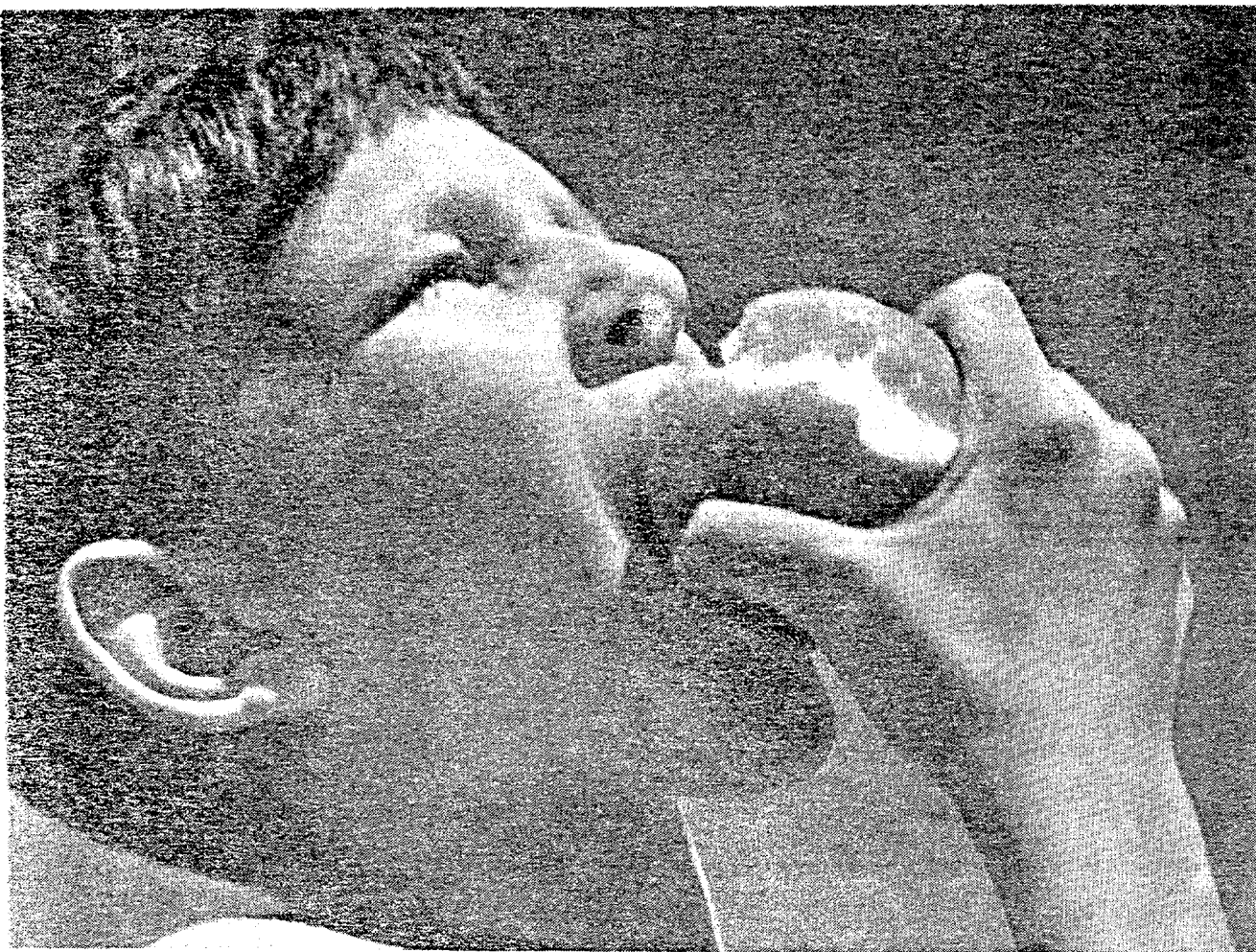




Carl Berger

A Clean Bill of Health for Apples

By WALLACE D. MORRIS

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Like most rumors, the one concerning the use of lead arsenate as an insecticide has many more lives than the proverbial cat. Here are the results of a Public Health Service study of the effects of this chemical on the health of both the apple orchardist and the consumer

THE CODLING MOTH started it. This pest, if permitted to mature, eventually becomes a worm and eats its way into apples, rendering them unfit for human consumption. Nearly half a century ago it was discovered that if apple trees were sprayed with lead arsenate before and during the growing season of the fruit, the moth was killed before it could do any damage. The apple growers have utilized this protective method almost exclusively ever since, else the apple would possibly have vanished from the American scene. With the lead arsenate spray out of the picture, the moth would have had no competition.

Then came the charge that people who ate apples were being poisoned by spray residues. The belief persisted, to plague the apple-growing industry to the point where the consumption of apples fell off markedly, untold hundreds of farmers saw their apple orchards become financial losses, and the apple business as a whole approached perilously near the point of bankruptcy.

The growers, packers, marketers and other workers in the apple industry fought back. Time after time, when apples were suspected of causing illness or death because of lead arsenate residue, they proved that some other factor was the cause of the trouble.

Finally help was sought of Congress, and on July 1, 1937, that body directed the United States Public Health Service to make an investigation "to determine the possibly harmful effects on human beings of spray insecticides on fruits and vegetables." The results of the Service's findings as regards sprayed apples have recently been released under the title, "A Study of the Effect of Lead Arsenate Exposure on Orchardists and Consumers of Sprayed Fruit," being Public Health Bulletin Number 267.

The region around Wenatchee, Wash., was selected as the place to find the answer to the question: "What has been the possible effect on human beings of exposure to lead arsen-

section were that lead arsenate has been used there as a spray material for more than a quarter of a century, as much as 7,000,000 pounds of it being used for this purpose in a single year; more spray applications are given there each season than in most other apple-growing districts; since many of the apples consumed locally were not commercially washed, there were opportunities for studying consumers who, over a considerable period of time, had eaten lead arsenate residues in excess of the amount permitted by the United States Food and Drug Administration; the orchardists there are concentrated in a relatively small area, making it possible for subjects to come into a centrally located clinic; and, finally, the varieties of apples produced in the Wenatchee region are usually eaten raw, rather than cooked.

Although apples are grown in nearly every state in the Union, Washington produces one fourth of the national total. The Wenatchee-Okanogan district in Washington contains only 1.5 per cent of the total apple acreage in the United States, but produces from 20 to 25 per cent of all commercial apples. During the years 1934-1938, the average per capita consumption of apples in the United States was 56.8 pounds, with oranges, their nearest competitor, running 36.6 pounds.

The state of Washington is highly apple-conscious, to the extent that it has a unit of the state government, the Washington State Apple Commission, whose job it is to aid the growers in making Washington apples the finest that its rich volcanic ash soil can produce, and to tell the world about those apples. Clifford E. Chase, secretary-manager of the commission, makes his home—as might be expected—in Wenatchee, when he is not off across the country to Washington, Miami, Chicago, New York or somewhere else in the interest of the famed fruit of his state. In or out of Wenatchee, Mr. Chase has taken a leading part in the campaign against the lead arsenate bogey.

The packers of apples make every effort to

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sale. First the apples are washed in a sodium silica wash, at a temperature of 110 degrees, to remove any spray residue. Next they are rinsed, and then are sent into a second hot bath, a one per cent hydrochloric acid solution, for the removal of any additional residue or dirt, after which they are rinsed again. They are then dried, sorted for size, defective fruit removed, the good apples weighed and packed, then stored in chilly storage rooms or refrigerator cars. It is usually less than an hour from the time the apples arrive at the packing plant until they go into chilly storage, and they are kept there until they go on sale in the store where you buy them.

The Public Health Service's bulletin states that the investigation comprised "a study extending over three years of the possible injury to health of people exposed to lead arsenate, whether by ingestion on fruit (consumers), by inhalation of spray mist or dust (orchardists), or by other forms of exposure." The study also "included both an intensive field study of large groups of men, women and children, as well as toxicologic laboratory investigations of the effect of lead arsenate on man and animals, and of similarly-related problems. The possibility that lead arsenate could have been a factor, directly or indirectly, in other diseases was studied."

This phase of the investigation extended over 14 months, and included health examinations of 488 adult male and 54 adult female orchardists; 95 men and 146 women classified as consumers, who had no seasonal exposure to lead arsenate or any similar compound; 158 men and 171 women, former orchardists or seasonal workers in apple-packing sheds; 99 boys and girls under 15 years of age; and a group of 20 men and women whose records were set aside for special consideration because of previous industrial exposure to lead, or because their exposure at the time of the investigation did not fit into any of the categories mentioned. The total number of persons examined was 1,231. The youngest was a 19 month old girl, the oldest an 86 year old woman.

Each person in the various classifications was questioned as to how many apples he or she ate annually (based on recollection), and whether they were washed, unwashed, or both. Some said they ate no apples, while others said they ate more than 2,000 a year. Again, some ate commercially washed apples almost exclusively, some both washed and unwashed

apples, and some unwashed ones almost exclusively.

For example, in the consumer classification it ran: Washed—men, 255 apples annually; women, 263; both washed and unwashed—men, 431; women, 400; unwashed—men, 345; women, 371. Men and women orchardists ate more unwashed apples than washed ones.

In the medical procedure followed in examining the patients—"patients" because many of those examined were in various stages of health—particular attention was paid to regions and systems important in the diagnosis of lead and arsenic intoxication. Each subject was given a fluoroscopic chest examination, and about a tenth of the total number of subjects were x-rayed, this being done on all cases where fluoroscopy indicated a pathologic manifestation. Specimens of blood and urine were taken from each subject at each examination, and fecal specimens were collected from the first 48 men examined, for clinical laboratory tests and chemical analysis. The subjects were examined, over a period of a year devoted to this phase of the survey, from one to four times each, to note any changes in their health or in symptoms of which they might have complained.

Tests revealed that blood lead concentration was higher in orchardists than in nonorchardists, but the report on a 14 year old boy who had tended a mixing tank during the season of the survey was: "Clinical findings were negative, and results of clinical laboratory tests fell well within the range of normal variation."

Again, "It thus appears that these elevations in blood lead, urinary lead, and urinary arsenic content correspond to elevated levels of lead arsenate intake, peculiar to the Wenatchee district and to fruit-growing regions in which there are similar opportunities for exposure. There was no indication at the time of examination of any adverse effects on the health of Wenatchee children." The children examined were nearly all in the consumer class—those who ate apples, but had nothing to do with their growing or packing.

Of the men apple growers the report says: "This population of orchardists shows no tendency for the symptoms and signs of lead and arsenic intoxication to occur in combination."

Speaking of subjects found in need of medical attention, the report states: "Physicians will recognize that more data, special laboratory tests, and particularly the opportunity to

observe the patient over longer periods of time, would be needed to establish definite diagnoses of many of the diseases (listed in tables in the report). Enough evidence, however, was usually available to establish or rule out lead or arsenic injury."

Another significant paragraph: "It is known that lead can be stored in the body, following periods of heavy intake, and that it is eliminated, under normal circumstances, with the passage of time. These data indicate that it does not require much time for a population of former orchardists to so deplete the stores of lead and arsenic within their bodies that their urinary lead, blood lead and urinary arsenic values fall to the levels of men who never had an unusual exposure to these metals."

The report runs the gamut of ills to which humanity is heir. Of the Wenatcheans' heart disease incidence it says: "No more frequently than in the general population." Of blood pressure: "The average blood pressure of the persons in this study are no higher by age groups, and in most cases are lower, than those of industrial workers studied by the Public Health Service." Of skin disorders: "The paucity of all forms of dermatitis seems to indicate that dermatitis is not a significant toxic manifestation of lead arsenate." Of eye irritation: "Close study of the orchardists failed to establish lead arsenate as the cause of the difference." Of nervous disorders: "Most of the organic nervous disorders observed represented either chronic disease states or the residuals of acute nervous

illnesses," adding, a few words later on: "This is about the same degree of prevalence observed . . . among the rural white inhabitants of Cattaraugus County, N. Y." One would assume the latter to be pretty healthy. Kidney diseases: "None of these diseases was unusually prevalent." Of patients found to be suffering from tuberculosis: "Nothing was noted during this period of observation to lead one to suspect that their lead arsenate exposure was having an adverse effect on their pulmonary disease."

On the whole, the findings of the survey are contained in these words, given in the summary of the report: "Insofar as comparative data for other populations are available, no evidence was found that any of these forms of ill health was more prevalent in this region than elsewhere, or that any cases of chronic diseases had been caused or influenced by lead arsenate exposure."

[NOTE: Apples, with their health-giving vitamins A, B, C and G; their valuable minerals, iron, calcium and phosphorus, and their pure appeal to the palate, are one of Nature's finest gifts to mankind. We must do everything possible to insure their continued availability. No doubt there have been instances of persons who responded unfavorably even to small amounts of the toxic substances used as sprays. But proper handling and washing of the fruit reduces this hazard to infinitesimal proportions, as shown by the report of the United States Public Health Service. Meanwhile research is continuing for sprays free from the inherent dangers of lead and arsenic.—Ed.]