

## **Rehabilitating Rachel Carson**

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## Rehabilitating Rachel Carson

Rachel Carson launched the modern environmental movement. She was posthumously awarded Presidential Medal of Freedom, and has conservation areas, prizes and associations named in her honor.

Yet Carson is also regularly accused of killing more people than Hitler. Her accusers hold her responsible for a ban on the use of the insecticide DDT (Dichloro-Diphenyl-Trichloroethane) which allegedly halted a campaign that was about to eradicate malaria, and blame her for millions of deaths from malaria in the Third World.

This claim has been made repeatedly, and in strident terms, on the *Wall Street Journal* editorial page, Fox News and other outlets associated with the political right. The basic premise of the story, that pressure from environmentalists has hindered the fight against malaria, has been accepted by writers in the *New York Times*, *Washington Post* and so on. This has led to pressure on the World Health Organization (WHO) and other bodies to reverse the putative ban, pressure which has led WHO to replace the head of its antimalaria division and announce changes in policies.

Perhaps the most striking feature of the claim against Carson is the ease with which it can be refuted. It takes only a few minutes with Google to discover that DDT has never been banned for antimalarial uses, and that it is currently in

use in at least 11 countries. Although outdoor spraying has been abandoned, DDT and other insecticides are used in countries with malaria either to spray interior house walls or to impregnate bednets.

It takes only a little more time to discover that the attempt to eradicate malaria by the spraying of DDT was a failure, in large measure because Carson's warnings that overuse of insecticides would lead to the development of resistance in mosquito populations were ignored. Modern approaches to the use of insecticides are far closer to the methods advocated by Carson than to the practices she criticized.

How then, did the idea that Carson was responsible for millions of deaths gain currency, to the point where US Senator Tom Coburn blocked a Senate resolution celebrating the hundredth anniversary of her birth?

Any good myth requires a few grains of truth, and the DDT malaria story has a couple. First, the 2001 Stockholm Convention on Persistent Organic Pollutants prohibits the use of DDT except for disease control, and calls for DDT use to be phased out when satisfactory alternatives are available. The phaseout commitment is often loosely referred to as a "ban" and then commonly conflated (either through ignorance or malice) with the 1972 ban on the agricultural use of DDT in the United States. A prime example is the malaria clock maintained by Fox News junk science correspondent Steve Milloy which blames the US ban for 14 billion cases of malaria and 95 million deaths.

Second, by virtue of its massive misuse in the 1960s and 1970s, DDT gained

a bad reputation that was hard to shake, even when the proposed uses were much more limited. WHO's Allan Schapira has stated that donors sometimes insist on the use of an insecticide other than DDT and this “has occasionally occurred in countries where the government wished to use DDT, and there was evidence that it was the best option for malaria-vector control.”

Related to this, there has been a long-running, and at times intemperate, dispute within the community of health professionals between advocates of house spraying (for which DDT is often used) and advocates of bednets (which typically use other pesticides). Supporters of house spraying are often quoted by those pushing the DDT myth.

But these grains of truth are scarcely enough to generate a myth as widespread as that of Rachel Carson, baby killer. And there is no real commercial interest here. DDT is in the public domain and the only producers are India and China. What, then, accounts for the campaign against Carson?

As with other debates on environmental issues the answer to this question requires an exploration of a network of think tanks, lobbyists and commentators who turn fringe science into received knowledge on the political right. And digging a little deeper, the campaign against DDT turns out to be linked to another public health scandal, the attempt by the tobacco lobby to discredit scientific evidence of the health risks of exposure to tobacco smoke.

The story begins in the 1940s. Swiss chemist Paul Hermann Müller won

the 1948 Nobel prize for Medicine "for his discovery of the high efficiency of DDT as a contact poison against several arthropods." It was used in World War II by Allied forces with striking success to protect troops and civilian populations from the insects that transmit malaria, typhus and other diseases.

At the same time as fighting infectious disease, however, the armed forces were contributing to the great epidemics of the 20th century, lung cancer and heart disease, by distributing free cigarettes to their troops. Although the connection between lung cancer and smoking had been observed as early as 1912, it had not yet been clearly established.

After World War II, the use of DDT continued apace. In 1955, the World Health Organization adopted a Global Malaria Eradication Campaign, based on spraying the interior walls of houses with DDT to protect residents against malaria-carrying mosquitoes. DDT was particularly well suited for this task because it was persistent – a wall sprayed with DDT would kill mosquitoes who rested on it for six months after spraying.

Although support was strong, there were always misgivings about the financial resources and organization capacity required for an approach that relied on universal and consistent application of regular DDT sprays. Despite the word "global", the program was never extended to sub-Saharan Africa, where these problems were most acute, and where the technical difficulties were greatest.

But the failure of the DDT eradication program was not due to underuse:

quite the opposite. In the first flush of enthusiasm for DDT in the 1950s, the range of applications was rapidly extended from disease control to agricultural and general uses. DDT was widely used in both developed and less developed countries to protect crops, and to eliminate insects perceived as nuisances. As with antibiotics, indiscriminate use of DDT in agriculture meant that the problem of resistance in mosquito species was exacerbated.

Smoking was also booming in the 1950s. The taboos against smoking for women were breaking down, and increasingly sophisticated advertising techniques help to sell the association between smoking, glamour and independence. The Marlboro Man appealed to male fantasies, while Chesterfield, Lucky Strike and a little later Virginia Slims ('you've come a long way, baby') were pitched at newly emancipated women.

In the early 1960s, the tide turned against both smoking and DDT. The stage was set for two decades-long battles, initially separate, but ultimately closely related.

Rachel Carson, a prominent science writer, had long been concerned about the impact of DDT and other pesticides on the environment. In 1962, her ideas were crystallized in the bestseller, *Silent Spring*, which made the case that overuse of pesticides threatened wildlife, human health and even their usefulness against malaria. She wrote:

No responsible person contends that insect-borne disease should be ignored. The question that has now urgently presented itself is

whether it is either wise or responsible to attack the problem by methods that are rapidly making it worse. The world has heard much of the triumphant war against disease through the control of insect vectors of infection, but it has heard little of the other side of the story - the defeats, the short-lived triumphs that now strongly support the alarming view that the insect enemy has been made actually stronger by our efforts. Even worse, we may have destroyed our very means of fighting. ...

Malaria programs are threatened by resistance among mosquitoes. ...

Practical advice should be 'Spray as little as you possibly can' rather than 'Spray to the limit of your capacity' ..., Pressure on the pest population should always be as slight as possible.

The Nutrition Foundation, an organization run by chemical and food companies, led a vigorous attack on *Silent Spring*, accusing Carson of being a biased and unscientific amateur. Despite this and other attacks from chemical companies and some scientists, within a year Carson was vindicated when the President's Science Advisory Committee produced a report calling for a reduction in the use of persistent pesticides.

Carson's central theme, that DDT and its metabolites are persistent poisons which increase in concentration on the way up the food chain was borne out was borne out by subsequent research, as were her concerns about the impacts on bird populations. In 1972 the use of DDT in US agriculture was banned, though an exception (which has apparently never been used) was made for emergency public health applications.

Meanwhile, the DDT-based campaign against malaria ran into the trouble

that Carson had warned about. The high-water mark of the campaign came in 1964. Sri Lanka had reduced the number of malaria cases from millions after the end of World War II to just 29. Sri Lanka declared victory over malaria and suspended DDT spraying. The remaining few cases could be mopped up with anti-malaria drugs. WHO called the eradication program “an international achievement without parallel in the provision of public health service”.

But then malaria returned. In 1968-69 there was a malaria epidemic in Sri Lanka, with half a million cases. Sri Lanka went back to spraying DDT, but because DDT had been extensively used in agriculture, mosquitoes had evolved resistance. DDT became less and less effective, eventually forcing Sri Lanka to switch to malathion in the mid 70s. Other countries in the eradication program suffered similar setbacks and by 1969, the 22nd World Health Assembly had concluded that the goal of global eradication of malaria was not feasible. The financial and debt crises of the 1970s led to more cuts, and a further resurgence of malaria.

As regards smoking, the crucial event was the *Report on Smoking and Health*, issued by US Surgeon-General Luther Terry in 1964. Although the relationship between smoking and lung cancer had been reported previously, this authoritative report established the link in the public mind, despite a lengthy campaign of denial and deception by the tobacco companies.

By 1990, it seemed that the public health issues surrounding both DDT and smoking had been largely resolved. In developed countries, DDT had been replaced

by less persistent, and less environmentally damaging, alternatives. Critics of the 1972 ban, like entomologist J Gordon Edwards, were reduced to publishing in fringe journals like Lyndon LaRouche's *21st Century Science*. And the tobacco companies had largely abandoned the strategy of claiming that the dangers of smoking were unproved. Indeed, in defending themselves against lawsuits from smokers with lung cancer, they argued the opposite, that smokers must have known the risks they were taking.

In the 1990s, however the situation changed radically, first for tobacco and then for DDT. The tobacco industry was faced with the prospect of bans on smoking in public places driven primarily by concerns about the health effects of passive smoking. Realising that such restrictions would prompt large numbers of smokers to quit, the industry sought, once again, to cast doubt on the scientific research.

Given its bad, and well-deserved reputation, it was evident that a campaign focused on tobacco alone was doomed to failure. So the industry tried a different tack, an across-the-board attack on what it called “junk science” about environmental and health hazards. Its primary vehicle was The Advancement of Sound Science Coalition (TASSC), a body set up by PR firm APCO in the early 1990s and secretly funded by Philip Morris. Although the term “junk science” has no real meaning, it provided a convenient basis for attacking any scientific work that might harm the interests of APCO's corporate clients.

TASSC had an advisory board with a number of conservative luminaries (some of whom later regretted their involvement) but the real work was done by an

activist named Steven Milloy, with whom the stories of tobacco and DDT intertwine for the first, though not the last, time. TASSC and its website junkscience.com attacked the environmental movement across the board, on everything from food safety to the risks of asbestos. The result was that advocacy pieces dismissing the scientific evidence on the health dangers of passive smoking, for which Phillip Morris was paying, appeared to be just part of the general campaign against “junk science”.

One of the issues Milloy took up with a good deal of vigor was DDT, where he teamed up with J. Gordon Edwards. With the aid of Milloy's effective advocacy, Edwards' attacks on Rachel Carson moved from the LaRouchite fringes of the political spectrum to become part of the orthodoxy of mainstream Republicanism.

By the late 1990s, the tobacco industry's fight against restrictions on passive smoking was clearly headed for failure. Milloy switched his primary focus to climate change. He collected money from Exxon and other fossil fuel companies. This switch only made DDT more useful as a rhetorical stick with which to beat environmentalists.

Tobacco companies also created a European version of TASSC, the European Science and Environment Forum (ESEF). The Steve Milloy role at ESEF was filled by another tobacco lobbyist, Roger Bate. Like Milloy, Bate took up DDT as an issue in the late 90s.

In 1998, the new Director-General of the World Health Organization, Gro

Harlem Brundtland established the Tobacco Free Initiative to reduce death and disease caused by tobacco use. This represented a threat to the interests of tobacco companies, so Bate pitched a plan to them to attack the WHO for being concerned about smoking when they should be using DDT to fight malaria.

The environmental movement has been successful in most of its campaigns as it has been 'politically correct,'” he explained (Tobacco Archives, 09/98). What the anti-environmental movement needs is something with “the correct blend of political correctness (. . . oppressed blacks) and arguments (eco-imperialism [is] undermining their future).

In Bates' telling of the story, given in a recent interview with Aaron Swartz, tobacco companies did not give him the money he asked for but he went ahead anyway to establish “Africa Fighting Malaria”, an astroturf organization based in Washington DC. It turned out to be a good career move.

In his pitch Bate suggested that they could drive a wedge between public health and the environment by suggesting that we had to choose between birds and people. That by banning DDT to protect birds, environmentalists caused many people to die from malaria.

But anyone who reads a history of the struggle against malaria will know that isn't true. Banning the agricultural use of DDT helps the environment and, by

slowing the evolution of DDT resistance, the fight against malaria. Sri Lanka stopped using DDT, not because of pressure from environmentalists, but because it stopped working.

Bate's pitch includes a plan to deal with this – rewrite history. He said that they should produce a book on malaria explaining “how malaria was eradicated in many parts of the world (WHO-backed DDT programmes), why it came back (spraying DDT was banned under pressure from US greens)”.

Bate and Richard Tren duly produced a book “Malaria and the DDT Story”. In their version of history, Sri Lanka banned DDT because they “followed the US lead” and DDT remains effective even if mosquitoes are resistant. And it's not as if they weren't aware of what really happened, since the primary source for their history was Gordon Harrison's excellent “Mosquitoes, Malaria and Man” which devotes an entire chapter to story of the resurgence of malaria.

Between them, Milloy's junkscience.org (affiliated with the Cato Institute until 2005, and now with Fox News and the Competitive Enterprise Institute) and Bate's “Africa Fighting Malaria” (affiliated with the American Enterprise Institute) have convinced the entire political right, and many people with no political alignment, that DDT is a panacea for malaria, denied to the Third World by the machinations of rich environmentalists.

For both groups, the big opportunity came with the negotiations leading up to the 2001 Stockholm Convention on Persistent Organic Pollutants. Under the

Stockholm Convention, most uses of organochlorine pesticides such as DDT and dieldrin were banned because of their persistence and toxicity, particularly to birds of prey and other top predators, and because of the risk of adverse effects on human health.

It was agreed in the negotiations that the use of DDT in malaria control should be exempted from the general ban until affordable substitutes could be found. The only point of dispute was whether, as proposed by the World Wildlife Fund, an explicit target date for the phaseout of DDT should be set, with commitments from developed countries to bear the cost of the transition.

This proposal received no support from any government and was opposed by most malaria specialists, aware that financial commitments from developed countries are easily made and just as easily broken. In the process, unsurprisingly, the phaseout proposal was described as a “ban”, and news stories made it appear that the ban was imminent. Moreover, the debate naturally gave prominence to the strongest supporters of DDT-based strategies within the malaria control community, and tended to hide the fact that such strategies were applicable only in a limited range of cases.

The outcome of the Stockholm Convention was an entirely sensible one, of which Rachel Carson would probably have approved. WWF abandoned its proposal for a targeted date for a phaseout, focusing instead on more stringent attempts to control the illegal use of DDT in agriculture. The leading group in the campaign to continue DDT use, Malaria Foundation International noted that “The outcome of

the treaty is arguably better than the status quo going into the negotiations over two years ago. For the first time, there is now an insecticide which is restricted to vector control only, meaning that the selection of resistant mosquitoes will be slower than before.”

But the debate had given Milloy, Bate and others the start they needed. Successfully conflating the use of the term “ban” to describe the eventual phaseout proposed in the lead up to the Stockholm Convention with the 1972 ban on agricultural use in the US, Milloy produced his “malaria clock” that blamed the US ban for all malaria deaths since 1972.

Meanwhile, Bate and Africa Fighting Malaria embarked on a campaign to promote DDT use and to push the claim that its widespread use was being prevented solely because of the opposition of Western environmentalists. Issues such as resistance to DDT were ignored. The distinction between the failed strategy of global malaria eradication and more modest programs based on localised use of indoor residual spraying was fudged wherever possible.

An essential component of the success enjoyed by Milloy and Bate was the development of a “parallel universe” of think tanks, radio talkback shows, news sources and blogs devoted to propagating a right-wing (and, more specifically, Republican) view of the world on issues of all kinds, but particularly an alternative to mainstream science on health and environmental issues.

Much of this activity built on the work of the tobacco industry in

establishing TASSC and funding a range of sympathetic think tanks such as Cato, the Heartland Foundation and the Competitive Enterprise Institutes. The activities of these groups and the associated network of lobbyists and interest groups was documented by Chris Mooney in his book *The Republican War on Science*.

The high point of the pro-DDT campaign came in late 2006, with the appointment of Arata Kochi as head of the WHO Malaria program. Kochi had no background in malaria control, but had previously run the WHO tuberculosis program, earning a reputation as an abrasive but effective manager. As in the tuberculosis program, his arrival was quickly followed by the acrimonious departure of long-standing staff.

Kochi saw the need to placate the right wing critics influential in the Bush Administration and issued an announcement describing a renewed commitment to DDT. Comparison with earlier policy statements issued over the period since the signing of the Stockholm Convention indicated that the “new” position was little more than a restatement of long standing policy. Nevertheless, it had the desired effect of appeasing critics and mobilising support for additional funds, particularly from the US government.

Kochi’s announcement was hailed as a triumph by the promoters of the DDT myth. But the tide was already turning. By the beginning of 2006, Milloy's financial ties to the tobacco and oil industry had become common knowledge, and he lost his position with the Cato Institute (though not with Fox News). Bate's tobacco links were more obscure, but, thanks to the treasure trove of documents that

entered the public domain through the tobacco litigation of the 1990s, they could not be concealed forever.

More importantly, both environmentalists and scientists involved in malaria control and public health started fighting back. The idea of DDT spraying as a panacea for malaria threatened to derail the tentative progress that was being made with broadly-based campaigns incorporating improved treatments, insecticide-treated bednets and a range of public health measures.

As more and more people became aware that DDT had never been banned, and that the move away from DDT-based strategies reflected their inherent limitations, public debate began to turn around. Some of those who had eagerly libelled Rachel Carson and the environmental movement went quiet, while others began to talk of a *'de facto'* ban, mining the Internet for any quote critical of DDT use that could be interpreted as evidence of such a ban.

The response of the pro-DDT campaigners was revealing. Milloy, who has long shown himself to be utterly shameless, maintained his malaria clock, adding footnotes to indicate that he knew his claims to be false. By contrast, Bate began to adjust his position, noting in a recent interview that "I think my position has mellowed, perhaps with age," "[I have] gone from being probably historically anti-environmental to being very much pro-combating malaria now."

It now appears that sanity is returning to the debate over options to deal with malaria. At meetings on the implementation of the Stockholm convention,

WHO put out another restatement of its position, this time stressing the commitment to an eventual phaseout of DDT, while noting that its use would continue until adequate substitutes were found.

In 2007, following impressive results with long-lasting insecticide treated bednets, the WHO concluded that such bednets were more cost effective than DDT spraying in high malaria transmission areas. Most recently, in 2008, WHO announced dramatic progress against malaria in Rwanda and Ethiopia based on a strategy of long-lasting insecticidal nets and artemisinin-combination therapy drugs.

Following these successes, the goal of global eradication of malaria, abandoned after the failure of the DDT campaign in the 1960s has been revived. With funding from the Bill and Melinda Gates Foundation, the WHO has announced a new commitment to this goal. The hope is that a combination of existing measures, like bednets, insecticides (including DDT among others) and drugs, can drive down the number of cases and shrink malaria's range across Africa and Asia. Then, as new drugs, vaccines and insecticide are developed, they could provide the knockout blow.

The new strategy is based a judicious mix of tactics against malaria, rather than a knockout blow based on a single weapon. Rachel Carson would surely have approved.

