

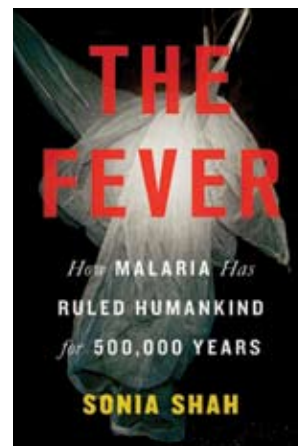
A Feverish Malthusian Defends Malaria As a Non-Problem

by Donald Roberts, Ph.D.

The Fever: How Malaria Has Ruled Humankind for 500,000 Years

by Sonia Shah
 New York: Farrar, Straus and Giroux (Sarah Crichton Books), 2010
 Hardcover, 307 pp., \$26.00

In contrast to Shah, I am an entomologist who has worked for 45 years to combat malaria, and I state unequivocally, from my experience in the developing sector, that DDT is an essential part of the armamentarium against malaria, and that indoor residual spraying with DDT



Clad in presumptions of an enlightened understanding of malaria, its history and evolution, Sonia Shah's *The Fever* presents a subtle array of denunciations and smear tactics against the tools, the methods, and even the motivations of key individuals who endeavored to control malaria, both past and present. Shah comes across as a journalist who is looking for fame. She describes herself as hating mosquitoes, but perhaps she hates people more.

The Fever is a book written to charm and soothe other people like herself, the armchair environmentalists who think people are the problem—and who want to eradicate DDT and other essential public health insecticides, not eradicate malaria.



Author Sonia Shah thinks people, not malaria or mosquitoes, are the problem.

is most effective in stopping the spread of malaria. The key here is the unique spatial repellency of DDT: Mosquitoes, even those that are DDT-resistant, are

repelled by DDT and, more often than not, do not enter a house that has been sprayed.

I say this at the outset of this review, because it is crucial to keep in mind that Shah's denunciations of past and present programs to control or eradicate malaria are consistent with those who are responsible for allowing malaria to continue to kill millions of people—instead of eradicating the disease. My intention here is, for the record, to counter some of the misstatements Shah makes to build her case that malaria isn't all that bad.

Precise Imprecision

The Fever introduces the reader to malaria parasites and possible evolutionary scenarios for species that infect humans. The author scrupulously avoids using technical terms in describing the natural

histories of the parasites, the diseases they cause, and the mosquitoes that transmit the parasites. Having sidestepped a defined technical vocabulary, Shah's writing must rest on the depth of her understanding and interpretation of the underlying science. This becomes problematic when she carelessly refers to the unicellular parasites as "gestating" in the mosquito, and states that the parasites cause blood to "curdle" in veins.

Although the terms are

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Still River Alliance

Contrary to Shah's belief, the New England mosquitoes were there before the early settlers built mill ponds. Here, an old mill pond in Danbury, Conn.



Eugenio Arima/Michigan State University

A saw mill near Brazil's western Trans-Amazon Highway. It was not government development projects in the Amazon that led to malaria increases, as Shah claims, but the government's phaseout of DDT house spraying—in response to WHO anti-insecticide campaigning and guidelines.

not precisely wrong, they are nevertheless precisely imprecise, and contribute little to a clear definition of what occurs with parasites in mosquitoes or with parasites in human blood. But far worse than her failure to use precise descriptors in discussions of technical details, Shah mounts a number of deceptive and erroneous arguments.

For example, in Chapter 4, Shah reports that around the time of the Revolutionary War, the main eastern U.S. malaria mosquito caused major malaria outbreaks in New England, because the mosquito had spread north as settlers constructed large numbers of millponds. She infers that people were responsible for the outbreaks, because the settlers perturbed natural environments in ways that favored northward extension of the mosquito's range, and she asserts that those environmental perturbations led to malaria outbreaks where previously there had been none.

Shah's facts are wrong. Dr. Bruce Harrison, one of the world's leading malaria vector taxonomists and mosquito biology experts, states in a review of Shah's argument that Shah is clearly "... wrong in presuming (stating) that *An. quadrimaculatus* came up from the south when the dams were built. I think the current known distribution indicates that [the] species was there with the native Americans, before the settlers arrived and be-

fore malaria arrived in the new world."

Another story Shah related to further her claim that humans are at fault in promoting malaria takes place in the Amazon region of Brazil. Between 1970 and 1999, she says, the malaria caseload in the Amazon region of Brazil zoomed from around 30,000 to 600,000. She attributes those huge malaria increases to agricultural and mineral extraction projects promoted by the Brazilian government. In reality, however, Shah's example of increasing malaria in Brazil illustrates how the malaria burden grows when national programs stop spraying the inside of houses.

I was researching malaria, in collaboration with Brazil's national malaria control program, in the Amazon Basin during the 1970s, and I have monitored the course of its malaria control efforts ever since. I can testify that Shah's information is factually wrong. She should have looked more closely at what happened with Brazil's malaria control program, instead of making superfluous claims about the contributions of new extraction projects.

With a modest research effort, Shah would have learned about the large movement of people and extensive landscape changes in the 1970s, with construction of the Trans-Amazon Highway and the colonization program. That massive alteration of landscape and large movement of malaria-susceptible people

into those areas did *not* result in major outbreaks of malaria.

In fact, the mere 30,000 cases Shah cited for the 1970s were the result of Brazil's use of DDT. Spraying DDT in houses prevented malaria outbreaks along the Trans-Amazon Highway. Large increases in malaria only started in the 1980s, when the government began to ramp down its house-spraying program in compliance with World Health Organization (WHO) guidelines.

During the 1980s and 1990s, the number of sprayed houses in Brazil declined and the number of malaria cases grew. By inferring that malaria is caused by man's impact on the environment, Shah misses the point that our perturbations of natural or already impacted environments can have a positive, negative, or even no influence on malaria transmission.

Malaria: No Big Deal?

In a chapter titled "The Karma of Malaria," Shah attempts to characterize malaria as a normal and natural part of life in malaria-endemic countries. She argues that the perception that malaria is a great killer and that it must be stopped at any cost, is not a view shared by the populations at actual risk of malaria. People in endemic regions, she asserts, accept malaria as a normal part of life. In other words, malaria is no big deal.

Shah touches on this theme repeatedly, as revealed in her statement about a boy who has just been diagnosed with malaria: "The boy, the reader is led to understand, has just received a death sentence. In fact, in endemic countries such as Mozambique, people get tested for malaria not because they are worried that they have it, but in the hopes that they do, for that would mean they don't have anything worse. The positive malaria diagnosis the boy received would have been, in fact, a solace."

This is a false and imperious argument. If there is any relief whatsoever in getting a malaria diagnosis (and I have), it comes from knowing that the disease can be treated. There can be some level of resignation at the repeated exposure to any disease, but this does not mean that people accept as desirable the burdens of malaria illness, the chronic anemia, the risk of low fertility, or the risk of death.

Does Shah actually think people would choose to have an enlarged spleen and liver, or to be severely anemic, or to have



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Fred Soper (1893-1977) was an American epidemiologist who pioneered methods of disease eradication for malaria, yellow fever, and hookworm, in particular. During World War II, he worked with the Secretary of War in programs to control typhus and malaria. After the war, he directed the Pan American Health Organization.



NLM/NIH

*Soper made use of laboratory analysis in his eradication campaigns. Here, microscopists are screening *Anopheles* larvae for *Anopheles gambiae* in the 1930s.*

a neurologically damaged child, or to lose their infants to infections that can be prevented? Accepting malaria as a normal part of life doesn't mean that people wouldn't opt to be free of it, if given a chance.

Contempt for Malaria Workers

Shah treats those who study malaria or work to control it with equal disdain. She relates a story about a visit to a research institute in Panama, during conditions of malaria outbreaks, where she describes how personnel were just talking and relaxing, instead of frantically attending to malaria problems. She generalizes from this experience as follows: "Anyone who has worked with health authorities in malaria endemic countries will recognize the pattern. Noises are made about the urgency of the malaria problem, the travesty of thousands dying from mosquito bites—and then the sleepwalker returns to bed."

Her message that malaria workers are willing to talk about fighting the disease, but aren't willing to do much, is absurd—an insidiously mean and unfair characterization. The institute in Panama is a research organization with staff working on many subjects, not just malaria. The government's National Malaria Control Program (NMCP) was the entity responsible for responding to the outbreaks, not the research institute that Shah visited.

As for NMCP people, my experience is the opposite of what Shah says. I find that malaria control workers are diligent and hard working. Almost without exception, they are required to abandon their families for days or weeks of work, and perform hard and arduous duty even though they are underpaid, underfunded, under-equipped, and understaffed. They deserve respect. Shame on Shah for such mean and unfair characterizations.

Another example of false logic is Shah's assessment of the relationship between malaria and poverty. She seems to be saying that those who suggest that controlling malaria will be an economic boon to malaria-endemic countries are wrong. She states: "... while [Jeffrey] Sachs and others have conducted widely cited studies on the correlations between malaria and poverty, none has been able to pinpoint a cause-and-effect relation. Does malaria cause poverty, as they say, or conversely, is poverty responsible for malaria?"

Shah continues this mindless argument without ever noting that no one proposes that it is either one way or the other. In fact, it is both; malaria is such a huge burden on malarious populations that it most assuredly contributes to poverty. Likewise, poverty is commonly associated with the substandard living conditions—for example, no screening, walls with cracks, or no walls at all—that

favor malaria transmission.

A reasonable perspective, which Shah apparently does not embrace, is that fewer malaria deaths and malaria infections will greatly improve human capacities and promote economic advancement. Likewise, to the extent that economic advancements reach the people, improvements in living conditions—for example, screening and better-enclosed houses—this will most assuredly help reduce malaria.

A Misinformation Barrage

Shah saves her most blistering barrage of misinformation for coverage of the global malaria eradication program and the spraying of DDT on house walls. She introduces DDT with intertwining dark messages of chemical warfare, Nazis and the Jews, nuclear bombs, and Hiroshima. Outrageously, she insinuates that Fred Soper, an experienced DDT champion, was a "fascist," presumably because Soper carried out his wars against diseases with military precision.

Shah reports that the Allied military decided to advance the use of DDT during the war, "despite its alarming toxicity profile." She never explains what she means by DDT's "alarming toxicity profile." Today, after decades of study, DDT is considered safe for human exposure. In fact, there has never been a documented death or human illness as a result of



NLM/NIH

Dusting civilians and Allied troops with DDT saved millions of lives from the scourge of typhus during and after World War II. Here, typhus prevention in Italy during the war.

exposure to DDT in the environment.

Shah prepares the reader for her anti-DDT onslaught by the old, but ignorantly false argument that DDT had no role eliminating endemic malaria from the United States. She states authoritatively, "By the time . . . the United States created the Malaria Control in War Areas program in 1942 (which would later become the Centers for Disease Control), the weaknesses of their antimalarial methods didn't matter anymore. Malaria had already nearly vanished."

The facts are otherwise. By the early 1940s, the ability of the United States to exert effective control over malaria was still limited, in spite of growing wealth and improving standards of living. As revealed in government documents of that era, control was possible only in urban settings where draining and eliminating aquatic habitats for mosquitoes, and using larvicide to kill mosquito larvae, was cost-effective. In contrast, the only real progress in poor rural areas was to screen houses to prevent mosquitoes from entering and

transmitting disease. Unfortunately, screening required rural people to spend money they didn't have.

The office of Malaria Control in War Areas (MCWA) was created in 1942 shortly after the bombing of Pearl Harbor. In time, spraying houses with DDT became established within the program, and DDT was demonstrably the most effective method of stopping malaria transmission in and around the military installations. Beginning in 1945, the MCWA extended its coverage to all malarious civilian areas. From January 1945 to September 1947, 3.2 million houses were sprayed with DDT, and millions more after that.

But Shah claims that the MCWA program was weak and contributed nothing to malaria elimination—a claim seemingly based on her assumption that malaria was not a problem by the time of this broad spray coverage. Before making this assumption, she should have perused some original sources of historical data. In 1945, for example, Arkansas reported 1,182 malaria cases. After DDT spraying of houses that year, malaria cases dropped to 849 cases in 1946.

Arkansas is one of several states with deeply entrenched rural malaria problems in the 1940s, which was attacked with spray coverage. The pesticide spraying provided other health benefits too. Missouri, for example, sprayed 85,000 homes in 1945, and by 1946, the number of cases of fly-borne diseases dropped by 66 percent.

Eradication Bias

Shah remains highly biased against the global eradication program throughout her review of the program's achievements. She mentions the old saw of the program eradicating malariologists, not malaria. She claims that a DDT-sprayed house smelled like chlorine—actually it doesn't. Shah falsely asserts that DDT killed chickens, cats, and so on.

Having worked for decades in many settings in various countries of the Americas, where houses were sprayed or were being sprayed with DDT, I have never heard mention of DDT being a problem for domestic animals. Perhaps there were unusual food chains and events in other areas of the world that led to such events,

but they were not a normal outcome.

Shah is correct that the agricultural uses of DDT led to problems of DDT resistance, although her description is not correct. She describes mosquitoes alighting on DDT-dusted vegetation and concludes that what didn't kill them, only made them stronger. Of course, resistance only improved chances of their survival in the presence of DDT, so it did not make the mosquitoes stronger at all. In fact, resistance could actually reduce mosquito fitness for survival away from DDT-sprayed vegetation.

Shah describes DDT resistance as a huge and growing problem for success of the global anti-malaria program, a view promoted by the anti-pesticide faction. Apparently, she does not know that the last malaria program review in 1969, found that only about 1 or 2 percent of malaria-endemic regions exhibited insecticide or drug resistance, or other technical problems.

With this misanalysis of resistance, Shah then states that the problem of DDT resistance caused countries to begin using alternative methods of control, such as mass drug administration (MDA). She illustrates this by describing Brazil's use of chloroquinized salt in the Amazon Basin. Apparently, Shah does not know that *Anopheles darlingi* is the major malaria vector there, and that after decades of DDT use, the Brazilian populations of *Anopheles darlingi* are not now, and never have been, resistant to DDT. Actually, Brazil's experiment with chloroquinized salt had nothing at all to do with DDT resistance. Shah rightly informs the reader, however, that drug resistance was sometimes the dominant result of MDA programs.

DDT Demonization

After her wide-ranging warm-up to the supposed failings of DDT and malaria eradication, Shah begins demonizing DDT, with the same erroneous claims used in the 1960s. Shah repeats the DDT-robin story as described by Rachel Carson in her book *Silent Spring*. More than any other part of *The Fever*, this story reveals that Shah does not know what she is talking about, or is willfully lying. The claim of DDT endangering the robin was disproved decades ago. In fact, Shah overstates Carson's story by claiming that robins were eliminated completely from the Michigan State University campus. Not even Carson made such an out-



U.S. Army

The office of Malaria Control in War Areas sprayed millions of U.S. houses with DDT to stop the spread of malaria, contrary to Shah's claim that malaria had "nearly vanished" by the 1940s. Here, MCWA training a malaria control unit in swamp draining in Louisiana.

geous claim, nor have others. Yet, Shah presents it as gospel truth.

In sequence, Shah quickly announces the end of the global malaria eradication program and the resultant resurgence of malaria in countries around the world. She ties all this to the ending of funds from the United States, which she reports as occurring when the five-year appropriation for the global eradication program ended, in 1965. The end of that appropriation, Shah says, was just the excuse the endemic countries needed for abandoning their malaria programs.

Again, Shah's conclusion is wrong. The internal reports of the World Health Organization throughout the 1970s document how countries struggled to continue their malaria programs in spite of declining international support, and in spite of environmental activist pressures against DDT use. Surprisingly, many countries succeeded in continuing their programs.

Even Shah's assessment that program funding ended in 1965 is wrong. The U.S. Agency for International Development (AID) and the Public Health Service actually continued funding national eradication programs at incrementally lower levels into the early 1970s.

In her closing comments about the

global program, Shah makes sweeping denunciations. She states that the global program had made malaria more vicious and harder to control than before, and that chloroquine and DDT had been rendered toothless. Without doubt, where drug resistance evolved the control programs had to switch to alternative drugs. However, in the case of DDT, its primary mode of action is as a *spatial repellent*, not as a killing agent. Hence, resistance signalled only a failure of DDT toxicity, so DDT could still exert control over ma-



Ixtia/Creative Commons

A malaria control sign in Zambia. Shah questions the value of malaria eradication campaigns and pesticide spraying. In her view, malaria isn't a problem, and the natives aren't worried about it.

laria through its spatial repellent action.

Last but not least, there is no evidence that the malaria parasite became more vicious as a consequence of becoming resistant to chloroquine. Shah's statement that chloroquine and DDT had been rendered toothless by the end of the program is nonsense, as the 1969 program review makes clear.

Overall, Shah criticizes malaria control methods (drugs, insecticides, and insecticide-treated mosquito nets), both past and present, as highly flawed. She criticizes organizations that work to control malaria as ineffectual. She attempts to undermine credibility of malaria control proponents by suggesting ulterior motives for their advocacy. She questions the value of the achievements of the global malaria eradication program, and proposes that programs that continue spraying houses are a waste.

The author makes no constructive suggestions about what she thinks should be done as alternative methodologies for malaria control. Additionally, she never even mentions that large and extremely well-funded environmental and anti-insecticide campaigns were the primary force in stopping malaria control programs.

Indefensible

In conclusion, Shah's criticisms of DDT and malaria eradication are erroneous and indefensible. To question the value of the global malaria eradication program, one must trivialize the hundreds of millions of infections that were prevented, the elimination of malaria threats from large geographical areas, the prevention of millions of premature deaths, and the great reductions in maternal and infant mortalities.

As Shah herself states, life expectancy in Sri Lanka increased from 43 to 57 years as a result of the global malaria program. Just imagine: across Sri Lanka's population of 15 million, this would equate to an increase of 210,000,000 years of human life. This example is for just one small country. Even greater changes in life expectancy occurred in other countries, all as a result of spraying DDT.

How can any reasonable person seriously question the value of a program that can produce such results in just 10 years at a cost of only \$1 billion?