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A World Without Pesticides

BY R. G. VAN BUSKIRK

Such a subject has to contain conjecture. But the only conjecture used is that someday we might actually legislate pesticides out of existence.

Every point to be made is based upon past history, when we had no pesticides. And some points are also based on current history where we have had pesticides but have conducted controlled experiments on crops — with and without pesticides.

We are going to embark on a bad dream — about a world without pesticides. The purpose, admittedly, is to show the good in pesticides.

Is a world without pesticides an impossible dream to conjure? Consider this: We have an alarming population explosion going on in the world. Even in the U.S., the increase in population since the turn of the century is tremendous: 76 million versus 200 million today. And the **world** population will double in the next 35 years or less. The U.S. cannot ignore what is going on elsewhere. We **are** involved.

Food, clothing and health preservation requirements are tremendous now, will become staggering in the decades ahead. It's no longer possible to live as we lived in 1840, when there were

17 million people in the country, abundant land we could waste was available and no farm chemicals were used.

But the back-to-nature people seem to ignore this. They picture an impossible-to-achieve utopia to which we should return.

We all **should** be disturbed. Pollution is going on. Cities are dumping sewage into our waters; factories and machines are spewing fumes and sludge into the environment; large vessels dump sewage, garbage and other pollutants into our bays, rivers and estuaries. The air is often unclean.

The politician knows this but he's looking for an easy way out. Can you imagine his discomfort when he considers collecting another 30 billion dollars in taxes to correct the sewage systems of America?

Practically everything we buy pollutes to some minor degree. Pesticides rank in this category. They are not **major** pollutants but the public often believes they are.

The politician knows the true situation. He knows the public is concerned, frightened, confused and, often, emotional. The stage is ripe for an irrational but mollifying move. So now let's go to our bad dream.

Remember, everything mentioned has already happened somewhere before — in some degree.

Legislators from a major agricultural state, urged on by a state senator who is receiving wide publicity due to his anti-pesticide speeches, pass a law banning all uses of pesticides. So the movement begins.

Other states follow suit. State and Federal officials, confronted by many problems including: Vietnam, strikes, pollution, conservation, the population explosion and inflation, decide to create a diversionary action. Pesticides are finally outlawed throughout the land. The rest of the world follows suit.

During the first year the pesticide prohibition act was in effect, very little seemed to be happening. Ecologists, conservationists, politicians all made speeches indicating that their forecasts were right. Nature was holding things in balance. Color pictures were run in mass distribution magazines showing the beautiful green corn fields of the Midwest, the white cotton fields of the South, the healthy looking fruit trees of the San Joaquin Valley, the good looking apple trees in Washington and New York and the green fields of vegetables grown from coast to coast.

Everything was in harmony and several politicians began to renew their drive to outlaw the internal combustion engine now that the major problem in the U.S., pesticides, had been solved.

"He Didn't Like What He Saw"

But the farmer wasn't so sure. He didn't take a panoramic view of his fields. He examined them from between the rows, within the crop, on the trees and with the fruit, vegetable or cotton boll held in his hand. And he didn't like what he saw.

Potato farmers had a fairly good year. Conditions didn't favor either early or late blight. The corn crop farmer had a good yield but he noticed many more corn earworm on the plants. And some of the corn was "down", the victim of corn rootworm. The cotton yield was good — but the farmer found an above average count of boll worm and the dreaded boll weevil. All of the farmers noticed more weeds in their crops and they had to resort to much more manual labor to keep the weeds in check.

Still, when all harvests were in, the total agricultural yield was only 10 per cent lower than yields achieved during the previous year.

Politicians, conservationists and the anti-pollution societies all hailed the first year as being a great one.

They cited lower production as being a result of the weather. California had hard, late and unseasonable rains. Texas had drought conditions. Floods and a late spring occurred in the Midwestern part of the country and the Florida citrus crop was hurt by cold weather.

"We have", one critic said, "observed the breakthrough into common sense. Pesticides are superfluous in our society"

Dramatic, Tragic Changes

The following years changed everything dramatically and tragically.

In the Southwest, a tremendous green bug infestation occurred. All small grain crops were wiped out by this member of the aphid family.

In many sections of the country the corn earworm reappeared in volume. This versatile worm has three names: Corn earworm, fruit worm and boll worm.

Corn, fruits and cotton were devastated by this little child of nature. And the Florida sweet corn crop was eliminated.

The weather changed and the lima bean crop was erased by

downey mildew. The cotton crop, attacked by boll worm and boll weevil was reduced to a 50 per cent yield.

Weeds grew in abundance and the carrot, spinach and mustard crops were severely reduced. Prices for these products, rarely found in the marketplace, skyrocketed.

Worms and fungi attacked the apple crops and yields were reduced to 20 to 30 per cent of normal year production. People fought each other in the marketplace to get apples — many of which proved to be wormy.

The State of Missouri reported that it had suffered a 50 per cent loss on unsprayed summer variety fruits and a 100 per cent loss on winter species. New York state reported similar losses.

On a country-wide basis, pests such as brown rot, oriental fruit moth, peach tree borer, scale, green bugs, chinch bugs, grain rusts and grasshoppers were reported to be multiplying in alarming fashion.

The USDA and H.E.W. combined in making a nationwide appeal: "Have faith", they said. "relief is on the way in the shape of biological controls."

A few weeks later these departments issued another report. It featured the biological control resulting from the production of bacillus thuringiensis. This disease, it was explained, kills 120 injurious pests. The pests were listed. But the article ended with an explanation that the departments were encountering severe production problems.

The report also listed the other biological controls now available on a limited basis. These included control of the screw worm, the oriental fruit fly, milky disease control of the Japanese beetle and use of the lady beetle to control alfalfa aphids.

One crusading editor pointed out that this list had to be stacked up against the 2 million estimated species of insects, over 1 million of which had been identified. He stated that even if we concede a point to the naturalists — that only 3,000 species are truly destructive in the U.S. — we still only have about a dozen effective biological controls. Another 100 are, theoretically, possible — but only laboratory proven.

No one in government attempted to answer this editor.

Food Quality Down, Prices Up

Meanwhile, the consumer was feeling the pinch. Where he had been spending 20 to 25 per cent of his income on food, he was now spending between 50 and 75 per cent on food.

And he noticed the food quality. Sweet corn reverted to olden times and contained many corn borers or parts of corn borers in the canned food. The whole worm was detectable, the fragments were not!

Cherries harbored fruit flies, cider was full of insect parts and flour was mixed with rodent pellets and rodent hairs.

The Food & Drug Administration, concerned over food shortage, lowered its standards. Vermin, filth and decomposition became quite common.

The era of fewer and larger farmers began to change. Farmers with \$50,000, \$100,000 and \$500,000 invested in capital items found they could no longer achieve a reasonable, or even liveable, return on their investment. They began to sell off their land in parcels.

Buyers of the small parcels were city dwellers who needed food. They attempted to grow vegetables and fruits on the small plots purchased to augment the sparse food supply available to them in the city markets. This proved a strenuous life as they worked a five-day week in the city and then moved to the country evenings and weekends to administer their crops. This activity included hand-picking and killing chinch bugs, potato bugs, army worms and other bugs — just as their ancestors had.

Disaster in Disease

The rest of the world was experiencing the same crop problems. But parts of the world outside the U.S. were quick to have other problems as well. In India, Thailand, Italy, Ceylon, and in parts of Central and South America, malaria cases began to increase dramatically. The anopheles mosquito was on the increase.

This infectious disease is caused by protozoa that are parasitic in the red blood corpuscles. It is transmitted to man by the bite of the mosquito. DDT, the great controller of malaria, was long gone and millions of people became infected.

India, down to 150,000 victims, with only 1,500 deaths per year during the DDT control periods, found its incidence rate increasing alarmingly. New cases exceeded the old pre-DDT rates, reaching 8.0 million cases per year. The death rate rose to 800,000 per year.

Yellow fever, always a dread disease until modern methods controlled it, reappeared as a major disease. This is an acute infectious tropical disease caused by a virus transmitted by the bite of certain mosquitoes. DDT controlled many of these mosquitoes. The victim suffers from fever, jaundice, vomiting — and often the disease is fatal.

Typhus reappeared in many parts of the world — including the U.S. It is an acute infectious disease caused by a rickettsia transmitted to man by the bite of fleas and lice. The victim suffers fever, nervous disorders, weakness and an eruption of red spots on the skin. The disease is a killer.

Dengue, a disease little known to many parts of the world, staged a comeback. This disease, too, is transmitted by mosquitoes. The victim suffers severe pains in the joints and in the back. This is accompanied by fever and rash.

And filariasis increased. Here, the ever-present mosquito carries filarial worms and passes them on to humans. These worms invade the lymphatic vessels and the lymphoid tissues.

The little things in nature, which are allowed to live and maintain their balance are numerous. And during this period of no control they managed, predictably, to thrive.

Amoebic dysentery showed up in many sections of the world, including the U.S. Little one-celled animals grown in stagnant water and called amoeba, lived their happy little lives there — or elsewhere. An interesting object for a biologist to watch through a microscope, an amoeba is something else again when it becomes a parasite in an animal — including man. When this happens, intestinal disease develops, great abdominal pain occurs, toxemia and diarrhea follow. A bloody, mucous feces is a telltale sign of the work of this little organism of nature.

In Asia, especially, but not exclusively, cholera took hold again. It too is an infectious disease characterized by violent diarrhea, vomiting, muscular cramps — and collapse.

In Kenya and other parts of Africa, the black fly multiplied. This fly carries a disease called onchocerciasis, or river blindness. Victims wrinkle, acquire dry skin, become aged before their time — and, ultimately, go blind.

In the U.S., fresh outbreaks of virus Encephalitis occurred. Carried by certain types of mosquitoes, this virus causes inflammation of the brain. Brain damage often ensues and the disease is sometimes fatal.

All these diseases, and many more, were once controlled, or controlled in part, by DDT — the first pesticide to be banned.

There is one more disease which increased in scope during the period of the pesticide prohibition law: Bubonic plague! You know its place in history. It is highly contagious and usually fatal. The lymph glands swell — usually in the groin and armpit. Chills and fever develop. This is followed by delirium, prostration — and death. The disease is carried by fleas. Pesticides control fleas.

Other disasters took place. Late blight took hold in the U.S. and much of the potato crop disappeared. This disease caused a famine

in Ireland in 1845 and threatened, now, to repeat its damage in many parts of the world.

Livestock did not escape losses. Production of meat, milk and wool fell off 25 per cent. Cattle grubs, face flies, horn flies, lice, ticks, fleece worms, chiggers and numerous other pests attacked in force. Biological control methods kept the screw worm in check.

Rats prospered. In the central city areas, especially in the slums, frequent cases of rat attacks on babies occurred. Permanent mutilation usually happened. One economic benefit resulted: The rat trap industry flourished.

As food supply dwindled another little known ailment appeared. Known as sugar baby, it is a disease caused by lack of protein. Numerous cases were reported in Jamaica, British West Indies, India and South Africa. Eventually cases were noted in the U.S. The disease attacks children.

Recreational activities such as picnics and outdoor barbecues became a thing of the past. Nuisance pests such as flies, mosquitoes, ants, roaches and yellow jackets took over the backyard.

The economy was severely set back as foods dwindled. Some production was maintained because of good cultural practices. Planting dates, picked to be compatible with specific pests, were employed. Where available, resistant varieties of crops were grown and a few biological controls worked effectively.

But fruits and vegetables soared in price and became a luxury of the affluent. For example: The codling moth damaged 40 to 80 per cent of the apple crop and apple scab attacked 30 to 80 per cent of the crop.

Fruit trees died because of root borers, scale insects and other pests. Bats became a real nuisance, with millions of them appearing in the buildings of the central cities.

In the forests, some 160 types of insects chewed up 1½ billion cubic feet of young forest growing stocks and 8 billion board feet of saw timber. This was enough material to account for two-thirds of the homes constructed each year.

Wildlife, formerly thriving in the forests, lakes and on the marginal land, suffered. Grasshoppers stripped grazing land, the lamprey eel destroyed lake trout and man cultivated land formerly given over to wildlife in a desperate effort to secure more food. Weeds covered many lakes and ponds.

The Nightmare Ends

But all bad dreams come to an end. Our dreamer saw a panoramic view of the world. Flies abounded; pigs were dying from hog cholera; people were shooting song birds to obtain meat; dread diseases were everywhere; food was laden with rat pellets, insect parts and worms. It was too much. So he awakened.

With sleep time left, he awoke to find it was only a nightmare. And he returned to sleep, determined to give the dream a happy ending. And he did.

The people rebelled. The politician caught on to the new feeling and built a catch word phrase: "Benefit and Risk".

Mass media saw the need for positive, educational publicity and picked up the phrase. "Benefit" was emphasized by "science" writers.

The Delaney amendment was voided and a benefit and risk law was incorporated as a replacement.

Then the world went to work on improving our environment, which was sadly in need of improvement. Citizens readily paid higher taxes and prices to handle sewage properly, to reduce emissions from internal combustion engines, to eliminate manufacturing wastes, to minimize discharges into our waterways, to control our population. The true major causes of pollution were recognized — and pesticides were very low on the list. This was because everyone recognized the principle of evaluating benefit and risk.

When our dreamer awoke he was shaken, but he felt like a new man.