REMEMBERING SILENT SPRING AND ITS CONSEQUENCES

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In 1962, Rachel Carson published *Silent Spring*, and because of my 25 years of nature study I expected to be delighted with the book. It didn't take long to learn that she had filled the book with great numbers of untruthful things. Vice President Al Gore has stated that Rachel Carson "turned his life around." She turned mine around, too, but in the opposite direction, changing me from an "environmentalist" to a scientist with a desire to keep truth in science and environmentalism.

I could no longer feel that environmentalism was wholesome and honorable. Instead of dedicated nature enthusiasts I found environmental extremists at work, and I discovered that many "scientists" were going along with the propaganda in order to get paid for tendentious "experiments" that would support untruthful allegations. Most scientists that I knew in the past seemed trustworthy, and I thought they always tried to be truthful, but that had suddenly changed.

Meetings of the Audubon Society and the Sierra Club became frustrating, because everyone else praised Rachel Carson, while I knew that she had exaggerated, fabricated, and prevaricated throughout the book! The environmental groups began getting most of their funding from people who had been frightened by the untruthful allegations about pesticides, fertilizers, and many other propagandist issues. I knew they needed money, but hated to see them getting it that way! I offered to write "the other side of the DDT story" for *Audubon* magazine and was bluntly criticized by the editor. He, and most other spokesmen for environmental groups, soon considered me a bitter enemy because I was punching holes in their untruthful propaganda.

The environmental groups are now fighting each other for the dwindling funds. The media still give them great support, and repeat everything they say as if it were true! If that bias ever yields to truthful reporting, we may revert to responsible science and perhaps even see "truth in environmentalism."

However, Ben Bradlee (*Washington Post* editor) stated: "I'm no longer interested in news.I'm interested in causes. We don't pretend to print the truth. We print what people tell us. It's up to the public to decide what's true," and

Charles Alexander admitted: "As science editor at TIME, I freely admit that on the environment we have crossed the line from news reporting to advocacy." Greenpeace's Paul Watson stated "It doesn't matter what is true, it only matters what people believe is true."

In 1959 George Wallace, of Michigan State University, wrote an article claiming DDT was killing robins on the Michigan State campus, where it had been sprayed to combat the European Bark Beetles that were spreading Dutch Elm Disease (*Atlantic Naturalist* 14: pp. 4-9).Most other midwestern campuses that were sprayed in the same manner did NOT have robins dying, which indicated to me that something else must be responsible. I learned that they had treated the soil with a mercury compound to combat soil fungi, and the robins were eating the contaminated earthworms in that soil. The symptoms displayed by the dying robins were attributible to mercury poisoning on the Michigan State campus. We wrote to ask Wallace for details of his DDT analysis, and he said the dead birds had been kept in cold storage for weeks before being sent to a science institution for analysis. There they used the "total chlorine method" of analysis, and *estimated* how much of the chlorine resulted from DDT in the birds' tissues!

Rachel Carson started the environmental activists down the path of untruthful propaganda when she wrote *Silent Spring* in 1962. Later the groups were joined by vicious extremists opposed to technology and dedicated to reducing human population in every way possible, even by massive starvation and disease, especially in the third world nations, where the population growth was fastest.

Rachel wrote (p. 118): "Like the robin, another American bird [the bald eagle] seems to be on the verge of extinction." Yet the robin was never endangered at all! Roger Tory Peterson, America's leading ornithologist, also writing in 1962 (in the *Life Nature Library*), cited the robin as "the most abundant bird in North America. There is no doubt as to who was correct! Also, the eagles had declined before DDT, but they increased during the DDT years. In addition, the Audubon Society's Christmas Bird Counts revealed that twelve times more robins were counted, per person, on the 1960 count than were seen on the 1941 count (before DDT). In addition, there were 21 times more cowbirds, 38 times more blackbirds, 131 times more grackles, and so forth.

Then there was Rachel's false allegation that DDT inhibited bird reproduction. She wrote (p. 120): "Dr. DeWitt's now classic experiments on quail have established the fact that exposure to DDT, even when doing no observable harm to the parent birds, may seriously affect reproduction. 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 hatched." (emphasis added) I was concerned when I first read that, and I went to the library to get a copy of

that article (*Journal of Agriculture and Food Chemistry*, 1956). What a shock to find that the article yielded a very different conclusion! The quail to which Rachel referred were fed 200 parts per million (ppm) of DDT in all of their food throughout the breeding season. Human beings at that time were ingesting about 0.03 ppm of DDT in their food, so DeWitt's quail food contained 6,000 times as much DDT as ours. Furthermore, since quail eat more food in comparison to their body weight than we do, DeWitt's quail were actually producing good eggshells while ingesting 20,000 times more DDT than people, per kilogram of body weight.

DeWitt's table shows that after producing normal numbers of eggs, the quail hatched 80% of those eggs. His "control" birds, with no DDT, hatched 83.9% of their eggs. Certainly that was not a significant difference, and who would consider an 80% hatch as being "few" of the eggs? The DDT-fed pheasants that were covered in that same table hatched more than 80% of their eggs, but the "controls" (with no DDT in their diet) only hatched 57% of their eggs. Chick survival was also better in the DDT-fed birds than in the "controls." Rachel didn't mention DeWitt's pheasant experiments!

Rachel also wrote (p.125) that near California rice fields: "Pheasant sickness became a well-known phenomenon: birds seek water, become paralyzed, and are found on the ditch banks quivering, according to one observer," (one observer is hardly a credible scientific source!) She was referring to work by Rudd and Genelly (*Condor*, March 1955), who experimented with a pen of 12 pheasants into whose food they mixed DDT. The food contained DDT at the rate of one and a half pounds of DDT per 100 pounds of rice. Rudd stated "this concentration is equivalent to 15,000 parts per million DDT in the diet"! That was the greatest concentration I have ever heard of in any experimental diet!! What were the results, which Rachel did not mention? Seven of the birds survived, and five of those showed no symptoms. Perhaps they survived by refusing to eat any of the poisoned rice! In his summary, Rudd stated that "mortality may be entirely eliminated by applying the chemical and the food separately."

I had been teaching medical entomology for years and was concerned about malaria, yellow fever, typhus, plague, encephalitis, river blindness, leishmaniasis, and other tropical diseases that are transmitted by insects and could be controlled by the use of insecticides, especially DDT. The National Academy of Sciences wrote in their 1970 book, *The Life Sciences*, that: "In little more than two decades DDT has prevented 500 million deaths due to malaria, that would otherwise have been inevitable." I found no references to such diseases in *Silent Spring*, however she wrote (p. 187): "Only yesterday mankind lived in fear of scourges of smallpox, cholera and plague. Now our major concern is no longer with the disease organisms; better living conditions and new drugs have given us

control over infectious disease. Today we are concerned with a different kind of hazard that lurks in our environment." She then launched into many pages of unsupported attacks on insecticides, with never a mention of the millions of human lives that had already been saved by DDT!

In the front of her book, Rachel Carson wrote that it was "Dedicated to Dr. Albert Schweitzer, who said 'Man has lost the capacity to foresee and to forestall. He will end by destroying the earth.'" Miss Carson *knew* he was referring to atomic warfare when she quoted that, but she implied that he meant there were deadly hazards from pesticides such as DDT. Because I had found so many other lies in her book, I got a copy of Schweitzer's autobiography to see if he really mentioned DDT. He did, writing (p. 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."

No matter how deceitful her prose, the influence of Carson's *Silent Spring* was great, and it continues to shape environmentalist propaganda as well as U. S. policy.

The Environmental Defense Fund

In 1967 the Audubon Society financed the establishment of the Environmental Defense Fund (EDF), which then could legally lobby for Audubon propaganda issues without endangering the Society's tax-exempt status (Audubon, January 1973, p. 38). EDF Founder Victor Yannacone was paid $60,000 a year for part-time work, and Charles Wurster joined the EDF as chief scientist. Wurster listed his specialty, in *American Men of Science* 1960, as being "jet fuels and fuel luminosity."

In 1969, attorney Yannacone and fuel researcher Wurster (working for the Environmental Defense Fund) took DDT to trial in Wisconsin and easily won, resulting in a ban on the insecticide in that state. Wurster boasted (in *New York Times* and the *San Francisco Chronicle* (30 Nov 1969) that "If the environmentalists can win on DDT, they will achieve, and quite probably retain in other environmental issues, a level of authority they have never had before. Much more is at stake than DDT." (emphasis added)

Yannacone told me that he urged urged Wurster to perform "some kind of biological research, since he was the chief EDF biologist." Wurster got tanks of sea water, put some marine algae in them, and poured large amounts of DDT into the tanks, to see if it would harm the algae. He described how "to each flask of DDT, ethanol was added, in order to get the desired concentrations.[500 parts per

billion]" We knew that the solubility of DDT in water is only 1.2 parts per billion, so we wondered about the validity of his research. In previous tests with the same kinds of algae, Ukeles Ravenna found that 600 ppb of DDT in the water (without solvents) did not affect the algae, and Menzel reported a beneficial effect on algae after 700 ppb of DDT was added to the water. (*Science* 167: 1970)

Wurster published his results in *Science* magazine (29 March 1968). Dr. Paul Ehrlich expanded on Wurster's hoax and wrote what he called a "scenario" based upon it. He titled it "Ecocatastrophe," and published it in *Ramparts* magazine (August 1969). His article began with: "The end of the ocean came late in the summer of 1979, and it came even more rapidly than the biologists had expected. There had been signs for more than a decade, commencing with the discovery in 1968 that DDT slows down photosynthesis in marine plant life. It was announced in a short paper in *Science*, but to ecologists it smacked of doomsday. They knew that DDT and similar chlorinated hydrocarbons had polluted the entire surface of the earth, including the sea." Thousands of school children were required to read Ehrlich's article, and teachers warned that "it shows how humans are endangering the earth with pesticides." Ehrlich also published that identical "Ecocatastrophy" article in 1970 a British journal called *The Year's Best Science Fiction* (which was certainly a more appropriate outlet).

Claims Against DDT

Although at first the anti-DDT crowds alleged that DDT was killing off adult birds, they soon had to admit it was not. They were not "dropping out of the sky dead," as alleged by some environmentalists (*Ann. N. Y. Acad. Sci.* 160: 162-171, 1971), nor were they "falling out of the trees by the thousands." (*Innovation magazine*, No. 17). Wurster (*Congressional Record*, 5 May 1969) referred to "increasing numbers of pheasants, quail, turkeys, and other game species," and Audubon naturalists added at least 26 other species that increased in numbers during the decades of greatest DDT use (*Audubon* magazine, Jan 1942 and *Audubon Field Notes*, Feb. 1961).

The propagandists changed their story, as a result, and said DDT was only killing nestling birds. That was also shown to be untrue, even when all of the food given the nestlings contained DDT (*Journal of Wildlife Management* 17:45-54, 1953) They next said perhaps DDT makes the eggs sterile, or kills the developing embryos. That was soon refuted by the multiplying hordes of birds counted by the Christmas Bird Counts and the Hawk Mountain Sanctuary migration counts.

The anti-DDTers were not impressed except when birds destroyed fields of corn or broke down the trees in which they roosted. They didn't seem to realize

that DDT had failed to harm the destructive birds. They apparently felt that DDT caused *good* birds to decline and *bad* birds to have population explosions!

The activists also had to explain the population explosions of predaceous white-tailed kites in heavily-sprayed California, and of robins, starlings, cowbirds and red-winged blackbirds throughout North America. They tried saying that not all birds were affected, but only predators. It was evident that predators were also multiplying rapidly, so they decided that not all predators were affected, but only those that preyed on fish. But the fish-eating murres, ospreys, and gulls were rapidly increasing, too. The murres on Funk Island (along the North Atlantic Coast) increased during the DDT decades, from 15,000 pairs in 1945 to a million and a half pairs by 1971, and gannets there went from 200 pairs in 1942 to 3,000 pairs in 1970 (*Animals Magazine*, April 1971, p. 555).

Herring gulls in Massachusetts exploded during the DDT decades, from 2,000 pairs (1941) to 35,000 pairs (by 1971). Although they were on the "protected" list, Massachusetts gave the Audubon bird-lovers permission to poison 30,000 of them on Tern Island. The local Audubon president, William Drury, said "It's kind of like weeding a garden." (*Associated Press, New York Times, and San Francisco Chronicle*, 13 April 1971).

Next, the zealots claimed that the eggshells were either (1) becoming so thick that the young could not get out of the eggs (*San Francisco Chronicle*, 14 February 1969), or (2) becoming so thin that they were being broken by the weight of the incubating females (*San Francisco Chronicle*, 16 April 1969). Eventually they settled on the latter as being essentially the only harm done to birds by DDT and DDE.

The thin shell story was hard to sell, however, because they could not explain the thin shells that occurred before DDT was used, nor could they explain the lack of effects on eggs of captive birds heavily dosed with DDT or DDE.

Finally, the environmental extremists had to simply resort to endlessly repeating all of the old allegations and hoping that most people had not heard about the refutations. The failure of the news media to report the truth helped them get away with that ruse, and the pseudo-environmental magazines frightened readers with the same old unsubstantiated myths.

During that battle to ban DDT, the Audubon Society distributed hundreds of thousands of yellow propaganda leaflets stating: "DDT should be banned throughout the land, and banned from export." In a news release dated 25 February 1971 the president of the Sierra Club stated: "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." These actions were taken despite the full knowledge that a ban on DDT would result in the death of more than three million Third World inhabitants annually. (The problem is that the leaders, rather than the members, execute policy in those powerful environmental groups.)

Last winter the Sierra Club hired Dave Foreman, the author of "*Confessions of an Ecowarrier*" (which describes how to wreck equipment, how to spike trees to destroy saws and threaten lives, etc.) as their "fifth officer." The Sierra Club also recently elected a 23-year old activist as national President!

Alexander King, the president of the Club of Rome (which is active in more than 40 countries) wrote "My own doubts came when DDT was introduced. In Guyana, within two years it had almost eliminated malaria. So my chief quarrel with DDT in hindsight is that it has greatly added to the population problem."

EDF founder Victor Yannacone, in a speech to the Paper Industry, at the Union League Club in New York (20 May 1970) described an incident in which a reporter asked Charles Wurster if a DDT ban wouldn't result in greater use of much more toxic pesticides that had a long history of killing people? He said Wurster responded: "So what? People are the cause of all the problems. We have too many of them. We need to get rid of some of them and this is as good a way as any." He was then asked: "Doctor, how do you square the killing of people with the mere loss of some birds?" Yannacone said Wurster answered: "It doesn't really make a lot of difference, because the organo phosphate acts locally and only kills farm-workers, and most of them are Mexicans and Negroes." Congressman De la Garza was outraged, but couldn't force Wurster to testify.(This was reported by chairman Rarick, in House Hearings on the Federal Pesticide Control Act of 1971, pages 266-267, in Serial No. 92-A)

Yannacone told me that such statements were leading him to consider withdrawing from the Environmental Defense Fund, because he was formerly a civil rights attorney and was beginning to feel that he was working with the wrong people. He resigned that year, and during <u>our</u> 1976 libel trial in New York federal court against the *New York Times* and the National Audubon Society Yannacone volunteered to testify on our behalf. His testimony reported meetings in the National Audubon Society Office, where they were deciding what to do about our use of the Audubon Christmas Bird Counts to reveal that DDT had not adversely affected bird populations. His testimony certainly helped the jury to decide that we had been libelled by the *Times* and by the Audubon Society, when they wrote that we were "paid by the pesticide industry to lie about the Christmas Bird Counts showing increased numbers of birds during the DDT years." (The scientists who were accused of being "paid liars" were Norman

Borlaug, Donald Spencer, Thomas Jukes, Robert White-Stevens, and J. Gordon Edwards.) We were pleased that we won the libel trial in New York Federal Court!

There was no scientific basis for the allegations that DDT caused bird populations to experience general declines. On the contrary it is much more likely that proper use of DDT actually increased the populations of birds and mammals, because of the following actions: (1) The applications increased the yield of plant products in fields, woods, marshes, fence-rows, and roadside ditches (it is true that fewer insects remain to nourish birds after DDT sprays, but the birds quickly move to unsprayed areas for a few days); (2) They increase protective cover for birds and mammals and provide better nesting and denning sites; (3) they kill mosquitoes, flies, fleas, lice, and mites in sprayed areas, not only reducing stress and annoyance, but also eliminating bird diseases transmitted by those arthropods (avian malaria, bronchitis, rickettsia-pox, Newcastle disease, and cancer); and (4) DDT stimulates the liver to produce more hepatic microsomal enzymes that break down many toxic substances in the body, including "aflatoxins" that occur commonly in many natural foods such as moldy grain, nuts, cotton seed, etc., and those aflatoxins are among the most potent carcinogens known, causing cancer at levels of only 1 to 10 parts per billion in foods. DDT-induced hepatic enzymes prevent the development of tumors and cancers in mammals, according to research by McLean and McLean (*British Medicasl Bull.* 25: 278-281, 1969), Edward Laws (*Arch. Environmental Health,* Sept. 1971), and Salinskas and Okey (*J. National Cancer Institute* 55: Sept. 1975).

ENDANGERED BIRDS

Brown Pelicans

In 1968, Schreiber and DeLong surveyed California's Anacapa Island pelican colony for the Smithsonian Institution and wrote: "While fluctuations in numbers do occur, there has been no apparent decline in recent years along the California coast."(*Audubon Field Notes* 1969)

On 28 January 1969 the Santa Barbara Oil Spill occurred near the southern California coast. Oil surrounded Anacapa Island, where the population of brown pelicans was nesting. Two biologists later went out in March to see how much damage the oil was causing to sea lions, and reported in *Cry California* (summer, 1969) that the brown pelican colony had many soft or broken eggshells in and near the nests. J. R. Jehl recalled that "As soon as the condition of the eggs was

appreciated, Risebrough was able to postulate that chlorinated hydrocarbon pesticides were probably responsible." (*Pacific Discovery,* January 1970)

The pelicans had experienced no difficulties during the 20 years of heavy DDT usage, but suddenly suffered a reproductive failure just two months after the great oil spill surrounded their colony. Scientists should have been impressed by that, but the opil spill was not even mentioned in any of the reports about the pelican nesting failure issued by federal and state wildlife agencies! Government biologists later admitted they had collected 72% of the intact eggs in the pelican colony, "for analysis." The analyses of the eggs, however, showed an *inverse* statistical correlation between DDT residues and shell thickness! (*Nature* 239: 410-412, 1972) Some of the thinnest shells were those of eggs with low DDT levels, and the higher DDT concentrations were often in thick-shelled eggs.

My student and collaborator, Richard Main, was employed by the National Park Service for two years. He trapped many large Norway rats in pelican nests in the Anacapa colony (in "safe traps"). The National Park Service wanted to poison the rats, to protect the young pelicans, but that was prohibited by the California Fish & Game Department because, they said, they feared that native rodents there might also be killed. Several feral cats also roamed about in the colony, after the man named Frenchy left them there when he moved from Frenchy's Cove a few years earlier.

The oil film, through which the pelicans were diving for fish, contained 21 ppm of mercury (D'Itri, *International Conference, Ann Arbor,* 30 Sept. 1970), and the anchovies upon which the pelicans fed contained 17 ppm of mercury. Mercury is known to result in serious adverse effects on birds, their eggs, and their young. Robert Finley (who was in charge of FWS pelican studies throughout the United States), responded to criticisms in my testimony before Congressman Poage's Agriculture Committee by writing Poage (2 August 1971) that "there is not a shred of evidence that spilled oil is capable of causing thin-shelled eggs or otherwise affecting bird reproduction." On the contrary, Hartnung, (*J. Wildlife Management* 29:872-874,1965) said oil on eggs reduces hatchability by 68%, the National Wildlife Federation (in *Conservation News* 15 Oct. 1979) said oil on parent's feathers causes embryo mortality. King, *et al.* said oil is a cause of pelican mortality for six weeks after a spill (*Bull. Environ. Contam. & Toxicology* 23: 800-805, 1979). Dieter wrote that "oil on eggs kills 76 to 98% of embryos, birds ingesting oil produce 70% to 100% fewer eggs than normal, and liver and spleen atrophy result from oil exposure (*Interagency Energy-Environment Research and Development Program Report,* 1977, pages 35-42), and Szaro reported that oil causes kidney nephrosis, pancreatic degeneration and lipid pneumonia." (*Proc. 42nd N. A. Wildlife and Natural Resources Conference,* pp. 375-376, 1977).

Dawson, in his *Birds of California* (1923), described how "merely the brief presence of a human on Anacapa caused adult pelicans to spring from their nests, breaking their eggs with their feet as they did so, and the exposed eggs and nestlings were quickly eaten by marauding gulls." The FWS biologist in charge even admitted (in *Proceedings of 35th N. A. Wildlife Conference*, 1970) that they had shot-gunned pelicans sitting on their nests of eggs, so they could compare the DDT residues in the birds with those in their eggs. When those government biologists invaded the Anacapa colony in 1969, the results were certainly anticipated, yet they sought to blame the nesting difficulties entirely on traces of DDT in the fish eaten by the birds. (Feeding experiments dosing pelicans with great quantities of DDT or DDE have never been shown to cause any such results.)

Franklin Gress, a graduate student at University of California, studied the Anacapa pelicans in 1970.The desertion of the colonies coincided with his flights to the island by helicopter and his hours sitting in deserted nests in the colonies. His first visit was March 29th, and he wrote that "The number of birds dwindled, as nests were deserted, and by April 1st the colony was abandoned." He returned on April 20th, and wrote that "the birds appeared irresolute, and two days later the colony was suddenly deserted." A similar result followed his third visit, on June 1st. He later wrote that "only one young pelican was produced there in 1970, but the rangers who patrolled the island by boat laughed and said they saw numerous young pelicans standing on the nests during the intervals between Gress' disruptive visits.

In 1970 Richard Main and I drew up protective regulations for the National Park Service and Under-Secretary of the Interior William Pecora (who was extremely supportive and even came to visit us). The regulations kept the predaceous government biologists out of the colony during the following breeding season. The oil was mostly gone, but there had not been enough time for DDT levels to decrease, yet the pelican productivity was great!

The Federal FWS and the California Fish and Game Department continued to issue reports that **never** mentioned the oil spill, the rats, the disruptions by humans and helicopters, the egg predation by biologists, the lead in the bones, or the epidemic of Newcastle Disease in southern California. The alleged declines were always attributed to DDT!! That allegation played a very important part in the EPA hearings that led to the banning of DDT in December 1972. We, and the National Park personnel, were convinced that they wanted to totally destroy the colony, so the EPA would ban DDT. Malaria would then continue to destroy millions of humans in the third world, and halt the population explosions there.

As it turned out, they succeeded in the broader goal, but failed to actually destroy the pelican colonies.

Now let's look at the pelican situation in eastern United States. Fishermen complained that pelicans ate too many fish, so the federal government asked Dr. T. Gilbert Pearson in 1918 to survey the brown pelican populations along the 1,500 mile coast of the Gulf of Mexico, from Key West to the mouth of the Rio Grande. Writing in *National Geographic* magazine in March 1934, Pearson estimated a total of 65,000 pelicans during that 1918 survey. Robert Allen, the president of the National Audubon Society, duplicated that survey in 1934, found only 900 pelicans in all of Texas, and published the result in *Auk* 52: 199,1935). He wrote that "In 1918 Dr. T. Gilbert Pearson estimated the total number of brown pelicans on the Texas coast not to exceed 5,000, thus in 16 years there has been a decrease of about 82 per cent." The number dropped to only 200, in 1939, four years before DDT was developed. (Since it is axiomatic that "effects" cannot precede their "causes," it is unlikely that the pelicans declined in anticipation of DDT!)

I reported these and dozens of other findings during my testimony at Congressman W. R. Poage's hearings before the House Agriculture Committee, on 18 March 1971. R. B. Finley and J. O. Keith (FWS) were issuing bulletins (which were cited by spokesmen in many cities), stating that "A catastrophic decline has occurred on the Gulf Coasts of Texas and Louisiana where a population of over 50,000 brown pelicans has all but disappeared since 1961" The cause, they insisted, was DDT! In 1961, G. F. van Tets saw the last active nesting colony in Louisiana on North Island, containing only 200 pairs (in *A.O.U. Monograph of The Pelicaniformes*). Those, plus the 5,000 reported in Texas, fell far short of the alleged 50,000 conjured up by Finley, so I called him to ask for details. He wrote to me on 29 March 1971, saying "In response to your inquiry, I have investigated the source of the reported 50,000 brown pelicans formerly on the Texas and Louisiana coasts. The only comprehensive estimate was made by T. G. Pearson: 65,000 birds, in his 1937 book." (Was it possible that Finley didn't know that was the total for the entire 1,500-mile Gulf Coast?) He then cited only five references, dated 1879 to 1955, and concluded "Although the reports are sketchy, Jim Keith and I both feel that the estimate of 50,000 is not unreasonably high.." (emphasis added) Five months later (2 August 1971) he wrote to Congressman Poage criticizing my testimony, but stated: "The year 1961 was merely a hasty approximation of an unknown time. After reviewing the evidence, I think now that I should have said the 50,000 pelicans disappeared by 1961 (instead of since 1961)." (emphasis added) The total number did not exceed 300 pelicans along the entire Texas coast in 1942, (before DDT), according to Audubon researchers. If the pelicans somehow multiplied from less than 500 in

1959 to 50,000 before 1961, as Finley and Keith claimed, they would have had to do it in a habitat that was admittedly very rich in DDT!

The significance of Finley's retraction of the 50,000 pelican disappearance was great, for it removed the possibility that DDT or DDE could be blamed for pelican troubles during the 1960s. The problems actually occurred long before any DDT was present, and resulted from human persecution, oil spills, gas blowouts, bombing and machine gun targets for the military, and hurricanes. The Fish and Wildlife Service never publicly corrected their erroneous "since 1961" propaganda, so the news media continued to say "DDT nearly caused the marvelous pelicans to became extinct during the 1960s, but they were saved because attorney Ruckelshaus banned DDT in 1972."

It was enough to shake our confidence in the FWS and the EPA, their pelican expertise, and their integrity!

I could spend almost this much time discussing the other birds that played such prominent roles in the anti-DDT debacle, but I will be more brief.

The Endangered Osprey

Long before DDT was used in this country, J. J. Hickey (in his *Guide to Bird Watching*, 1943) attributed a 70% decline of eastern ospreys to "pole trapping," around fish hatcheries. After DDT was developed, he ignored the pole trapping and shooting of ospreys, and blamed only DDT for all bird declines. I was a member of the Hawk Mountain Sanctuary Association, and was impressed by their published data on ospreys. At Hawk Mountain, Pennsylvania, the survey of migrating ospreys during the years after DDT appeared revealed the following results: 191 ospreys in 1946, 254 in 1951, 352 in 1961, 457 in 1967, 529 in 1969, and 630 in 1972 (*Hawk Mtn Sanctuary Newsletters*). It was difficult to believe the propaganda that DDT threatened osprey extinction, when more were migrating every year following the introduction of DDT, setting new all-time records in several of those years." After DDT was banned, the *Sanctuary Association Newsletter* 48: April 1976 reported: "For reasons we do not understand at all, the number of osprey going south is returning to something like normal --318 in 1974 and 279 in 1975."

Chesapeake Bay ospreys had no problem with DDT or DDE, but "lipids of osprey eggs had PCB levels from 545 to 2270 parts per million." (*Hawk Mtn Sanctuary Newsletter*, 1971)

Ornithologist Charles Henny estimated there were 5,000 or more breeding pairs in North America, plus non-breeding adults and juveniles. He wrote that "The population declines of the 1960s, largely attributed to DDT, were not as widespread as originally thought. . . many incorrectly assumed that the population crashes were uniform throughout North America, but actually there may be more of the birds in the West than ever before. Their future appears good."(*Audubon*, March 1976)

Bald Eagles

These birds have suffered much at the hand of man, but not because of DDT. In 1917 Alaska enacted legislation providing a bounty of 50 cents per eagle, and increased the bounty , later. From that time until 1952 the state paid bounties on 128,000 dead eagles (more than $100,000.00). Anarticle in *Ecology* magazine 2: 76, 1921, was titled "Threatened Extinction of the Bald Eagle."

In the 1930s there were no records of bald eagles in most of New England, not more than 25 in Ohio, 10 in Pennsylvania, and perhaps 15 or 20 along Chesapeake Bay. *Bird Lore* magazine stated "this will give some idea of the rarity of the eagle in eastern United States." (vol. 32: 165, 1930) That was 14 years before DDT existed.

Each year thousands of bird watchers participate in the annual Christmas Bird Count for the National Audubon Society. In 1941 (before any DDT was used) they saw 197 bald eagles (*Audubon* magazine, 1942), but in 1960 (after 15 years of heavy DDT use) the count was 891 bald eagles seen (*Audubon Field Notes*, 1961) If those results had been the reverse, I might have also thought that DDT or some other chemical was killing them off!

In *Science News Letter* (3 July 1943) it was stated: "When the timber was cleared it was inevitable that the eagles had to go. The cities grew and fouled the rivers with sewage and industrial waste. The once-teeming fish population vanished. With their main source of supplies thus taken away, it was only natural that the eagles should vanish also." That was written before any DDT was used there.

The Hawk Mountain Sanctuary counts, tabulated daily throughout the years, showed that the number of bald eagles migrating over Pennsylvania more than doubled during the first six years of heavy DDT use in eastern United States (1946 to 1952). (Their summaries also revealed great increases in most other kinds of raptors during the "DDT years.")

In *America's Eagle Heritage* (USDI, 1965) the study of bald eagles in the Everglades is discussed. In 1959 there were 24 active nests, which produced 18 young; in 1964 there were 51 nests, which produced 41 eaglets." Notice the sizeable increase! The chief Everglades biologist reported that "The population is stable and is reproducing at a rate more than adequate to mantain its numbers.(and) I know of no evidence that the region ever supported a larger number of nesting eagles." (Laycock, in *Autumn of the Eagle,* 1973)

At Patuxent Wildlife Research Center in Maryland (U.S. Department of Interior) autopsies were performed on all 76 bald eagles found dead in eastern U. S. between 1960 and 1965 (*J. Wildlife Diseases* 6: 72-76,1970) None of the deaths were blamed on DDT. Forty-six had been shot or trapped, and 7 died of impact injuries from flying into buildings or towers. Between 1965 and 1980 they performed autopsies on 652 more bald eagles, from across the nation. The major cause of death was always shooting and trapping, but there were also many deaths from electrocution or impact with solid structures. "The scientists concluded that the role of pesticides has been greatly exaggerated." In 1972 the carcasses contained twice as much PCB as DDT, DDD, and DDE combined, and the brains had four times as much PCB." (*Pesticide Monitoring Journal* 6:133-138, 1972)

A multi-million dollar federal project began financing captive rearing and releasing of bald eagles. The eggs were stolen from successful eagle nests, incubated, reared, and released into the wild. "If 1200 eggs are collected, about 20 will yield adult birds," according to the National Wildlife Federation. Each year up to 75 were released in the southeastern states. Peter Nye (*Natural History* May 1992) wrote "My colleagues and I identified 80 locations in New York believed to have been bald eagle nesting sites since 1880. By 1940 only a handful were nesting, yet (he said) the oft-mentioned culprit, DDT, wasn't put into use until the last few nesting eagles were already struggling for survival. We imported eaglets from Alaska beginning in 1976, including 49 in the first three years. Now a healthy population is here."

In summary, the bald eagle in the lower 48 states was on the verge of extinction in the 1920s and 1930s, long before DDT was discovered. They were shot on sight for fun, bounty, or feathers, trapped accidentally, killed by impact with buildings and towers, or electrocuted by powerlines. Many more may have died because of the high levels of PCBs in their lipids and brains.There is still high mortality due to the physical hazards, but much less to shooting and trapping (because if caught engaging in either activity you may now face a prison term). The increased numbers of bald eagles in the United States are admired and protected, and thousands have been reared in captivity and released into the wild. **The most surprising thing is that the environmental industry and the**

news media continue to attribute the increase to just one thing. . .the 1972 ban on DDT!

Peregrine Falcons

The peregrine falcons first gained environmental notoriety in England during world war II, when they kept killing the vital carrier pigeons that were carrying messages back from embattled France and Germany. The British government sponsored the shooting of as many peregrines as possible, to protect the pigeons. They killed about 600, reducing their numbers to half the pre-1939 level (Ratcliffe 1980, in *The Peregrine Falcon*). In 1967, Derek Ratcliffe, evidently unaware of that program at that time, hypothesized that DDT might be threatening the peregrines (Nature 215: 208-210). Ratcliffe had heard North American propaganda about eggshell thinning, but lacked the equipment to measure shell thickness, so he simply weighed eggs, trying in vain to determine if their shells might be thinner. His results were meaningless, but he proposed a "shell thickness index" that attracted anti-DDT activists in the United States. He simply divided the weight by the product of the length times the breadth of the egg. A few American ornithologists used that "index" repeatedly, and tried to convince the environmentalists and the media that DDT had caused significant thinning of eggshells if the eggs simply were lighter than expected.

Comparisons between that "index" and the actual shell thickness have little validity, because the shell thickness varies with egg size and also because shells become much thinner as the embryo develops (calcium for bone formation is drawn from the eggshell). Jefferies weighed the eggs of DDT-fed finches, and found they became 9% lighter, but had shells 13% thicker than normal (*J. Wildlife Mgmt* 32: 441-456, 1969). Claus & Bolander (in *Ecological Sanity*, 1977) reported that eating thyreoprotein caused hens to lay lighter eggs, but with thicker, heavier shells.

The Wilson Report, produced by the British Federal Advisory Committee on Pesticides in 1969, pointed out that the peregrine decline there had ended in 1966 even though DDT was still as abundant as ever, and concluded "There is no close correlation between the decline in populations of predatory birds, particularly the peregrine falcon and the sparrow hawk, and the use of DDT." Gunn (*Ann. Appl. Biol.* 72: 105-127, 1972) pointed out that there was not enough DDT present in 1947 to have caused thinner peregrine shells in Britain, and he observed that "an effect coming before its cause is utterly unacceptable."

In Ratcliffe's 1980 book, *The Peregrine Falcon* , (416 pages, Buteo Press, S. D.). he retracted his statements about DDT and the peregrines. It is not surprising that we have never heard any American environmentalists refer to this interesting book.

Peregrine falcons were extremely rare in eastern United States long before there was any DDT present. In 1913 Dr. William Hornaday, head of the N. Y. Zoological Society, said (in *Our Vanishing Wildlife,* page 226) that they are undesirable and "deserve death, but are so rare that we need not take them into account." Persons who found a nest were urged to "shoot the parents and destroy the eggs or young in the nest." Egg collectors, however, liked them, and often specialized in peregrine eggs. Roger Tory Peterson wrote as follows, in *Birds Over America* (1948, pp. 135-151). "One collector in Philadelphia showed a cabinet full of the eggs, drawer upon drawer. This awesome display represented years when the eyries in eastern Pennsylvania fledged scarcely a single young bird. A Boston oologist was reputed to have more than 700 peregrine eggs. . .One collector said he secured the eggs from one nest each year for 29 years, but that site is no longer occupied." He complained that "the falconers often climb the cliffs first, daub India ink on the eggs to make them worthless to oologists. " Berger, *et al.,* in *Peregrine Falcon Populations* (1969, pp. 165-173), referred to "the prevalence, for 70 years, of fanatic egg collecting." In *The Duckhawk and the Falconers* (1944) it was reported that: "falconers in the east raided every nest, every year, keeping the birds on the brink of extinction, and farmers and hunters contributed to their demise by shooting them on sight and destroying their eggs and young." In *Peregrine Falcon Populations* (1969, pp. 155-164) J. N. Rice said: "The egg collectors reduced by at least one third the marginal population already restricted by its environment." He recalled "53 sets of eggs were taken in Vermont before 1934, and most eyries were deserted by 1940."

Until 1964, peregrines were unprotected or on the vermin list in every Canadian province and every U. S. state except Massachusetts. Twenty three states protected all owls and hawks *except* peregrines. (Beebe, in *Hawks, Falcons, and Falconry,* 1976, 320 pages).

By the time DDT was introduced, there were literally NO peregrine populations in eastern U. S., but the anti-pesticide extremists later placed the blame on DDT, anyway! W. H. Stickel (FWS) wrote (in *Peregrine Falcon Populations,* p 538, 1969) that "it is not likely that pesticides will explain everything. . .one could explain the observed phenomena at least as well by a theory of poisoning by metals such as lead or mercury."

In the 1960s peregrines in northern Canada were "reproducing normally," even though they contained 30 times more DDT, DDD and DDE than the

midwestern peregrines that were allegedly being extirpated by those chemicals. In fact, the peregrine containing the very highest DDT residue ever found (2,435 ppm) (Enderson, *Auk* 85: 383, 1968) was efficiently feeding her three healthy young!

In 1972, surveys were made by several Canadian biologists, after which they reported that the Arctic peregrine "seems to be holding its own, with a nesting success as high as ever recorded for the species (an average of 2.4 young per active nest)." (Campbell, R.W. & B. Davies, Environmental Protection Board, Winnipeg, 1973)

In 1976 Fyfe feared that "virtually all Canadian eyries were deserted" but the most reliable indication of breeding success should be the number of offspring produced. In 1976, 2,900 Arctic peregrines were counted migrating through the United States and in 1977, 9,750 such migrants were counted (*Federal Register* 1991). On my own trip to Inuvik last year I found that peregrines are common in the northern Yukon Territory and Northwest Territory.

Frank Beebe,the leading Canadian authority on falcons, who in 1971 wrote *The Myth of the Vanishing Peregrine Falcon* (31 pages, in which he exposed the political and financial dealings involved) should be applauded for concluding that "It appears that the Canadian Arctic peregrines, not knowing how gravely ill they are, go right on reproducing in blissful unconcern of their desperate plight."

Tom Cade, the founder of the Peregrine Fund Inc., stated to *Associated Press.* that "As far as is known, peregrine falcons completely disappeared east of the Rocky Mountains in the 1960s. The Fund has not been able to reestablish the subspecies of peregrine that lived in the East. It is probably extinct. But the captive breeding program has introduced other subspecies that have taken hold." Cade said (*Audubon*, November 1973) "if 1,000 peregrines could be released in the next 10 years, and if 400 survived to breed, the pre-DDT numbers could be restored." The cost would be $650,000, he said (*Raptor Reviews*, 1976).

In 1976 Cade requested permission from the FWS to take for captive breeding six more peregrines from nests in northern Mexico, because, he said "a regional director of the USFWS suddenly decided in June that no more peregrines of European origin are to be released in the eastern United States, thus leaving a large number of Spanish and Scottish peregrines on our hands." (*Audubon* Nov. 1977, p. 141). It seemed untruthful to refer to the offspring of western Canadian, Mexican, Spanish and Scottish falcons as being "reintroductions of the eastern peregrine falcons." According to Beebe,"The subspecies that is reproducing most successfully in the cages at Cornell is the western Canadian maritime subspecies, *Falco peregrinus pealei*, which is <u>not</u> endangered. The only <u>eastern</u> peregrines

were *Falco peregrinus anatum*, but they are not the ones that are being 'reintroduced' there." (*British Columbia Prov. Museum, Occ. Paper* No. 17, 1975.)

Since 1979 about 850 peregrines have been placed in 13 eastern states, and another 1,150 have been released in other states." Brian Walton (in *Chevron World*, Spring 1985) wrote that his group in California had reared and released more than 250 peregrines, at a cost of $1500 to $2000 for each bird. In 1985 Bill Burnham, the Peregrine Fund's Director, said: "We're having a terrible time trying to fund the program, in the face of 50 million people starving in Ethiopia. The Fund's goal. is to establish a $7 million endowment to help pay its estimated $1 million annual expense." The Endangered Species Act provided much of the funding for the propagation and release programs, and Burnham said the group has released more than 3,700 peregrines into the wild. (*Los Angeles Times* 27 March 1985)

The noble peregrine, environmentalists' now crow, is recovering in the United States "as the result of the 1972 ban on DDT!"

Bird Eggshell Thinning Experiments

In their effort to convince people that DDT (or DDE) in the diet causes thinning of eggshells, the environmental industry fostered tendentious feeding experiments during which their birds were exposed to treatments that every poultryman knows would cause severe eggshell thinning. This included removing calcium from the food, starving the birds, depriving them of water, cutting the light from 16 hours a day to 8 hours a day, and mixing dieldrin with the high levels of DDT in the diet. The anti-DDT extremists relied on just three or four studies in their attempt to convince the Environmental Protection Agency hearing examiner that DDT causes serious thinning of the shells of birds. The studies were: Bitman, *et al* (*Nature* 224: 44,1969), (essentially repeated in another study by most of the same people, in *Science*, 1970); Porter and Wiemeyer (*Science*, 165: p. 199, 1969), Peakall (*Science* 168: 594, 1970), and Heath *et al.* (*Nature* 224: 48, 1969).

Bitman's study was designed so as to produce thin eggshells regardless of whether DDT was added to the diet. They fed their Japanese quail a diet containing only 0.56% calcium, "to provide a calcium stress during egg-laying." The DDT concentration added to the diet was 4,000 times the level in normal human diets in the United States. They blamed the DDT, instead of the calcium deficiency, for the production of thinner shells. Compare that with the 1970 tests by FWS researchers Tucker and Haegele (*Bull. Env. Contam. & Toxicol.* 5 (3): 191). They fed different amounts of calcium to each of three different cages of

quails: 3% calcium to the "controls", 1.73% calcium to another group and 1% calcium to the third group. (None got any DDT or DDE.) The shells formed by the lowest-calcium birds were 9.3% thinner than the controls. Remember, Bitman and his colleagues at the FWS laboratory fed their quail only 0.56% calcium, which would be expected to cause much thinner eggshells than Tucker's lowest-calcium group, even if Bitman had NOT added any DDT or DDE to the diet!

During my Congressional testimony I explained my criticism of the calcium-deficient feeding experiments. Bitman evidently considered my criticisms, and performed yet another experiment. This time he fed the quail 2.7% calcium in the diet. The result was that both the DDT-fed and the DDE-fed birds produced heavier eggshells than the "controls, and there was no difference in shell thickness." They sought to publish their article in *Science* magazine, but this time it was rejected, so they published it in *Poultry Science* 50: 657-659,1971.

Why did *Science* refuse the article? The editor of *Science* (Philip Abelson) had earlier informed Dr. Thomas Jukes that *Science* would never publish any article about DDT that was not antagonistic to that insecticide, and through the years he enforced that attitude. This explains why the anti-DDT literature simply kept expanding. It was all written by the same coterie, and for references in Science, they just kept citing each other. No other research was accepted and no disputes were permitted in America's leading science journal. Without that sheltered bias the case against DDT would have quickly folded!

There were a couple of exceptions. When Abelson was on vacation I submitted a Letter in which I pointed to an error in a previous article by Woodwell, where he had mistakenly translated "parts per 10 to the twelfth power" to mean parts per million, when it really means parts per trillion. It was published (Science 72: 194, 1972) but would probably never have been acknowledged if Abelson had been in town! It was a pleasure to see it in print.

Porter & Wiemeyer (*Science* 165: 199, 1969) conducted a 2-year study of kestrels (sparrow hawks), feeding them a diet rich in DDT **and** dieldrin. Lockie (in *J. Applied Ecology* 6, 1969, page 385) reported that golden eagle breeding success increased by 38% as soon as dieldrin sheep-dips were stopped in Ireland. (The eagles often ate young sheep that had died in the field.) Knowing that dieldrin alone appeared to have inhibited breeding success, why would Porter and Wiemeyer feed their birds dieldrin, along with the DDT, and then claim that DDT caused egg problems?

In the 1968 "control" group of Porter's kestrels, 45% of the embryos died. In the high-treatment DDT- and dieldrin-fed group (which they said "was calculated to be just short of lethal to adults") only 30% of the embryos died. The experimenters said the 30% was "highly significant," but the 45% of "control"

embryos that died, they said, "may have been caused by bacterial infection of the eggs." During 1967, the investigaters reported a 46% loss in the dieldrin/DDT high-dosage group, which they said was "significant," but the 58% loss in the "control" group was not considered significant at all! It was interesting that the thinnest shells both years were also produced by the "controls" (0.13 to 0.21mm). In the DDT/dieldrin birds, the very thinnest shell during the two years was 0.153 mm thick.

Peakall (*Science* 168: 592, 1970) kept his ring-doves in a communal cage on a 16-hour light and 8-hour dark schedule. When ready for the experiment, he put the female of each pair into isolation and changed the schedule to only 8 hours of light per day. Simultaneously he fed them 10 ppm of DDT in all their food. Poultry would have stopped laying entirely under those lighting conditions, but the doves produced good eggs, anyway (it just took them longer). Into some doves he therefore injected 150 mg/kg of DDE intraperitoneally (300,000 times the daily level of DDT eaten by humans). The doves still laid eggs, but they became lighter than normal. Before Peakall performed his experiment it was already well known that any reduction in illumination causes birds to produce thinner eggshells. E. J. Hauser (*Pacific Poultryman*, August 1963) wrote that "Providing adequate light is just as important as your vaccination, parasite control, and feeding programs. When bulbs are dirty the hen receives less light than she needs, and the stress may be severe enough to cause a premature molt." Furthermore, Morris, *et al.* (*British Poultry Science* 5: 133, 1964) had reported that "the most critical area of light intensity change is in the range between 8 and 16 hours, and decreasing photoperiods depress rate of lay." It is interesting that Peakall deliberately utilized those precise hours in his tendentious "experiments."

In *Scientific American* (April 1970) Peakall suggested that the DDT might inhibit carbonic anhydrase formation (a vital enzyme involved in eggshell formation). He didn't succeed, because qualified research teams had already proved that carbonic anhydrase was *not* depleted by DDT or DDE. Those scientists were: E. Chang & E. L. R. Stokstad at the University of California; Y Pocker, M. Beug, & V. Ainardi at the University of Washington; B. Dvorchik, M. Istin & T. Maren at the University of Florida; and B. Switzer, J. Lewin & F. Wolfe, at the University of Alberta.

Heath, *et al.* (*Nature* 224: 48, 1969) fed DDT to mallards, and the DDT-fed ducks actually seemed to benefit. Those fed 2.5 ppm DDT in all of their food produced 40% more young than the controls, and those fed 10 ppm DDT produced 81% more young than the controls. Despite those results, Heath's published conclusion stated that "DDT in concentrations of 2.5 and 10 ppm did not have measurable effects on reproduction." Later, when queried, he indicated that he was just pointing out that the DDT did not interfere with reproduction. People who read only the title or the abstract were totally misled!

Actual Causes of Eggshell Thinning

Shell-less eggs or eggs with thin or distorted shells are the result of any of a great number of factors. Older birds produce thin-shelled eggs, as do some young birds, and perfectly normal eggshells become 5% to 10% thinner as the developing embryo withdraws calcium for bone formation. Even the same bird produces varying egg shell thicknesses as time passes. Higher temperatures, and dehydration cause thinner shells to be formed, as does higher relative humidity. A reduction in illumination causes drastic changes in shell formation, and the duration of the light has physiological effects as well as regulating the amount of food the birds have time to eat. Stress from excitement, fear, and noise is very destructive to egg laying success. Simple restraint interferes with the transport of calcium throughout the bird's body, preventing it from reaching the shell gland and forming good eggshells. Lower than normal temperatures reduce the carbonic anhydrase activity, which causes thinner shells to be formed.

A great many environmental substances inhibit the bird's ability to produce normal eggshells (oil, lead, mercury, PCBs, Sevin, 2,4-D, cadmium, lithium, chromium, selenium, and sulfur compounds in the diet). Sulfa drugs, especially sulfanilamide, may result in the complete absence of a shell around the yolk. These are all covered in detail in the literature, including a great book, *The Avian Egg*, by Romanoff (1949). The environmental extremists, who sought to blame DDT, never mentioned that book or *The Avian Embryo* (1967), also by Romanoff.

Tucker (*Utah Science*, June 1971) reported that after quail were withheld from water for 36 hours they produced eggshells 29.6% thinner when drinking was resumed. He also found that parathion caused 4.8% thinner shells, Sevin caused 8.7% thinning, mercury caused 8.6% thinning, and lead caused 14.5% thinner shells, but p,p'-DDT and DDE caused NO shell thinning and o,p'-DDT caused shells 0.5% thicker to be formed.

Bald Eagles produced eggs with shells 14% to 21% thinner, after lead, mercury, or a small dose of parathion was added to their food. (*Trans. 31st N. A. Wildlife Conference*, 1966)

A deficiency of phosphorus or Vitamin D also results in thin eggshells, but the most notorious cause of thinning is the lack of sufficient calcium. When the diet contains less than 1% calcium the bird's leg bones may soften to such an extent that even walking is difficult. When adequate calcium is included in the bird's diet, there will be no shell thinning unless some of the other conditions mentioned

above are introduced into the equation (OR unless the bird develops a disease like avian bronchitis, avian malaria, rickettsia pox, or Newcastle disease). Wasn't it curious that the FWS researchers at Patuxent deliberately fed their DDT-dosed birds only food that was grossly deficient in calcium. . . and then attributed the shell thinning to the massive levels of DDT and DDE they added to the diets?

Dozens of researchers (and thousands of farmers) had found that DDT did not cause shell-thinning. Jefferies fed his finches 50 to 300 micrograms per day of DDT, which "caused calcium metabolism to tend toward the production of heavier shells." (emphasis added) After two years, they still formed shells that were 7% thicker.(*Journal of Wildlife Mgmt.* 32: 441-456, 1969). Cherms fed quail 200 mg/kg of DDT for months, with no effect on shell thickness through four generations. DeWitt (*Journal of Agriculture and Food Chemistry* 4: 863-866, 1956) fed pheasants diets containing 50 ppm DDT throughout the year, and reported that the birds produced 23% more hatchable eggs than the controls did (and two weeks later 100% of the DDT chicks were alive, but 6% of the "controls" had died).

Measuring Eggshell Thickness.

The great book by Claus and Bolander (*Ecological Sanity,* published by David McKay. Co.in 1977) includes nearly 300 pages dealing with DDT. They revealed a great many examples of the untruthfulness of anti-DDT propagandists A section titled "The Turning of the Screw" (pp. 400-405) exposes the reasons that screw micrometers failed to accurately measure bird eggshells. The differences between thicknesses of shells were measured "to the nearest 0.01 mm" (10 microns) and were, in some cases, reported as "significant" thinning if the difference was 5 to 7 microns! Claus and Bolander reminded readers that a human red blood cell is about 8 microns across and a human hair may be 50 to 80 microns in diameter. Also, an eggshell that has a soft texture and an easily-compressible inner membrane might not be measured very accurately with a screw micrometer by a person seeking to prove that DDT has caused eggshell thinning.

Hickey and Anderson, *Science* 162: 271-273, 1968, studied 1729 museum eggs. They reported changes in shell weights of the eggs of five species, but said "changes did not occur in the five other species we studied, or in the dozens of others, not studied." Four of the five species they reported in their big Table had eggs that were heavier after DDT use began, than those produced during pre-DDT years. They also measured the actual thickness of some of the shells, with a micrometer, and indicated that red-tailed hawk eggs just *before* DDT was present had much thinner shells than did the pre-1937 eggs, but that during the years of heavy DDT use the birds produced shells that were 6% *thicker.* Golden eagle

eggshells during the "DDT years" were 5% *thicker* than those produced before any DDT was used. The authors concluded that for five of the six species of raptors whose eggs they had studied, "the data do not permit a precise delineation of the time of onset" of the change in eggshells.

Looking at the graphs in the article by Hickey and Anderson, we find that the greatest "decline" indicated was the 40 micron difference between the 1900 shells and the 1946-52 shells, but the "standard error"was plus-or-minus 30 microns within most of the 10-year intervals indicated on the graphs. In other words, there was a variability of 60 microns among the shells within each decade, but only a 40 micron difference overall between 1900 and 1952. That is the stuff of which the anti-DDT eggshell propaganda is composed! Claus and Bolander wrote: "We have nowhere seen reports of changes in the shell thickness of any species which exceed 50 to 60 microns (0.05 to 0.06 mm) , and in some cases differences of 5 to 7 microns have been reported as 'significant' decreases (0.005 to 0.007 mm differences). Since only the 2nd and in some cases the 3rd decimal point differ, one wonders. . ."

Biological Magnification up Food Chains

A great effort was made by the environmental extremists to convince people that there was "biological magnification up food chains." The theory was as follows: "Small crustaceans ingest DDT, and when hundreds of them are eaten by a fish, that fish might contain a higher concentration than any one crustacean. If numerous fish are eaten by a duck, it might harbor a higher concentration than any of the the fish. After hawks eat the ducks, they could theoretically contain tremendous amounts of DDT! The major difficulty with this theory is that it simply doesn't work that way, where DDT is involved.

The wet-weight samples of zooplankton or crustacea are analyzed, but the fish muscle is analyzed via dry weight.. Dry tissue will have a higher concentration of DDT, because it is not diluted by water. Dr Virgil Freed proved that most DDT enters the fish through its gills, and scarcely any through the diet. (*Env. Health Sci. Center Progress Report,* Oregon State University, 1968) J. C. Davis found that "trout pass all of the blood in their body through the gills every 64 seconds, causing rapid transfer of water-borne chemicals into the body tissues" (*J. Fisheries Research Bd., Canada* 27: 204-214, 1970).

When the fish is eaten by a duck, most of the DDT passes through the gut and is eliminated (the DDT residues that remain in the body are metabolized and the results are excreted). (See Abou-Donia, *Biochemical Pharmacology* 17: 2160, 1968). Duck muscles do not contain a higher concentration of DDT than did the fish muscles, but duck lipids do. Propagandists therefore analyzed the lipids in

ducks and compared their DDT levels with with those of the non-fatty muscles of the fish. The propagandists then analyzed only the brain tissue of the hawks, knowing that.brain tissue concentrates more DDT than lipids do, and they then compared the DDT levels in hawk brains with the levels in duck lipids.) If the crustacea, the fish, the duck, and the hawk all have only their muscle tissues analyzed, there is not a significantly higher level at any point going up the food chain! There is no significant "biomagnification."

Many animals store lower levels of DDT or DDE than did their food. Anchovies in Monterey Bay contain no more DDT residues than the algae there, upon which they feed (750 to 1000 parts per billion). Sea lions were found to contain much lower concentrations of DDT than the fish they ate. Jefferies and Davis (*J. Wildlife Mgmt.* 32: 441-456, 1968) reported that earthworms kept in soil saturated with dieldrin contained less dieldrin than the soil, and thrushes that were fed only on those earthworms never accumulated any more dieldrin than the earthworms contained individually.

DDT in the water adheres to particles in the lake bottom, so the mud or sand has a higher concentration than the water, but "biological magnification" only begins after the DDT gets into some living creature! In *Our Stolen Future*,(1996) the diagram showed 600 times more DDT in the osprey brain (25 ppm) than in the wet-weight sample of zooplankton (0.04 ppm). The propagandists claimed, however, that DDT levels increased "10 million times," because they started multiplying from the 3 ppt of DDT in the water. A National Academy of Sciences Committee (in a Panel Report on the Marine Environment) offered the explanation that "the absence of concentration increase going up the food chain can be due to either varying solubilities or a biodegradation in a pool of pesticides relatively sequestered from the surroundings." (For more details, see Edwards, in *Agriculture Age*, April 1980, or Edwards' chapter in Lehr: *Rational Readings on Environmental Concerns*, 1992).

Sierra Club president Edgar Wayburn, an anti-DDT activist, wrote in *California Medicine* (November 1970) that "In Sarawak recently, spraying for malaria led to biological magnification of DDT through food chains. Cats died after eating DDT-loaded geckoes and cockroaches; the rats then multiplied until there were threats of plague. Replacement cats had to be parachuted into the villages to keep down the rats." Dr. Thomas H. Jukes responded in the February 1971 issue, stating that "the program to which Wayburn objected had (according to the WHO) saved five million lives and prevented 100 million illnesses in the first eight years of its use, without causing any symptoms in the 130,000 spraymen or the 585 million inhabitants of the sprayed houses." The cat-rat story first appeared as a Vietnam anecdote in the *New York Times.* and the parachuting of cats occurred in North Borneo as a result of dieldrin deaths, not DDT. Jukes

pointed out that "DDT as applied has not caused any side-effects among domestic animals"(including cats). The LD50 of DDT for cats is about 300 mg per kg of body weight, and DDT has an LD50 of 25 micrograms per roach." He concluded that "a 5-kilo cat would have to eat 60,000 cockroaches in one day to ingest a lethal dose of DDT. It would more likely die from ruptured intestines caused by impaction by those roaches, or from physical exhaustion -- the cat would have to catch 42 roaches per minute for 24 hours, and would probably too busy with the roaches to chase many geckoes." Dr. J. Ralph Audy was the person who wrote the story that led to Wayburn's articles. Audy responded to Jukes. in *California Medicine*, saying "I wrote my article in too much of a hurry, while traveling abroad, and did not check that story. I will accept that cats would not be killed acutely by eating either geckoes or cockroaches. . .But what are the prospects for chronic poisoning following "biological magnification.?" (We might all wonder what the world would be like if there were no hypothetical questions.)

Persistence of DDT in the Environment

For years the environmentalists insisted that "DDT cannot be broken down in the environment," and Marc Lappe (in *Richmond Independent*, 29 March 1969) said that "DDT is not broken down by living things." Obviously if DDT did not break down, it would have been unnecessary to apply it again so soon in order to control pests on plants or animals! When I heard him testify before the California legislature that DDT cannot be broken down in the environment I quickly went to my files and made a list of more than 140 articles documenting the breakdown in the environment. (And I didn't even have to include examples of pests that built up "resistence" to the chemical.) I sent copies of that list to dozens of newspapers, and radio and television stations, but not a single one responded or modified their earlier false statements.

Actually DDT is broken down rather rapidly by heat, cold, moisture, sunlight, alkalinity, salinity, soil micro-organisms, hepatic enzymes of birds and mammals, and a great many other environmental agents. Croker and Wilson, in *Trans. Amer. Fish. Society.* 94 (1965) applied DDT to a tidal marsh. In less than 24 hours only traces remained, and even those traces disappeared in five days.

In Washington state estuaries the Bureau of Commercial Fisheries monitored pesticide residues in shellfish at 19 stations during three years of heavy DDT use (1966-1969). Ninety-three percent of the samples contained less than 10 parts per *billion* of DDT (and the highest level found was only 0.1 part per million). Only 3% if the samples contained any chlorinated hydrocarbon insecticides. Shellfish are known to "concentrate" chlorinated hydrocarbons in their system at levels 40,000 to 70,000 times as great as that in the surrounding water, so it is evident that the coastal waters were very free of DDT residues.

The Department of Interior study at Gulf Breeze Florida was reported in *Chemical Assays* (*USDI Circular* 335, page 20, 1970). Large glass containers were filled with sea water, a large amount of DDT was added, and the closed containers were suspended in the gulf. Nearly every day a sample was taken out for analysis After 38 days, 92% of the DDT (and its metabolites, DDD and DDE) had also disappeared. Studies abound regarding DDT disappearance in soil, sand, leaf litter, plant tissues, animal tissues, etc. During the campaign to spray parts of three northwestern states with DDT to halt a great tussock moth outbreak in 1974, two newspapers editorialized regarding the persistence of DDT. The *Vancouver Sun* and the *Lewiston Tribune* both wrote in editorials (12 December 1974) that "DDT has a half-life of several thousand years." (It had only been in existence for 30 years!) I sent each editor copies of literature that cited scientific studies giving actual data, but neither paper responded. Sometimes it gets discouraging!

Inaccurate Analyses of DDT

During the 1960's the gas-liquid chromatograph was routinely used for pesticide analyses. It was very sensitive, but very often it could not differentiate between DDT residues and other chemicals which were not pesticides at all. Sherman (*New York Entomological Society* 81: 152-157,1973) called attention to this difficulty, warning that "This negates the putative data that were the basis for previous alleged sensational charges against DDT. For 30 years DDT has been a scapegoat for artifacts and mimics, on the gas chromatograph."

In 1966 J. J. Hickey sent a dead robin to the WARF Institute in Wisconsin for analysis. It had been collected in 1938 and stored in formalin. Although collected and stored seven years before DDT was ever used in that state, the analysis indicated that the robin contained DDT, DDD., and TDE (Sherman, pp. 156-157). Dozens of other robins were being analyzed, and many scientists realized that DDT "readings" did <u>not</u> mean DDT was actually present in the carcasses. Experts at the WARF Insitute confirmed that material earlier believed to contain DDT residues actually had none at all.(Coon, 1966, At the Conference of American Chemical Society, in New York.)

Anderson, Hickey, Risebrough, *et al.* helped ban DDT by reporting high levels of it in five pools of cormorant and pelican eggs. In 1965 they reanalyzed the five pools, after learning that PCBs can interfere with analyses of other chlorinated hydrocarbons. They discovered that three of the pools contained no DDT residues at all, and the other two had only a fourth as much as claimed in their anti-DDT articles (*Can. Field-Naturalist* 83: 91-112, 1969) Gunther and

Blinn (*Interscience Publ.*, 6: 357, 1955) stated that most aromatic compounds interfere with gas chromatograph analyses, and J. J. Sims (plant pathologist and biochemist at University of California) discovered in 1977 that certain red algae produce halogen compounds that may be misidentified as DDT metabolites. Sims said "the natural halogens were unknown previously but are now known to be common in natural marine habitats, and compounds containing bromine or iodine rather than chlorine may also have falsely registered on the gas chromatograph as DDT." (Press Release, 15 June 1977) Hylin *et al.* explained how "organic compounds in plants cause interference in residue analysis." (*Residue Reviews* 26: 127, 1969.)

Frazier *et al.* (*Pesticide Monitoring Journal* 4: 67-70, 1970) analyzed 34 soil samples that had been sealed in glass jars since they were collected in 1911. The gas chromatograph indicated that five kinds of chlorinated hydrocarbon insecticides were in that soil, even though none were in existence until 30 years after the samples were sealed." They concluded that the apparent insecticides were actually misidentifications caused by the presence of "co-extracted indigenous soil components." Bowman *et al.* (*J. Economic Entomology* 58: 896-902, 1965) analyzed soil that was sealed in 1940, and reported "a naturally-occurring extraneous substance appearing in pre-DDT soil that gave the same chromatographic retention times as DDT (62 ppb) and DDE (35 ppb)." Glotfelty and Caro (*Anal. Chem.* 42: 82-84, 1970) commented that misidentifications of chlorinated hydrocarbon insecticides resulted from "interference by pigment-related natural products found only in photosynthetic tissues." F. B. Coon also reported on a gibbon that was collected in Burma in 1935 and sealed in a tight container for 30 years before being analyzed. The analysis indicated DDE in the kidneys, testes, liver and fat tissues, even though DDE didn't exist anywhere on earth until six years after that gibbon was sealed in preservative." (1966, *op. cit.*)

There are many other such incidents, and even more major problems developed after PCBs (polychlorinated biphenyls) became widespread, because many of them have the same retention times on the gas chromatograph as DDT, DDD, DDE, and other chlorinated hydrocarbon insecticides. PCBs abounded in fluorescent light ballasts, distorting GLC analyses performed in rooms with fluorescent lights.

Lichtenstein, *et al.* presented a Table revealing GLC analyses of eleven Aroclor plasticizers and listing various chlorinated hydrocarbon insecticides that yield peaks that are identical with some peaks of each PCB. The insecticides that mimic the PCB peaks are DDT, DDD, DDE, Lindane, heptachlor, heptachlor epoxide, aldrin and dieldrin.

PCBs were also produced by plastic tubing within the GLC itself, as well as in the plastic bags in which most samples were stored until analyzed (including all of

the samples from Antarctica). (Gustafson, *Envir. Sci. Tech.* 4: 814, 1970) and Lisk (*Science* 170: 589, 1970). Later, Wolff and Peel (*Nature* 313: 535-540, 1985) confirmed that the famous allegations of high DDT levels in Antarctic samples "were overblown by more than 100-fold."

Harvey (*Science* 180: 643, 1973) and (*Oceanus* 18: 19-23, 1974) stated there was "twice as much PCB as DDT in Atlantic sea water, while Giam (*Bull. Env. Contam. Tox.* 9: 376-382, 1973) found similar levels in plankton from the Gulf of Mexico and the Caribbean. Hom, *et al.* mentioned large amounts of PCB in the Santa Barbara Basin of southern California (near Anacapa Island), where a high "apparent DDE" concentration in sediment deposited there 12 years before any DDT existed was explained away by saying "we attribute the higher DDE concentration in the 1930 sediment to spurious contamination during collection, storage or analysis" (*Science* 184: 1197-99, 1974) (Presumably the samples were collected in plastic containers.)

DDT in the Ocean

On June 10th, 1971, Philip Butler's report for the National Academy of Sciences claimed "As much as 25% of the DDT produced to date may have been transferred to the sea." (Two other panels of the NAS, headed by Kanwisher and by Harvey, later refuted such reports.) The *Washington Post* (13 June 1971) expanded upon that untruthful claim, saying "Nearly 25% of all DDT manufactured to date is now in the world's oceans, where it is killing baby fish." Jacques Cousteau must have been confused by it all, for in his testimony before the Senate Commerce Committee on 18 October 1971, he stated "For example, we now know that 25% of all DDT compounds so far produced are already in the sea, and finally they all will end up in the sea." (That faulty statement was repeated in *U.S.News &World Report* , 1 November 1971.)

SO, a false estimate of how much DDT may have gotten into the sea (made by the man whose own EPA laboratory at Gulf Breeze, Florida had shown that DDT and its metabolites break down rapidly in sea water), was escalated to a solid statement by the *Washington Post* (and alleged to "kill baby fish"). It was then blown completely out of context by poor Cousteau and the anti-DDT press, warning that **ALL of the DDT and its metabolites ever produced will "finally end up in the sea."** That sort of propaganda was faced by innocuous DDT 20 years ago. The same sort of misstatements and deliberately false allegations are still being directed against many other chemicals that are of great potential benefit to mankind and the environment.

Attorney William Ruckelshaus And the Environmental Protection Agency

On 31 August 1970 attorney William Ruckelshaus, as Assistant Attorney General, stated that Secretary of Agriculture Clifford Hardin declined to ban DDT, explaining that:"The total value of DDT to mankind is inestimable, and is comprised of nutritional, economic and social benefits." (That statement was originally presented by Dr. S. W. Simmons in his 1959 book, *DDT the Insecticide, and its Significance, Volume II: Human and Veterinary Medicine,* p 252)

BUT on 22 May 1971 (In a speech to the Wisconsin Audubon Society) Ruckelshaus stated: "Western man is running out of control and must be stopped -- if necessary by such drastic steps as outlawing chemical pesticides and fertilizers, prohibition of nuclear power plants, compulsory population control or declaring a moratorium on growth. I was highly suspicious of DDT, to put it mildly. But I was compelled by the facts to temper my emotions because the best scientific evidence now available did <u>not</u> warrant such a precipitous step. However, we in the EPA have streamlined our procedures so we can make our final decision regarding DDT and its use expeditiously in accord with all the facts developed in the statutory hearing process now underway. . .Certainly we'll all feel better when the persistent compounds can be phased out in favor of biological controls."

He later explained his ambivalence by stating that as assistant attorney general he was an advocate for the government, but as head of the EPA he was "a maker of policy." (*Barrons* 10 November 1975)

Dr. Lee DuBridge, the president's science advisor, wrote in April 1972, that "Responsible groups have not attempted to advocate impractical panaceas -- such as prohibiting the use of automobiles, or of DDT, or of phosphates in detergents." (*Science* 176: 230, 1972) He was certainly right, but where WERE the responsible groups? Certainly not the EDF, the EPA, the Sierra Club, or the National Audubon Society!

The EPA Hearings

During the six months of EPA Hearings on DDT, Dr. George Woodwell testified regarding an article written by him and Charles Wurster (*Science* 156: 821-824, 1967). The abstract stated "DDT residues in an extensive salt marsh on

the south shore of Long Island average more than 13 pounds per acre"(This was discussed on p.7232 of the hearing transcript, on 13 January 1972).

The USDA attorney asked:

Q "Isn't it a fact that after you initially studied this marsh you continued your samplings, and found as a result that you were getting an average of one pound per acre of DDT?"

A "No, I wouldn't agree with that.

Q "Didn't you also find out later that one of the areas where you took your samples was an area that was convenient for the mosquito Commission's spray truck, too?"

A "I can't say that I discovered that, either. I don't believe there's any evidence to that effect."

Q. "Dr. Wurster, perhaps?" [We had told the attorneys the details of Wurster's Seattle testimony, and Wurster was in the audience, this day]

A "I don't believe he knows that, either. I don't believe there's any evidence to that effect."

Q "Dr. Wurster, your coauthor, made the following statement at the Washington state hearings, and I'm quoting him verbatim: He testified: 'We have since sampled that marsh more extensively, and we found that the average in the marsh was closer to one pound per acre. The discrepancy was because our initial sampling was in a convenient place, and this turned out to be a convenient place for the mosquito Comission's spray truck, too.' Did you learn that after the fact, Doctor?"

A "That is a true statement in my experience. I did not know that Dr. Wurster had said that, but that is a true statement."

Q "Doctor, have you ever published a retraction of this 13 pounds per acre, or a further article which discloses the results of your further sampling which brings the average down to around one pound per acre?"

A "I never felt that this was necessary."

Woodwell also admitted they had only taken six samples of the soil in that extensive marsh!

Later that same day Dr. Woodwell was questioned about another of his publications, titled "Persistence of DDT in Soils of Heavily-sprayed Forest Stands," (*Science* 145: 481-483, 1964). He claimed that after spraying DDT on New Brunswick forests, the concentration in the soil built up to higher levels each of the following years. He was questioned by the USDA attorney, as follows:

Q "Are you aware of the critique of that article which was published by Yule in the *Bulletin of Environmental Contamination and Toxicology* in 1970, where Yule said, 'Spray program veterans claim that Woodwell's sampling site near the

BC airstrip was heavily dosed with DDT by aircraft during local testing and calibration of spray equipment and the relatively large amounts of DDT residues found there, Table 1, do not represent typical operating conditions?' Have you read Yule's criticism of your work? Is that an accurate statement, Doctor?"

A "That is an accurate statement, that is was used. It was used. That's why it had such large levels -- high levels of DDT. That's why we picked that site in the New Brunswick." *(sic!)* [He was very "shaken up" at this point]

Woodwell also had written (in *Science*, 174: 1101, 1971) about the disappearance of DDT in the environment, stating that "six billion pounds of DDT had been used, but only 12 million pounds could be accounted for in all of the earth's plants, animals, fish, and birds." He stated that was "Less than a thirtieth of one year's production of DDT during the mid-1960's." He theorized that "most of the DDT has either been degraded to innocuousness or sequestered in places where it is not freely available." That article contrasted so sharply with his testimony at the EPA hearings that a reporter asked him why that article in *Science* was completely omitted from his testimony. Woodwell replied that EPA lawyers had told him not to mention the article, "lest my testimony be disallowed." (*Business Week*, 8 July 1972)

When asked about persistence of DDT residues in the environment, Butler testified (p. 3725) "I am thinking of work which has shown that DDT persists for as much as 40 years in terrestrial deposits. I have no reason for thinking that it will last for any less time in silt deposits in the estuaries." (Remember, DDT had only been in existence for 30 years, at the time of this testimony!) Under cross-examination, Butler admitted that published reports from his own laboratory at Gulf Breeze, Florida, confirmed that 92% of the DDT and its metabolites had disappeared from sea water in huge closed glass submerged containers, in just 38 days! (Wilson, A. J., *et al. USDI Circular* 335, (for 1969), 1970,p. 20)

Additional testimony by Philip Butler was equally astounding, even though he was employed by the EPA at that time. He testified (p. 3712) that "if you expose oysters to 0.1 parts per *billion* of DDT, you can cut their growth by about 10%." Under cross-examination, however, he stated that "we have been unable to find any correlation with growth (p. 3752). There can be as much as 150 parts per *million* of DDT residues in the system and not have effect on the growth." (p. 3749) Obviously, if there is NO effect at 150 ppm the claim of a 10% growth reduction at 0.1 ppb must be questioned (150 ppm is 1,500,000 times greater than 0.1 ppb!) [Later, in *BioScience* 22: 691, 1972 he wrote that "DDT will disappear within one or two generations of sensitive estuarine fauna."]

Butler also testified (p. 3769) that in thousands of samples from sea water in coastal Texas, which he called "one of the most contaminated areas" the greatest

DDT residues in oysters were "from 0.2 to 0.8 ppm," but under cross-examination he admitted that the absolute highest level ever found in Texas was "about 0.487 ppm, about a half part per million."

Dr. Samuel Epstein was being paid by the EPA at the time of his EPA testimony, but did not mention it. He claimed that DDT causes cancer, citing as his source an unpublished study by Fitzhugh, Gross and Davis. Dr. Gross says it was not published because the mice had been fed 300 mgs of DDT per kg of body weight, by mistake, rather than the intended 100 mgs/kg, for an unknown period of time. A total of 83 tumors developed in the "control" mice (with no DDT) but only 68 tumors developed among the DDT-fed mice. Epstein testified simply that "the DDT-fed mice developed cancer," but avoided mentioning that the mice *without* DDT developed *more* cancers. (That impressed us as being unscientific, and many might even say unethical!) Epstein also testified under oath (pp 7306 and 7340) that he was a member of the Health, Education and Welfare panel on carcinogens, but under cross-examination he admitted that he was not (p. 7374).

Science magazine approved of Epstein's actions, and printed a summary. In response to criticisms for doing that, Nicholas Wade (editor of News & Comments) wrote (in personal letter of 20 March 1972): "We chose to print (it) because it seemed to us to be outspoken and controversial. We will doubtless return to the subject of DDT when the hearings are finished, and Dr. Epstein's testimony will then be placed in its proper perspective." (They did not "return to the subject," and Epstein's testimony was therefore never discredited in *Science* magazine.)

It was after hearing sworn testimony of this sort by the anti-DDT witnesses for seven months that EPA Hearing Examiner Edmund Sweeney arrived at the decision that DDT should NOT be banned. The judge's final official decision, issued on 26 April 1972, stated that: "DDT is not a carcinogenic hazard to man. DDT is not a mutagenic or teratogenic hazard to man. The uses of DDT under the regulations involved here 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."

John Quarles served as General Council for Mr. Ruckelshaus in 1971 and 1972. He testified in an affidavit to a U. S. Court in northern Alabama on 3 June 1982 that: "After seven months of hearings, the EPA Hearing Examiner made findings generally supportive of the position that DDT did not cause undue harm and that an adequate basis did not exist for cancelling the uses of DDT. There were no findings that DDT had caused harm or would cause harm under a specific set of circumstances or at any particular time or place."

Attorney Ruckelshaus never attended a single day of the seven months of EPA Hearings on DDT, and his Special Assistant (Marshall Miller) told reporters that Ruckelshaus had not even read the transcript (*Santa Ana Register* 23 July 1972). He turned the transcript of the Hearings over to a 29-year-old judicial officer, Charles Fabrikant, who also "had no special background in science." Two non-scientists in Fabrikant's office prepared anti-DDT tracts based upon Environmental Defense Fund propaganda, rather than on the hearings transcript and the data of the experts. [They included claims from EDF literature that appeared nowhere in the entire 9,300 pages of the Hearings transcript] Fabrikant synthesized a report based upon those tracts, and prepared the document that became the infamous "Ruckelshaus Opinion and Order on DDT.'

That final "Opinion and Order" ignored the scientific data that had so deeply impressed Judge Sweeney during the seven months of hearings. On page 1 Ruckelshaus [via Fabrikant's assistants] used an incorrect formula for DDT. On page 4 he stated "DDT has three major breakdown products: DDA, DDE, and DDD; separate registrations exist for TDE (DDE)." The truth is that TDE is the same as DDD, **not** DDE, and that DDE is not insecticidal at all, thus there are no registrations for it! As a likely substitute for DDT, Ruckelshaus recommended the use of parathion, a chemical with a long history of killing farm workers! Rachel Carson (p. 126) referred to a small 1959 parathion application that killed rabbits, raccoons, and 65,000 red-winged blackbirds . The DDT ban was opposed by bee-keepers and honey producers, because it was not very toxic to bees, but Azodrin, an organophosphate substitute for DDT, destroyed 83,000 colonies of honey bees in southern California, and thousands of pheasants died. On page 37 he wrote that "a program can also introduce farmers to the less acutely toxic organophosphates, like carbaryl..." [Carbaryl, or Sevin, is a carbamate, NOT an organophosphate!] On page 29 he said that "The possibility that DDT is a carcinogen is at present remote and unquantifiable," however he was already in possession of more than 70 articles by cancer specialists, in scientific journals, specifically reporting that all of the tests showed NO evidence that DDT was carcinogenic. In fact, some of the articles had even proved that DDT *inhibits* the growth of some tumors or cancers.

Ruckelshaus obviously did not rely on scientific literature or upon the facts presented during the hearings, and many people objected that his decision to ban DDT was political, rather than reflecting scientific evaluations. EPA officials vigorously denied that, but Ruckelshaus himself wrote a letter (26 April 1979) to Allan Grant, the President of the America Farm Bureau Federation, in which he stated: "Decisions by the government involving the use of toxic substances are political with a small 'p' . . . science, along with other disciplines such as economics, has a role to play. The ultimate judgement remains political. In the

case of pesticides in our country, the power to make this judgement has been delegated to the Administrator of the EPA." (emphasis added) Surely most people would prefer such judgements to reflect the *truth*, rather than only an administrator's personal biases! Surely the Congress intended for the Administrator of the EPA to make judgements based on scientific facts and accurate data, rather than emotions and politics!

My lengthy critique of many of the errors in the Ruckelshaus Decision was placed in the *Congressional Record* by Senator Barry Goldwater on 24 July 1972 (pages S11545-11546)

The Judicial Review of His Own Decision

It was highly unusual, but even before the EPA released the result of the EPA hearings, the Environmental Defense Fund had obtained all of the details, and had already moved to file an Appeal!

John Quarles (General Council for Ruckelshaus) later (3 June 1982) testified that a judicial official should have considered the Appeal, but *"Because of the importance of the question, rather than refer it to the judicial officer, Mr. Ruckelshaus decided to rule on the appeal himself."* (emphasis added)

Ruckelshaus was a member of the Environmental Defense Fund and he had solicited donations for the group on his personal stationery. On that stationery, he said "I hope you will read this brochure explaining some of the critical problems EDF has fought to solve, and I hope you will join." Ruckelshaus' brochure claimed that "EDF's scientists blew the whistle on DDT by showing it to be a cancer hazard," and "three years later, when the dust had cleared, EDF had won."

After reversing the decision reached by his EPA hearing examiner, Ruckelshaus refused to release the secret tracts upon which his ban was based. (We had seen a leaked copy and were eager to expose the errors and propaganda therein.) He even defied USDA efforts to obtain those tracts through the Freedom of Information Act, saying that they were just "internal memos."The scientists were therefore prevented from refuting many of the allegations in the Ruckelshaus "Opinion and Order on DDT."

Ruckelshaus also consistently spurned the National Environmental Quality Act by refusing to file any Environmental Impact Statements regarding the anticipated environmental effects of his DDT decision, including outbreaks of diseases in birds, mammals, and humans, the destruction of beneficial insects birds,and mammals (by deadly substitutes for DDT), the devastation of millions

of acres of oak and Douglas-fir forests, extensive crop losses in the United States, and widespread famine and death in third world nations.

Attempting to defend its DDT ban, the EPA told Congress that Americans were ingesting 13.8 milligrams of DDT daily before the ban, and implied that was a serious health hazard. Scientists quickly pointed out that EPA's figure was one thousand times higher than reality. The EPA admitted their error in a letter to the Montrose Chemical Company (11 September 1975), and changed their figure to 0.015 milligrams daily in 1970, but dropping to 0.0018 milligrams per day, by 1973. (See also *Chemical & Engineering News* 29 September 1975)

Ruckelshaus was the keynote speaker at an EPA symposium at Stanford Research Institute on 27 August 1975. He warned ecologists that the use of confrontation for resolving disputes "is all too often causing bad decisions that are, in the final analysis, not in the public interest." We presumed that he was thinking of the harm already caused by the DDT ban.

Charles Wurster, in *BioScience* 23: 106, 1973, said that "carcinogenesis was a pivotal issue in the hearing and the ultimate decision," but that "The banning of DDT by Ruckelshaus was not a political decision. It was based on sound scientific information." (Remember Ruckelshaus' letter to Allan Grant, in which he said "the ultimate judgement remains political?")

On 7 March 1994 Dr. Fredrick M. Steinberg's Letter was published in the *Wall Street Journal.* The title was "Millions Must Perish Because of DDT Ban." After reviewing the death statististics, Dr. Steinberg said "None of the charges against DDT -- namely, as an agent of widespread bird deaths, as a nonbiodegradable material, or as an agent of human carcinogenicity -- have ever been substantiated."

In the *Wall Street Journal,* 21 March 1994, Ruckelshaus responded. The title was "DDT Ban Was Based on Solid Science" (Remember his letter to Allan Grant stating that "the ultimate judgment remains political?"). He wrote: "The scientific basis for the ban was solid then and still stands. The basis for the decision was it's impact on the thickness of eggshells of raptors, brown pelicans, and the peregrine falcon. The decision was not based on any claim of human carcinogenicity." Remember that he praised his Environmental Defense Fund for "showing DDT to be a cancer hazard," and remember that Wurster said "carcinogenesis was a pivotal issue in the ultimate (Ruckelshaus) decision!"

Dr. Bruce Ames (Head of Biochemistry at University of California in Berkeley) wrote in *Science* 236: 271-280, 1987 that "The total amount of possible carcinogenic pesticides we eat in a day, on average, is about 20 times less than the

known natural carcinogens in a cup of coffee, which in itself is a minimal risk." Every plant produces its own toxic insecticides, and that can comprise as much as 5% of the plant." He noted that "The amount of nature's pesticides we ingest is at least 10,000 times the level of man-made pesticides consumed. . .and many are now known to be both mutagenic and carcinogenic. Yet, people are much more afraid of traces of man-made chemicals than of piles of natural ones."

In Edith Efron's 1984 book, *The Apocalyptics, Cancer and the Big Lie* she wrote (p. 292) that the U.S. Occupational Safety and Health Agency's 1980 policy statement specified that "negative results in carcinogenicity bioassays simply define a limit beyond which carcinogenic activity would have been detected, if higher doses had been applied," and that "an assay that is not positive for carcinogenicity is the same as if the chemical has never been tested for carcinogenicity." (emphasis added)

Dr. Alice Ottoboni (California's state toxicologist) testified that after two decades of surveying human diets they determined that the average American ingests between 0.0006 and 0.0001 milligrams of DDT per kilogram of human body weight (mg/kg). The World Health Organization set an acceptable daily intake (ADI) of DDT for humans at 0.01 mg/kg per day.

Ottoboni and associates reared beagle dogs through three generations (resulting in over 600 pups) while feeding them DDT in their daily diet. The lowest level they used was 100 times that ADI and approximately 1,000 times the average American human intake. The highest levels they fed the dogs were 10,000 times greater. (The FDA level for DDT in cow's milk at that time was 0.05 ppm, not because of any danger from higher levels, but because that level could be easily achieved if DDT was not applied to the cattle forage.) In the beagle tests, DDT produced no differences among the groups of dogs , except a 60 day earlier age of puberty for the female dogs. There were more reproductive problems among the "control" dogs than there were in the DDT dogs. As a result, she reported, the animal caretakers have dubbed the control group as "the DDT deficient dogs." They also found that DDT was almost non-toxic to newborn rats, perhaps because of an enzyme effect, or perhaps because the baby cannot absorb DDT from the digestive tract. (The details are in *California's Health* August 1969 and May 1972.)

Eating DDT to Prove it is Not Toxic to Humans

After hearing DDT be accused of being extremely toxic to humans, and after studying the U.S. Public Health Service's report of tests in which human volunteers ingested up to 35 mgs of it per day for nearly two years, with no adverse effects (Hayes, W.J. "The effect of known repeated oral doses of DDT in man." *JAMA* 162: 890-897, 1956), and after reviewing Dr. Edward Laws' report on the workers who absorbed 400 times as much DDT as normal Americans, daily, at the Montrose Chemical Company (after 1300 man-years of exposure there was never any case of cancer) (Laws, *et al.*, "Men with intensive occupational exposure to DDT." *Arch. Environ. Health* 15: 766-775, 1967), and after remembering my own days of dusting hundreds of civilians during the war in Europe with 10% DDT to kill lice and help prevent millions of cases of deadly typhus, I thought I should try to convince people that the environmental extremists were wrong. Thereafter, at the beginning of each DDT speech I made I would publicly eat a tablespoon of DDT powder. I believe it was a successful effort, and it resulted in a full-page photograph of me doing that, in *Esquire* magazine (September 1971). The caption stated that I was eating 200 times the normal intake of DDT "to show it's not as bad as people think." We must sometimes trust the media, and *Esquire* treated me well!

I was surprised by a letter written to me on 26 February 1970 by William Denneen, who claimed to be a biologist at Allan Hancock College in California. He referred to a newspaper article that mentioned I had "orally consumed DDT to show that it is not toxic." Denneen asked me: "If DDT is not toxic, why will the California Brown Pelican, the American Bald Eagle and many other top carnivores soon be extinct?" (I am still wondering about his gullibility!)

Robert Loibl was so concerned that he and his beautiful wife, Louise, decided to do something, too. In 1971 they had a pharmacist fill dozens of gelatine capsules with 10 mgs each of pure DDT, and every day for three months Bob and Louise each swallowed one and had observers sign testimony. They daily ingested an amount equal to a year's intake by the average U. S. citizen. They got tremendous media coverage, had no adverse effects, and convinced a great many people that the environmental extremists were wrong. Attorney Ruckelshaus made a speech to the Sierra Club chapter in San Jose, in which he claimed that Bob and Louise Loibl wrote to him almost daily, and sent photographs of themselves eating DDT, every Monday. They were close personal friends of mine, and they assured me that they never even sent him a post-card, let alone a letter or photograph. It was amazing that he would lie that much about such a simple thing!

In 1974, Ruckelshaus was acting attorney-general of the United States, under Richard Nixon. He reported that records from Ehrlichman's office were hard to get, and that "we almost had to arm wrestle with the Secret Service." The Secret Service heard that, and objected, pointing out that Ruckelshaus and his men were only in the building for four minutes and that "without incident we gave them the files they requested." Ruckelshaus then apologized and said the Secret Service agents "could not have been more polite or efficient," and that his "allusion to arm wrestling was an effort at hyperbole at a time when reality could not absorb exaggeration." Furthermore, he said "The gloves were never donned, and the bell never rang. . . in short, the bout never occurred." (*San Francisco Chronicle*, April 1973) It was unfortunate that he was never forced to similarly retract his lies about DDT, which resulted in so much environmental destruction and were responsible for so many human deaths!

In 1975, after leaving the EPA, Ruckelshaus developed a firm in Washington, D.C. with nine other lawyers. Five of the lawyers were ex-employees of the EPA. The *New York Times*, through the Freedom of Information Act, forced exposure of some of the results. In the first 18 months, Ruckelshaus and his friends made "at least 178 identifiable contacts with EPA officials, for 20 different clients." Thirty-seven of those EPA contacts were made on behalf of the Plastics Industry, involving "air pollution controls the EPA might impose to protect the public from polyvinyl chloride, a potential cause of cancer." EPA had planned actions against plastics, but now they took no action against it. The FDA was not a part of the cozy relationship, so they announced on 27 August that they would act against the plastic food containers they feared might be carcinogenic. Ruckelshaus himself made 27 of the contacts. A Ralph Nader associate, Mark Green, criticized those actions, and Gus Speth (of the National Resources Defense Council) commented simply "It's obscene."

Nevertheless, that group persisted, and became known as "The Institute For Congress." According to the *San Jose Mercury News*, 8 February 1976, "The Institute for Congress, estimated to cost $22.5 million over five years, with much of the money coming from Congress, has quietly been established here. The Commission plans a professional staff of 80. The vice chairman is Washington lobbyist William Ruckelshaus, formerly the EPA Administrator, who is now using the skills he learned in the government to fight against some of the regulations he helped create." The Institute 's Board of Directors included Craig Hosmer (of the nuclear industry), William Coleman (Secretary of Transportation), William Eberle (President of Motor Vehicles Association), Clarence Mitchell (Director of Washington Bureau of NAACP), Cyrus Vance (former Secretary of the Army), Ben Heineman (First National Bank of Chicago), Lucy Bensen (Secretary of Human Services) and Leon Jaworsky

(Director of Bank of the Southwest in Houston. but more famous for his political activities).

Attorney Russell Train becomes EPA Administrator

In September 1973 Ruckelshaus was replaced at EPA by Russell Train, another attorney with limited scientific ability. Train said he would "not take any precipitous action against pesticides without giving Congress advance notification." He then surprised even his own staff by calling a Christmas Eve press conference to announce his intention to ban chlordane. The makers of chlordane had not lifted a finger to help Montrose defend DDT during the seven months of hearings. Perhaps they were looking forward to great sales of chlordane if DDT could be banned? Now suddenly they were faced with the banning of their own great pesticide!

Train's EPA later claimed that "hundreds of thousands of American farm workers are injured every year by pesticides and hundreds of them die annually." (*EPA Radio Broadcast* on 15 May 1975) We learned that this fabrication came from the 1970 congressional testimony by a spokesman for Cesar Chavez. After strong objections from many authorities, EPA meekly apologized, saying: "We used those statements in good faith, thinking they were accurate, and they turned out not to be accurate. . .They cannot possibly be substantiated." (*UPI Press Release*, 24 May 1975 & *San Francisco Examiner* 1 June 1975) Despite that embarrassment, attorney Train used that very misstatement as an excuse to inaugurate the famous EPA "Hot Line," which anyone could call, toll free, and anonymously accuse their neighbors of misusing pesticides. (*EPA Radio Broadcast* 24 May 1975). It was later discovered by the *New York Times*, via the Freedom of Information Act, that the toll-free number was not in any EPA office, but instead was in Chavez's National Farmworkers' Information Clearing House in Texas. Furthermore, the project was financed by the U.S. Labor Department, via Antioch College in Ohio. (*UPI Press Release* 3 June 1975) Only after vehement congressional criticism of this gestapo-like operation was the Hot Line discontinued. (*San Jose Mercury*, 26 June 1975)

But what was the evidence that led someone to make that claim? *USA Today* (14 April 1992) printed an editorial that said essentially the same thing and attributed the figure to "a congressional study last month." Actually it came from a World Resources Institute press release seven years earlier! The two WRI researchers who made the study (Robert Wasserstrom and Richard Wiles) quit the WRI because of the untruthful figure of 300,000 in that release, which Wasserstrom said "tells a story substantially different from what Richard Wiles and I found in the epidemiologic record." (*Chemical and Engineering News*, September 1985). The 300,000 figure was based on an official report of 235

cases of farmworker medical complaints in California in 1982. (Roughly half were skin irritations caused by exposure to sulfur.) Dr. Molly Coye (NIOSH) extrapolated from that figure to the awesome 300,000 allegation, as follows: Because Dr. Ephriam Kahn had estimated in 1976 that "California doctors report only 1% of such cases," Molly multiplied 235 by 100 and concluded that 23,500 California farmworkers suffered from pesticide illnesses in 1982. Since that was 7.8% of California's farmworkers, and there were four million farmworkers in all of United States, she then extrapolated to 312,000 poisoned workers annually (7.8% of 4 million workers). Dr. Coye neglected to mention Dr. Kahn's 1977 article (based on a 12-month study that followed his earlier estimate), wherein he stated that 80% of the pesticide-related illnesses are reported. Untruthful propaganda such as Coye's were common, and were contrived to frighten the public and generate financial support. I sent these details to the editor of *USA Today,* but received no reply. (I am indebted to Pamela Jones for these details)

International Dictators

In 1974-1976 U. S. Export-Import Bank assistance financed more than $3 billion worth of pesticides. In 1976 the Audubon Society and the NRDC file suit in federal court to compel the Ex-Im Bank to file environmental impact data on all exports financed by such banks. That would have effectively halted most medical entomological activities in underprivileged nations. The Mid-America Legal Foundation opposed that suit, and in 1980 a federal court ruled against the pseudoenvironmentalists. The president of the Foundation rejoiced, saying "The federal court order means American exports will not be curtailed, and our nation will not be practicing environmental imperialism."

Meanwhile, in 1977 the environmentalists sued to force the Agency for International Development to prepare environmental impact studies for all pesticides that are shipped from the U. S. to Third World Nations. In June 1980 a subcommittee of the U. S. Foreign Affairs Committee opened hearings that could stop American corporations from making overseas shipments of pesticides that have been restricted by our EPA.

In 1986 the U. S. Agency for International Development responded to the National Policy Act by issuing "Regulation 16 Guidelines." Secretary of State George Schultz, relying on that as his authority, telegraphed orders to U. S. embassies in Africa, stating that "The U. S. cannot, repeat cannot, as a matter of longstanding policy, participate in programs using any of the following pesticides: (1) lindane, (2) BHC, (3) DDT, (4) dieldrin." Countries that could not support their own pest control programs without U. S. aid were therefore unable to use the only really effective insecticides in combatting the locust swarms,

namely dieldrin! Millions of tons of food were destroyed as a result, and widespread human starvation followed. Additional millions of humans died of insect-transdmitted diseases because public health programs in poor nations were prevented from obtaining those insecticides

The Delaney Clause

In 1958 Representative James J. Delaney entered a Clause into the food additive provisions of the Federal Food, Drug and Cosmetic Act. It was intended to reduce the threat of cancer that might result from exposure to significant levels of man-made food additives. It was approved by the majority of the remaining members.

Section 408 of the Federal Food, Drug, and Cosmetics Act states that raw foods must conform with tolerance levels (for crops) established by the FDA.

Section 409 - Deals only with the intentional addition of chemicals to processed foods, such as man-made preservatives, dyes, etc. This section includes the Delaney Clause, which is discussed below:

21 USCS: 348 (Food and Drugs) (Section 409)

(3) "No such regulation shall issue if a fair evaluation of the data before the Secretary --

(A): Provided, That no additive shall be deemed to be safe if it is found to induce cancer when ingested by man or animal, or if it is found, after tests which are appropriate for the evaluation of the safety of food additives, to induce cancer in man or animal. . ."

A National Research Council Report (May 1987) attempted to distort the clause by applying it to raw crops, but The General Council of the U. S. Department of Health, Education and Welfare quickly pointed out that "the Delaney Amendment does <u>not</u> apply to pesticidal chemical residues in raw agricultural commodities or to foods processed from lawful crops. Crops are covered in Section 408." (Delaney was <u>only</u> a part of the Food Additives Law, under Section 409).

Russell Train ignored the portion of the Delaney clause that required tests which are <u>appropriate</u> for the evaluation of the safety of food additives. As a result, EPA attorneys assumed they could ban ANY substance which caused ANY tumor or cancer when applied to test animals at ANY dosage, in ANY <u>inappropriate</u> manner (including gavage and injections). Even worse, the attorneys assumed they could ban the substance if it was found to be present on crops at ANY concentration above "zero." Unfortunately, that is the situation at

present, which explains why there is so much sentiment to remove the Delaney clause." With modern methods of analysis, parts per billion, parts per trillion or even parts per quadrillion can be detected, so "zero" has almost ceased to exist.

In the 1970s and 1980s the EPA, relying primarily on that misinterpretation of the Delaney clause, banned aldrin, endrin, BHC, Lindane, heptachlor, toxaphene, and many other pesticides. Even after ignoring Representative Delaney's intent that "appropriate tests" for carcinogenicity be required, they still could not have banned many of those substances if "cancer" had not been redefined by attorney Russell Train!

In Delaney's day, cancers were considered as malignant growths that tended to spread to other parts of the body, frequently with fatal results. Tumors, on the other hand, were usually non-malignant lumps that did not spread (and in lab rodents they often disappeared after the massive chemical insults were halted). When concerns began to be expressed about the differences between "cancers" (as considered by Delaney) and "tumors" (which were not included by Delaney), attorney Russell Train simply redefined those medical terms. He specified that "for EPA's purposes of carcinogenicity testing, tumorogenic substances and carcinogenic substances are synonymous" and "for purposes of carcinogenicity testing, no distinction should be made between the induction of tumors diagnosed as benign and the induction of tumors diagnosed as malignant." (*Chem. & Engineering News* 52: 13, 1974) [Lysenko would have loved Train!]. The EPA then substituted the word "oncogenic" for substances that caused either benign or malignant tumors. Substances of either type would be called "carcinogenic," and could therefore be banned by invoking the Delaney clause! CAST (a consortium of more than 30 scientific and professional organizations, observed that "classifying as 'carcinogens' all chemicals that cause tumors greatly overestimates the 'cancer' risk."

Attorney Train also tried to ignore the distinctions between Sections 408 and 409 of the Federal Food, Drug and Cosmetic Act, and sought to apply the Delaney clause to pesticides that were on the crops instead of in the food. At least he failed in that effort!

Train left the EPA and joined the Board of Directors of the Union Carbide Corporation. Later he moved to the World Wildlife Fund, where he is still making much more than $100,000 a year. He was replaced at the EPA by attorney Douglas Costle. At that time, the EPA had more than 10,000 employees and its 1980 budget was $5,000,000,000 (yes, billion).

More Delaney Problems

In The *Environmental News* (17 February 1996) the EPA stated that "Today's action is another in a series of Delaney related actions resulting from a 1992 U. S. Ninth Circuit Court of Appeals Decision." Lynn Goldman, EPA Assistant Administrator for Prevention, Pesticides and Toxic Substances, said "The strict application of the Delaney Clause requires us to propose these revocations because of technical legal requirements for processed foods." He commented that "a standard is needed that will protect everyone, especially children, while allowing EPA to use current science in making its pesticide decisions. Until such reforms are enacted, however, EPA must comply with the Delaney clause as it stands."

In 1988 the EPA regarded pesticide residues that posed no significant risk as acceptable under the Delaney clause. (*i.e., de minimis* levels would not be cause for banning). Environmental extremists, bent on removing all traces of man-made chemicals, challenged that interpretation, and the 9th court decision, required the EPA to revoke tolerances which violate the mangled Delaney clause, no matter how small the risk."

The portion of the Delaney clause specifying that "appropriate tests for carcinogenicity" are mandatory has not even been considered! The EPA should be establishing what tests were "appropriate for carcinogenicity evaluation" at the time Delaney penned his famous clause, and specifying what Delaney meant by "cancer." Instead, they say they have no choice but to ban anything that causes rodent cancer, no matter what kinds of tests are used and how insignificant a risk is indicated!!

An appropriate question is, has anybody in the EPA actually read the Delaney clause? Has anybody in the Ninth Circuit Court read the clause? Even more important, does anybody in either place really want to comply with the Delaney clause, as written and as approved by the Federal Food and Drug Commission?

Representative Delaney once stated that "too many egos, reputations, and careers are at stake; if you try to change things, the crazies come at you with blow torches and chain saws." He was evidently very correct! It is easy to understand why he bemoaned the fact that, as he stated, "I'll go to my grave with that damn thing hanging around my neck."

Troubles with Rodent Tests

There have been hundreds of complaints by toxicologists who are convinced that chemicals have very different effects on rodents than they do on humans. Also, the use of tremendously inappropriate tests involving massive dosages and unnatural applications of the chemicals have caused much opposition to reliance on rodent tests.

The American Council for Science and Health wrote that "Sound toxicological primciples are routinely flouted in laboratory rodent tests and the results are frequently inappropriately extrapolated to humans (1991). Also, test rats were found to produce a special protein (Alpha 2U Globulin) which makes them especially prone to develop tumors and cancers. In 1992 the Environmental Protection Agency pointed out that humans lack that protein, which they said "could invalidate thousands of tests of pesticides, preservatives, additives, and other chemicals that have been banned on the basis of producing tumors in rats in laboratories." Those tumors, they said, "are a species-specific effect inapplicable to human risk assessments" and "are not relevant to human risks from those chemicals."

Obviously, such rodent tests are NOT "appropriate for the evaluation of the safety of food additives to induce cancers in man or animals," as specified in the Delaney Clause!

The Politics of Cancer

Breast cancer became a major topic during the early 1990s. ABC's *Prime Time* presented an incredible show on 9 December 1993. Congress had allotted hundreds of millions of dollars for research into possible causes, many groups were desperately seeking a way to cash in, and DDT, the perennial whipping boy, was quickly blamed as a likely cause. Prime Time stated that "DDT doesn't disappear, it lingers more than a century." (It had only been in existence for half a century) The National Cancer Institute and the American Cancer Society agreed that "there is not now and never has been an epidemic of breast cancer here." Prime Time claimed that Long Island women have "startlingly high rates of breast cancer."

Those same women had appealed to the CDC with their allegations, in 1991, and the CDC investigated the situation there in 1992. The investigation determined that the women did not appear to have an extraordinarily high rate for the disease, considering their overall background. The mortality rates for breast cancer have held steady over the past 20 years, and the NCI reported that the incidence of new cases actually declined in 1988 and 1989 (the latest years for which records were available). The American Cancer Society had been frightening women by stating that the odds of U. S. women developing breast cancer were one in nine, but many other authorities said the odds were one in 500 to one in 1,000 (depending upon the women's age, etc.) When pinned down, a spokeswoman for the ACS said the one in nine odds estimate was "more of a metaphor than a hard figure."

The National Breast Cancer Coalition got millions of dollars, the NCI received $197 million, and the Department of Defense got $210 million. Early in 1992, Massachusetts had a $3 million budget for breast cancer testing, education and research programs, and the NCI agreed to match that amount. Prime Time stated "This 1987 study shows that many women have more DDT in breast milk than the government allows in a carton of cows milk on the supermarket shelf." That was an amazing understatement, since the government allows ZERO in supermarket milk. That statement would have been valid in the 1960s, when cow's milk was permitted to contain 0.05 ppm of DDT (and canned baby food was allowed to contain 5 ppm).

In 1978 the EDF sought to ban the use of DDT on airliners to kill insect pests coming from the east coast. At a hearing held in San Francisco on 15 March, the EDF spokesman said "Dr. Wurster has presented incontrovertible evidence that DDT causes cancer, gene mutations, and behavioral effects in lab experiments and probably in man." I submitted into evidence a list of more than 70 articles by cancer experts, all specifying that DDT was NOT carcinogenetic. Wurster's major "evidence" was that in 1964 Halver had found trout developing tumors, and thought it might be caused by DDT in the water. In 1966 it was proven that the tumors were caused by aflatoxins in the cottonseed oil that was a part of their diet. The aflatoxins, formed by *Aspergillus* mold, were present in the midlings at concentrations of 6 ppb, and 1 ppb is considered carcinogenic!

DDT-induced enzymes detoxify aflatoxins, preventing the development of cancers or tumors in humans, birds, and other animals. This was discussed by Edward Laws (*Arch. Environ. Health* 23: September 1971), Salinskas and Okey (*J. Natl Cancer Institute* 55: September 1975), McLean & McLean (*British Med. Bull.* 25: 278-281, 1969), and others.

When I hear the statements of some "environmentalist activists," including many in government circles, I wonder how to explain their positions. I often recall a statement in Somerset Maughm's book, *Of Human Bondage.*, that might be applicable. It was as follows:

"He saw nothing for himself, but only through a literary atmosphere, and he was dangerous because he had deceived himself into sincerity. He honestly mistook his sensuality for romantic emotion, his vacillation for the artistic temperament, and his idleness for philosophic calm. His mind, vulgar in its effort at refinement, saw everything a little larger than life size, with the outlines blurred in a golden mist of sentimentality. He lied and never knew he lied, and when it was pointed out to him he said that lies were beautiful. He was an idealist."

Perhaps instead of "idealist" we could just substitute "coercive utopian environmental extremist"?

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