The Lives of Great Women Leaders & You

Joan Franklin Smutny
& S.E. von Fremd

Contributor: Margaretta wa Gacheru

Royal Fireworks Press
Unionville, New York

Also by Joan Smutny

Manifesto of the Gifted Girl

Reclaiming the Lives of Gifted Girls and Women

Royal Fireworks Press
PO Box 399
41 First Avenue
Unionville, NY 10988-0399
(845) 726-4444
fax: (845) 726-3824
email: mail@rfwp.com
website: rfwp.com

ISBN: 978-089824-490-8

Printed and bound in Unionville, New York, on acid-free paper using vegetable-based inks at the Royal Fireworks facility.

9ja4

Table of Contents

About the Authors

Dr. Joan Franklin Smutny is Director of the Center for Gifted, a Northern Illinois University Partner, and Director of the Midwest Torrance Center for Creativity. She is a winner of the NAGC Distinguished Service Award for outstanding contribution to the field of education. She directs programs for thousands of gifted children every year and teaches courses on gifted education for graduate students. She is editor of the Gifted Children Journal, contributing editor of Understanding Our Gifted and the Roeper Review for gifted education professionals, and a feature writer for the Gifted Education Communicator. She has authored many books and articles on gifted education.

Also by Dr. Smutny for Royal Fireworks Press: *Manifesto of the Gifted Girl*, and *Reclaiming the Lives of Gifted Girls and Women*

S.E. von Fremd is an independent scholar, writer, and editor with a background in education, cultural studies, and dance. She performed with the Never Stop Moving Dance Company in Chicago and taught creative dance and theater to children in the city and surrounding areas. Her interest in culture and creativity led her to pursue a doctorate in Performance Studies at Northwestern University. This included a year's research in Uganda under the guidance of Professor Rose Mbowa, where she focused on the role of theater and dance as a popular forum for social change and cultural revival throughout the country. She collaborated with Joan Smutny on the first and second editions of *Differentiating for the Young Child* (2004 & 2010) as well as on *Igniting Creativity for Gifted Learners*, K-6 (2009).

Introduction

If you are a girl or young woman who wants to do what you've always dreamed but who thinks you cannot, this book is for you. If you think your ideas for education and career are unrealistic and impossible to achieve because other people have told you so, this book is also for you. If you live in a place where you cannot find anyone or anything to show you how you can create a new life, you will find in this book the footprints of women leaders who faced even greater challenges. You will discover what actions you can take to make your life your own and to have a life that makes you happy.

The times are not as hard for you as they were for your mother or grandmother. Even if you live in a place where the schools are not good or in a community that believes women should limit themselves to certain roles and careers, you still have more choices. Today, women have children without sacrificing education and careers. They can express their opinions and speak out against injustices without being "put in their place." They can have careers in many different fields without giving up on having a family. Even for women who live in places where these freedoms seem a distant dream, the ground is shifting under their feet. At some point, even these most oppressed women are willing to face threats to their safety and well-being because something within them can no longer be suppressed.

A woman, Ingrid Betancourt, a presidential candidate in Columbia in 2002, was captured by a brutal rebel group and kept in the Columbian jungle for six years under torturous conditions. When she tried to escape, her captors chained her to a tree in punishment. Here is what she said:

> Having lost all my freedom and, with it, everything that mattered to me—my children, my mom, my

> life and my dreams—with my neck chained to a tree—not able to move around, to talk, to eat and to drink, to carry out my most basic bodily needs—subjected to constant humiliation, I still had the most important freedom of all. No one could take it away from me. That was the freedom to choose what kind of person I wanted to be. With this realization came the understanding that I was no longer a victim.

That example may be extreme, but many women who have felt tied down, bound, or gagged into silence have made that fundamental choice about what kind of person they wanted to be. They knew who they were and chose to be true to themselves no matter what circumstances they faced. This book brings you stories of girls and women with fortitude, persistence, and courage to follow their calling. Prejudice, pressure, and intimidation cannot force you to retreat from your goals or imprison your spirit unless you allow them to do so. Leadership begins with your natural desire to be yourself and your conviction that your identity and prospects for the future should not be suppressed or co-opted.

This book uses biographies not only as inspiration, but as roadmaps to guide your development and help you navigate challenges to your progress. Often, we see biographies as stories to inspire us when our spirits are low and when we start questioning if we should bother going on. Biographies do much more for women and girls, however. In the first place, the story of female achievement is still more or less a buried one. Most girls and young women know little about many startling achievers who've created, discovered, and explored their way to new territories of knowledge and invention. The invisibility of such extraordinary female pioneers has deprived them of models to follow.

This book aims to show you what a wonderful heritage you possess. However far you go, you stand on the shoulders of others, and you are not alone.

Shuttle commander Eileen Collins once said that she and all women astronauts owed their gratitude to the early women pilots in the 1960s, called Mercury 13. Though these early pilots never made it to space, they laid the groundwork, undergoing extensive and grueling tests to determine if women could endure the physical and mental stresses as well as men. Despite the fact that they passed all tests proving their fitness to become astronauts (some even exceeded those of the men), NASA decided against women in its space program until 1978. Nevertheless, their efforts to stand on equal footing with men, their willingness to take their cause as far as humanly possible, built a foundation for the first women who came later.

The life experiences and voices of these women should help you see that you do have choices. You can stand at a crossroad, where so many fingers may point in one direction, and decide, based on your deepest interests and on the lives and wisdom of impassioned women such as these, to try another road, a road perhaps less traveled by women. In many cases, women struggled against far more restrictive rules and traditions than you, and you can draw on that wellspring of wisdom to advance the future for others. If there is any advice this book gives, it is to get to know great women; keep them close to your heart during those times when you need inspiration or when you face belittlement. Use them to fire up your soul when you see injustice and prejudice. Learn not only what they did but the characteristics that enabled them to endure and overcome.

Concha Gómez, an exceptionally gifted mathematician, co-founded a group of fellow female students who worked hard for a more inclusive math department. Not only female but also Latina, she felt held back on two counts. She and other women called themselves the Noether Ring—after the woman mathematics genius Amelie Noether, a contemporary of Einstein whose discoveries have become the founding principles of modern physics.

The group's very name was a tribute to the historic facts about mathematical achievement among women.

Discovering Your Dreams and Talents

Many girls grow up believing that their lives don't really belong to them. Even in more progressive homes and societies, many still form their views for the future on gender-based ideas about where they belong, rather than on the exploration of their interests and talents. Some women surrender or postpone their aspirations for higher education and career training because they feel pressured to meet others' expectations or demands. Other women choose careers they simply feel more comfortable with, not realizing that they've shut out others that seem unsuitable. Why are they unsuitable? The women aren't really sure. Looking more closely, we can see that many girls today are still socialized to believe that, for example, if they love science, they should be doctors or perhaps environmental scientists (both fields now more open to women), rather than work in the more theoretical science they might actually love if they had a chance to explore it.

Women still have a lot of work to do if they hope to push back the barriers against their full participation in all sectors of our society. According to a 2012 *Newsweek* report, men in the United States have retained the most powerful positions in such key fields as government, law, religion, business, and academia, and they continue to make key decisions affecting all citizens. Looking at government, women constitute a mere 17% of the Senate and 16.8% of the House of Representatives; three women serve on the Supreme Court, and a mere six out of 50 are governors (12%). Debora Spar, President of Barnard College, said, "We have fallen into what I call the 16 percent ghetto, which is that if you look at any sector, be it aerospace engineering, Hollywood films, higher education, or Fortune 500

leading positions, women max out at roughly 16 percent. That is a crime, and it is a waste of incredible talent."

That said, women are nevertheless challenging the idea that they must occupy a "place" determined by others. American and European women comprise 60% of university graduates. They continue to enter fields dominated by men and to become effective leaders in many sectors of society. A report in *Foreign Policy* revealed that women in the United States hold 43% of senior management positions and that they own or co-own 46% of American firms. This is remarkable, given that they constitute 47% of the labor force. Women with strong credentials have begun to surmount barriers to their leadership in the companies where they work. For some, this means leaving their companies to start their own. With the support of others and the examples of successful women, they have learned to navigate through difficult terrain. So can you.

Perhaps you have an opportunity to grow and lead in situations where you feel you don't belong. Or you fell in love with a field, such as entomology, that would be acceptable if you were male but that is seen as odd or irregular for a girl or woman. But you can belong in any situation where others do, and you can bring your own wisdom, experience, and talent to make a difference. You can resist the idea that you must conform to the unwritten traditions or habits established by those who've come before you.

At the beginning of your journey, what you most need is exposure to the lives and accomplishments of women who were once like you. Becoming a leader starts with your being able to become the leader of your own life, rather than of others' opinions and directions of what you should be or do. You have a passion for something that you may or may not want to reveal to anyone, even your best friend. You think people will laugh or tell you that this is not a goal for girls or that it's so beyond the life you have that you should forget about it.

Yet you can't forget about it if you heed the wisdom, practicality, and inspiration of these stories. The path to your love calls to you through the voices of these great women. You can learn new skills, find support to strengthen your resolve, and explore alternatives to traditional roles for women in the workplace and in the home. These all promote your growth in important ways. Women's stories are indispensable to this process. Nothing inspires like the life experience of someone who faced the challenges that surround you and who discovered a path to a more expansive and fulfilling life.

What you find in the stories of other women is not only the qualities they possessed that supported their interests, but steps they took to pursue their goals. As you read their stories, you might keep a record of their choices and decisions. Here are some examples:

- How did they gain the confidence and skills to follow a path? Were they always that way? Did they have a mentor or parent who encouraged them? Did their passion for their interest override any concern for others' opinions?
- What steps did they take to educate themselves and find opportunities to move toward their goals? What did they learn? What did they do when no one would help? How did they find ways to pursue their interests right where they were?
- What special qualities did these women have that enabled them to overcome obstacles?
- How did they find people in their lives to inspire them when they felt despondent or intimidated? If their families questioned them, were there others who believed in them? If no one thought they should go on with their choice, did they have models of women they admired to keep them going?

WOMEN PIONEERS IN MATH AND SCIENCE

Amelie Noether

In an article in the *New York Times*, Natalie Angier wrote:

> Albert Einstein called her the most "significant" and "creative" female mathematician of all time, and others of her contemporaries were inclined to drop the modification by sex. She invented a theorem that united with magisterial concision two conceptual pillars of physics: symmetry in nature and the universal laws of conservation. Some consider Noether's theorem, as it is now called, as important as Einstein's theory of relativity; it undergirds much of today's vanguard research in physics, including the hunt for the almighty Higgs boson. Yet Noether herself remains utterly unknown, not only to the general public, but to many members of the scientific community as well.

The story of Amelie ("Emmy") Noether is an example of a young woman who had to struggle against many walls of resistance to her dream of studying mathematics. Born in 1882 in Erlangen, Germany, she lived at a time when even educated women candidates could not attend the university as students and when rocketing into the realms of higher

mathematics could not be a more remote dream. Yet although the University of Erlangen turned her away, she found that she was still able to audit classes, giving her access to the knowledge she needed to pass the state matriculation and entrance exam. At the University of Gottingen, she continued in her role as auditor. She was one of only two women among thousands of men.

What got her through that time? First, her love for mathematics. Emmy never suppressed or surrendered her passion, and this allowed her immense creativity and intelligence to flow, even within the narrow space where she could study and work. Mathematics was a wondrous world that beckoned her in a way that she could not resist. She discovered links between seemingly separate domains that others could not see. Her intuitive, conceptual explorations were controversial, yet they resulted in a set of principles that helped to unify algebra, geometry, linear algebra, topology, and logic. Her research on invariants and transformation theorem revealed vital connections between symmetries and constants of the motion in dynamical systems—a critically important theorem in modern quantum field theory. She published about 45 research papers—a legacy of teachings that benefited legions of mathematicians after her time.

Despite the support of the most prominent mathematicians, including Einstein himself, Emmy had to work under the radar of an official status or position. After passing her final examinations for a doctorate in mathematics, she could not find a position as a professor due to her gender. Yet from 1908 to 1915, she continued to focus on her research interests in theoretical algebra at the Mathematical Institute at Erlangen without a formal appointment, often teaching under David Hilbert, a brilliant mathematics professor who supported her. In 1919, Hilbert and Einstein interceded for her, and Emmy obtained permission to lecture, although still without a salary. In 1922, the university

made her an "associate professor without tenure," and at that point she received a nominal salary.

Despite all of this resistance, however, Emmy's discoveries were phenomenal, revolutionizing mathematical theories about rings, fields, and algebras. In 1918, her creative genius resulted in two theorems that she could prove—both fundamental to the understanding of general relativity and elementary particle physics. One is still known as Noether's theorem. American physicists Leon Lederman and Christopher Hill hold Noether's theorem to be "one of the most important mathematical theorems ever proved in guiding the development of modern physics, possibly on a par with the Pythagorean theorem." The theorem unveiled a deep link between two separated areas of physics and led to new discoveries, such as the wondrous connection between time and energy.

Had Emmy Noether been a man, she would undoubtedly stand in the mathematical world beside the greatest mathematicians ever known. But she does not—this despite Einstein's assessment of her as a creative mathematical genius of the highest order. It was he who secured a paid position for her at Bryn Mawr when the Nazis purged her from her unpaid position at the University of Gottingen. Her students at Bryn Mawr noticed her passion, how her hair would sometimes fall down on her face as she expressed herself, how they would work together on problems, and she would tell them to look at things from every possible angle. Though a "creative genius," Emmy also had a boisterous sense of humor. Little is known about how she felt about her struggles to become a mathematician in Germany—as a woman, and then later as a woman and a Jew. What is remembered is her passion and her humor. Emmy was so often laughing.

Amelie Noether is a model for you. Your parents and teachers may know little or nothing about her, but she paved a path for girls and women like you. Her life story urges you to embrace your strengths fully—not only the talent and imaginative power

within, but the bravery to say, "I'm going to try anyway," and the humor to laugh at the nay-sayers.

Emmy would not accept "no" to her dreams. Instead, she looked for any opening she could find to learn and explore her interests and ideas, whether that meant auditing classes or taking unpaid lecturing positions. She never suppressed or surrendered her passion. This allowed her immense creativity and intelligence to flow, even within the narrow space where she could study and work. If you are one of those girls or women whose passion for something is so big that you can't imagine living at the fringe of it or at least giving it your all to see where it leads, then this story is for you.

Noether: A Model for Another Woman, Concha Gómez

In another century, another math student would help form a society of women math scholars called the Noetherian Ring, after the great female mathematician Amelie Noether. This woman's name was Concha Gómez, a Latina who found herself drawn to mathematics in the 1980s while taking some math classes at a community college in San Francisco. Concha had always excelled in math and loved it, but she had never considered the field as a possibility for her. The community college environment nurtured her gifts and enabled her interests to come forth and blossom. With the encouragement of friends, she applied to the University of California, Berkeley, for her bachelor's degree.

Many years passed between Emmy Noether and Concha Gómez, yet limiting traditions can hold fast. Concha discovered that though she loved mathematics, she was not taken

seriously by her peers, nor did she feel a part of the mathematics community. Despite exceptional achievement, no one paid attention to her insights or ideas in class or in study groups. Being a woman and Latina, she, like Emmy, had to be willing to ride on her own resources: a passion for her subject and a willingness to learn independently.

Her passion for mathematics carried her far, but when Concha entered graduate school, her resiliency faced a greater test. In the 1990s, UCB's mathematics department did not welcome women mathematicians, and pushing against the wall of resistance became overwhelming. What strengthened Concha was finding other women in the department who suffered the same prejudices. They bonded together and formalized their association as a mathematics group for women, which they called the Noetherian Ring, co-founded by Concha Gómez. The name is significant, as it refers to a mathematical structure named after the brilliant Amelie Noether, whose life and work we just affirmed and explored.

Women Helping Women

Facing prejudice alone and achieving in spite of it are tall orders and for a number of girls and women—practically impossible, in fact. But here is a case of women supporting women and of doing so under the banner of an extraordinary woman mathematician whose contributions to advanced mathematics could not be denied. Together, Concha Gómez and the other women scholars aimed to change the whole landscape of the mathematics department so that it became more open to female scholars both inside and outside the university. They helped other struggling students, got more visiting women mathematicians to speak at department events, and pressured the department to take a more inclusive stand in recruitment.

Concha and her colleagues evoked hostility among the men who claimed the mathematics department as their own.

Accustomed to dominating the field, they felt that these women were stepping out of line. Even the meetings of the Noetherian Ring became an object of sabotage. Concha said that they would find their fliers torn down and defaced.

Yet the Noetherian Ring never backed down when faced with such resistance. It became a leading force at UCB. Not only that, but news of its existence traveled. Other struggling female mathematicians in universities across the country began hearing of this women's group at UCB and wanted to start their own.

After receiving her doctorate in 2000, Concha knew that her work had to include attracting and supporting high-potential female and minority students to the subject she so loved. At the University of Wisconsin, Madison, she served as director of the Wisconsin Emerging Scholars (WES) program, designed to support underrepresented students in math and science who may lack the skills demanded by the university's math classes. Concha saw that for females, minorities, and bilinguals, studying in a diverse environment with others who also need extra help gives them the confidence and support they need to push for their dreams of entering a field that they had thought was closed to them.

The Noetherian Ring had become not only the discovery of a creative genius in the 19th century, but an advocacy group for women mathematicians eager to participate fully in the field they love.

The NASA Women: Rocketing into Space

Not all great women reach their goals completely. Doors are sometimes shut that cannot be pried open. Campaigns, presentations, and arguments meet with deaf ears or scoffing remarks about what a field would look like with women in it.

Yet these women's achievements, their bravery, their push for gender equality can make a significant difference to the generations that follow. The Mercury 13, who never got their chance to fly due to women being excluded from the space program, nevertheless paved the way for others. Their story might have become another historic lapse had not shuttle commander Eileen Collins in July of 2005 invited them to attend NASA's Return to Flight.

Today we know that these 13 women, with college degrees, pilot licenses, and at least 1,000 hours of flight experience, passed rigorous testing as handily as men. When NASA did not approve of the venture and would not fund further testing, these women could have gone home defeated. They did not. First, they went to see Vice President Lyndon Johnson, who claimed the issue to be NASA's alone, although Johnson actually wrote a note to NASA against the women's campaign for inclusion in the space program. Next, they went to the House Subcommittee on Science and Astronautics, made their case, and said: "We seek only a place in our nation's space future without discrimination." It was not until 1978 that women could enter the space program, but this does not take away what the Mercury 13 accomplished.

Former test pilot Eileen Collins, the first woman to command a space shuttle in 1999, invited the Mercury 13 women to Cape Canaveral to watch NASA's Return to Flight. Eileen said, "I stand on their shoulders," recognizing how the first women to push against a door do so for the women who follow. For the Mercury 13 who attended, acknowledgement of the work they did put them where they belonged: at the beginning of a new future in space for talented female astronauts.

In 1978, there were six women and 29 men in NASA's Astronaut Group 8. Of those six, two, Sally Ride and Kathryn Sullivan, had sat in the same first-grade classroom. Now, at 26, they sat together again—in a much different classroom, preparing for a future in space travel, something the Mercury 13 could only dream about. After only six years in the program, Sally and Kathryn flew on the Challenger shuttle. Sally flew first, although becoming the first woman in space had never been her ambition. For her, if anything, it merely increased her devotion to science education for children and young people. She and Kathryn collaborated in many teaching endeavors and projects related to the milestones in space exploration. Sally loved flying and served devotedly as the first American female astronaut from 1983 to 1984 on two trips to space. She also used her expertise in aeronautic science to investigate the 1986 Challenger and 2003 Columbia disasters.

Sally left NASA in 1987 to become a professor of physics at the University of California in San Diego and Director of the California Space Institute, initiating projects that profoundly affected science study in young students. She worked with NASA's Jet Propulsion Laboratory and UCSD on the ISS EarthKAM and the GRAIL MoonKAM so that middle school students can analyze images from space. Her company, Sally Ride Science, which she co-founded in 2001, was born out of her desire to make science come alive in the imaginations of children—girls as well as boys. Certainly the EarthKAM, a high-resolution digital camera on a space station, assumes a whole new level of significance when middle school students are actually controlling it! Through a website, they perform calculations so that they can take pictures when the station passes above areas of the earth where they want images.

Because of Sally Ride's contribution to science learning, children can document the earth's changes, comparing images from a decade or so ago to areas today where snow no longer

covers mountains or glaciers have disappeared. Sally gave young students a view of their earth and what climate change looks like from space, with the result that children are more informed and engaged in the issue.

Sally supported Kathryn Sullivan in becoming the first American woman to conduct a spacewalk, which she did outside the Challenger in 1984. Though this was the same Challenger that exploded in 1986, Kathryn launched again—not once, but twice. Earth revealed its wonders to her on her "walk":

> At one point, I looked down, and there was Venezuela sliding by beneath my boots... Just when you think you've picked the most beautiful sight, there's another. Like realizing when you see a continent-size mass of thunderstorms from above, there is never a moment there isn't an electrical discharge in that mass. It's the illusion of being at one place on the ground that makes you think lightning is intermittent. Or, on the day side, going over parts of the earth you know. I don't know where the myth came from that you only see the Great Wall of China. You can see airports, dams, baseball stadiums—even the spot we launched from.

As with Sally Ride and her fame as the first woman in space, Kathryn may be known as the first woman astronaut to spacewalk, but being first was never the draw. The love of flying, the thrill and wonder of moving in space and discovering earth's stunning beauty—these quickly surpass all other considerations. "That would have been my first space walk if 10,000 people had done it before me. So from that point of view, the little historical fact doesn't play any role."