

## 25. Pesticides

**Henry:** I take it that there was a mutiny among the troops, regarding my tendency to recapitulate the previous session at the beginning of the present session, which takes up a lot of time in some people's opinion. I do reserve the right to occasionally fill in something I may have forgotten last time which in my opinion is worth preserving. I am going to take a minute or two to remember something I did not mention before. That is, that I was feeling so depressed by my failure to be able to hold on to any kind of position with the surveillance of the MediCal program, and being forced to accept a really dumb position in the Bureau of Air Sanitation, I was seriously considering dropping out altogether, and doing some writing. I had in mind an absurdist novel, kind of inspired by "Catch-22", to be called "The Memorandum Jungle".

But then a cooler head prevailed, namely my own, and I had to face the fact that I was responsible for support of 5 children, since my second marriage had also failed. So, I had to keep working. I don't know what I would have done if there hadn't dropped in my lap, totally unexpectedly, the news that a position was available in a unit within the Dept. of Public Health called Community Studies of Pesticides. I'll also say a few words about that, since it was part of the bureaucratic jungle.

This unit was funded entirely by the Environmental Protection Agency (part of the federal government in Washington DC) -- quite different from most other functions in the state health dept., which were totally dependent on appropriations from the state legislature. In the case of Community Studies of Pesticides, we had to apply every year for renewed funding from Washington DC. At the time I became interested, it functioned under the overall umbrella of the Bureau of Occupational Health, which was headed by Dr. Tom Milby. He apparently knew something about and cared about pesticides because he had done some research on women who had worked for a major manufacturer of pesticides (perhaps Monsanto; I'm not sure). He examined whether residues of exposure to the pesticides (DDT in particular) were transmitted from the women to their children through breast milk. He made something of a reputation for himself based on that research.

When the vacancy came up, Milby interviewed me before he passed me down the line to the head of the pesticide unit itself. He warned me in advance that I would have to go through an oral interview, to be held in Los Angeles, that one of the members of the panel was probably going to be a pro-pesticide guy from USC, and I should be prepared for some questions that were not "creampuffs".

The head of the pesticide studies unit was Dr. Dudley Miller -- I guess he had a PhD in some field, but I don't know what. He interviewed me and seemed very agreeable, amiable, and simpatico, so I had a good feeling about that. There was another professional person on the staff. I don't remember his position title, but his pay grade was the same as mine: associate public health analyst. There was a secretary for the unit.

I went down to LA for the oral interview. The USC guy did ask me, after some preliminaries, what did I think of Rachel Carson? She had written a book called "Silent spring" which was a piece of special pleading, really, that the use of DDT was having a really deleterious effect on certain bird populations -- principally those that lived on fish. The fish were affected by agricultural runoff of DDT, a very long-lived pesticide that built up in the food chain. These sea birds were laying eggs that had very soft shells. The eggs frequently broke before hatching, and the populations of these birds were declining -- to such an alarming extent that, as the book title suggests, the songbirds in certain parts of the country were not being heard as they used to be.

I tried to dodge the question without answering very directly whether I liked the book or not. I said something along the line that it was very effective in its way. The guy let the subject drop. So, I passed that exam, which was pretty much a sham. They all knew I was wanted by Milby, and they didn't want to antagonize him by turning me down.

I reported for work in Sep 1968. The first assignment I was given by Dr. Miller, I think he put in the form of a question. He said, "There's going to be a trial held in Bakersfield in which the health dept. is going to want the right to have the manufacturers of agricultural chemicals report what they have sold, where, for what purposes, and in what quantities. The manufacturers are going to take the position that these are trade secrets, and they don't have to report if they don't want to (and they didn't)". The hidden agenda was that they didn't regard the health dept. as a friendly dept. They thought that the supervision of the use of agricultural chemicals should be by the state Dept. of Agriculture -- which was legally responsible for protecting and advancing the interests of the industry of agriculture. The purpose of the health dept. was to preserve and protect the health of the public at large.

I accepted this assignment with pleasure. I went down there and sat in on the trial for a couple of days. I believe that after the judge took it under submission, it ended with the health dept. winning, and the judge refused to issue an injunction prohibiting them from receiving this information. I came back and wrote a report on what I had seen and heard. Because it was for a very limited audience, namely Dr. Miller himself, I didn't hesitate to write it in a non-bureaucratic way, using adjectives, adverbs, and whatever I could to add spice to the subject, rather than the usual bureaucratese. Dr. Miller liked it a lot; he told me that it was a noble piece of writing. He was the first person to ever say anything about my writing, so that meant a good deal to me. I would have liked nothing better than to continue working under Dr. Miller, but it seems that he was on the verge of retiring. Within a month or two he was gone, and was replaced by a guy named Bill -- I've blanked out on his last name. A psychologist might call it "motivational forgetting". I didn't have much respect for him. He was a PhD in chemistry. I have no idea how he got his PhD, but it didn't have anything to do with pesticides.

Up to this point, almost all of the studies by Community Studies of Pesticides unit had been on people with possible pesticide exposure during the manufacture of these compounds, and to some extent the application of the materials in the field by crop-dusting planes or ground rigs.

The unit had never studied the effects of these chemicals on field workers, which was my big interest. So, I began sending out ideas for possible research subjects that I felt would fit within the purview of the unit, beginning with a survey. I was an old hand at designing questionnaires and running them by some sample population. It occurred to me that I would ask people who were knowledgeable about the field what types of symptoms people might exhibit who had been exposed to agricultural chemicals on the job while harvesting the crops. I proposed a questionnaire which would list 10, 12, or whatever number of these symptoms, mingled with a few that were not related, so people wouldn't get the idea that the questionnaire was biased. It was to be administered to a representative group of farm workers, and a control group of people who had never worked in agriculture.

I got advice from Miller, Milby, and anybody else in the health dept. who might have ideas on the subject. I was given carte blanche to go down to Tulare County, which was selected because it still had harvests going on. We were approaching the late fall/ winter season, and some parts of the state, like the Salinas Valley, didn't have any harvests going on that time of year. Tulare County had things going on year-round. In the middle of winter, the navel orange harvest was at its peak. That's why I selected that area as the study site. It also happened that my old friend Cesar Chavez was in the midst of organizing grape workers, and mounting a grape boycott, not only in that area, but in the entire U.S. and overseas as well. One of the weapons he was using in the boycott was to tell people that under existing conditions, growers who were not organized by the union were using these pesticides on grapes without supervision. Chavez was very interested in the subject of pesticide control. I talked to him about it ...

**David:** Can I interrupt here?

**Henry:** Yes.

**David:** What was the extent of your personal contact with Cesar Chavez? When did you meet him? Was he actually your personal friend at that point?

**Henry:** Oh, I knew him way back when I was starting as research director for AWOC, in Jul 1959. I met him that fall, and we kept in touch one way or another for all the intervening years. It's not that we saw each other regularly at all, but our paths would cross. When the grape strike first began in Sep 1965, I used to go on car caravans, which was one of the functions of the Citizens for Farm Labor group that I started. We would transport supplies of beans and rice, etc. They had mass meetings every weekend involving Chavez and other strike leaders, including filipinos, who were very actively involved in the early stages of strike. At these mass meetings, the workers themselves would hear progress reports. The general public was welcome to sit in. Those of us who brought supplies in the car caravans would mingle, and listen to the reports. I would usually sit near the back of the hall, because I thought the farm workers themselves should be the principal participants at the meetings.

Chavez was gifted at being able to remember names and faces. It seemed that every time I went to these meetings, no matter where I sat in the auditorium, he would spot me, remember

me, and walk down the aisle to greet me. That just made me feel great. That's why I say I considered him a friend. I was in this sphere of pesticide studies. He said that if he had known that I was looking for a job [*chuckle*], I could have worked for him. He was being semi-facetious; at that time all his co-workers were being paid \$5 a week spending money, and room and board. That's what I would have been getting if I had worked for him. He knew I had dependents and couldn't do that, but he still talked about the possibility.

The reason I wanted to talk with him on this occasion was that I needed interviewers. He suggested 2 or 3 people that he knew were highly responsible. They were farm workers, probably working in the oranges at that time of year. He thought that what the health dept. would be able to pay them would equal what they could make picking oranges. He gave me their names, addresses, and phone numbers. I interviewed them, and they were very responsible people, all Spanish speaking. They were willing to work for the health dept. because they were also interested in the subject matter. I had to instruct them, as I had my interviewer in the bracero study years before, that this survey should be presented as being of general public health interest, not as having any axe to grind. I did not want them to have the feeling that we were going to try to eliminate agricultural pesticides, or anything of that sort.

We got several hundred results. We found that for most of the symptoms that were likely to be associated with parathion and the other organophosphates, there was a statistically significant difference between the two groups in the frequency with which the symptom was experienced during the study period. There were a number of holes in the methodology. Eventually, after we had several hundred returns, I became convinced that we should turn to other ways of looking at effects of pesticides on field workers. A couple of years later I learned that almost exactly the same methodology was being used by a team of sociologists from UC Davis, without giving me any credit, but I didn't care. As they say, imitation is the sincerest form of flattery.

Another of my ideas had to do with a line of argumentation used by pesticide manufacturers: that if field workers suffered from exposure, it was to a large extent their own fault, from not protecting themselves adequately by what they wore. If one followed up this line of argumentation with them, they were happy to write back a list of things that field workers should wear to protect themselves. They didn't indicate whether these things should be provided by the employers, or whether the workers should pay for them out of pocket. The list included things like fingerless gloves, in which the fingers were exposed so that the worker could grasp the crop. The palm of the hand, according to the manufacturers, was more vulnerable to dermal exposure because it was wide open; the thumb and fingers were better protected by pads. So, that was one thing the farm workers should supposedly use to protect themselves.

I remember another area that was emphasized was the forehead, which was supposedly a wide open avenue through which pesticide residues could leach into the bloodstream and have adverse effects. Of course, one should also wear appropriate clothing to protect the body. I don't think they ever went so far as to recommend wearing anything like raincoats or

rubberized material of any kind -- in warm weather, that would have been unthinkable for a field worker. But they were supposed to wear reasonably thick shirt and pants fabrics.

I conceived the idea of testing this line of argument by measuring exactly how much pesticide residue was penetrating to the skin through the clothing. I guess what I did was have patches of aluminum foil (or some such thing) taped to the subject's arms, legs, and torso, retrieved after a day's work, and forwarded to the pesticide laboratory in the main building of the state health dept. There was a guy on duty full-time there to examine specimens with a spectroscope, to see what kinds and what quantities of pesticides penetrated the clothing. This lab served for purposes other than our pesticide studies unit. It was available to local health depts. around the state in cases of suspected pesticide poisoning, by accident or suspected foul play. This was an example of the kind of thing I was going to put into my novel. The fellow at the lab (it was a one-man operation) would put the samples into a freezer to be examined at his leisure -- and he did love his leisure. Every time that I ever visited that lab, I always found him reading the Wall Street Journal. He did not take his work seriously, let's just put it that way. He lacked any passion for safeguarding the public health. Jim was his name. I have again (perhaps deliberately) forgotten his last name.

Don Mengel was my associate with the same job title I had -- whatever that was. Whenever there was a major pesticide poisoning in the field, one or the other of us would usually go out and try to get the complete history of what had happened, and why.

The health dept. was under the leadership of Dr. Lester Breslow, whom I have mentioned on a number of occasions as being a real pioneer in the field of public health, as long ago as the first year I was there -- 1952. At that point he was already trying to get the health dept. and the public at large concerned about the effects of smoking cigarettes. This was before anybody else was talking about it. I believe that he used his influence, which was considerable, to get the state to make pesticide poisoning a reportable condition by physicians in private medical practice -- like measles, mumps, or any other communicable disease. He wanted to add pesticide poisoning, even if it were only suspected, to the list of reportable conditions -- that is, to be reported on a standardized form to the state health dept. There are certain cases in which a practicing physician in a rural area should be able to spot something caused by exposure to the highly toxic compounds called organophosphates. They include parathion and many compounds with similar names, such as malathion. Reports would come in to our office. Some cases were fully self-contained. For example, if laboratory analysis indicated some other cause, no further investigation was needed. In some cases, the report was quite skimpy, so Don or I would go out and fill in the missing information. There was never any lack of things to do.

Here's one I had a lot to do with. In my reading, I came across an article about a group in England who had worked on a technique to ascertain the effects of organophosphates by something called electromyography. This consisted of stimulating a nerve (the ulnar nerve) with a small electric shock, resulting in a reflex action by the forearm muscles -- a bit like a doctor using a rubber mallet to tap the patellar tendon, which results in involuntary contraction of the

thigh muscle in a healthy person. The idea was that you can get a picture of the spike resulting from the reaction to the stimulus -- a bit like the printout of an EKG, except in this case there was a series of four stimuli. In a healthy subject, the spikes would be identical. In a person with impaired neuromuscular system, the spikes would be progressively smaller. I looked around to find someone who might be able to provide a general outline of the apparatus required, based on the description in this article, which was actually pretty fragmentary. I finally found an outfit in Alameda that said they would take a crack at it, with various safeguards built in so that nobody would be electrocuted. They succeeded in making something serviceable, and we tried it out on ourselves. It wasn't exactly pleasurable, but as long as the subject was told in advance what to expect we thought we might be able to get some data.

Again, we were interested to compare control subjects with farm workers who had been exposed to pesticides, particularly in the harvest of oranges. With oranges, you're working among the leaves all the time. If those leaves have any residue on them, you're bound to inhale some and get it on your skin. Again, I went down to Tulare County to look for subjects. This time, it didn't require any interviewers. I was looking for people who were willing to be exposed (if they weren't already) and also willing to undergo small electric jolts from the apparatus. I was only able to find one to begin with, and that was Stephen Anderson. This was in the summer, and he was out here from back East, where he was living at the time. He might have been starting Harvard already by this time. Anyway, we got him a job picking oranges, and at the end of the day hooked him up to this apparatus to get an electromyograph. We may have kept this up for a couple of days. We had great difficulty finding other people to participate.



**David:** Was he exposed to pesticides?

**Henry:** Oh, he couldn't have failed to be.

The results were indeterminate, possibly because the equipment wasn't all that great. As I say, it was practically impossible to get a large cohort. So, this had to be written off as an interesting beginning which required further work. We didn't have the time or expertise to carry it on to a really convincing conclusion.

The "gold standard" in assessing the effects of organophosphates is taking blood samples, and sending the samples for analysis of an enzyme called cholinesterase, which plays a crucial role in transmission of nerve impulses. Exposure to organophosphates inhibits cholinesterase activity, which is a very reliable marker.

I may have mentioned the name Wendy Goepel in some of my previous episodes. She and I had worked together closely in the formation of Citizens for Farm Labor, editing the magazine, etc. When the great strike of 1965 broke out, she left Berkeley, moved to Delano, and became kind of a personal secretary for Cesar Chavez. In the course of time, she met a young doctor, David Brooks, who was setting up a clinic to be called "Salud" (which means "health"), intended

primarily for agricultural workers. She left the strike to work full-time on the establishment and growth of this clinic. She and Brooks got married. They didn't live happily ever after, but they made quite a success of that clinic.

I went to Wendy and said, "How about if we draw off a small portion of the blood samples that you take for other purposes, and look at cholinesterase levels in that subsample?" She thought that was a capital idea. In order to round out the research design, it was necessary to have the people who had given the blood samples give us some detail about their activities in the previous 30 days or so. We would then divide the subjects into two groups: those who had done farm work, and those who hadn't. The ones who had done farm work needed to be further subdivided according to the amount of work, which crop, etc. It was pretty complex, but it was the best thing going, and it kept on going as long as I was with the pesticide studies unit.

**David:** So, these organophosphates interfere with neuromuscular activity. What other kinds of symptoms would people have? Did you look at long-term things like cancer rates?

**Henry:** Pesticides can be divided roughly into two large groups. The organophosphates are comparatively short-lived. The other group, called chlorinated hydrocarbons or organochlorides, includes the DDTs and other long-lasting pesticides, and affect mainly the reproductive system rather than the neuromuscular system.

**David:** What pests did these things target? On oranges, for example.

**Henry:** Insects. Interestingly enough, the principal target in oranges is an insect called a thrips, and the only damage it causes is cosmetic. It leaves a little scar around the stem, on the outside. The growers douse the trees heavily with parathion at the time of the year when thrips are likely to emerge from their pupal stage. They leave the tiny scar when they lay their eggs. The inside of the orange is totally unaffected. So, this particular use of parathion is simply because the housewives of America want flawless fruits and vegetables. They consider this small scar to be as serious as if there were a worm inside the orange, which there never was and never will be. You can't argue with the tastes of American consumers.

**David:** What are the long-term effects of organophosphates on humans?

**Henry:** Long-term effects of organophosphates are probably minimal. It's the short-term effects that one has to worry about. They include dizziness, sweating ...

**David:** Do they cause accidents in the workers? I mean, if you're up on a 20-foot ladder and you get dizzy, do people fall?

**Henry:** I suppose that is possible. Somewhere in my souvenirs, I have records from all these projects, including copies of the questionnaire, the electromyographs I got from studying Stephen, and copies of my field reports of particularly dramatic poisoning cases, in which I

probably used a "purple prose" style [*chuckle*], knowing myself as I do. I would have to go through all the boxes that are stored at the rear of the property at 1243 Ashby Ave., and I just haven't had time.

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Web pages:

*Silent Spring* (book by Rachel Carson): [http://en.wikipedia.org/wiki/Silent\\_Spring](http://en.wikipedia.org/wiki/Silent_Spring)

Organophosphates (incl. organophosphate pesticides):

<http://en.wikipedia.org/wiki/Organophosphate>

Organochlorides (incl. chlorinated hydrocarbon pesticides):

<http://en.wikipedia.org/wiki/Organochloride>