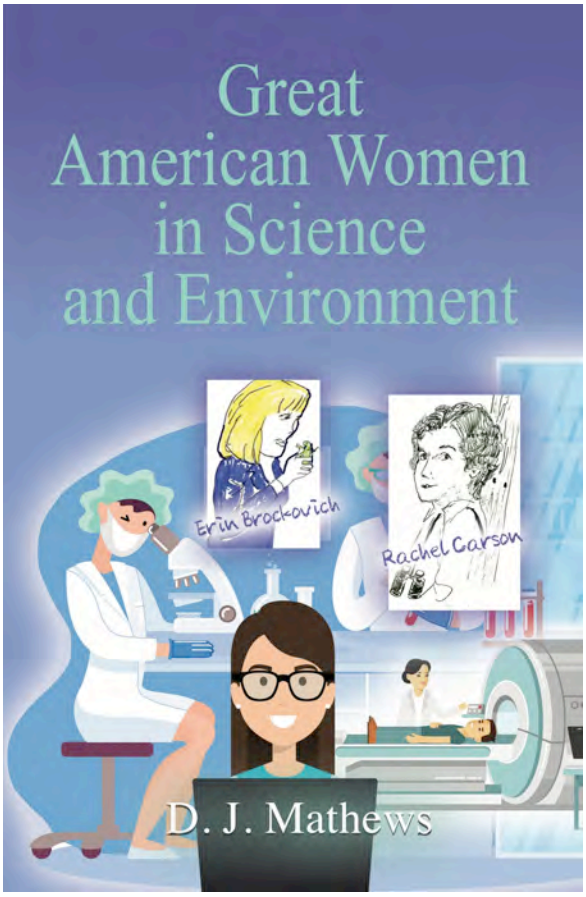

Had Elizabeth Blackwell planned on being our first woman doctor? Or Madam C J Walker, a self-made millionaire? Or Sally Ride, an astronaut? What about Grace Hopper being the mother of computer programming? These young women found inspiration and help to become our "Great American Women in Science and Environment." They are worth knowing better.

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Great American Women in Science and Environment

D. J. Mathews

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Chapter 2
Sally Ride

First U. S. Woman in Space, Physics Professor

Introduction

Millions were glued to their TV sets as the Houston, Texas Mission Control counted down for the space shuttle liftoff.

"That's 5- 4- 3- 2-1. And ignition. We have ignition. And liftoff of STS-7 and the first American woman in space. Ride, Sally Ride!"

Sally Ride and the rest of the astronauts in the space shuttle Challenger could feel the rumble, their spaceship surging high into the sky. In a few minutes they would be in space, circling the earth and doing experiments. What an adventure that would be!

On television, the 1960's show "Star Trek" began with the introduction "Space, the final frontier… to explore new worlds, to boldly go where no man has gone before." Space exploration has been a topic of great interest to men and women in America for several

decades. When the former Soviet Union sent up its first Sputnik **satellite** in 1957 around our planet, the U.S. worked to also get people and vehicles in outer space.

President John F. Kennedy told the nation our goal should be to send a man to the moon and return him back safely to earth in the 1960s. No one mentioned or even thought of women in space in the beginning of what was called the space program. Not until they gave Sally Ride a chance.

The Early Years

"Come on, sport, let's go to the game."

Sally Ride's dad Dale Ride was a big basketball fan. At Santa Monica Community College where he taught political science, there were some sports teams. Sally was the older of two daughters and more outgoing than her sister Karen. She went to ball games with her talkative dad when she was as young as five years old. Karen did more things with their quiet, more **introverted** mother.

Sally was a California "Valley Girl." She was born May 26, 1951 in Encino, California, a well-to-do region. It was a sunny community where Sally could become athletic by playing many outdoor sports.

Dale and his wife Joyce Anderson Ride had a desire to know more about the world around them. They encouraged their daughters' interest in science or whatever mattered to them. They also signed up to have foreign exchange students visit the family.

An active child, Sally liked to skate, play softball, and tennis. This last interest her mother Joyce kept in mind when they all sailed on a big ship, the S. S. Rotterdam, in 1960, bound for Europe. Her dad visited places he'd fought in World War II; in Spain, Joyce had Sally try out tennis playing on a clay covered tennis court. "This is cool. I want to do this at home," Sally decided.

"My, your Sally is like a ball of wind, always moving around, especially with tennis," her mother's church friend observed one day. "Does she ever stay still?"

"Maybe, if we sit to watch TV," said Joyce. "I gave her *Treasure Island* to read recently and she enjoyed that. But she may be getting serious about tennis as a career."

"Too bad she's not serious about housework."

"Oh — well, Dale and I encourage the girls' interests more than good housekeeping, I'm afraid," Joyce admitted.

Sally was so good at tennis as a teen that it helped her win part of a scholarship to pay for Westlake Preparatory School in nearby Los Angeles. Westlake was unique in that it was an all-girls school, which some believe helps female students study harder and do better overall.

One of her science teachers was liked by many of the students. Elizabeth Mommaerts asked Sally after class, "Why don't you consider a college major in science?"

"I don't know. I like playing tennis a lot," Sally replied. Back then Billie Jean King was quite popular, proving to young women they could have a satisfying career playing tennis, and be as good as men too!

From the 1940s on, science research had become a big part of American society. Scientists had created the formula to make a **nuclear bomb**; it killed thousands of people in Japan in August 1945. After the war the U.S. then worried about the goals of communist Soviet Union. The government worried the Soviets (now Russia) might bomb the country over disagreements with political ideas. There were evacuation

drills where school children hid under desks or in school cellars when Sally was in grade school.

No nuclear bombs hit the United States. But the Soviets pushed ahead of us in the space program. In 1957, the Soviet launched into the atmosphere Sputnik 1 and 2**,** manmade satellites. Sputnik 1 was the size of a basketball and circled the earth while it monitored the earth's atmosphere density. The U.S. decided to do something about this activity. NASA, the National Aeronautics and Space Administration, was created in July 1958.

In the 1960s, NASA became important. Hard work and practice missions prepared astronauts to fly and live in outer space. On July 20, 1969, they landed on the moon. They were a quarter of a million miles away.

"Sally, come to the TV, quick!"

"What's happening?" asked Sally, who had been doing homework in her room.

"They're stepping on the moon!" her mother cried.

Three men, Michael Collins, Edwin "Buzz" Aldrin, and Neil Armstrong, had flown to the moon. Although the moon looks close by, it took them three days to fly to the moon and land. The spacecraft split into two pieces. Michael Collins flew the command module around the moon. The other two men in a "lunar" module went down to land on the surface. Later, half of the lunar module would blast off and meet up with the command module so all three could fly home.

A TV camera showed Neil Armstrong and Buzz Aldrin bouncing with big steps on the moon because of its low **gravity**. Armstrong famously said, "That's one small step for man, one giant leap for mankind!"

They moved among rocks and dirt and collected samples of it to take out. They put up a U.S. flag and also talked to President Nixon by telephone link. Although potentially quite dangerous because the moon was cold and airless, this was exciting for Sally to see. It helped her decide to study physics, which dealt with the inner workings of matter and energy.

Tennis still had a pull on her. She decided to go to Swarthmore College in Pennsylvania. There she could take classes in **astrophysics** and English. She could also play tennis when she wasn't going to parties or reading *MAD Magazine*. But it was so far from home. And the winters were long and cold!

Back in California, between college semesters, Sally wondered if she could be a professional tennis player. But it didn't exactly work out. "I just can't play for hours and hours," she told her tennis buddy Sue.

"Why not?" Sue asked.

"I get sore. My body is worn out. My forehand isn't that great. Let's quit for the day and get an ice-cream."

She later wrote boyfriend John Tompkins she was just going to play tennis for fun only. John soon went off to do science research in Moscow in the Soviet Union. Sally moved her studies from Swarthmore to Stanford University in California.

In 1970, only six percent of those with a B. A. or four year college degree in physics were women. Some professors even told the coeds like Sally "you're taking jobs away from the men!" She stayed the course, taking classes in magnetism, electricity, and **quantum mechanics**. In 1973, her parents proudly watched her receive a diploma for a Bachelor of Arts (B.A.) in English and a Bachelor of Science (B.S.) in Physics. She went on to get a Master's Degree in Physics in 1975, then a Ph. D. or Doctoral degree (so she could then teach at college full time) in 1978.

Getting There

The U. S. stopped sending men to the moon in 1972. But something new, a space shuttle, had been developed. Unlike other spaceships that had splashed into the ocean or broken up into parts, the space shuttle could be used in outer space and re-enter the atmosphere like a regular airplane, and slow down its speed to land on a runway. And it stayed in one piece.

In 1977, while at college, she saw an advertisement from NASA. The space agency was looking to recruit young women astronauts to go up in space. They were looking for science majors. "Wow, this I have to try," Sally told her folks. Over 7,000 people applied to be astronauts, and NASA whittled it down to thirty-five; several of those would be women. Sally Ride was on the list!

With any job, there is education or special training. The future astronauts had classes in geology, oceanography, and systems that work the space shuttle. They went on field trips to observe and get in jets that the military uses. Sally practiced flying techniques on a big Boeing 747. She also went up in a T-38 jet that did rolls over the Gulf of Mexico. It

was quite a thrill for someone who'd enjoyed fast rides at amusement parks as a kid.

During training Sally met fellow astronaut Steve Hawley. They both trained in Houston, Texas, and their relationship became romantic. They married in July 1982.

"Wasn't that fun?" Sally, fellow astronaut Judy Resnik, and several other women got to go up in a fast plane. The plane then dropped fast; for thirty seconds they could float around in the plane cabin like they were weightless**.** Being weightless was practice for being up in the space shuttle, where the earth's gravity wouldn't be there to hold them down. Weightlessness was super fun for Sally and the other women enjoyed it too.

But which one would be the first American woman to fly in space? (The first woman in space was a Soviet woman named Valentina Tereshkova in 1963, and it was already the 1980s.) There was wavy haired and single Judy Resnik; married Shannon Lucid; Rhea Seddon, a blonde haired surgeon; slender, athletic Sally Ride; tall Kathryn Sullivan; and brown haired Anna Fisher. All had various science backgrounds and were quite able to do anything thrown at them.

"We've decided on you," Flight Operations Director George Abbey told Sally one day.

"Fantastic. I won't let you down," she said.

Why Sally and not the others? Perhaps it was because of her interest in learning about using the RMS—Remote Manipulator System. It was a fifty foot, 900 pound mechanical arm Sally and another astronaut would learn to move "remotely" to do work on the outside of the space shuttle. She would also help with space capsule communication with the ground crew in Houston. George Abbey felt Sally was also good at being cool under pressure and calmly made decisions with others.

They decided to put Sally with Bob Crippen, the commander or head of the crew, and several others. Bob Crippen had been on the first space shuttle mission to space and specifically asked that Sally join his

crew for the 1983 flight. There would also be Rick Hauck, a former navy man who served in Vietnam**,** and tall John Fabian, once an aeronautics professor who taught the science of traveling through the air. Also Norman Thagard, a doctor who'd check them for what is called "space adaptation syndrome."

Right before her first flight into space her husband Steve said, "Have a ball up there!"

"Oh, I will," Sally promised.

The big day, the astronauts were in special flight suits with helmets, strapped into their seats and almost sitting upside down, their backs on the floor. Mission Control had to check and recheck everything before they would blast off into space. In a book she wrote about it, *To Space and Back* (1989), Sally loved this "one-chance-in-a-lifetime" experience. She was part of the seventh space shuttle mission.

Soon, Mission Control announced the rockets beneath them were on fire and powering up to move them up. "10-9-8-7-6-5-4-3-2-1! IGNITION." This controlled explosion pushed them up and they zoomed through the clouds. Are we there yet she felt like saying aloud.

In a few minutes the space shuttle moved so fast they were up in the blackness of space, the side rockets empty of fuel and falling back to earth. The shuttle's small engine fired, pushing them into an orbit, 200 miles above earth. They went so fast they finished a revolution around earth, going from night to day to night again, every ninety minutes.

"Look at that view," said Bob Crippen.

"Awesome," said Sally. The shuttle had windows that showed a deep blue ocean. The desert in Africa looked bright orange. They saw that the earth is a wonderful jewel of life in the vastness of black outer space.

"Now comes the fun part," she told fellow astronauts. They took off their helmets and wore light flight clothes to float around. Sally did a somersault, turning around five times. She couldn't really swim in the air so she pushed off the walls to move around. The shuttle was actually facing earth upside down as it circled the earth.

"I feel a little strange," she told Dr. Norm.

"It may take a few days to get used to space. Some people may get seasick, like in a rocking boat," he said.

Up there everything was different. Sleeping was different. Eating was different. And science experiments were even done a bit differently. They had the option of going to sleep in a sleeping bag attached to the wall or just floating around. And there was a privacy curtain and toilet

(Sally enjoying a weightless time in her spacecraft.)

with a vacuum like tube that would suck waste coming out of the body. They drank water from a bottle with a straw. If some spilled out it, would become a ball that floated in the room. They heated precooked food in a special oven and took turns doing it. Sally's hair partly floated above her head. She couldn't really comb her hair properly. "So much for a neat hairdo," she told herself.

John Fabian and Sally took turns moving the big robotic arm. Sally used it to move a satellite a certain way to get it up into earth's orbit. Experiments were done on plants and animals in a weightless environment. Mission Control contacted Sally.

"Time to come home, Challenger."

"Roger that," said Sally.

They got into special "G-suits" to spread blood through their bodies as they fell to earth and into its gravity again. They hit the earth's atmosphere and felt some vibration. Then the shuttle became an airplane, not a spacecraft, its wheels down; it landed on a runway, a parachute coming out to stop the shuttle. They were back home on earth!

Sally did this again in October 1984, and stayed in space about eight days. But reporters and the media weren't interested in the science of the mission. They asked about her feelings.

"Do you do the cooking in the space shuttle? If you're frustrated, do you cry? Is it easy to live with the men?"

Sally thought these were private, unimportant questions. She tried to be logical and professional; she didn't enjoy being this "girl in space" news item.

"Gee, they don't ask Bob Crippen these questions. But I enjoy my work. Being up in space is fun. Especially being weightless!"

Making a Difference

On a cold morning in 1986, the space shuttle called Challenger went up. But after two minutes there were big clouds in the air. There'd been an explosion. Seven astronauts, including friend Judy Resnik and schoolteacher Christa McAuliffe, died as it broke apart.

"Can you help us?" NASA asked Sally.

"Of course. What can I do?"

Sally Ride was part of a special study commission to look at why the space shuttle Challenger exploded. It had design problems. They went up in freezing temperatures. That affected a connection between the side (solid fuel) booster rockets and the big fuel tank the shuttle was attached to. A **defect** in design caused smoke and then an explosion of the fuel tank, which had liquid hydrogen fuel. (The defect was later fixed.)

DID YOU KNOW? A number of women have gone up in space after Sally did. This includes Hispanic American Ellen Ochoa, who delivered supplies to the International Space Station, in 1999.

In 1989, a divorced Sally Ride decided to head back to California. She became a physics professor at the University of California and was also director of the California Space Institute (Cal Space) for space-related research. But it didn't seem like enough.

"We need to do more," she told close friend Tamara O'Shaughnessy.

"I agree," said Tam. "What did you have in mind?"

In 1995, she came up with the Sally Ride Earth KAM. It was a NASA program to allow middle school kids permission to get photos of space from a camera on the International Space Station.

She went further with the idea in 2001. Sally, with Tam's assistance, established Sally Ride Science. It was a program to interest students, especially girls, in science. "Many girls think a scientist is a nerdy guy in a white coat with a pocket protector," she pointed out. "But it doesn't have to be that way." Her program came up with the TOY challenge, in which girls could build things, using math and engineering principles. She traveled for several years, most of the year, promoting STEM subjects – science, technology, engineering, and math. (Now STEAM, which includes art, is also pushed in many schools.)

In 2010 Sally told Tam, "I feel really poorly."

"Let's go see a doctor," Tam suggested. To Sally's surprise, she had pancreatic cancer, which causes uncontrolled cell growth. She had to start cancer treatments to fight this disease, but she died from cancer on July 23, 2012, longtime companion Tam O'Shaughnessy at her side, in La Jolla, California. She was 61.

Sally wrote a few other books on space to interest young people, like *Mystery of Mars* (1999) and *Mission: Planet Earth* (2009). The 2009 book talked about global warming, or climate change. It is an issue of concern today that scientists watch closely. Many scientists want Americans to use less fossil fuels like oil and coal so that earth's warming doesn't melt the North Pole. The space shuttle ended its work in 2011. Astronauts have been carried to the international space station from a Russian spacecraft in Kazakhstan since then. But now, America companies like SpaceX and Boeing also plan to ferry astronauts up there.

Glossary

Astrophysics: It deals with astronomy or objects out in the solar system. Astrophysics studies the physical properties of objects in outer space. **Defect:** A blemish or something that is not perfect. **Introverted:** A reserved, shy person. **Nuclear bomb:** A bomb creating a big explosion by using the nucleus in an atom. **Quantum Mechanics:** A theory of matter that involves waves through tiny particles, like atoms. **Satellite:** An object in outer space that circles around a larger object, like the moon around the earth. But private American companies like SpaceX and Boeing want to also ferry astronauts to the space station (2020).

Questions to Think About/Discuss

1. Why do you think Sally liked to play tennis?
2. Were Sally's parents independent thinkers?

   Do you agree or disagree?

3. How come Sally was picked to be the first American woman in space?
4. Would you want to be asked personal questions the way Sally was after being up in the space shuttle?
5. Why should young women get more interested in science and math subjects?

Read More About It

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NEXT UP: THE MOTHER OF MODERN COMPUTER PROGRAMMING JOINS THE NAVY

Chapter 4
Rachel Carson

Environmental writer, Aquatic Biologist

Introduction

During World War II, the chemical ammonium nitrate was used with the explosive TNT and other chemicals to send bombs down on the enemy during the war. After 1945, a lot of ammonium nitrate was left over. Scientists found it could be used for fertilizer, which is put on crops so they will produce more. The **chemical industry** also pushed farmers to kill bugs with **pesticides**. The industry felt the pesticides would also produce more food for the country. It was the first time this was being done on such a national basis. No one thought there could be bad consequences to so much chemical use.

On April 4, 1963, Senator Hubert H. Humphrey said: "A great debate has been raging over the issue posed by the use of pesticides. Last night the nation saw an outstanding television program, 'The Silent Spring of Rachel Carson.' It pointed out the great challenges of our time." People started to become very concerned about pesticide use. That June the government had a special Senate subcommittee hearing because there was evidence the pesticide **DDT** was hurting animals in

the environment. Some citizens worried it hurt people too. Later, DDT use was banned. And Rachel Carson's book *Silent Spring* made it happen.

The Early Years

Well before fourteen year old Marian and twelve year old Robert headed off to school, Rachel was awakened by her mother, Maria.

"Rachel, wake up!" Maria said, gently shaking her four year old. It was barely light out.

"Come quickly. The birds are waiting." On this spring morning the birds were out in force, singing and twittering. Each one wanted to find a mate**.** Rachel and her mother stood just outside the front door and watched.

Suddenly a red breasted robin called "Cheer-ee, cheerup. Chirt, chirt."

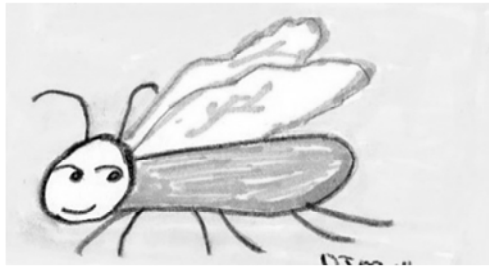
"I see it, Momma, right on our front lawn." Then they heard the dark blue indigo bunting call: "Wheat-wheat-wheat. Chur, chur…. See-it, see-it."

"Aren't those sounds lovely?" her mother asked. "We need to always have birds sing for us in springtime. They are the music of nature."

Maria McLean Carson was a special mother. Her two older children showed no interest in schooling. So, she would fawn over Rachel and school her when she could. Maria had graduated from the Washington Female Seminary in 1887, with honors, and taught school a while. When she met Rachel's father Robert, she quit teaching to become his wife. Rachel was their third and last child, born May 27, 1907.

Robert Carson was not the traditional, reliable **breadwinner** of the family. He did have money to buy 65 acres of land near the Allegheny River in Springdale, about eighteen miles from Pittsburgh, Pennsylvania. The land was actually a wonderful place for a young girl without neighborhood friends close by. Part farmland, part woods, it had

apple orchards, pigs, and chickens. Rachel even had a dog named Candy. Sometimes, Candy tried to jump on the pig, but he was soon tossed off. If she wanted to, there were some nearby streams where Rachel could see fish – or dragonflies.



Her older brother Robert said one day he was going to hunt rabbits. "I don't think that will be much fun for the rabbit," Rachel commented.

Growing up by herself so much, Rachel took to reading and writing a few ideas on paper. She liked reading the *St. Nicholas* magazine for children. When she told her mother the clouds outside looked like they were butting heads, Maria got an idea.

"Why don't you write about the clouds you see, for the *St. Nicholas* magazine?" Maria suggested.

The magazine accepted Rachel's story. It was titled "Battle in the Clouds." It was published in September, 1918, when Rachel was eleven. She wrote a few other stories for the magazine. She became known in school as being quite studious. Later on there was a poem about her in the high school yearbook:

> Rachel's like the mid-day sun/ Always very bright.
> Never stops her studying/ 'till she gets it right.

After graduating Parnassus High School, Rachel decided on the Pennsylvania School for Women in Pittsburgh, Pennsylvania.

The Pennsylvania College for Women (or PCW) was a big private school on a hill in Pittsburgh. It was actually a fancy mansion with sixty rooms. (It later became Chatham College.) Rachel received a partial

scholarship to help pay for it. The family also had to sell some nice family china.

It was a place for Saturday afternoon teas and other social events to help them meet a future husband. A formal prom was held at Schenley Hotel, where the girls wore formal gowns and fancy white kid gloves.

In a college essay Rachel wrote "I love all the beautiful things of nature, and the wild creatures are my friends." Her biology professor, Miss Mary Scott Skinker, an attractive woman who wouldn't wear her glasses, may have heard about that. She convinced Rachel it made more sense to do something more practical than writing, like study biology. Biology is the study of living things and is divided into different courses like the study of **morphology**, animal behavior, the internal and external body (anatomy), and the origins of living animals.

One time her professor pointed something out in their studies Rachel felt was quite true.

"Nature doesn't exist in a vacuum. The world of the bear is also the world of the fish, the wolf, and the eagle. They are 'interconnected,' part of a greater system. This system needs things to be in balance to work together," Skinker pointed out.

"That makes sense," said Rachel. "They depend on each other to survive." Rachel and Mary Skinker became more than school associates over the years; they became friends.

Before the start of her senior year of college, Miss Skinker revealed what her future plans were to Rachel between classes.

"It looks like I'm going to back to school," she told a concerned looking Rachel, who nervously pushed her light brown waves away from her face.

"You're leaving us?" Rachel was so surprised.

"Yes. I have a chance to get a doctorate, to be fully qualified to teach. Or I might do other work in the science world. I'll be either at Cornell University or Johns Hopkins."

"But you'll be so far away!" Rachel lamented.

"Don't worry, we'll find some time to get together. And maybe you can get a scholarship to work at Woods Hole, Massachusetts in the summer – for some experience. I'll be going there myself."

In 1925, Rachel Carson received her degree in Biology from PCW, graduating magna cum laude, a high honor. But she started to fall behind in payments to the school. Her dad sold a few plots of land to help. Rachel also started the advanced science club while there, Phi Mu, partly in honor of Mary Skinker, her **mentor**.

For a brief time Rachel had a scholarship for her graduate work at Johns Hopkins, though in her second year she'd have to earn money and go part time. She would study zoology. It was like biology but more focused on mammals than other living things. She'd also get to do research, and discover new things for herself.

After looking over a copy of a weekly newsletter about the interesting **aquatic** wildlife at Woods Hole's biological lab from Mary Skinker, Rachel admitted to a classmate "I'm so jealous!" She applied for a summer job there. But before she went, Rachel went to visit Mary Skinker at a vacation cabin up in Virginia's Shenandoah Mountains, which had a wonderful view of the valley. Then Mary Skinker took her on a train trip to our nation's capital, Washington, D.C.

"It looks like I may get a job with the Department of Agriculture," Mary bragged as they entered the National Mall. The National Mall is an area near the national Capitol Building. It has gardens and park areas and many museums.

Mary took Rachel to see to Elmer Higgins.

"What can I do with my degrees in biology and zoology?" Rachel asked, thinking a few years ahead.

"Let's see," said Higgins. Elmer Higgins, a serious looking man with dark glasses, would soon become head of the Bureau of Fisheries. "It's not an easy field for women to find work in. You could work in a museum, perhaps, or maybe do research for the government." In the 1920s women were not exactly encouraged to go into science fields, an issue that has lasted into the twenty-first century.

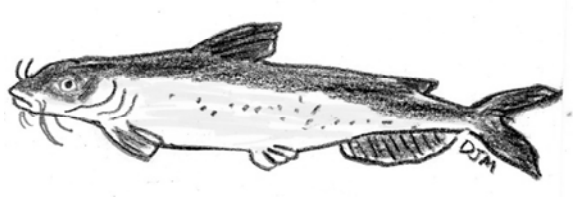
Her first summer at the Marine Biological Laboratory at Woods Hole was very new and exciting. It was her first time living on the east coast, right near the water. She learned a lot about different types of fish, and there were some parties too. But most of her study and work was done indoors. She wrote her friend Dorothy Thompson back in Pennsylvania, "I've given up all hope of getting a tan!"

In the evenings Rachel would walk along the beach, in the moonlight. She could get a closer look at crabs, seashells, and sea-based life. What was it really like living in the ocean all the time, she wondered?

Partway through her studies at Johns Hopkins University, the Great Depression hit. There was little family money from her father. She had to work for her Master's degree part time, and fund her schooling with work as a lab assistant and part-time teacher. Now, Rachel was putting her knowledge of zoology to use, instructing slightly younger students at the University of Maryland nearby.

"Times are tough here," her parents admitted. "Why don't we live in Maryland near you?" Rachel agreed, and found them a two story brick house near the Chesapeake Bay. Even her brother Robert came to look for work, as well as her sister and her two nieces.

When it came time for her final thesis paper, it was difficult to find a subject to study. She finally settled on the forward kidney ("pronephros") development in channel catfish.



Although she completed her Master's degree, Rachel couldn't study further. Her father was in failing health and her sister Marian had a disease called diabetes and only worked part time. The spring of 1934 Rachel wrote her friend Dorothy and said, "Everyone seems to be depending on me. I am soooo busy, but I hear you have a new boyfriend and would love to have you visit this summer! But now I need to find work!"

She took some government tests, called civil service exams, to help her find a position using her knowledge of biology and zoology. Then she marched right back into the office of Elmer Higgins in Washington, D.C.

"Yes, may I help you?" the serious looking Elmer Higgins asked.

"Remember me, Rachel Carson? I have graduated and need a job. I've already taken tests in wildlife biology, aquatic biology, and parasitology. Do you have anything available at your fisheries bureau?"

"Hmm, let me see." He shuffled through the many papers on his desk.

"We don't need a scientist at this point. But we are starting to do publicity about our work on the radio and in print."

"You need a writer? Did you know I had originally majored in English as an undergraduate at PCW? I even wrote stories for the college magazine!" Rachel exclaimed.

"Do you happen to have any of those stories with you to show me?" he had to inquire.

"Uh, no, I don't." Even so, Elmer Higgins decided to give her a chance to prove herself.

Getting There

Higgins wanted the general public, the people who paid taxes and helped pay for their jobs, to learn more about fish: how fish grew up, the habitat of fish on the coast and in the ocean, how the government raised and tried to conserve fish. He wanted Rachel to write over fifty short pieces, called scripts, to be read on the radio. And the topic would be called "Romance under the Water." She was paid $19.25 a week, a fair wage then.

It was certainly urgent Rachel get and keep this job. On July 6, 1935, her father said he wasn't feeling well and walked into the backyard of their home. There he passed away. The family was so poor they paid to have his body taken back to Canonsburg, Pennsylvania to be buried. But they didn't go along. At age twenty-eight Rachel's mother, sister, and nieces were almost totally dependent on her.

Rachel used department research to write about shad fishing in the Chesapeake Bay. (It was an important sport fish.) In her research she found populations of different fish were declining, producing less young every year. She noted in the late 1930s that salmon fish were virtually gone from the rivers of New England, east of New York. (Salmon fish have been in great decline in the Connecticut River and are making a small comeback today, with the help of the Atlantic Salmon Federation.)

By August 1936, at twenty-nine, she became a full time junior aquatic biologist in Higgin's department. She would eventually become editor-in-chief of all published writing for the U.S. Fish and Wildlife Service. Her job also allowed her to go out in the field with assistant bureau chief Robert Nesbit. They went out and studied and gathered statistics on different "food fish" populations. They went to the Chesapeake Bay, where she interviewed other scientists about the ocean and coastal life.

Some of her writing was flowery, too poetic for a government program or printed brochure. “Why don’t you send some of this writing to a magazine?” Higgins suggested. She then had stories published in *The Baltimore Sun* and wrote something called “Undersea” for *Atlantic Monthly* magazine.

Her first book, *Under the Sea-Wind*, talked in great detail about the lives of fish and fowl, such as Rynchops the black skimmer. This black skimmer flew to the outer banks (probably of North Carolina) to nest near the ocean. And the life of Scombe the mackerel, a big surface fish, was also talked about, and other living things by the water.

But it was published at a bad time: December 1941. Japan attacked Pearl Harbor in Hawaii, and the U.S. entered World War II. Few people were thinking about reading about nature for fun. Still, Rachel kept on writing. *The Sea around Us* was published in July 1951. It contained a history of how the oceans formed and life became so varied, including what is now called the web of life.

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She made enough money to buy a summer home in Maine. Her neighbor Dorothy Freeman and her husband encouraged Rachel to keep writing. She wrote another book about the sea; then a woman wrote her about pesticides. A friend and fan in Massachusetts said in a letter that it was horrible how many birds died when they sprayed the Cape Cod area with DDT to kill bugs. DDT had been used during World War II to fight

the disease malaria. Malaria could kill, so it helped protect soldiers and others. But how safe was it back in America?

"This seems like a topic worth writing about," Rachel told Dorothy Freeman.

"I agree. You won't be at peace with yourself if you stay silent on the pesticides issue anyway, will you?" Dorothy pointed out.

"No I won't!" said Rachel.

Making a Difference

(Robert Hines and Rachel exploring marine life, 1955.)

By the mid-1950s, Rachel was writing full time, no longer at the Fish and Wildlife Service. It took over four years to research the book that would become *Silent Spring*. And she spoke to the National Institutes of Health and read at the Library of Medicine (in Maryland) for her facts. Before it was published, in 1962, it was serialized, printed in parts in *The New Yorker* magazine. It became a media sensation; it was critical of the mostly unregulated chemical industry. President John Kennedy even decided to appoint a committee to study the issue of DDT use.

The book starts out like a warning, describing how "there was once in America a town where all life seemed to live in harmony with its surroundings…. The countryside was famous for its abundance of bird

life…. Then a strange **blight** crept over the area and everything began to change… the cattle and sheep sickened and died…. The birds – where had they gone? The few seen anywhere trembled violently and could not fly. It was a spring without voices."

In *Silent Spring* Rachel wrote about aerial spraying – chemicals sprayed from planes that fell down on neighborhoods to kill various bugs. When Dutch elm tree disease hit elm trees, there was spraying that left remains of the chemical on leaves and grass. Worms would wiggle on that grass. Robins would eat the worms with chemicals on them and get sick or die. This also happened with the great American symbol of America, the bald eagle. It ate tainted food and now this bird was becoming an endangered species.

But the chemical industry was in an uproar over this and challenged Rachel's book. The TV show *CBS Reports* decided to do a bunch of interviews with Rachel about her book. They also interviewed Dr. Robert White-Stevens, who spoke for the chemical companies. White-Stevens pointed out we needed chemicals or we'd have worms in our apples and not enough food would be produced. Rachel pointed out "mankind can't master nature. We can't have science without spirit."

Did you know? Though she never married, Rachel adopted her grand-nephew Roger Christie in 1957, when he was five. Mother Maria, her editor and constant companion, died in December 1958, at age 89.

As for Rachel's book, it was supported by a New York City book critic and women's **civics groups**. Though her book sold a lot of copies – it became a bestseller – the critics wouldn't stop. Some said she was a nature fanatic. Others felt she was a hero for the environment.

But Rachel Carson wasn't well. In 1960 she had a stomach problem, an ulcer. Later, the doctor said she had breast cancer but it wasn't that bad. Then she found out the cancer had spread in her body. When *Silent Spring* came out in 1962, she wore a wig. Radiation treatments made her lose her hair, and they were uncomfortable too. In

her book she wrote pesticides could cause cancer. She died of a heart attack in Silver Spring, Maryland, on April 14, 1964, at 56.

Environmental groups, like the Environmental Defense Fund, pushed Congress to phase out or eventually end the use of the pesticide DDT, in 1972. Rachel has inspired many today who want a healthier, safe planet.

Glossary

Aquatic: Growing in or living in the water, like the sea. **Blight:** A disease or something that destroys an area or can get in the way of progress. **Breadwinner:** The people who earn the most money to support their family. **Chemical Industry:** Businesses that make and sell products with chemicals in them, from perfume to pesticides, to household cleaners and food additives. **Civics groups:** Groups that work to improve the local neighborhood or city by volunteering their time. **DDT:** It stands for **d**ichloro **d**iphenyl **t**richloroethane, a synthetic or manmade chemical. It is a white powder and toxic to living things. It's been used to kill insects. **Mate:** A member of a married couple or breeding pair of animals. **Mentor:** A trusted counselor or guide; a coach. **Morphology:** A branch of biology that studies the form of living things. **Pesticide:** An agent or chemical used to kill pests, like bugs.

Questions to Think About/Discuss

1. From what age was Rachel exposed to nature?
2. Mary Skinker was Rachel's mentor. Why is a mentor important?
3. How easy is it to be "the first" to do your job?
4. Rachel was concerned about pesticides. Why are they still used today?
5. Why should we care about birds and bears and other animals?

Read More About It

Morgan, Sally. *Pollution and Waste: Environmental Facts And Experiments*. Boston, MA: KingFisher (Macmill-An), 2002.

Musil, Robert K. *Rachel Carson and Her Sisters: Extra-ordinary Women Who Have Shaped America's Environment.* New Brunswick, NJ: Rutgers U. Press, 2014.

Sterling, Philip. *Sea and Earth: The Life of Rachel Carson*. New York: Dell, 1970.

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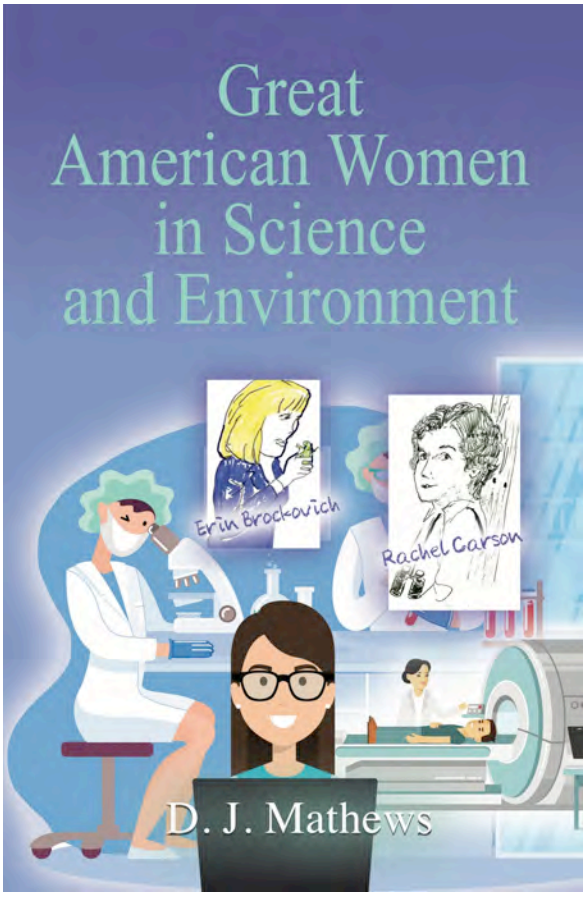

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