text editions of poetry by British and Irish women written

36

between 1789 and 1832 (the Romantic period). As of January, 2000, there are 50 texts, automating the process for cataloging project texts. The library is fully searchable.

Early Modern Women Writers – University of Montana (Bozeman)

Results for: http://www.montana.edu/wwwwhitn/index.html

Search Engine	Links to Website
Yahoo	0
Northern Light	0
Lycos	1
Teoma	3

This library is very limited, consisting of a text, Sweet Nosegay (1573) by Isabella Whitney and Female Poems on Several Occasions (1679) by Ephelia. Nothing is searchable.

Emory Women Writers Resource Project

Results for: http://chaucer.library.emory.edu/wwrp/

Search Engine	Links to Website
Yahoo	0
Northern Light	0
Lycos	99

Teoma	74

The Emory Women Writers Resource Project is a collection of edited and unedited texts by women writing in English from the seventeenth century through the nineteenth century. The Emory project contains a couple hundred texts, all fully searchable.

Appendix B

Screen Shots of the Website

Sophie Main Page
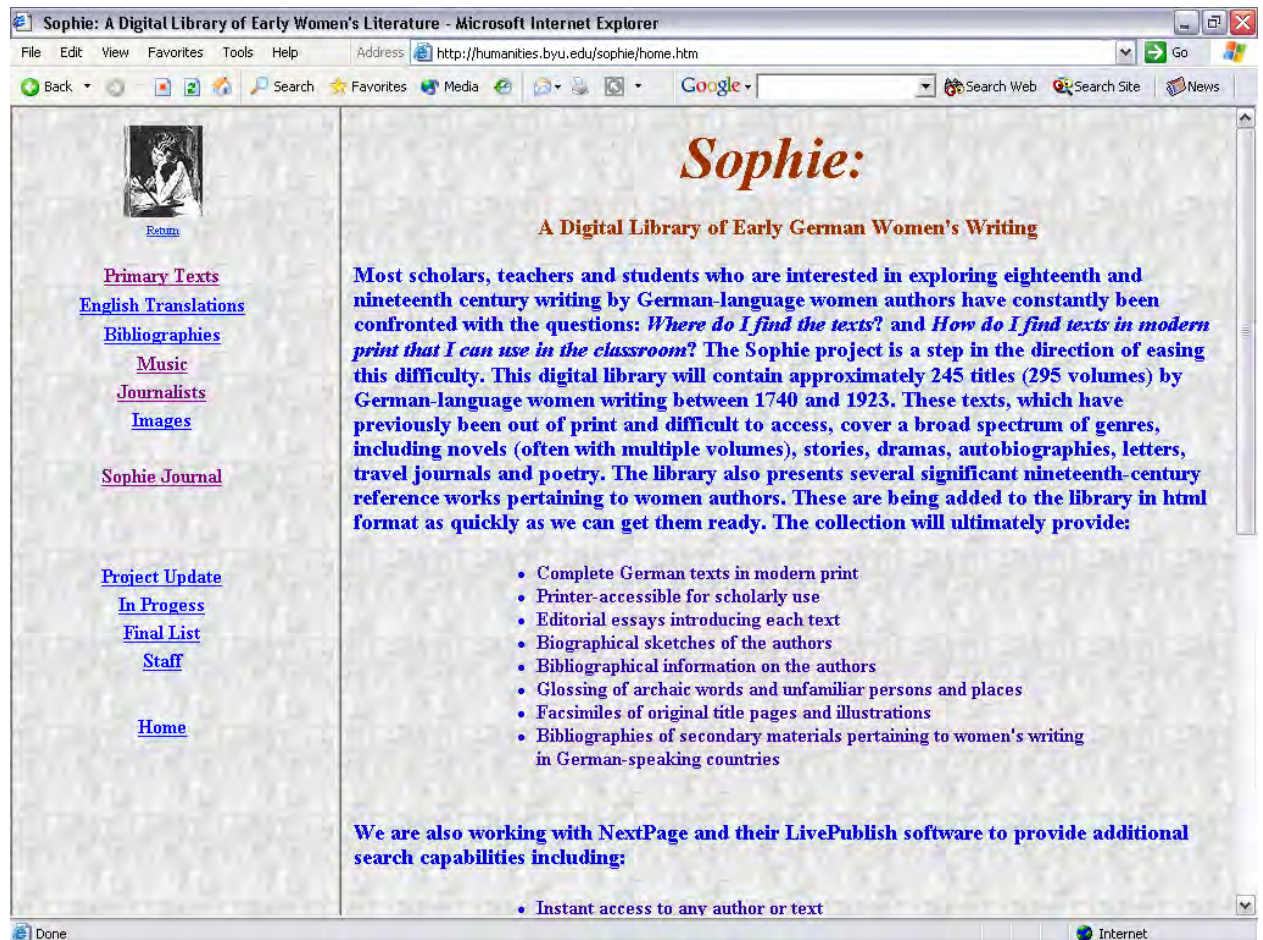
This is the site's homepage. From here, the user can get access to all the different areas of research. The Primary Texts link on the left will take the user to a list of texts that are finished and ready for use. The English Translations link gives several texts that have been translated by Sophie researchers and professors. The Bibliographies link is still under construction as the bibliographies we have are still being edited. One can also get access to updates on the project and the complete list of what the Sophie library will eventually contain. The title, noted at the top of the page, reads "Sophie: A Digital Library of Early Women's Literature." I changed that from SophieHome, because of the search engine implications.

Sophie's Daughters

The Sophie's Daughters site is put together in tables instead of frames as the picture shows. The Music & Texts button will take the user to an index of all the pieces the library contains. There are also pictures of most of the composers and links to scores, biographies, and works of literature in other areas of the project. The concerts link is to a page where there is information on the concerts by the performers and information about the researchers involved. The music pieces under Music & Texts is encoded in mp3 format and will play streaming pretty well on most internet connections.

Journalists
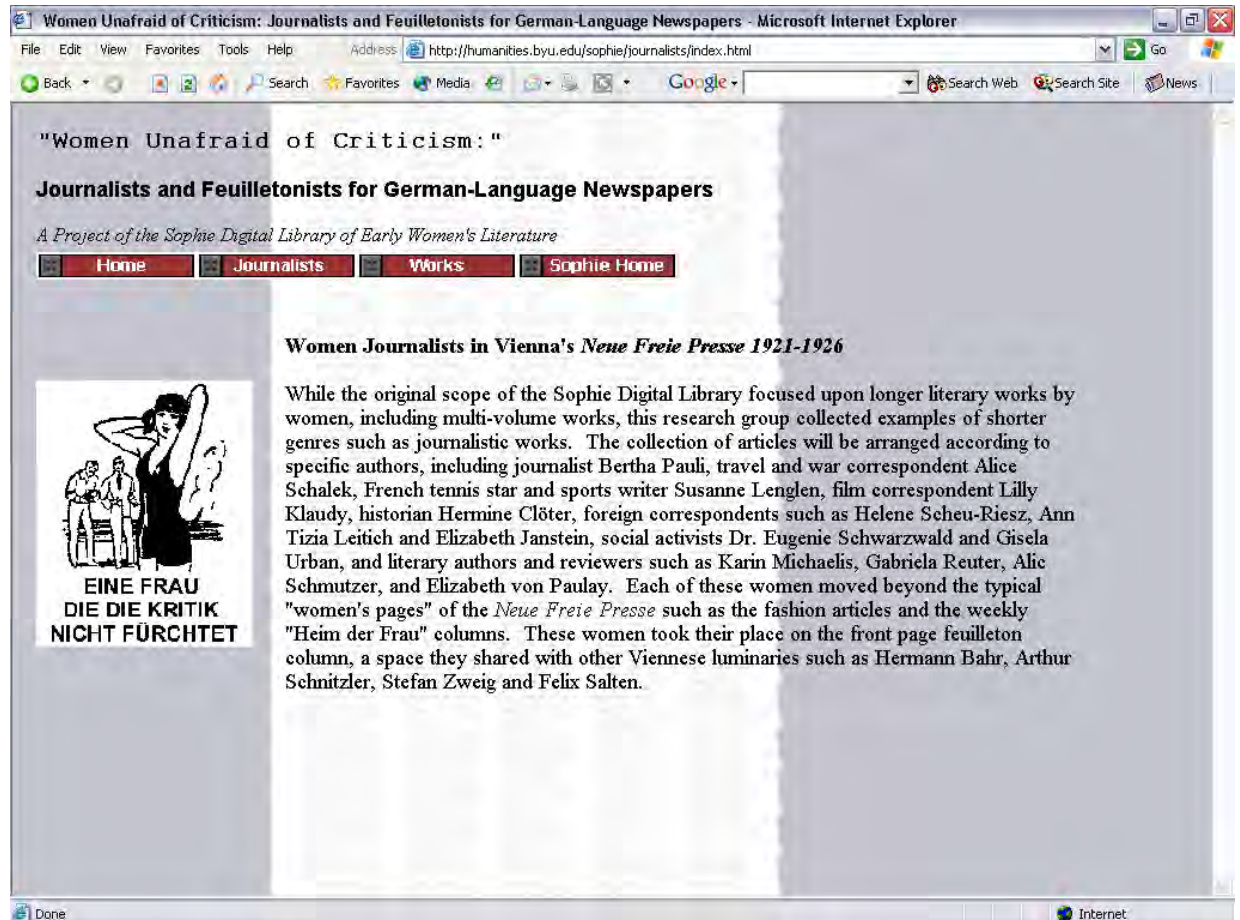
The Journalism page has been our favorite. The line, "Women Unafraid of Criticism" comes across the page when you open it and gives a sort of newspaper feel to the site. The picture's caption translates to "a woman who doesn't fear criticism." The Journalists button takes the user to the different journalists and their articles. The works button will be a better index to articles by subject. This site is still under construction as we edit the articles and the glossing.

The Sophie Journal
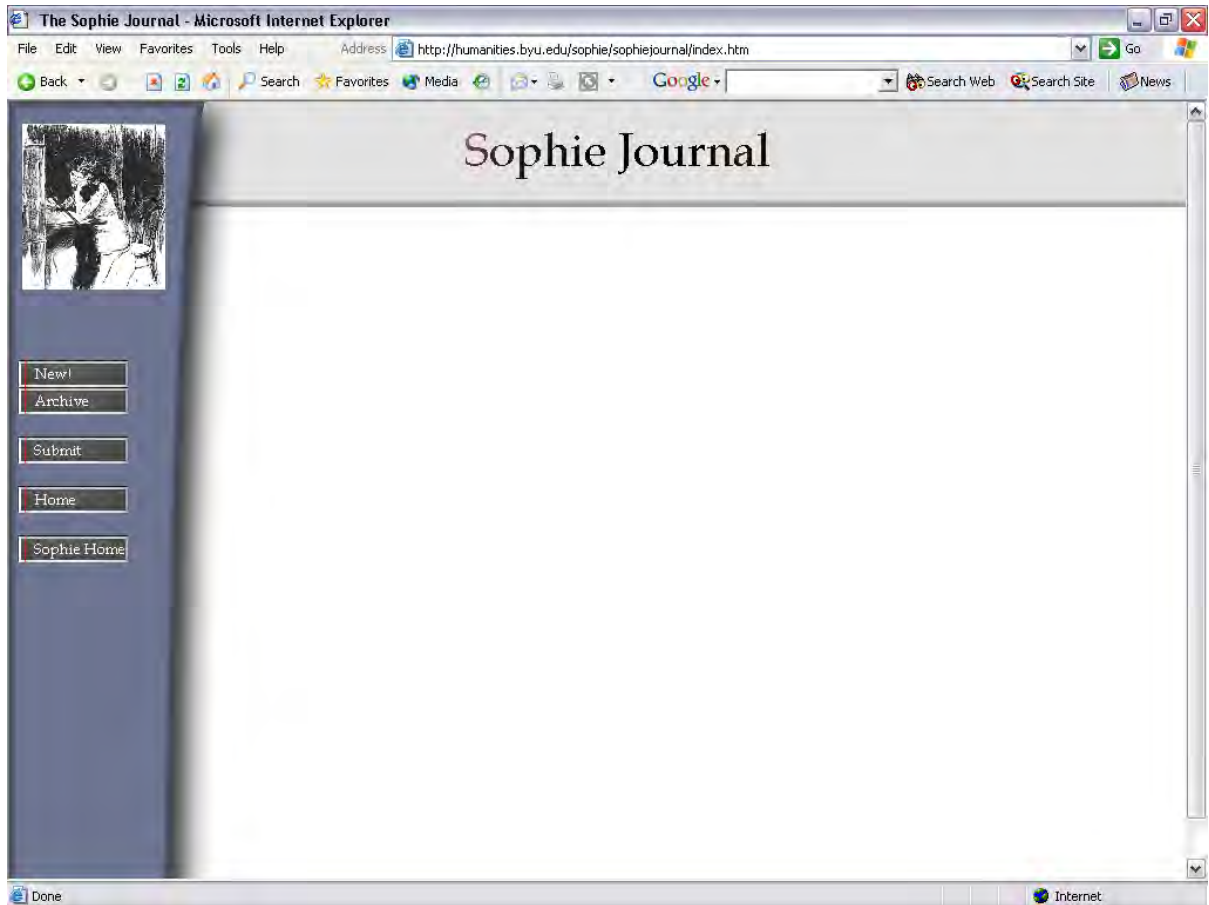
The Sophie Journal is still very much under construction. The peer review team for the project is put together and is going to begin deciding on articles. The buttons will index the new articles to the site for repeat users to see what the site is producing. There will also be articles archived by their titles and topics. The submit button will take the user to a page with instructions for submission of an article to the editorial staff of the journal. This will all be automated so that the project will be able to move quickly through the publishing of articles.

Sophie: Stage and Screen

This aspect of the project is obviously still under heavy construction. It has been put on hold so that we can finish up a number of texts that are half completed and get them on the main part of the site. But we are still very excited and already have some material to put on the site. Preliminary areas planned are screenplays, set design, and costume design.

Novellen, Theresa von Bacheracht
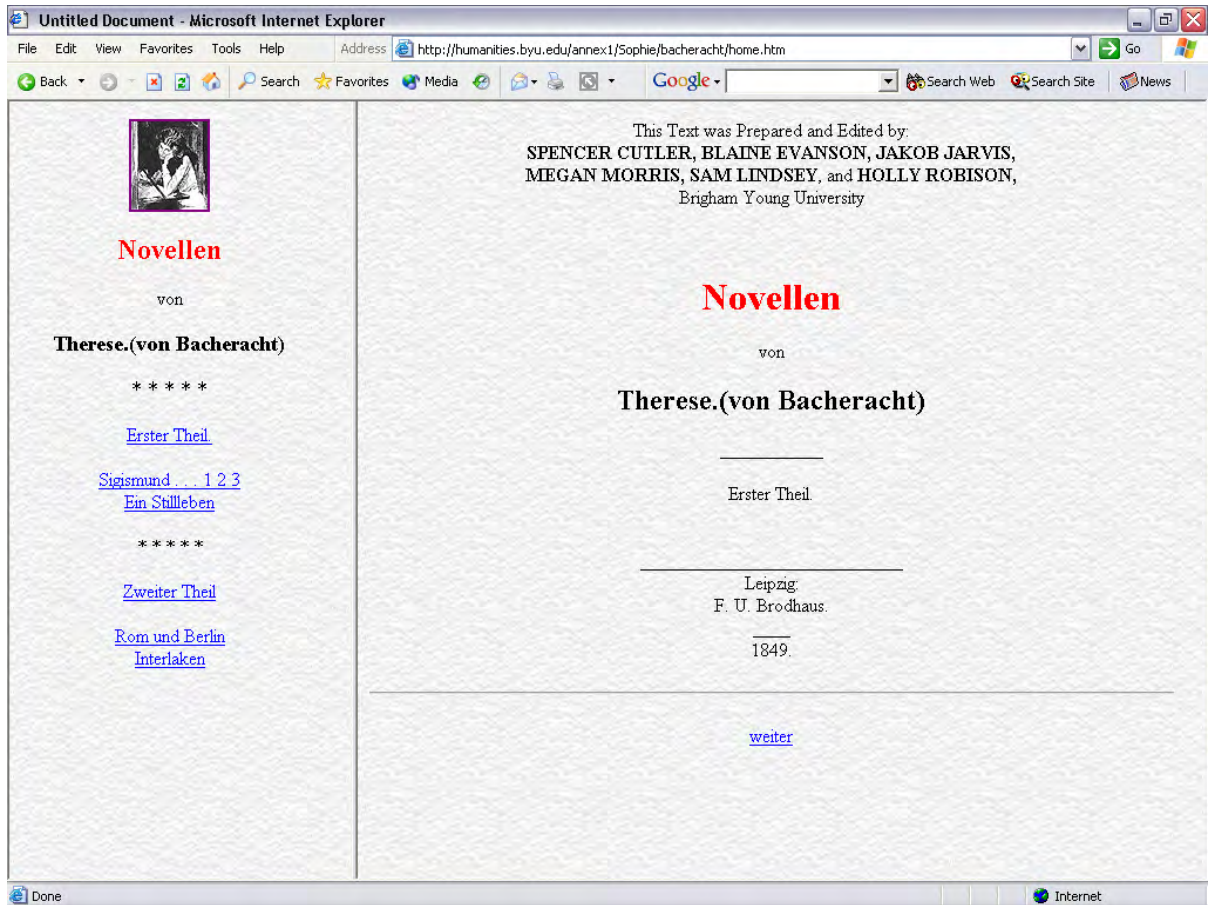
This is the first text I worked on. My name is listed among the other researchers on the project. The text has two main parts, which can either be found through the links on the left or by clicking on the "weiter" links at the bottom of the pages.

"Dulden" Aus der Lebensbeschreibung einer Armen, Dr. Hedwig Bleuler-Wafer

Dulden was the second text I worked on as my own project. It has a Foreword and an epilogue, and can be navigated similar to the first text.

Appendix C

Bibliographies Prepared by Me, Not Yet Published in the Project

Women and the French Revolution

Craciun, Adriana and Kari E. Lokke. *Rebellious hearts : British women writers and the French Revolution*. Albany : State University of New York Press, c2001.

Daunton, Martin and Matthew Hilton. *The Politics of consumption : material culture and citizenship in Europe and America*. Oxford: Berg, 2001.

Dubroca. *Interesting anecdotes of the heroic conduct of women, previous to, and during the French revolution*. Baltimore: Fryer & Clark, 1804.

Elson Roessler, Shirley. *Out of the shadows : women and politics in the French Revolution, 1789-95*. New York: P. Lang, c1996.

Godineau, Dominique. *The women of Paris and their French Revolution*. Berkeley: University of California Press, c1998.

Hilliard, Henry W. *Speeches and addresses*. New York: Harper & Brothers Publishers, 1855.

Hufton, Olwen H. *Women and the limits of citizenship in the French Revolution*. Toronto: University of Toronto Press, c1992.

Jebb, Camilla. *Mary Wollstonecraft*. Chicago: F.G. Browne & co

Kadish, Doris Y. *Politicizing gender : narrative strategies in the aftermath of the French Revolution*. New Brunswick: Rutgers University Press, 1991.

Landes, Joan B. *Women and the public sphere in the age of the French Revolution*. Ithaca: Cornell University Press, 1988.

Letzter, Jacqueline. *Women writing opera : creativity and controversy in the age of the French Revolution*. Berkeley : University of California Press, c2001

Mazel, Ella. *Ahead of her time : a sampler of the life and thought of Mary Wollstonecraft*. Larchmont, N.Y.: Bernel Books, c1995.

Melzer, Sara E and Leslie W. Rabine. *Rebel daughters : women and the French Revolution*. New York: Oxford University Press, 1992.

Michelet, Jules. *The women of the French revolution*. Philadelphia: Henry Carey Baird, 1855.

Montfort-Howard, Catherine. *Literate women and the French Revolution of 1789*. Birmingham: Summa Publications, 1994.

Mosse, Werner E. , et al., eds. *Revolution and evolution, 1848 in German-Jewish history*. Tübingen : Mohr, 1981.

Peyre, Henri. *Historical and critical essays*. Lincoln: University of Nebraska Press, 1968.

Rogers, Bruce. *Bookmaking on the Distaff Side*. New York: Pynson Printers, 1937.

Roudinesco, Elisabeth. *Théroigne de Méricourt : a melancholic woman during the French Revolution*. New York: Verso, 1991.

Serebr´i`akova, Galina. *Nine women, drawn from the epoch of the French revolution*. New York: J. Cape & H. Smith

Twain, Mark. *Sketches*. Toronto: Belfords, Clarke & Co., 1879.

Whitham, John Mills. *Men and women of the French Revolution*. Freeport, N.Y.: Books for Libraries Press, 1968.

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Agosín, Marjorie. *Women, gender, and human rights : a global perspective*. New Brunswick, NJ: Rutgers University Press, 2001.

Alberti, Johanna. *Gender and the historian*. New York: Longman, 2002.

Burr, Vivien. *Gender and social psychology*. New York: Routledge, 1998.

Calasanti, Toni M. *Gender, social inequalities, and aging*. Walnut Creek: AltaMira Press, 2001.

Charles, Nickie and Helen Hintjens. *Gender, ethnicity, and political ideologies*. New York : Routledge, 1998.

Coltrane, Scott. *Sociology of marriage & the family : gender, love, and property*. Belmont, CA : Wadsworth/Thomson Learning, 2001

Donald, Moira and Linda Hurcombe. *Gender and material culture in historical perspective*. New York : St. Martin's Press, 2000.

Elliot, Faith Robertson. *Gender, family, and society*. New York: St. Martin's Press, 1996.

Falk, Gerhard. *Sex, gender, and social change : the great revolution*. Lanham, Md: University Press of America, 1998.

Fenster, Tovi. *Gender, planning, and human rights*. New York: Routledge, 1999.

Fox, Bonnie J. *Family patterns, gender relations*. New York: Oxford University Press.

Helgeson, Vicki S. *The psychology of gender*. Upper Saddle River, N.J.: Prentice Hall, 2002.

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Randall, Vicky and Georgina Waylen. *Gender, politics and the state*. New York: Routledge, 1998.

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    Wiley, 2001.

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