

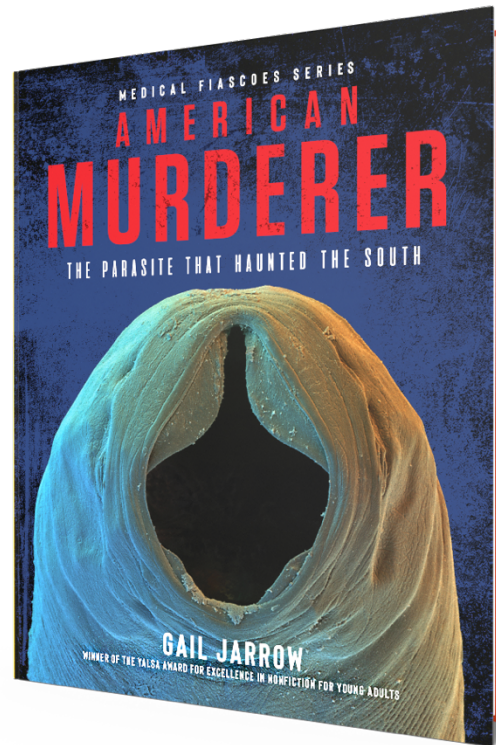
EDUCATOR GUIDE

AMERICAN MURDERER: THE PARASITE THAT HAUNTED THE SOUTH

Written by Gail Jarrow

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Ages: 10-17



ABOUT THE BOOK

In the late 1800s, many southerners in the United States were sick—but no one knew why. People suffered from anemia, weight loss, and pica (dirt-eating). Because they felt weak and sluggish, they were unable to work or concentrate. No remedies helped, and those afflicted often succumbed to an early death. Some physicians, officials, and journalists believed the cause of these symptoms was related to the character of the sick people—calling them lazy and “weak in body and weak in brain power.”(41)

One scientist, however, realized what was killing these people. By proving the existence of a microscopic murderer and later working to eradicate it, he helped to save millions of lives. Gail Jarrow’s third book in the Medical Fiascoes series is a fascinating look at how scientists, an American philanthropist, and teams of field workers labored together to rescue the American South from a tiny, yet deadly, parasite. Detailed photos, firsthand accounts, and startling scientific discoveries will intrigue young readers—and have them drawing parallels to medical challenges facing the world today.

ASTRA BOOKS FOR YOUNG READERS


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PRAISE FOR AMERICAN MURDERER:

★ "Jarrow's impeccable research and fascinating details will keep [readers] hooked, especially when they discover that this creature, known as *Necator americanus*—the American murderer—is a hookworm that once plagued the South...Numerous archival photos place readers in the time period, while a concluding chapter looks at ongoing parasitic-worm dangers across the globe...An engrossing blend of history and STEM." —**Booklist, starred review**

"Jarrow's coverage of the biological mystery is well-organized and deftly explained, and she also skillfully handles the social context of a condition that largely affected marginalized populations. Readers who wish to delve deeper into the topic are assisted by a glossary, bibliography and website list, source notes, timeline, index, and author's note on research." —**The Bulletin of the Center for Children's Books**

"The title is a literal translation of the hookworm's scientific name *Necator americanus*, but the lurid details don't stop there as Jarrow goes on to expand . . . accounts of the creepy creature's life cycle and the discovery of just how disturbingly prevalent 'America's bloodsucking murderer' was in the South in the 19th and early 20th centuries . . . [A] searching look at the borders between science and society." —**Kirkus Reviews**

DISCUSSION QUESTIONS AND RESEARCH

Who was Charles Wardell Stiles? What did he like to do as a child? How did his family's Sunday restrictions prove useful to him when he studied abroad?

In 1838, an Italian doctor named Angelo Dubini, performed an autopsy on a patient and found a tiny worm attached to the patient's small intestine. What was the significance of this finding? Why did he name the worm *Ancylostoma duodenale*?

Several scientists made additional discoveries, including that *Ancylostoma* caused patients to gradually die from blood loss. In 1880, hundreds of European miners developed severe anemia. Many died. How did doctors trace the miners' illness to *Ancylostoma*? What was the best guess to explain how the miners become infected? What new effective treatment "to kill and remove the parasites from the body" was later developed to cure other anemic miners? (20)

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After studying in Germany, Charles Stiles returned to the United States. Stiles “knew that American doctors hadn’t been trained in the past to diagnose hookworm disease.” He believed that hookworm disease “must surely exist here more frequently than reported.” How did he try to educate physicians about hookworm? (23)

Who was Bailey Ashford? How did Charles Stiles’s lecture about parasites have an impact on the work Ashford was doing in Puerto Rico?

How did German scientist Arthur Looss discover how *Ancylostoma duodenale* entered the body? What was the key to preventing hookworm infections?

After Looss’s discovery, more breakthroughs were made. Stiles discovered that hookworms from Puerto Rico, Texas, and Virginia were different from the *Ancylostoma duodenale* he had studied in Germany. What did he name this newly discovered parasite?

“In May 1902, Stiles published a scientific paper in which he announced that a second species of hookworm infected and sickened humans...[and] this worm was causing extensive illness in the southern states, ‘although it is rarely recognized.’” Why wasn’t hookworm disease recognized in the U.S.? (31)

In September 1902, Stiles embarked on a trip to the southern states to observe residents and speak with local doctors. Initially, he saw limited signs of hookworm disease. What made him expand his search? In what environment did Stiles find the most cases? Who suffered from the worst cases of hookworm?

“Afflicted people . . . didn’t have enough endurance to perform even minor work, and they were usually poor because they couldn’t earn a living. Some people had experienced these symptoms for years, and family members had died with the same ailments. None of them knew why they’d been plagued for generations. They just accepted it.” How did the symptoms of this illness lead to stereotypes about poor southerners? (37)

“The farther south [Stiles] traveled, the more hookworm disease he saw.” Why? Why was hookworm primarily a problem in warmer climates? (39)

Stiles believed there were millions of people affected by hookworm in the southern US, and he believed they could be saved. As Stiles traveled through the South, to whom did he speak? What treatment did he describe? How much did the treatment cost?

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What is a privy? Why did Stiles believe that improving sanitary conditions would help eradicate hookworm? How did audiences respond to Stiles’s blunt messages on sanitation and hygiene?

The Surgeon General “agreed with Stiles that to eradicate the disease, more had to be done to educate the public, doctors, and local government officials. The polluting rural sanitation had to be fixed. Hundreds of thousands, probably millions, of infected southerners had to be treated.” What roles did Walter Page, Frederick T. Gates, John D. Rockefeller, and Wickliffe Rose play in the plan to eradicate hookworm disease? (57)

How many states participated in the Rockefeller Sanitary Commission’s (RSC) hookworm campaign? How many speeches did Stiles give in the first year of the RSC to convince doctors of the prevalence of hookworm disease?

What roles did sanitary inspectors and field microscopists play in the RSC program?

How did the RSC use photos and the press to convince people of the need to diagnose and treat hookworm disease?

The RSC partnered with county governments to run free medical clinics, called dispensaries, to assist, diagnose, and treat patients as well as display hookworm educational materials. What was the response to these dispensaries? How were these dispensaries used to disseminate information? What was the atmosphere like at these clinics?

Hookworm diagnosis and treatment were only part of the solution. Charles Stiles wanted to address the root of the problem—unsanitary privies. Why did the RSC decide to take its sanitary privy campaign to schools? How did this campaign lead to improvements in sanitation at schools?

How did local residents get involved with RSC work?

As the RSC neared the end of its five-year hookworm education and eradication campaign, what were the successes of the program? How did the diagnosis and treatment of hookworm disease help dispel the notion that southerners were inherently lazy?

“In 1927, the Rockefeller Foundation announced, ‘Hookworm disease has almost disappeared from the United States.’” Charles Stiles disagreed. Why? (110)

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Soil-transmitted helminths (STH) refers to three parasitological intestinal worms, including hookworm, that continue to threaten people in some parts of the world. Where do the most infections occur today? What treatments are used?

CURRICULUM CONNECTIONS

The first chapter of the book is called “Vampire.” How did hookworms act like vampires?

When Charles Wardell Stiles studied at the University of Berlin in Germany, he took “courses in zoology, botany, physics, chemistry, and anatomy,” and he was most interested in studying a new field of zoology called “parasitology.” What is parasitology? What was the focus of the other courses he took? (14)

“In some communities, [Stiles] found that as many as half of the adults and 80 percent of the children had infections. Based on the symptoms in the medical literature and by southern doctors he met, Stiles concluded that *Necator* had been in the South for decades—maybe for more than two hundred years.” Throughout the book, the author notes that case numbers, even after hookworm was better understood, were typically underestimated. What are some of the reasons it was so difficult to get an accurate idea of the number of people infected? (39)

Children were severely affected by hookworm: “Stiles noted that a hookworm-infected boy or girl under age twenty often had the physical development of a child six years younger. Severely infected children had poor concentration and memory, which affected their learning and school performance.” On top of that, “[m]any rural schools were open just four months of the year, October to February” so that children could work during the growing season. How did hookworm compound the problem of limited time for schooling in rural communities? (39, 95)

In December 1902, Stiles gave a speech about hookworm at a conference in Washington in the hope of garnering more attention to address hookworm disease. What kind of publicity did the speech generate? Ultimately, did the speech help or hurt the cause to eradicate hookworm?

On pages 42–45 in the book, the author explains the life cycle of the human hookworm. How did the hookworm find a host? What is the most serious effect of a hookworm infection? Discuss how our understanding of hookworm disease has changed from the 1800s until today.

Today most biologists agree that “*Necator* likely arrived in the bodies of Africans forced to come to America as enslaved laborers.” Why do biologists believe this? (55)

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In 1909, John D. Rockefeller and his son donated \$1 million to develop the Rockefeller Sanitary Commission for the Eradication of Hookworm Disease, later shortened to the Rockefeller Sanitary Commission. This is equivalent to about \$29 million today. What economic impact did that program have on the South and on the people who lived there? Was the money well spent?

After Gates released a letter to newspapers explaining the goals of the five-year campaign to control hookworm disease, the author explains that the southern response to the program was initially mixed. How did the responses differ? What was the reasoning behind some of the responses opposing the program? Think about national and global health campaigns today. How are things different than they were 100 years ago? How are they the same?

Charles Stiles had a reputation for being arrogant and bluntly insensitive. Frederick Gates determined that the success of the RSC required a leader with “modesty and tactfulness,” so he appointed Wickliffe Rose, a professor and dean at a college in Nashville. Why were these characteristics so important to the success of the RSC? What characteristics did Charles Stiles have that made him so successful as a scientist, but less successful in a diplomatic role? (68)

Throughout the book, the author shares photos of adults and children affected by hookworm. Look at the before and after photos beginning on page 86. What were the outward signs of hookworm disease? What happened to a patient’s appearance once they were cured? These before and after photos were often shown to people to convince them to be tested for hookworm. Why were the photos so critical to convincing people?

How prevalent were sewer systems in the early 1900s? Look at the public health flyer on page 91. Why do you think the board of health used the headline “Sanitary Privies Are Cheaper Than Coffins” in the flyer? (91)

On page 108, the author includes illustrations from a book that taught children and their families about the dangers of hookworm. Throughout the book, the author shows all the different materials and methods used to educate and attempt to eradicate hookworm disease. What methods would you use today to educate people about disease and disease prevention and treatment? How would your methods be different or similar to those used 100 years ago?

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EXTRA CREDIT

Some of the photos in this book were taken using an electron microscope. Compare the image of hookworms taken with no magnification on page 45 to the electron microscope images of hookworms on pages 15, 32, or 135. When was the electron microscope invented? How did it change how we view things like hookworms, pollen, or even blood cells?

Miners became sick with hookworm while building the Gotthard Railway Tunnel. Where is the Gotthard Railway Tunnel? Why is this tunnel significant?

The author notes that while “hookworms alone usually don’t kill a patient, the weakened body becomes more susceptible to other deadly ailments such as pneumonia, malaria, tuberculosis, and typhoid fever.” These illnesses, along with pellagra, were common in the South in the early twentieth-century. Find out more about one or more of these illnesses. Are they still common today? (45)

Who was John D. Rockefeller? How did he amass his fortune? When was the Rockefeller Foundation established? What causes were supported by the foundation?

Also in Gail Jarrow’s Medical Fiascoes series:

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Blood and Germs: The Civil War Battle Against Wounds and Disease

Read Gail Jarrow’s Deadly Diseases series:

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Bubonic Panic: When Plague Invaded America

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Guide written by Jane Becker