



DDT: Rise and Fall of a Miracle

**Joseph M. Conlon
Technical Advisor, AMCA**

“Today, because Carson's work led to the ban on DDT, some of the species that were her special concern - eagles and peregrine falcons, for example - are no longer at the edge of extinction. It may be that the human species, too, or at least countless human lives, will be saved because of the words she wrote.”

Al Gore

“To only a few chemicals does man owe as great a debt as to DDT. In little more than two decades, DDT has prevented 500 million human deaths, due to malaria, that otherwise would have been inevitable”

National Academy of Sciences, Committee on Science and Public Policy. 1970

Discovery



Othmar Zeidler - 1874

P. H. Müller - 1939

DDT Patent granted

- 1940 – Switzerland
- 1942 – Great Britain
- 1943 – United States

Nobel Prize in Medicine 1948

Insecticide Properties

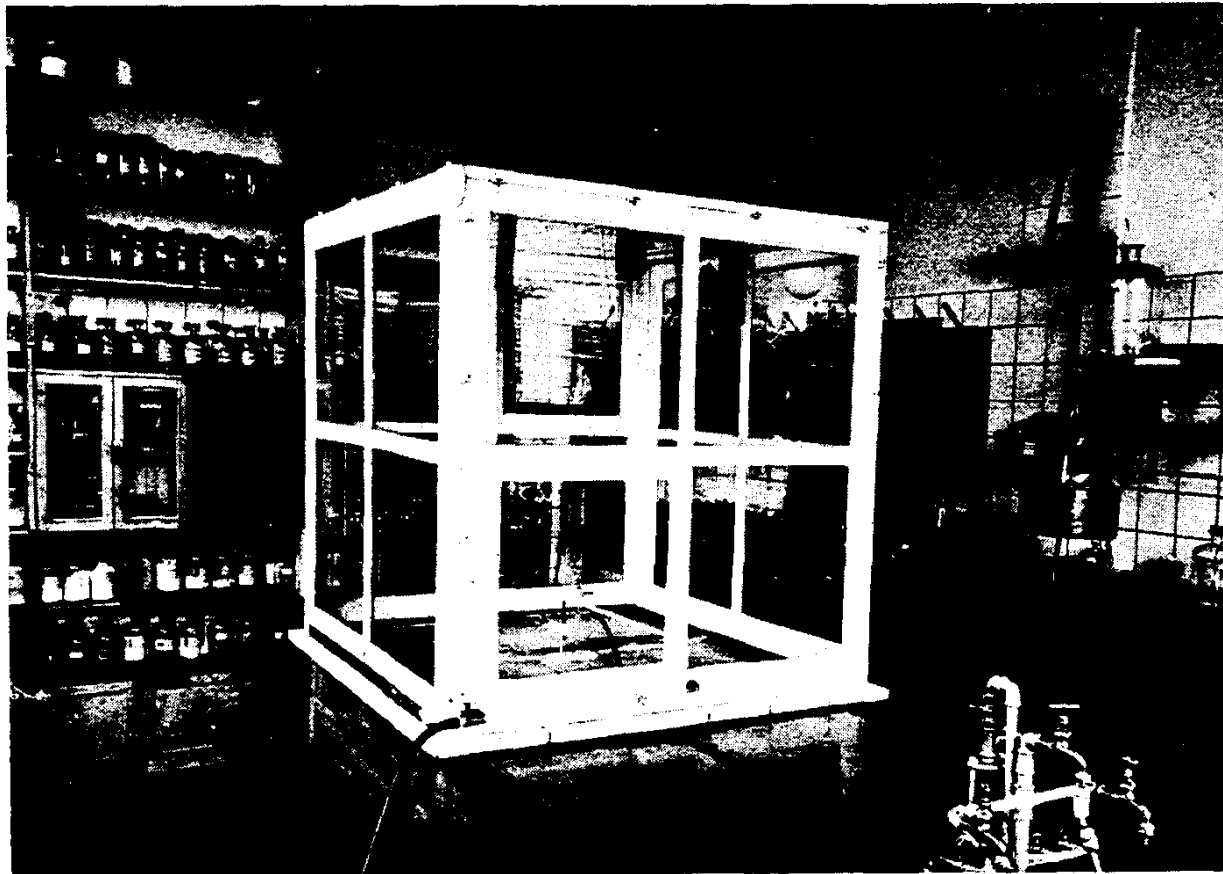
- 1. High insect toxicity**
- 2. Rapid onset of toxic action**
- 3. Little mammalian or plant toxicity**
- 4. No irritant effect or odor**
- 5. Wide spectrum**
- 6. Good chemical stability – persistence**
- 7. Inexpensive**

Nicotine	1, 2, 5, 7
Rotenone	1, 3, 4, 5
Pyrethrum	1, 2, 3, 4, 5
DDT	1, 3, 4, 5, 6, 7

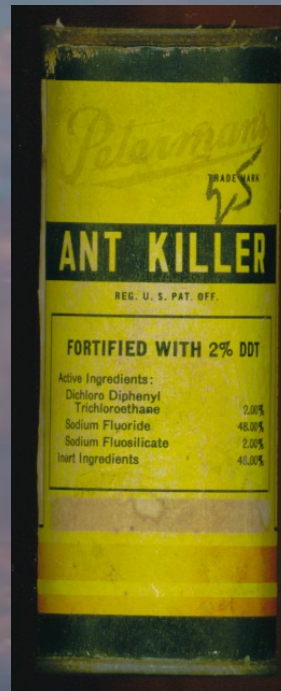
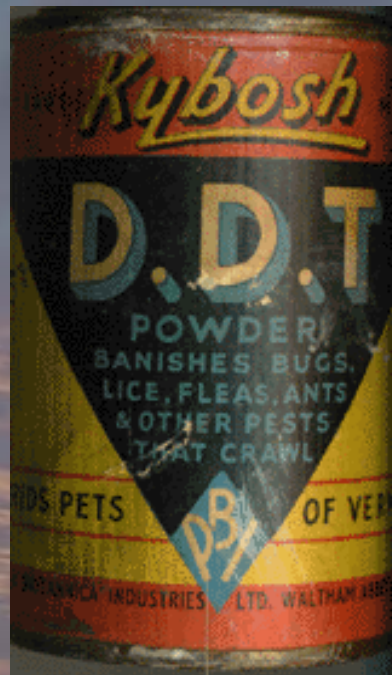
The Fly Cage

230

1948 P.H.MÜLLER



Formulations



History of Use

- **First large-scale use – 1943**
- **500 gallons produced by Merck & Company**
- **Delivered to Naples, Italy - louse-borne typhus**
- **1943 - U.S. Army issued tin boxes of 10% DDT dust**



104700



TYPHUS IN NAPLES

1000 medical officers control an epidemic with loss of delousing powder and a penicillin vaccine

By the time the epidemic of typhus in Naples had been under control, 1000 medical officers had been sent to the city to help in the control of the epidemic. The epidemic was caused by the typhus fever, which is a common disease in the tropics and subtropics. It is caused by the typhus louse, which feeds on the blood of its host. The epidemic in Naples was the first of its kind in the city since 1910. It was caused by the typhus louse, which had been introduced into the city by a soldier who had been in the city during the war. The epidemic was controlled by the use of delousing powder and a penicillin vaccine.



1000 MEDICAL OFFICERS were sent to Naples to help in the control of the epidemic. The epidemic was caused by the typhus louse, which had been introduced into the city by a soldier who had been in the city during the war.



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Malaria Eradication

WANTED

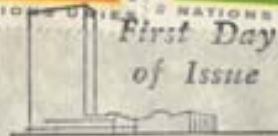
DEAD

FOR WAGING BACTERIOLOGICAL WARFARE ON MANKIND
MERCILESS SPREADER OF
MALARIA



ALIAS

Anopheles Mosquito

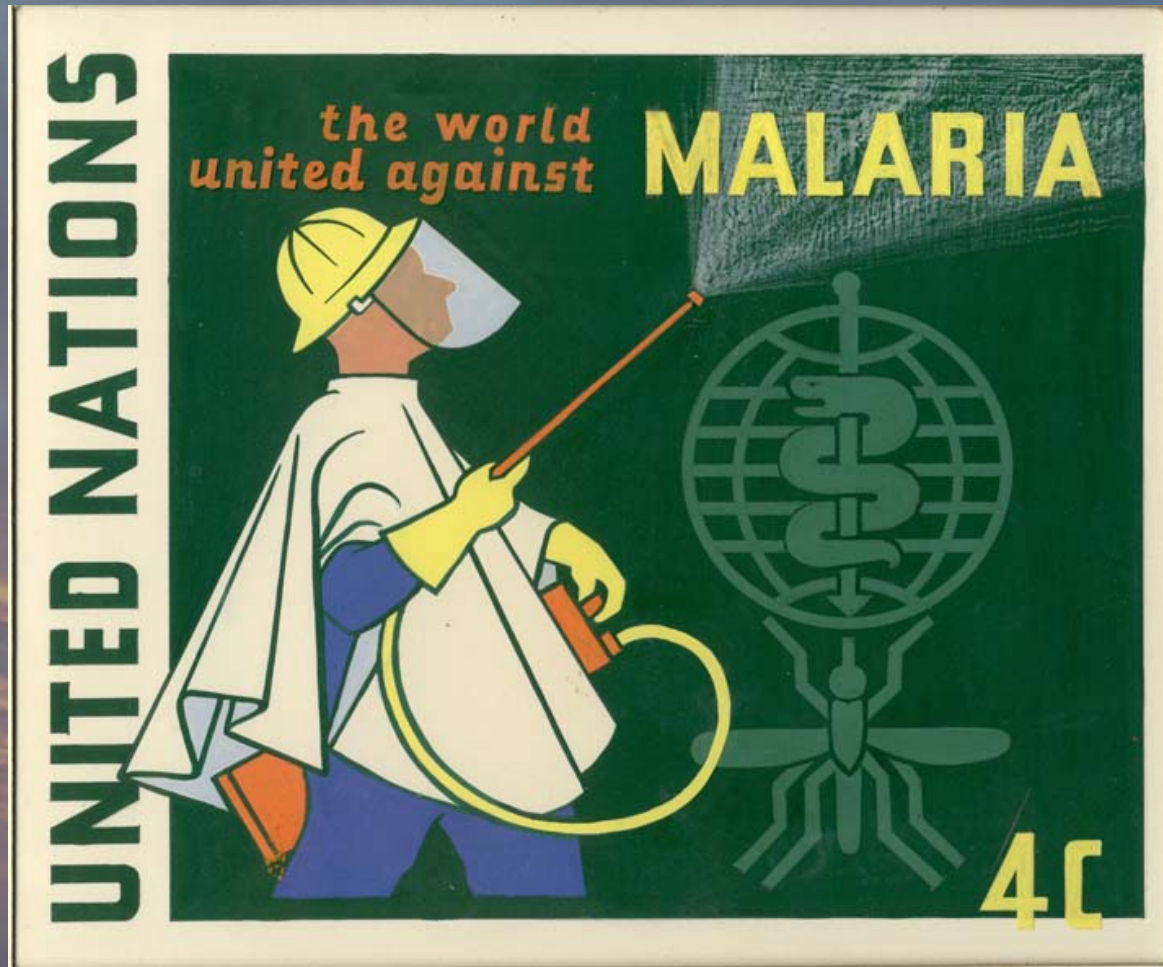


★ DECADE OF
UNITED NATIONS
POSTAGE STAMPS

REWARD

COMPLETE ERADICATION OF THE SCOURGE OF MALARIA
FROM THE FACE OF THE EARTH.

Malaria Eradication



Malaria Eradication



Malaria Eradication



Malaria Eradication



The Results

>30% of childhood deaths in Africa

- **South Africa - case rate rises over 1000% since DDT stopped in 1995**

- **India – 750,000 down to 1,500 deaths**

- **Guadalcanal – 1,800/1,000 down to 40/1,000**

- **Sardinia – 70,000 cases down to 44**

- **Sri Lanka – 3 million cases down to 17 in 1963**

 - **1968 DDT stopped – 2 million cases**



“If I were living in a hut in Africa, I would rather have a trace of DDT in my body than die of malaria”

Dr. Norman Moore
Chief Advisor, Nature Conservancy

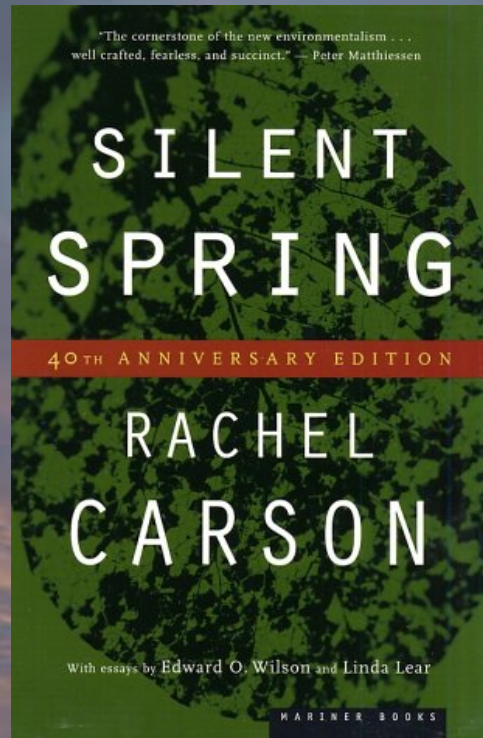
History of Use in U.S.

- **Peak usage – 1962**
 - **88,000 tons**
- **Low usage – 1970**
 - **6,000 tons**
- **Total US Usage**
 - **675,000 tons**
 - **80% cotton**
 - **14% peanut/soybean**
 - **3% gypsy moth/spruce budworm**

No Good Deed Goes Unpunished



Rachel Carson



“There was once a town in the heart of America where all life seemed to live in harmony with its surroundings...a pastoral Eden of hardwood forests and bountiful wildlife...strange blight crept over the area and everything began to change...Everywhere was a shadow of death...It was a spring without voices. On the mornings that had once throbbed with the dawn chorus of robins, catbirds, doves, jays, wrens, and scores of other bird voices there was now no sound; only silence lay over the fields and woods and marsh...Even the streams were now lifeless...No witchcraft, no enemy action had silenced the rebirth of new life in this stricken world. The people had done it themselves...”

Silent Spring

Rachel Carson - Background

EDUCATION:

1929- graduated Pennsylvania College for Women (now Chatham College) with honors

1932- M.A. in Zoology from John Hopkins University.

EXPERIENCE:

1932 - joined the U. S. Bureau of Fisheries as writer of a radio show entitled "Romance Under the Waters,"

1936 - 1st woman to pass civil service test for Bureau of Fisheries

1951 - appointed chief editor of all publications for USFWS

1952 - resigned post for full-time writing

1957 - Began writing *Silent Spring*

1962 - *Silent Spring* published

Rachel Carson - Background

1945 – writes letter to *Reader's Digest* proposing article about DDT effects on nature. Letter rejected.

1958 - stopped *Reader's Digest* from publishing article about beneficial aerial spraying


1958 – Olga Huckins writes to Carson: “The 'harmless' shower bath killed seven of our lovely song-birds outright. We picked up the three dead bodies the next morning, right by the door....The next day three were scattered around the bird bath. (I had emptied it and scrubbed it after the spraying, but YOU CAN NEVER KILL DDT.) On the following day one robin dropped suddenly from a branch in our woods.”

Rachel Carson – Deception ?

Carson dedicates Silent Spring as follows: *“To Albert Schweitzer who said 'Man has lost the capacity to foresee and to forestall. He will end by destroying the Earth.’”*

This would appear to indicate that the great man opposed pesticide use. However, in his autobiography Schweitzer writes, on page 262:

"How much labor and waste of time these wicked insects do cause us... but a ray of hope, in the use of DDT, is now held out to us."



“The chief public health threat has ceased to be disease; now it is a hazard we ourselves have introduced into our world.”

Rachel Carson

“It is human nature to shrug off what may seem to us a vague threat of future disaster...Some of these substances have toxic effects in very small quantities. In the ecology of our bodies, minute causes produce mighty effects.”

Rachel Carson

“For the first time in the history of the world, every human being is now subjected to contact with dangerous chemicals, from the moment of conception until death.”

Rachel Carson

“This statement is wrong: the vast bulk of the chemicals humans are exposed to are natural, and for every chemical some amount is dangerous”

Bruce Ames

“Substantial Evidence” Liver/Breast Cancer

- Feeding primates 33,000 times daily intake – “inconclusive with respect to a carcinogenic effect of DDT in nonhuman primates.”

J. Cancer Res Clin Oncol 1999;125(3-4):219-25

- “Our data do not support the hypothesis that exposure to DDT and PCBs increases the risk of breast cancer.”

N Engl J Med 1997;337:1253-8

- “Men who voluntarily ingested 35 mgs of DDT daily for nearly 2 years were carefully examined for 20 years and developed no adverse effects.”

Hayes, W. 1956. *JAMA* 1994;162:890-897

“Substantial Evidence” Liver/Breast Cancer

- **"Even after 20 years of follow-up, exposure to relatively high concentrations of DDE or PCBs showed no evidence of contributing to an increased risk of breast cancer."**

Cancer Epidemiol Biomarkers Prev 1999 Jun;8(6):525-32

- **“This study does not support the hypothesis that DDE increases risk of breast cancer in postmenopausal women in Europe.”**

BMJ 1997 Jul 12;315(7100):81-5

“Substantial Evidence”

Egg Shell Thinning

“Quail into whose diet DDT was introduced throughout the breeding season survived and even produced normal numbers of fertile eggs. But few of the eggs survived.” Rachel Carson, citing studies conducted by Dr. James DeWitt, USFWS.

Fact:

- 1. DeWitt reports in 1956 that 80% quail eggs hatched versus 83.9% in controls.**
- 2. 80% pheasant eggs hatched versus 57% controls.**

“Substantial Evidence”

Egg Shell Thinning

- **DDT and its metabolites do not cause serious egg shell thinning, even at levels many hundreds of times greater than wild birds would ever accumulate.**

Cecil, HC et al. 1971. Poultry Science 50: 656-659; Chang, ES & ELR Stokstad. 1975. Poultry Science 54: 3-10 1975.; Edwards, JG. 1971. Chem Eng News p. 6 & 59 (August 16, 1971); Hazeltine, WE. 1974. Statement and affidavit, EPA Hearings on Tussock Moth Control, Portland Oregon, p. 9 (January 14, 1974); Jeffries, DJ. 1969. J Wildlife Management 32: 441-456; Robson, WA et al. 1976. Poultry Science 55:2222- 2227; Scott, ML et al. 1975. Poultry Science 54: 350-368; Spears, G & P. Waibel. 1972. Minn. Science 28(3):4-5; Tucker, RK & HA Haegele. 1970. Bull Environ Contam. Toxicol 5:191-194; Edwards, JG. 1973. Statement and affidavit, U.S. Senate Committee on Agriculture, 24 pages, October 24, 1973; Poult Sci 1979 Nov;58(6):1432-49

“Substantial Evidence” Egg Shell Thinning

No correlation between DDT residues and Brown pelican egg shell thickness.

Nature, 1972;239: 410-412

Krantz WC. 1970, Pesticide Monitor J 4(3): 136-141

Postupalsky, S. 1971. Canadian Wildlife Service manuscript, April 8, 1971

Oregon State University Health Sciences Conference, Annual report, p. 94. Claus G and K Bolander. 1977.

Ecological Sanity, David McKay Co., N.Y., p. 461.

“Substantial Evidence” Egg Shell Thinning

Egg shells of red-tailed hawks and golden eagles actually thicker during years of heavy DDT usage.

Hickey, JJ and DW Anderson. 1968. Science 162: 271-273

USFWS egg shell thinning experiments used birds on low calcium diets.

Bitman, J et al. 1969. Nature 224: 44-46

Bitman, J et al. 1970. Science 594-595.

“Substantial Evidence”

Bald Eagles

1921 – threatened with extinction.

Van Name, WG. 1921. Ecology 2:76

No thickness problems from eagle eggs in Florida, Maine, Wisconsin.

Coon, NC. 1970. Pesticides Monitoring J 9:11-14

All bald eagle deaths investigated 1961-1977 (266 birds) analyzed by USFWS showed no adverse effects from DDT or metabolites.

Pesticides Monitoring Journal, 1969, 1972, 1974.

J of Wildlife Diseases, 1970.

Declines due to mercury, shooting, electrocution, collisions.

1984. National Wildlife Federation publication

“Substantial Evidence” Erroneous Detection

DDT mistaken for other organochlorines.

George JL and DEH Frear. 1966. Pesticides in the Antarctic. *J Applied Ecology* 3 (suppl): 155-167

Glotfelty, DE.. 1970. *Anal Chem* 42:82-84

Hylin, JW. 1969. *Residue Reviews* 26:127

“Substantial Evidence” Erroneous Detection

Plastic tubing leaching PCBs misidentified as DDT.

National Audubon Society Research Dept., 1968

**Gustafson, CG. 1970. Environ Sci Technology
4(10):814-819**

**Lisk, DJ. 1970. Analysis of pesticide residues:
methods and problems. Science 170:589-593**

**Anderson, DW et al. 1969. Canadian Field-Naturalist
83:91-112**

“Substantial Evidence” Peregrine Falcons

Populations declined prior to DDT.

Hickey JJ. 1942. Auk 59:176;

Hickey JJ. 1971 Testimony at DDT hearings before EPA hearing examiner.

Beebe FL. 1971. The Myth of the Vanishing Peregrine Falcon: A study in manipulation of public and official attitudes. Canadian Raptor Society Publication, 31 pages

“Substantial Evidence” Peregrine Falcons

Falcon with highest DDT residue (2,500 ppm) feeding 3 healthy young.

Enderson, JH. 1968, (Pesticide residues in Alaska and Yukon Territory) Auk 85: 683

Enderson, JH and DD Berger. 1968. (Chlorinated hydrocarbons in peregrines from Northern Canada) Condor 70:170-178

EPA Hearings

EPA told Congress and the media that Americans were ingesting 13.8 milligrams of DDT daily before the ban.

Scientists quickly pointed out that EPA's figure was one thousand times higher than reality. The EPA admitted their decimal point error, in a letter to the Montrose Chemical Company (11 September 1975), and changed their figure to 0.015 milligrams ingested daily in 1970.

(The level dropped to 0.0018 milligrams per day, by 1973.)

“A decision to ban the production of DDT in the U.S, would result in a denial of the use of DDT to most of the malarious areas of the world. The available evidence on the very slight risks, if any, does not justify the U.S. making a unilateral decision that would so adversely affect the future economic and social well-being of so many other nations of the world”

**Centers for Disease Control and Prevention
July 25, 1969**

EPA Hearings

“DDT is not a carcinogenic, mutagenic, or teratogenic hazard to man. The uses of DDT do not have a deleterious effect on freshwater fish, estuarine organisms, wild birds, or other wildlife. The evidence in this proceeding supports the conclusion that there is a present need for the essential uses of DDT”

Judge Edmund Sweeney

April 26, 1972

40 CFR 164.32

EPA Hearings

William Ruckelshaus overrules - *Congressional Record*, July 24 1972, pp. S11545-46

- Never attended hearings
- Never read transcript

“Decisions by the government involving the use of toxic substances are political with a small ‘p.’ The ultimate judgment remains political.”

letter to the Allan Grant, president of the
American Farm Bureau Federation
(April 26, 1979)

Let Them Get Malaria

“It doesn’t really make a lot of difference because the *organophosphate* (italics mine) acts locally and only kills farm workers, and most of them are Mexicans and Negroes.”

Dr. Charles Wurster

Chief Scientist, Environmental Defense Fund
Hearings before the Committee on Agriculture,
House of representatives, 92nd Congress on
Federal Pesticide Control Act of 1971, quoted in
questions by Rep. John Rarick (D-LA)

Let Them Get Malaria

“The Sierra Club wants a ban, not just a curb, on persistent pesticides, even in the tropical countries where DDT has kept malaria under control.”

**Michael McClosky
Executive Director, Sierra Club
UPI, Feb 25, 1971**

Let Them Get Malaria

“I was in Sri Lanka, where malaria was controlled by DDT. What people didn’t realize was that malaria was actually controlling population growth.”

**HRH Prince Phillip
December, 1981**

Let Them Get Malaria

“...my chief quarrel with DDT in hindsight is that it has greatly added to the population problem.”

Alexander King
The Discipline of Curiosity
President, Club of Rome

Let Them Get Malaria

Research outlays per death

AIDS **\$3,274**

Asthma **\$789**

Malaria **\$42**

“At best, their campaign suggests a painfully callous indifference to the devastating impact the ban would have on the world’s most destitute and disease-ridden peoples.”

Paul Driessen, PhD
Environment and Climate News
April 2001

“If there had been a world ban of DDT, as many have sought, then Rachel Carson and her book, *Silent Spring*, would now be killing more people every year than Adolf Hitler killed during his entire holocaust:

**Keynote lecture
British Agrochemical Association
May 13, 1980**

"The indiscriminate cancellation, suspension or outright banning of such pesticides as DDT is a game of dominoes we will live to regret I have dedicated myself to find better ways of feeding the world's starving populations. Without DDT and other important agricultural chemicals, our goals are simply unattainable."

**Prof. Norman Borlaug
Nobel laureate**

“It is probably fair to say that Rachel Carson single-handedly did more damage to Africa, though admittedly without intending to, than three centuries of the Atlantic slave trade.”

**Anthony Daniels, MD
District Physician, Obomasho, Nigeria**



“Banning DDT is Eco-Imperialism. It’s a model of environmentalists putting the interests of the environment ahead of human lives.”

**Dr. Amir Attaran
Director of the Malaria Project**

Current Anti-Malarial Applications

Currently
manufactured in
India and China

Currently used in 23
nations



A Revival

WHO

USAID

Africa Fighting Malaria

AMCA

Are Their Lives Worth It?

