

A Perspective on Pesticides



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There is a gathering reaction to the progress of science in our time particularly among the young, who though happily secure in the munificence provided by modern technology, nevertheless despair over its miscarriages. They are oppressed with a sense of decay and regression, by a fear of a world deteriorating through technological innovation. Artificial chemical fertilizers and pesticides are said to be undermining their health; the soil and the sea are being poisoned by chemical and radioactive

The Author

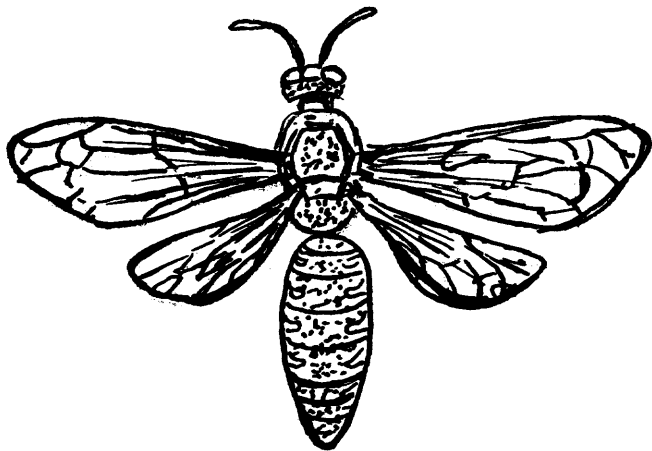
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wastes; drugs merely substitute one form of disease for another, and modern man oscillates continually under the influence of stimulants and sedatives.

This feeling of despondency seems to prevail everywhere. Even knowledgeable, intelligent people are seeking refuge in an elevated form of mystical nuttiness.

Thus we condemn the antibiotics because they elicit allergic reaction among a few, while they restore the health of many. We decry the use of medicaments in livestock feeds because minuscule and innocuous residues may occur in our food supply, the quality and quantity of which is vastly enhanced by their use. We accept as our rightful heritage the total elimination of vast areas of hunger and disease, yet we clamor furiously over the exaggerated and imagined dangers of pesticides.

There is a tendency, even a perverse willingness, to suppose that the despoliation sometimes produced by technology is inevitable and



irremediable, a trampling down of nature by some huge inexorable machine. Actually, of course, whatever environmental deterioration is induced by technology is a problem for which science has either found or will shortly find a solution.

Complaining about the rape of our environment by technology when the need is to seek and apply adequate regulation of unwanted side effects is futile. Panning scientifically established uses of certain pesticides when the overwhelming facts dictate that our food supply, our health and the entire measure of our living standards would clearly be threatened and ultimately impaired by such rash and ill-considered legislation is ridiculous.

Billions of Babies

The major environmental insult in the world today is the accelerating increase in the human population. Even conservative estimates now concede the world level will exceed 6 billion by the year 2000, and a more realistic figure is 7 billion. The major thrust of this fantastic increase continues to be in Asia, which may well support a population almost equivalent to the rest of the world combined by the year 2000. However, both South America and Africa are increasing as rapidly as Asia today. Although western Europe has virtually reached a plateau, eastern Europe continues to increase. Even North America may well exceed 400 million people by the turn of the century. In a recent Census Bureau projection, the United States population alone is expected to reach nearly 322 million. Either man will find an effective solution to curbing his numbers or nature will do it for him.

In the meanwhile, scientific agriculture can hold "a finger in the dike" certainly through the year 2000, and perhaps beyond, to provide food for up to 10 to 12 billion humans through the worldwide application of food production technology now on the books, together with new developments achieved over the next 30 years.

This, however, can only be done if the work is allowed to continue and expand without hampering legislation and regulations promoted by an irresponsible and uninformed minority.

Nonnegotiable Demands

There are two approaches to meeting the stupendous demand for food over the next 30 years.

The first—horizontal expansion into new and, as yet, untapped potentially arable land—is the most obvious and perhaps the more readily achieved. However, it will constitute the more serious threat to the environment and will press wildlife into extinction more rapidly.

The second approach—vertical expansion, or increased productivity per acre—will, therefore, become mandatory, even if the present arable area is increased by 33 per cent.

The possibilities for such a vertical increase are exceedingly promising. For example, in the United States within the past 30 years, grain yields have more than doubled and grain production per farm worker has advanced sixfold. These advances are reflected by the lowest cost in food supply to the consumer for the most abundant and highest quality food supply at all seasons of the year that any nation has ever achieved in history. It also allows five per cent of the population to provide all the food for all the people.



About the Bugs

No amount of productive efficiency or reliance upon natural controls of pests can ever be expected to attain a productive margin ahead of their ravages. Their rate of reproduction is far too rapid for farmers to be able to raise food in sufficient amounts to feed both pests and humans. The pests will win it all virtually every time.

In India, for example, where chemical pest control is minimal, as much as 50 per cent of the food from the very low yields harvested never reaches the consumer's mouth. Thus the application of simple protective pesticide measures could virtually double the effective food production in a land where 300 million people are continually on the verge of starvation.

A Matter of Life or Death

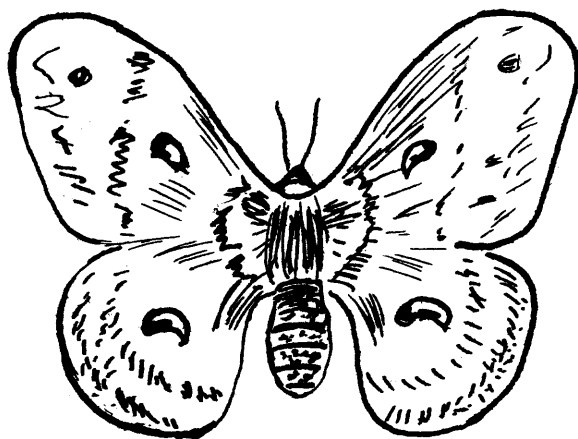
Pesticides, particularly the persistent organo-chlorine compounds, effect their most significant impact in the field of controlling insect-borne human diseases. DDT alone has saved more human lives than all the wonder drugs combined.

Malaria, as far back as history records, has been the greatest disease killer of mankind. More human beings have perished from malaria than all other infectious diseases combined.

When DDT was first introduced into India through the UN World Health Organization program to fight malaria, there were over 75 million cases a year with upwards of 5 million deaths. Within 10 years, intensive spraying of houses and breeding sites so reduced the vector that the total incidence per year was down to less than five million cases, with less than 100,000 deaths, probably the most fantastic achievement in the history of public health medicine.

On the island of Ceylon, where malaria had raged for millennia, the disease was virtually eradicated by 1950. Except for a few imported cases, malaria remained absent until the DDT spray was abandoned for questionable political reasons. Gradually, but with accelerating momentum, the Anopheline mosquito returned. By 1968 nearly 500,000 people came down with malaria and its incidence in 1970 exceeded one million in a population of eight million. The Singhalese Government wisely decided to return to the use of DDT.

In spite of all the furious clamor of late by a vociferous minority, no evidence of injury, cancer, or death to the one billion humans who have been exposed to DDT has ever been authoritatively reported after 25 years of use. Not one invidious claim has ever been medically established. Even workers in DDT plants, heavily exposed to the technical compound daily at a level at least 200 times that of the

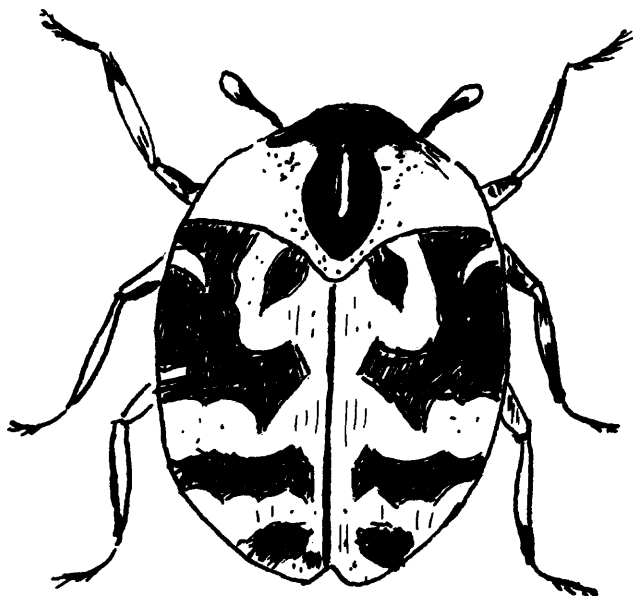


general population for upwards of 19 years, revealed no significant clinical effects.

Wrapped in DDT

Essentially, many ecologists and conservationists are concerned primarily with the persistence of pesticides in the environment to which they are applied. It has even been stated that over 95 per cent of all the DDT ever applied is still present as such, or as its biologically active derivatives, and continues steadily to impregnate the entire planet, land, water and air.

This is absolutely untrue. To begin with, the older pesticides such as lead arsenate, the mercuries and coppers are indeed permanent, as they never degrade. This is not true of the organic pesticides including DDT and the other organo-chlorines. Some, such as the organo-



phosphates, have half lives measured in hours or days, although many of them are exceedingly toxic to wildlife for the period they are around. Others, such as DDT and the other organo-chlorines, have half lives measured in days, weeks, months and in a few instances, years. Their rate of decay is subject to many environmental factors including temperature, moisture, light and the presence of organic matter and microflora. The particular combination of these factors determines the actual half life in each case.

Organo-chlorines are, as a group, highly insoluble in water so their movement in water is both slow and minute. They do, however, have a strong affinity for fats, oils and related fatty substances and they tend to be easily absorbed by organic matter. When streams or rivers do become contaminated at measurable levels with DDT, it is usually through erosion of treated soil which carries the absorbed pesticide into the water where it remains, settling with the soil into bottom muds. There it slowly decays. This has been verified by long-term monitoring of estuarine waters and bottom deposits at the mouths of our major river systems. The Mississippi delta is particularly significant in these studies, as this mighty river system drains a vast agricultural area where millions of pounds of pesticides are applied annually. If, indeed, there actually was a steady drift and accumulation of DDT and derivatives in our waterways, the mouth of this great watershed would reveal it. It does not, after nearly eight years of intensive investigation.

In sandy, dry soils in mild climates DDT and derivatives do persist, in some cases, with a half life of up to 10 years.

Pesticides in Perspective

Small quantities of DDT and derivatives have been detected in remote places on the planet where, presumably, no direct application has been made. This is true of many other toxic substances, including arsenic. Many of these studies are more an accolade to the exquisite refinement of our modern analytical techniques than an ominous warning of the poisoning of the total environment.

DDT and derivatives found in Antarctic penguins is a case often singled out. Actually, the amount is so trivial that if the entire Antarctic penguin population carried the same level (which it does not) the total amount of DDT or its equivalent would aggregate about half a pound for the entire continent. Nor was DDT detected in snow samples taken, so there is no evidence that the wildlife data indicates a universal contamination of this remote area. It seems far more probable that the observed DDT came from Antarctic explorers' wastes and



rubbish. Similar sources are suspect for the occurrence of DDT and derivatives among fish caught far out to sea.

There have undoubtedly been fish kills among inland streams and waterways that are in small part, at least, attributable to pesticides which entered the water either by direct application or by erosion of treated nearby soils. In a few cases, irresponsible dumping of residue sprays or old containers directly into streams has killed fish.

However, the published records of unnatural fish kills in the U.S. over the past seven years reveal that only one to three per cent of the total kill can actually be assessed against pesticides. Municipal and industrial wastes, on the other hand, account for over 70 per cent of the kill each year.

Bird Facts

Concern over the impact of pesticides upon terrestrial wildlife, particularly birds, is not entirely void of justification, but again it has been exaggerated out of all proportion to actual facts.

Consider that insects and disease destroy each year more than 30 times as much lumber and trees as all the forest fires combined, and with that insect destruction go vast ecological areas for feeding and nesting of birds and other wildlife. Consider also that insect-borne avian diseases, a number of which are transmissible to man, destroy literally millions of desirable birds—e.g., pheasants, quails, ducks, doves, etc. It would seem a very strong case for the contributions made by man's use of pesticides to the welfare of wildlife. Certainly an unrestricted plague of grasshoppers readily destroys

the wildlife along its extended paths. Last summer the gypsy moth denuded over 100,000 acres of forest in northern New Jersey: the wildlife—birds, mammals and even snakes—left the ravaged areas in droves, for they had no food, no nesting place and no shade.

Contrary to the oft-quoted myth initiated in Rachel Carson's *Silent Spring*, where the main concern was over the alleged rapid decline in bird life in America, careful bird counts made over the entire country and published by the National Audubon Society reveal that many favored species of birds have actually increased in numbers in many areas of the country. Thus robins, starlings, sparrows, seagulls, ducks, wild turkeys, blue jays, cardinals, pheasants, quail and grackles have all increased at least twofold and some more than 40-fold in the past 25 years since the organic pesticides (including DDT) were widely introduced. Surprisingly, a number of raptorial species (hawks) which, being at the top of the carnivorous food chain, are alleged to be rapidly poisoned into extinction, have also shown that they are either holding their own or are increasing. Unfortunately, several do show a steady decline and include among their number Cooper's hawk, golden eagle and the peregrine falcon. These declines, however, appear to be more related to the encroachment of man's civilization upon their wild breeding and feeding haunts than upon the direct effect of any pesticide. Certainly the peregrine falcon was driven from the Hudson River escarpments by man's intrusion long before DDT. In many areas of the world this superb raptor has shown a decline regardless of whether DDT was used in its environment or not.

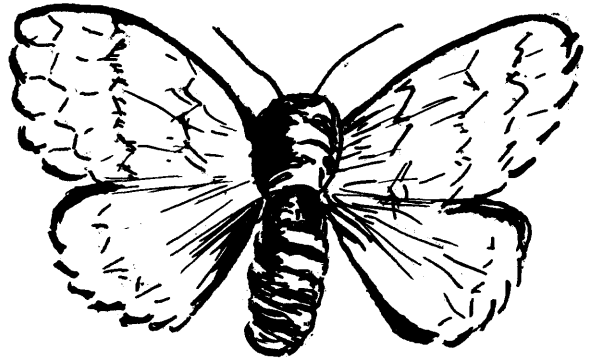
New Habitats

The fish hawk, or osprey, on the other



hand, though driven from its shoreline haunts on the East Coast has reinforced its numbers inland and a significant rise in the migration count has been recorded for several years at the Hawk Mountain Sanctuary Observation Post on the Great Appalachian Flyway.

The brown pelican's serious decline on the West Coast is furiously blamed on DDT. On the other hand, he is flourishing along the Florida coasts where DDT has been used as much if not more than in California.



Conservation or Conversation

Unreasonable public fear of scientific technology in general, and of agricultural chemicals specifically, gives rise to voracious criticism, but there is no point in banning pesticides until there is an equally efficient way found to do their job. Great strides have been made by the "Green Revolution" in producing food, clothing and shelter for billions of humans. Let's not negate these strides nor set an example for developing nations by hysterically restricting the use of pesticides.

There is no question that man's multiplication invokes a massive impact on the environment and impinges upon many of the wild creatures. Hopefully we can find a way to preserve and conserve both man and wildlife. Conservation is directed primarily at conserving man and those plants and creatures and areas which serve man: anything else is not conservation but merely conversation.