

## A CELEBRATION OF WOMEN IN CHEMISTRY

Barbara A. Burke

Chemistry

Since very early times women have had a strong influence on the development of the sciences in general and chemistry in particular. In this paper I present an original play about some historical women of chemistry, emphasizing the positive aspects of each woman's role in the history of chemistry, rather than dwelling on the hardships each endured. My hope is that modern young women, as they learn more about their collective past, will gain a sense of pride and tradition in their chemical heritage. This should lead to greater confidence in their own potential ability to contribute significantly to the development of chemistry. I also hope that young women will be encouraged to read and discuss the lives of these and other women chemists since these women can teach us much about what it means to be a woman chemist. Young women who aspire to be chemists need to be aware that they are carrying on a long and distinguished tradition.

As part of Women's History Month in 1994, I wrote a short play on the history of women in chemistry. I think a play is a creative way to have students learn facts and hopefully inspire them to look more deeply into a subject. Also, everyone has a bit of the "ham" in themselves — and what better excuse than an activity such as this play! I think that this play can easily be adapted to many different situations. For example, it could be performed by students at almost any grade level; the props and staging could be as simple or complex as circumstances dictate. We used period costumes, two chairs and a gong as our props.

This play was presented in the Recital Hall at Cal Poly Pomona during Women's History Month, March 1, 1994.

I came up with this idea as I was reading about one particular woman, Jane Marcet, who published the text, *Conversations On Chemistry, Intended More Especially For The Female Sex*, in 1805 (Alec, 1986; Kass-Siman, 1990). I decided to follow the same format that Jane Marcet used in her text, namely a conversation between a teacher and her two students: Mrs. B. and Caroline and Emily. I took the part of the teacher and re-named her Dr. B. and had seven of my former students each take the part of a woman in chemistry. I included contemporary women who had graduated from Cal Poly as chemistry majors as well as the four-year old daughter of one of my former students in order to make the connection from past to present to future. In the play I emphasized the positive aspects of each woman's role in the history of chemistry, rather than dwelling on the hardships they each endured. This was to be a celebration of achievements.

The feedback I received about the play, both from members of the audience and the cast, was both positive and enthusiastic. They enjoyed the sense of history, pride and hope for the future that the play conveyed as well as the conversation format.

I have included a short bibliography in order to make this play more easily adaptable to other sciences. Also as part of the adaptation to another school, etc., the contemporary women in the play could be graduates, parents of students, teachers at local high schools, colleges or industrial chemists.

I wish to thank the members of the cast for their enthusiastic participation in this project, and the theater department at Cal Poly for use of period costumes, which helped make our presentation more fun and visually exciting for all! I also wish to thank my son Jeff for his advice in script writing, which helped to make this play "conversational".

## **Conversations on the History of Women in Chemistry**

Players: Tracy Arce, Elvira Castrillon, Denia Manarrez, Norma & Miranda Martinez, Ana Paez, Maisha Parnell, Lenise Pye (Performed on March 1, 1994, Recital Hall, Cal Poly Pomona)

### **Characters:**

Elvira - plays herself, Elvira Castrillon, a science student at Cal Poly Pomona.

Food Gatherer - represents women in prehistory and their role in laying the foundations for alchemy. Played by Tracy Arce.

Maria the Jewess - first woman alchemist whose laboratory work was recorded and referred to until well into the Middle Ages. Played by Denia Manarrez.

Jane Marcet - wrote the first chemistry textbook suitable for introducing non-scientists to the subject. Played by Norma Martinez.

Marie Curie - first woman to win the Nobel Prize and the first person to win two Nobel Prizes, one in physics and one in chemistry. Played by Ana Paez.

Emma Carr - the first woman to establish a strong, successful research group in organic chemistry in the U.S. Played by Lenise Pye.

Cal Polly - represents the recent graduates of the chemistry department at Cal Poly.  
Played by Maisha Parnell.

Miranda - plays herself, Miranda Martinez, the four-year old daughter of a science student, Norma Martinez, at Cal Poly Pomona. Miranda represents the future.

## **Conversations on the History of Women in Chemistry**

[Curtain opens as Elvira is walking toward Dr. Burke's desk. At the desk, **Dr. B** is intensely pondering some huge, complex tome of chemical reference]

**Elvira** Dr. B?

**Dr. B** Hi Elvira, what can I help you with?

**Elvira** Oh, Dr. B., sometimes, well, I feel, you know — as a woman in chemistry, I feel so alone...

**Dr. B** Elvira, you shouldn't! After all, you're following a long and noble tradition in the history of mankind.

**Elvira** I don't understand...

**Dr. B** Well, perhaps I should start from the beginning and introduce you to some of the more notable women chemists of the past.

**Elvira** Oh, you mean like Marie Curie?

**Dr. B** Well yes, but everyone's heard of her. There are a lot of important chemists who very few people even know about. Let's see... For example, even before recorded history, women, as food gatherers, were chemists...

**Elvira** Don't you think you're reaching a bit, Dr. B?

**Dr. B** No, I'm not...

[A loud Shazaam, and the **Food Gatherer** appears.]

**Gatherer** I do not use the word "chemist" to describe myself, but in many ways, I am just like you. I study the things in my world — like plants, animals, and rocks — and try to use them or the knowledge I find through them to help my people. In our tribe, my sisters and I spend the day searching the fields and forests for plants. Through time, we have discovered different ways to remove poisons from plants so that they can be eaten safely and have learned to heal our sick with medicines we have extracted from various herbs. We have also learned how to tan leather to clothe ourselves and have discovered natural dyes and pigments to make our garments beautiful. We have developed many tools including what you would call the mortar and pestle, levers, mills and others we use to cook our food. Many of these same tools are still used in some fashion in your time.

[**Gatherer** fades into the background as dialogue continues]

**Elvira** Yes, I can see how it might have all began ...

**Dr. B** Good. But that was just the beginning. Then in ancient times, there was Maria, the Jewess...

[A second, loud Shazaam, and **Maria** appears.]

**Maria** I am Maria, the alchemist of Alexandria.

**Elvira** [*aside to Dr. B*] Where's that?

**Dr. B** [*whispering*] It's a city in Egypt in the first century A.D.

**Maria** Ahem! Although there are many alchemists today, I am one of the few women. And while many of my companions rarely even describe their experiments on parchment, I am most careful in accurately writing down both descriptions and even "quantitative" measurements. Through these experiments and their records, I have created some of my greatest works, most of which are special devices I use in my laboratory. My most notable designs are the water bath, the three-arm still and the reflux oven. Even the French have honored me by naming the double-boiler the *bain-Marie*. Artists still use "Mary's Black," a lead-copper sulfide pigment, of which I was the first to record how to prepare it. In my actual experiments I prefer glass vessels which allow me to observe "without touching," unlike many of my peers, who tend to injure themselves as they do qualitative analysis. I have also learned, through many years of careful

study, mind you, to recognize that many mixtures of chemicals produce poisonous fumes which can have noxious effects. This has saved a great amount of grief. Why once I even...

**Elvira** Fascinating, I never thought about the similarities between cooking ware and lab apparatus!

[**Maria**, with a rather indignant look at the interruption, fades into the background as dialogue continues]

**Dr. B** Right - I'll skip over the Middle Ages where magic and trickery reigned to the early 1800s and introduce you to Jane Marcet...

[A third, loud Shazaam, and **Jane Marcet** appears.]

**Jane** As was true for most women of my time, I obtained access to chemical information, especially the magnificent lectures of Sir Humphrey Davy, through my husband's interest in the subject. Wanting to ensure that other women would not have to learn chemistry from scratch, I wrote my first science textbook in 1805, *Conversations On Chemistry, Intended More Especially For The Female Sex*. It subsequently went through 16 editions. It was a most successful text because I myself acquired a deep understanding of both the experiments and underlying chemical principles and I could clearly explain them to others. In my text, I set the first role models for women as chemistry students and chemistry teachers...

[**Jane** fades into the background as dialogue continues]

**Elvira** Hey - Just like you and me, Dr. B!

**Dr. B** Exactly! Now we come to the most famous woman chemist - Marie Curie!

[A fourth, loud Shazaam, and **Marie Curie** appears.]

**Curie** I first became enthused about science through reading books. Later, I carried out physics and chemistry experiments in my cousin's laboratory. Since my family was poor, I needed to work for several years as a governess to save up money to go to Paris and study at the Sorbonne. I earned master's degrees in physics and mathematics. I also met and married Pierre Curie with whom I collaborated and discovered two new elements. The first I named radium because of its glowing nature. The second I named polonium after my beloved homeland. I, along with Pierre, shared the Nobel Prize for this work with Monsieur Becquerel. I received my second Nobel Prize in chemistry for the isolation of polonium and radium from pitchblende.

**Elvira** Wow! Two Nobel Prizes! - one in chemistry and one in physics...

**Dr. B** Another person you might want to meet is Emma Carr, who received the first Garvan Medal.

[A fifth, loud Shazaam, and **Emma Carr** appears.]

**Emma** My professional career as an organic chemist began in 1901 when I became an assistant in chemistry at Mount Holyoke College. For the next twelve years I went back and forth between Mount Holyoke and the University of Chicago. Ph.D. in hand I returned to Mount Holyoke for good in 1913! I served as professor and chairman of the chemistry department for many years where I built a department in which undergraduate teaching and research became world renowned. This reputation, I am happy to say, still remains. My undergraduate students and I made many significant contributions to my field, organic ultraviolet spectrophotometry. I am pleased to say that I received the first Garvan Medal, which recognizes the work of women chemists, awarded by the American Chemical Society.

[**Emma** fades into the background as dialogue continues]

**Elvira** This sure has taught me a lot Dr. B, But what about the here and now?

**Dr. B** Well, how about some people closer to home? Let me tell you about some recent Cal Poly women chemists who are now taking their place in history...

[A sixth, loud Shazaam, and **Cal Polly** appears.]

**Cal Polly** Many of my sisters have taken their place in the chemical world. Niedra Pope ('88) received an M.S. at UCI and is now working for Baxter Healthcare. Cynthia Flores Kowalski ('89) just received her Ph.D. at UCI and is now at Shell Development. Jennifer Timbrook ('91) and Kathy Knudsen-Smith ('92) are now attending medical school. Catherine Navitta ('92) works in the Orange County Sheriff's crime laboratory. Selwyna Tetangco ('93) is attending UC Davis Graduate School, pursuing her Ph.D. degree.

[**Cal Polly** fades into the background as dialogue continues]

**Elvira** Oh Dr. B. I'm so proud to be a woman pursuing chemistry! I never dreamed we had such a distinguished history in chemistry! [**Elvira pauses, takes deep breath, and steps forward**] I, Elvira Castrillon, am ready to take my place among my sisters!

**Dr. B** [to audience] Each of these women from history have taught us all much about what it means to be chemists — women chemists. But, where do we go from here? We cannot dwell only on the past. The lessons learned must be passed on to our future, the children, and they must take up this quest of knowledge and continue the study of our mysterious, wonderful world.

[A seventh and final, loud Shazaam, and **Miranda** appears.]

[**Jane Marcet** steps out of the shadows and hands a chemistry text to **Miranda**]

**CURTAIN**

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