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Winner of the John S. Knight Assignment Sequence Prize  
Fall 1997

## SCIENCE WRITES WOMEN / WOMEN WRITE SCIENCE

### "INVESTIGATING WOMEN:

### SCIENCE, GENDER, AND EDUCATION"

The attached assignment sequence formed a four week section of my FWS 105 towards the end of the semester. While my students were doing research in Kroch Library on early women scientists of Cornell University, our class discussion focused on excerpts from Jane Marcet's *Conversations on Chemistry* and *Conversations on the Natural Philosophy* (1819 & 1821) and Mary Somerville's *Autobiography* (1856). These texts introduced many concerns about women's education that the students encountered in their archival research. Writing about these texts in brief, controlled formats allowed students to "practice" the kind of thinking and writing that they needed for the longer research paper.

My focus in my freshman writing courses is to build "independent writers;" to equip students with critical reading, thinking, and writing skills -- skills which are not separate from one another -- so they can feel confident tackling any topic. Early writing assignments in the semester are focused and specific, and my responses to them convey my expectations of a concise, analytical style. As the semester continues and the students meet with success, I ask them to shoulder more of the burden of generating questions and focusing their papers themselves. In semesters past, this has been a rather seamless transition, because we've always been writing about literature and topics have emerged from class discussion.

In this case, however, the paper which would ask my students to make the jump to more independent writing was linked to research which, while related thematically to material they had written about earlier in the semester, was not like anything my students had encountered before. I wanted the research papers to be "big" -- to require students to put a lot of their skills together and to push hard -- but I also wanted them to be successful, since a draft of the paper and a formal rewrite were two of the final three assignments of the term. I put together this sequence of assignments with this in mind, as well as the following goals and concerns:

- >to keep analytical writing foregrounded while students were doing independent research.
- >to continue to build on close reading skills we'd concentrated on earlier in the semester.
- >to enable students to link their research to the greater questions of the course.

Here, I've appended the rationale behind the assignments to the handouts. (I put it in different typeface, so it's easy to see.) I put the research assignment first to contextualize the other assignments and because while students were working on the other shorter, at times more informal papers, they had the research assignment in the back of their minds. The rationale behind the three-part research assignment is included for the most part in the assignment instructions. Because archival research is sometimes disorientingly messy, I was careful to do much of the research myself and to indicate what information might be most useful to student papers. At the same time, students were encouraged to follow up leads and avenues that I didn't indicate to them in the assignment, but that we discussed either in class or in conference.

Our calendar went as follows:

- 10/21 In-Class Writing Marcet #1 supplemented by discussion of Marcet (and a little on Somerville, too.); assignment of Marcet Short Paper.
- 10/23 Marcet Short Paper due. Peer Proofread. In-Class Writing Marcet #2. Somerville discussion.
- 10/28 Somerville discussion; Somerville Short Paper assigned.
- 10/30 Somerville Short Paper due. Writing Workshop. Research tactics discussion and sharing of early finds. Research Pre-Write #1 assigned.
- 11/4 Research Pre-Write #1 due & discussion; Presentations begin.
- 11/6 Research Pre-Write #2 due & discussion; Presentations continue.
- 11/11 Presentations finish.
- 11/13 Research Paper & Critique due.

## **CORNELL WOMEN IN SCIENCE**

### **THE RESEARCH PROJECT**

We've talked a great deal this semester about how science often engages gender, both in its language and in its discoveries. But what we haven't talked about is "real" women in science: their education, their work, their lives. As several essayists have pointed out, the absence of women's voices in the scientific professions may have considerably altered the focus and conclusions of many scientific disciplines. This is an opportunity for us to locate and listen to those voices.

Cornell was one of the first U.S. institutions to offer PhDs in science to women, and we are lucky to have the papers from many of Cornell's early students and professors in the collections at Kroch Library. By looking closely at some of this material, we'll try to construct a picture of the Woman Scientist in academia in the early 20th century.

### **HOW TO GO ABOUT A RESEARCH PROJECT USING ARCHIVES**

or: How the heck do you write about something which isn't in a book?

What you do when you research is to learn all you can on a topic with the goal of constructing an argument from several pieces of evidence. It's not all that different from what you've been doing so far this semester, is it?

The interesting thing is that the same skills you apply when reading literature or essays -- close reading, questioning the claims you come across, fitting information into the context of a larger argument or vision -- apply to any "text", including drawings, diaries, receipts, even thank-you notes and movies!

Two things to keep in mind as you embark on this project:

- 1) Contextualize your conclusions about the subject and tell us why what you're working on is important. Your audience won't know anything about your subject -- you're the expert! -- so you will need to fill us in. Important things like dates, definitions, and a brief biography might help. Where do you find this? Much of what you need is in the files I've selected for you to peruse, but you may also need to do a larger search for handy reference materials (there's a good biographical encyclopedia of women in science, for instance) and historical information about education, science, etc.
- 2) Draw conclusions! You are NOT writing a biography or history about a person or an organization... and you are NOT simply paraphrasing or describing their work. Those tasks might form a small part of your larger project, which is to discuss how your subject fits in with the subject of this section of the course: Science, Gender, and Education. The "thinking" questions I list under each subject should help guide you to some topics of interest. It is wise to check in with me early and often about where you're headed with your topic.

This assignment has 3 sections:

### **ORAL PRESENTATION**

You will work in pairs (and in one case, a threesome). The reason for this is to divide the work up so you don't all have to do the same research. It should also provide you with a sounding board for your own ideas, while giving you valuable experience working on teams.<sup>1</sup> Your team will be responsible for a ten to fifteen minute presentation on your topic. You may wish to break your topic up into manageable "chunks"... say, have one person deal with the background of the subject and description of the materials you worked with and the other person talk about the importance of your findings.

### **PAPER**

Everyone will write a paper. It is understood that the research and "thinking" of the team belongs to everybody on the team, i.e. your conclusions need not be distinct from the conclusions of your teammate(s). In the end, though, your paper's success will rely on your own understanding of the conclusions you reach from your materials, the success of your paper's organization, and the persuasiveness of your prose. Your paper should contain analytical assertions and evidence just like the other "literature-based" papers you've written this semester.

### **PROJECT CRITIQUE**

You will also hand in a one page critique of your project which acknowledges the limits of your research. The critique might include discussion of what you couldn't do that you would have liked to, how other information might have led you to different conclusions, what you found frustrating about the materials you dealt with, what helped you in your project (people, resources, epiphanies!), what you might do differently if you did it again...

### **TOPICS**

Topics, like partners, will be randomly drawn from a hat. Should you desperately wish to work on a specific topic, there may be some switching, but only if the person who chose the topic agrees to it.

### **ALICE EVANS' MEMOIRS AND HER BRUCCELLOSIS LECTURE**

Alice Catherine Evans collection #2552

box 1 -- memoirs

Use the GREEN volume (not the red) as your text. What kinds of things did you expect to find in her memoirs that weren't there? Can her memoirs be regarded as "complete"? What were you surprised at? Can you make an argument for why she included certain things and excluded others? Where's her personal life in all of this? What about other women scientists? Did her gender affect her career? Also look at her "Brucellosis" lecture

<sup>1</sup> Teamwork experience looks good on that summer job resume!

presented to the Wicomico Woman's Club, Nov, 18, 1947 -- why does Evans get interested in brucellosis? (What is neurasthenia, anyway?)

### **ALICE EVANS AND THE CONFERENCE OF WORK FOR WOMEN**

Alice Catherine Evans collection #2552

Box 2

A chunk of Alice Evans' correspondence deals with her organization of Conference of Work for Women at Willard Straight Hall, on March 9, 1935. Look for American Association of University Women letterhead... that letter and several to follow are the record of her work for the conference. There is also a program from the conference and her essay "Opportunities For Women In Science". Look also at her "Brucellosis" lecture presented to the Wicomico Woman's Club, Nov, 18, 1947 -- why does Evans get interested in brucellosis? What can you conclude about the conference from this gathering of information? What conclusions does Evans make about science as a career? Specifically for women? What other claims does she make about the possibilities of professional lives for women?

### **ANNA COMSTOCK AND THE NATURE STUDY MOVEMENT**

John Henry and Anna Botsford Comstock collection #21-23-25

Box 7

--Syllabus of lectures, Nature Study...; "Field Notes" & introductory lecture. Also in that box -- diplomas and certificates & diaries (Without spending too much time with them, what do you make of them?)

Box 9

--*Ways of the Six-Footed & Trees At Leisure*

You will need to look elsewhere (in general stacks, probably at Mann Library) to find out the complete philosophy of "Nature Study". (It is not the simple study of nature, but an educational movement started here at Cornell.) What is the relationship Anna Comstock sees between education and the natural world? Does her introductory lecture to the summer course affect your understanding of a scientist's place in nature? Can you draw parallels between her approach to the education of adult scientists and her approach to children's science curriculums? Are the exercises suggested for children interesting? Can you determine the rationale behind them?

### **ANNA COMSTOCK AND SCIENTIFIC ILLUSTRATION**

John Henry and Anna Botsford Comstock collection #21-23-25

Box 9

John Henry Comstock's *Intro to Entomology*, *Report on Scale Insects*, and *A Manual for the Study of Insects*

Box 12

All of the insect drawings.... detail and understanding? Look at how they come out in the books in Box 9

Are there conclusions you can make about Anna Comstock's contribution to John Comstock's work? How might art and illustration be an important contribution to science? What do Anna Comstock's drawings show she values? How might they fit into a larger goal or understanding the world? What do you make of the whimsical drawings? Most of the drawings in the texts originated as the pen and ink drawings in box 12 -- do they seem different when you see them in the text? Why? What might that say about the relation of representation to scientific knowledge? You should look at other sources for background and theories about scientific illustration and cite them in your paper. You may also want to look at Anna Comstock's autobiography *The Comstocks of Cornell*.

### **ANNA COMSTOCK AND THE COMSTOCKS OF CORNELL**

John Henry and Anna Botsford Comstock collection #21-23-25

Box 8

--manuscript of an autobiography published posthumously as *The Comstocks of Cornell*

Check out a copy of *The Comstocks of Cornell* or use the one in the Cornell Archives (the problem with that copy is that you will have to use it only in Kroch). Compare Anna Comstock's original manuscript with what actually gets printed in the final version of the book. What gets left out? Why do you think she makes certain editing decisions? What does the manuscript reveal about what is important to her? What does she choose to emphasize in either or both of the texts? What does she reveal about being a famous science educator and illustrator? About being the wife of a famous scientist? What roles do you see her value?

### **THE WRITINGS OF SUSANNA PHELPS GAGE**

collection #1874

Box 8 contains a scrapbook of papers in a red binding called "PAPERS by Susanna Phelps Gage"

Box 10 contains several letters from Dr. Gage to her children.

Can you come to any overall view of her work? Check out the review of Geddes and Thompson -- a neat read, given we've also read sections of Geddes and Thompson. What does she say about them that might reveal what her interests in science are? Does her writing for children (not the letters, but the articles or stories in children's magazines) have any relation to her scientific writing? What kinds of publications did she get published in? Who else gets published in them? Do her letters to her kids reveal anything about her professional life? What are her concerns in the letters? Can you reconcile her professional life with her personal life? She's a very early example of a female scientist -- does her era affect what she can do or say? Is there any way to find this out?

### **THE MYSTERY OF MARY ANITA EWER**

Collection #2624

Box 1 -- Correspondence and (at the bottom of the box) one of her papers. (Don't read

ALL of the correspondence, just sample it fairly extensively.)

Box 2

Look for the reprint of Mabel K. Slattery's "Uranium As An Activator" -- skim through it for the mention of Mary Ewer's name. Does that help your mystery? Look at the memorial program about Lord Kelvin -- recognize any of the speakers names? (Both are in the bottom of the box.)

Who was Mary Anita Ewer? There's not a whole lot here to go by, is there? Why do all the letters addressed to her start "Dear Miss Ewer"? Who was Professor Nichols? What kind of tone do her letters to him take? What is the tone of his letters to her? What can you make out about her professional life from what's contained in these materials? Are there any other places you can think to look for information about her?

**SIGMA DELTA EPSILON FROM 1921-1942**

collection #37/4/835

Box 1

Local and National Constitutions, 1921-25; Membership data sheets for the early period. (Too many to look at all of them, but read a sample to tell you who these people were.)

Box 3

Suggested folders to look at: 3-4 (wedding and birth announcements); 3-4 (photos, postcards); 3-6 history from '22-'26; 3-7 history to '42; 3-2 correspondence. Also check out 3-1 notes... don't have to read them all, but what are some conclusions you might draw from them?

In these files you will find at least two written histories of the organization. What can you determine about the group? Why did it start and what's its function? How did this organization function to bring women together? The "Notes" are more helpful than the minutes. Check out the invited speakers and their lecture titles... what sorts of things were these women concerned with? What were the lives of female science students like? What kinds of women were invited to join, and out of those, who did join? Look at the money, loan, and scholarship information, questionnaires, etc. Can you find out more about certain women who were involved from other sources? What can you tell from the correspondence and pictures?

**IN-CLASS WRITING: Marcet #1**

It's 8:40 on Thursday and you show up at Caldwell Hall for 105.5/106.5. There's been a time warp! Instead of your regular instructor, Jane Marcet is there. She's pleased that you've read sections from her *Conversations on Chemistry* and *Conversations on the Natural Philosophy*, but she wants to know WHY you are reading them 170 years in the future. As you begin to answer, she disappears, but not before leaving her address. Take fifteen minutes to write your reply in the form of a brief letter to Jane Marcet.

**Rationale:** We were getting a little too used to approaching texts in class discussion from the "what's interesting" and "what I didn't understand" angles, and then working from there to the "larger" issues of the class. I wanted to see if starting with the larger issues of the class -- ideology, gender, scientific knowledge, "social construction" -- might help students arrive at better readings of specific passages. I often start class with short writing assignments to provide a focus to the ensuing discussion. Also, it gives students something written (rather than just notes) to build on for their longer papers.

The informality of the assignment (a letter to an author) enables students who get paralyzed by "big questions" or words like "ideology" to find a non-threatening way into that same material. I used this format early in the semester (a letter between two characters in *Frankenstein*) and it was consistently chosen as their favorite assignment in their course evaluations.

**MARCEY SHORT PAPER (1-2 pages) -- DUE NEXT CLASS MEETING**

Choose a BRIEF passage in Marcey's work that interests you and discuss how it shows or proves a scientific point while also revealing some of Marcey's assumptions about the social world.

Feel free to use anything we covered in class discussion in your paper. The idea here is not to come up with something "new," necessarily, but to substantiate one of the close readings we performed in class by tracing how we arrived at our conclusions. If you wish to select a passage we didn't cover in class, that's fine. Just remember to **MAKE AN ANALYTICAL CLAIM** about the passage and then **SUBSTANTIATE** it with evidence from the text which you work seamlessly into your argument.

**WRITING GOAL: INCORPORATING EVIDENCE!**

**Rationale:**

This is one of a continuing series of assignments designed to require students to perform close readings which eventually form the basis of longer, more complicated arguments. In this case, the students did not write a longer paper on Marcey, but the passages they dealt with here were quite close to the sort of material they were encountering in their research -- not easily "readable" -- and the idea was to give them practice in a very structured environment before turning them loose on a longer paper.

I frequently attach a "writing goal" to assignments as a way of telling students a specific task to focus on for the assignment. I pay close attention to the goal in my comments on their work (as well as addressing other concerns, of course). In this case, we spent part of a class period earlier in the week talking about how to incorporate quotations to substantiate claims about texts.

**IN-CLASS WRITING: Marcey #2**

Your letter to Marcey was stamped "RETURN TO SENDER:" (You got the zip code wrong.) This gives you an opportunity to change the letter, taking into consideration the class discussion and the short paper you wrote on Marcey's work. Write her another brief letter that answers the same question: Why are we reading Marcey's Conversations for this class?

**Rationale:** This in-class took place the day the paper was due. I first handed back their earlier in-class, so they could augment it or change it completely as they wished. The idea here is to show them how readings can deepen and change with reflection. It's also a chance for students to incorporate vocabulary they might have encountered in class discussion into their work to make their arguments more specific and a bit more sophisticated.

**SOMERVILLE SHORT PAPER (2-3 pages)**

Mary Somerville's *Autobiography* is an uncomplicated picture of the life of an ordinary woman who just happened to become the first prominent woman in science in England. Not!

Write a short paper using one or two passages of the *Autobiography* to discuss how Somerville's gender affected her career.

**WRITING GOAL: FOCUS!**

"Gender" is a huge topic and the *Autobiography* is long and complicated. Obviously, you can't do either justice in a short paper. How to approach such an impossible task? Use your papers on Darwin's *Descent of Man* and Marcet's *Conversations* as models: those assignments were focused for you. Choose one or two passages of Somerville's *Autobiography* and do a close reading of them in your paper. The passages you select should discuss gender-related issues: education, marriage, maternity, etc. Developing your paper's thesis around ONE of those issues will focus your paper while addressing the broader assignment.

**Rationale:**

This assignment followed a really terrific class discussion about Mary Somerville's *Autobiography*. I was pleased with how well the Marcet (scientific "conversations" between two girls and their teacher) worked with and contrasted Somerville's account of her education and career. Since many of the research subjects were related to women's education and careers in science, a close reading of Somerville was good practice, and allowed them to think about their research (which they were doing concurrently) more critically.

The assignment was vaguely worded on purpose to get them to think about how to focus a paper, which was both the writing goal of the assignment and the difficult task that lay ahead in their research project.

## Research Pre-Write #1

### MAKING SOMETHING OUT OF NOTHING

Select one of the following from the collection you are working with:

- an interesting object.
- one or two interesting sentences from a text.
- one picture or drawing.
- a newspaper clipping.

In a substantial paragraph, explain why the object, sentence(s), picture, or clipping you've selected is important to an understanding of the person you are studying. If your paragraph is to be "substantial," you will need to investigate connections between your selection and some greater topic concerning your research.

Up until now, all of your writing assignments have involved critical responses to assigned "formal" readings of published essays or novels. What do you do when what you've been reading is a diary? A grocery list? A collection of birth announcements? What if you've been "reading" pictures or sketches by Anna Botsford Comstock?

The funny thing is that reading those peculiar things is no different *really* from reading any text... and writing about them is not so different, either. This is an opportunity to take a brief crack at it before you launch into your presentation or long paper.

Rationale: This assignment was intended to help students grapple with what seemed at times like the overwhelming detail of their research. By identifying small details as essential to an understanding of some greater concept about their topic, students got practice in identifying and enlisting supporting evidence for larger claims. They also got a jump on thinking about the greater focus of their research topic. This focus didn't have to be "solid" here, but in order to complete this pre-write, students had to ~~be~~ think ahead toward the final product.

## Research Pre-Write #2

~~Coming up with a thesis for your research paper.~~

Your roommate wants to know why you've been spending so much time in Kroch Library. You have twenty minutes before dinner to explain it to her. You spend five minutes making a random list of what's interesting about the person or organization you're researching...

[MAKE THE LIST HERE]

And then your roommate interrupts you, saying, "So what? What's the big deal about [her/it]?" That leaves you fifteen minutes to make INTERESTING, ANALYTICAL CONNECTIONS between the different things on the list you've made about your topic. How might one observation you've made about your subject affect another? Might two interesting things you've observed be linked via some of the "big" topics we've discussed in class: language, education, gender, authority? What makes a "big deal"? [MAKE THOSE CONNECTIONS HERE]

After you're done, your roommate turns to you and says, "Oh, I get it. That's cool. What you're saying is....[FILL IN THE BLANK BELOW]."

Rationale: This was an attempt to naturalize "thesis-making." Gimmicky, yes, but their research projects were so big that I worried a straightforward "thesis paragraph" assignment would just lead to several vague introductory paragraphs that weren't very analytical... something we'd been through (and gotten over!) earlier in the semester. I didn't want them to backslide. Also, this was one of my many efforts this semester to model different ways of brainstorming to get over the stage fright many students encounter when asked for formal "introductions" to their papers.

It helped that presentations (the first formal part of the research assignment) started during the two pre-writes, because it meant that the students had to have much of their research done beforehand. The unexpected side effect was that many students found that the best research often results from critical thinking ... and they located the limitations of their research before they started their papers. Indeed, many of my students responded after the pre-writes that they wanted even more time to go beyond the contents of the archives, but time constraints didn't allow that. Instead, I encouraged them to explore the limits and constraints of their research in the third part of the research assignment, the critique.