

Magic in a Drop of Water

How Ruth Patrick Taught the World
about Water Pollution

written by
Julie Winterbottom

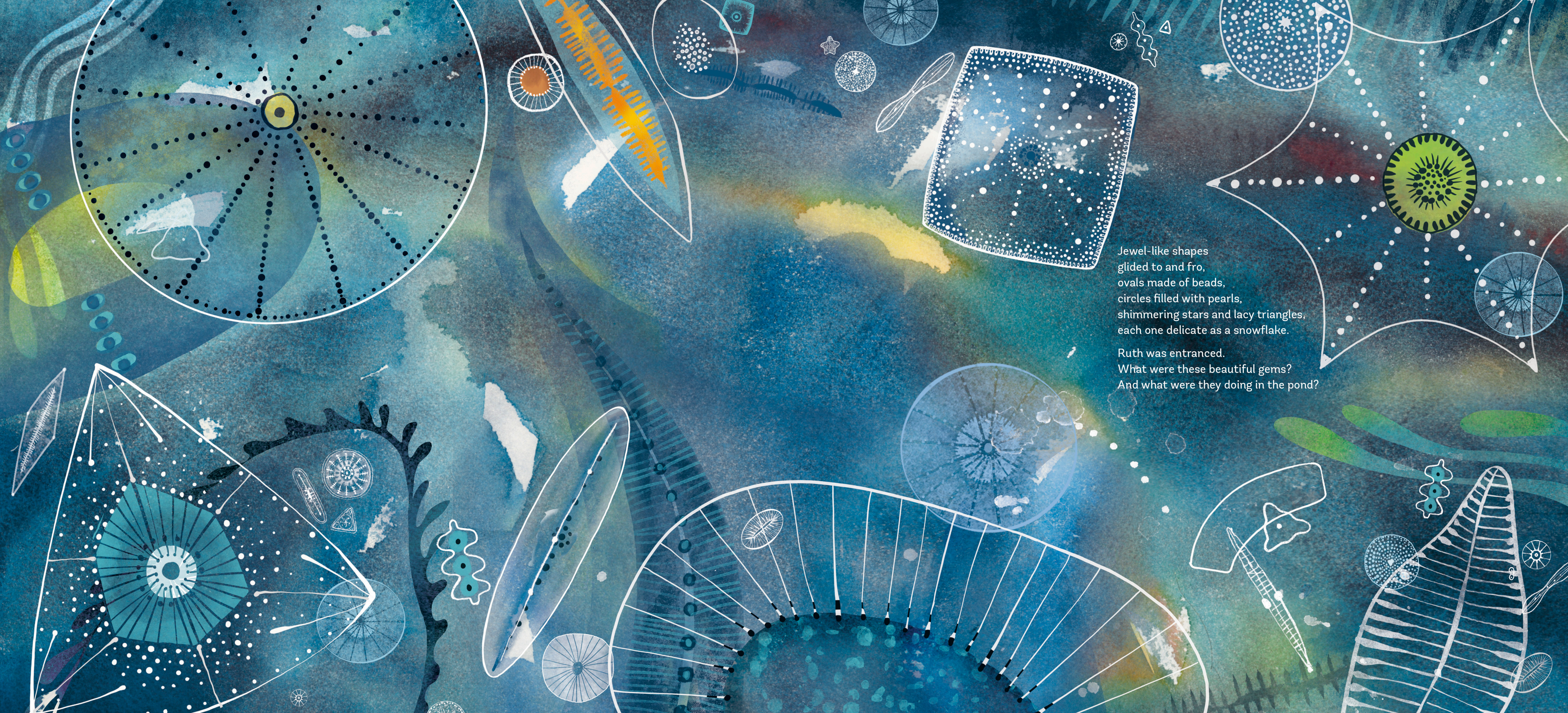
illustrated by
Susan Reagan



When Ruth Patrick was five years old, she fell in love with pond scum.

It happened one Sunday afternoon in 1913. Ruth and her father and sister had just returned from their weekly ramble through the woods near their home in Kansas City, Missouri. Their walks had a mission: Collect anything that looked interesting.

For Ruth, that meant just about everything.



Jewel-like shapes
glided to and fro,
ovals made of beads,
circles filled with pearls,
shimmering stars and lacy triangles,
each one delicate as a snowflake.

Ruth was entranced.
What were these beautiful gems?
And what were they doing in the pond?



She thought about all the plants and animals that live in streams. Not just the diatoms, but the whole community of sponges and spiders, water lilies and worms, everything from the tiniest protozoa to the biggest fish. She realized that if she really wanted to understand pollution, she had to listen to all of them. Not just one voice, but the whole chorus of water dwellers.

No one had ever studied everything in a river before. It would be a huge job.

Ruth jumped in feetfirst.

In very polluted waters,
nothing.

Ruth had found an ingenious way to measure pollution, by observing the life in a river.
Where there are many different kinds of animals, the water is healthy.
Where there are few—or none—it is polluted.

Today, scientists call this idea biodiversity. They use it to measure pollution everywhere.
Not just in rivers, but in forests and deserts and oceans.
They ask, “Who is here? Who is missing?”



More About Ruth Patrick

When Ruth Patrick led her team of biologists into the streams of the Conestoga Basin in Lancaster County, Pennsylvania, in 1948, she was embarking on an ambitious experiment. What made the endeavor even more remarkable was that a woman was at the helm. In the 1930s and '40s, science was considered a man's world. "Most men in those days believed that women had inferior brains and could not possibly achieve in science," Ruth wrote. Fortunately, Ruth's father and her high school botany teacher had nurtured her passion for science, and that gave her the confidence she needed to pursue a PhD in botany.

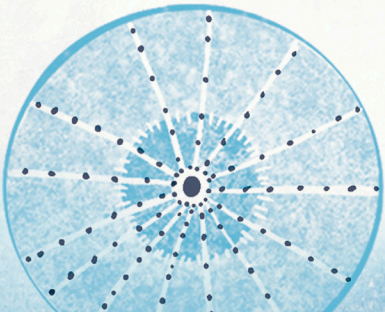
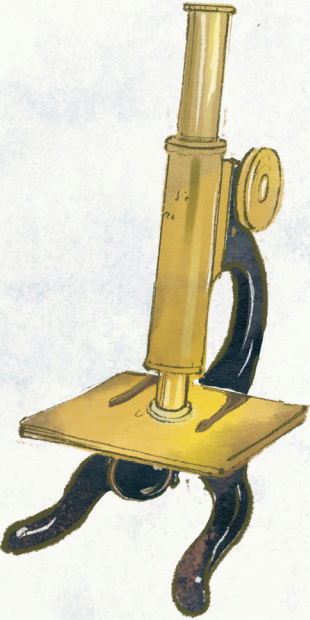
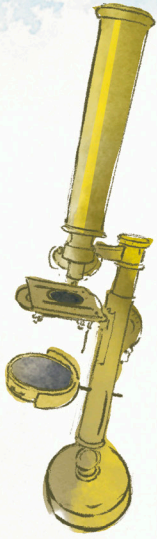
When she went to work at the Academy of Natural Sciences of Philadelphia in 1933, she was not made to feel welcome. She was the only female scientist on staff and she worked without pay until 1945, despite being a world expert on diatoms (pronounced DYE-uh-toms). She was told not to wear lipstick because it made her seem frivolous. And when a funder offered the Academy a large sum of money for Ruth to study river pollution, the Academy president replied that she could not possibly be in charge because "all women waste money."

Ruth refused to let the prejudice she encountered keep her from doing the work she loved. After completing her landmark 1948 study, she found mentors and funding outside the Academy to continue her research in rivers around the world. She confirmed her breakthrough finding that biodiversity is a measure of environmental health, now known as the Patrick Principle. She also showed that diatoms are excellent indicators of water pollution. She even built an artificial stream to learn how ecosystems recover from damage. In 1996, she was given the National Medal of Science, the nation's highest science award, for her pioneering research.

Ruth also spent countless hours persuading politicians and company executives to do something about water pollution. She helped write the 1972 Clean Water Act, the nation's most important water protection law, and was one of the first scientists to speak about global warming. She taught younger scientists—many of them women—how to study a stream holistically. And she never lost her deep curiosity about the natural world. At age one hundred, she was still donning her white pith helmet and wading into streams to look for diatoms. She was still asking herself—and everyone she met—her favorite question: What have you learned today?

Sources for Quotes

"If my friends . . ." Patrick, "Hometown Legends," 4:23. • "You must . . ." Patrick, "Acceptance Speech for 1996 Lifetime Achievement Award" ASLO Bulletin, Summer 1996, p. 12. • "Just one more . . ." Untitled memoir by John Cairns, Jr. 2014, p. 28. (vtechworks.lib.vt.edu/bitstream/handle/10919/25016/CairnsAutobiography.pdf?sequence=1) • "Most men . . ." Patrick, "The Development of the Science of Aquatic Ecosystems," p. 6. • "all women . . ." Patrick, "Hometown Legends," 15:22.



Timeline

- November 26, 1907: Born in Topeka, Kansas
- 1929: Graduates from Coker College with a degree in biology
- 1931: Marries Charles Hodge IV, an entomologist
- 1933: Moves to Philadelphia and begins working at Academy of Natural Sciences of Philadelphia (ANSP)
- 1934: Receives PhD in botany from the University of Virginia
- 1947: Founds Limnology Department (now the Patrick Center for Environmental Research) at ANSP to study pollution in streams and rivers
- 1948: Directs landmark study of the Conestoga River Basin
- 1950: Begins teaching botany at the University of Pennsylvania
- 1951: Son Charles is born
- 1954: Invents the diatometer, a device for collecting diatoms to assess water pollution
- 1955: Leads expedition to Amazon River
- 1966: Publishes study of the effects of a nuclear plant on the Savannah River
- 1972: Clean Water Act, which Ruth helped write, becomes law
- 1996: Awarded National Medal of Science, nation's highest science honor
- September 23, 2013: Dies at age 105

Selected Bibliography

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