

**A  
STRUGGLE  
WITH  
TITANS**

**G. L. WALDBOTT, M.D.**

**A Reflection Book**

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A  
STRUGGLE  
WITH  
DENTAL  
DISEASE

Dedicated to the Many Who have  
Joined this Struggle in the  
Conviction that They were  
Performing a Public Service

Second Edition

Third Printing

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"If at any time it was found that fluoridation was deleterious to the health of the people they [the U. S. Public Health Service] would certainly withdraw their endorsement."

Dr. Francis A. Arnold, Jr.  
Chief, National Institute of Dental Research  
U. S. Public Health Service

*(From Dr. Arnold's testimony before the Irish High Court, Dublin, March 15, 1963, as reported in the British Dental Journal, Volume 114, page 491, 1963).*

"In an age of conformism and 'team-work', where compromise and harmony are offered as the watchwords of human activity, being critical may be considered antisocial. But science without criticality is unthinkable, for the only route to scientific objectivity is to question, not to 'accept'."

The Journal of the American Medical Association, Vol. 185, Page 508, Nov. 1963.

## PREFACE

For eleven years I have been engaged in medical research on the effect of fluoride on the human organism. Some of my data have been published in medical journals. They include three monographs which encompass original observations and much of the world's medical literature on fluoride with emphasis on research which is difficult of access.

Because of the constantly increasing interest in this subject and because of the many conflicting data, I decided to make some of the information, thus far gleaned, available to the general public.

While exploring this subject, I have observed many practices usually not encountered in medical research. My original plan was to confine myself to presentation of purely scientific data in a book of encyclopedic proportion. This has been temporarily laid aside in order to narrate personal experiences in an unending struggle and the trials and tribulations of one who found himself swimming against the stream.

## ACKNOWLEDGMENT

I wish to acknowledge the invaluable assistance of my wife, Edith M. Waldbott, without whose untiring help it would have been impossible to accumulate the data presented in this book.

I am grateful to Professor H. E. Watson of Woking, England, to Professor A. W. Burgstahler of Lawrence, Kansas, and to Mr. George Schlaepfer of Grosse Pointe Farms for their helpful suggestions; to Miss Helen Turner and Miss Barbara Johnson, librarians at Detroit's Harper Hospital and their staff for obtaining literature; to the scientists and lay persons who have provided me with encouragement throughout the years.

George L. Waldbott

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## **A STRUGGLE WITH TITANS**

## CHAPTER ONE

### WHY I BECAME CURIOUS

"What do you know about fluoridation?"

This was my wife's greeting late one afternoon in the spring, 1953, upon my return from a busy day in my office.

"Fluoridation?" I questioned. "Fluoridation? — I do know something about fluorine. It is a poisonous gas. Like chlorine it belongs to the halogen group, but—fluoridation? I confess that I am only vaguely familiar with the subject."

"I just read an article about it in a magazine called *The Freeman*<sup>1</sup>," she replied. "It told the full story. The United States Public Health Service is adding fluoride to drinking water in a number of American cities. It is supposed to prevent tooth decay."

"Fluorine is a gas. Is it being added to drinking water?" I inquired. "Who wrote this article?"

"The author? What was his name? Let me get it. His name is Rorty, James Rorty. No, it isn't the gas that is added to the water, it is a fluorine salt, sodium fluoride."

"Fluoridation? The current U.S. medical literature has only occasionally dealt with it. If sodium fluoride really prevents tooth decay this would certainly mean progress. It would reach every person in a community. But is it wise to add a chemical to water other than to purify it?" I asked.

"This is the very idea. The article objects to it. It says that fluoride salts are extremely poisonous. They are used

to kill rodents." This remark aroused my attention, but I felt sure that in such small amounts it would not be harmful.

"Oh, I wouldn't be concerned. The U.S.P.H.S. certainly must have made enough studies to make sure that there cannot possibly be any harm. They have excellent scientists. They have every medical and dental school at their disposal to carry out controlled studies. They must know what they are doing. Who are we, you and I, to question their decision?"

This settled the matter for the time being. I had my hands full. It was hay fever season, the time when I am unusually busy in the office and dead-tired in the evenings. Furthermore, I was devoting all my spare time to preparing an article for the newly formed medical magazine, *GP*. I was on their consulting staff and felt that I should make a contribution. I had just completed some studies on dermatitis, an allergic skin disease. In my book entitled *Contact Dermatitis*<sup>2</sup> where my observations had been assembled, I had proposed a new approach for determining the cause of this disease. A most intriguing endeavor, it presented to the profession a glimpse into the detective workshop of an allergist. I was thoroughly preoccupied and my good wife knew it.

That night, after the lights in the bedroom had been turned off, she asked again:

"I have been thinking about that article. There was a Hearing in February, 1952, in Washington, D. C., before the House Select Committee to Investigate the Use of Chemicals in Foods and Cosmetics, according to the article. Experts on both sides were heard. It was brought out that the question of toxicity and possible damage from fluoride added to water is very much up in the air. There are still too many unanswered questions."

"If this is true," I assured her "they will be answered by

the proper authorities, particularly by the American Medical Association, before the U.S.P.H.S. introduces fluoridation on a large scale."

"But, no," she explained, "it is already being used in many cities in the United States and no one knows how much harm it can do!"

"Nonsense, my dear, I am satisfied," I replied somewhat impatiently. "These people know what they are doing. One thing is certain: no organization in this country has a higher scientific standing than the U.S.P.H.S. and the National Research Council. Let's forget about it."

At breakfast she brought the subject up again.

"I have been thinking about that fluoride business again during the night. Couldn't the American Medical Association be in error? Don't medical ideas and medical practices change, especially when they are new and inadequately tested?"

"Look at your own experience with the case of a penicillin death! No one would ever have predicted that this most valuable wonder drug could be harmful under certain conditions; that it could even cause death. There is evidence that milk contains penicillin in small amounts. Isn't this liable to sensitize people, especially your own allergic patients?"

The reference to penicillin aroused mixed feelings. One of my patients had died suddenly after an injection of penicillin for a chronic lung infection. It was the first case of its kind ever reported in the medical literature.<sup>8</sup> It appeared in 1949 in the *Journ. of the American Medical Association*. A middle-aged lady with asthma had been given several injections of penicillin. Since she had greatly benefited from this drug, she asked me to instruct her sister, a registered nurse, to let her have a few doses at home. Within ten seconds after the injection of a relatively small dose of 30,000 units she collapsed and expired. No one could have

known that during the two to three weeks which had elapsed from one injection to the other she had become allergic to the drug.

The wonder drug—penicillin—which was, and still is, the greatest saver of lives also has the power to kill. My report, the first of its kind, made a definite impact on our approach to penicillin therapy. *Time* magazine covered it in its March 7, 1949, issue. Up to that time hives, dermatitis and other allergic trouble were known to result from penicillin, but no one had died from it. My report alerted physicians to the potential danger of using it indiscriminately.

"Valuable as penicillin is, do you think anyone would even so much as suggest that it be added to drinking water to prevent imminent infection on a large scale?" she asked.

I had nothing to add. Somehow I couldn't entertain the thought that the A.M.A. would endorse anything unless they knew exactly what they were endorsing.

"You can't discount," she continued, "the importance of the testimony of some of the country's most respected career scientists who presented unfavorable evidence at the Washington, D. C. hearings."

"If they were competent scientists," I replied, "they would have registered their views with the A.M.A. Every so often quacks and charlatans are admitted at public hearings to give medical testimony. They act as so-called experts, yet they are in no way qualified. Do you remember ten or fifteen years ago when I appeared at a Detroit Federal Court as a key witness for the U. S. Food and Drug Administration in the trial against a physician who claimed to cure cancer and 'allergies' with a single injection? What an assortment of so-called 'experts' appeared in his behalf. Their testimonials regarding cancer cures made no sense to anyone with a scientific background; yet most of the men testifying for him were bona fide M.D.'s, qualified physicians."

"But—No! The hearing in Washington was quite differ-

ent," she retorted. "The witnesses representing the opposition were outstanding scientists, leaders in fluoride research! Some of them had done research for a lifetime—let me ask you this: Can't 'real experts' be mistaken, too, on some questions?"

My wife had seen an article in the *Seattle Times* of Dec. 16, 1952, which stated that The Aluminum Company of America had offered many grants to research groups for a solution of their serious disposal problem. Fluorides, by-products especially of the aluminum, steel and fertilizer industries, contaminated the atmosphere and induced poisoning of livestock and damage to plant life.

"The P.H.S.," she stated, "is collaborating closely with industry in the disbursement of research funds to overcome the menace. Isn't it possible that a conflict of interest might tarnish the objectivity of a researcher holding an influential position?"

This thought was revolting to me. To think of scientists in the P.H.S. as being motivated by politics and/or by personal gain—a fantastic accusation!

"How can you make such a statement?" I retorted irately. "The men in the P.H.S. are scientists, highly respected altruistic scientists."

At that time I would not have believed what happened a few years later. According to *Time*, May 30, 1960, p. 36, a director of a branch of the P.H.S., Dr. Henry Welch was obliged to resign his post because he had received "\$260,766.00 derived in one way or another from the interests he was sworn to regulate." How a scientist with the best intentions can be caught in a dilemma I learned from my own experience.

Indeed, at this moment I myself, was the recipient of a sum of money "for research." Strangely enough, I was completely unaware of what later turned out to be its real purpose, namely to bury the facts should the study produce results not in harmony with the donor's aims. Whether or

not such money is "compensation for services" is a matter for individual interpretation. This is how it happened:

In 1953, I described a new disease in the *Journal* of the A.M.A. which I termed "Smoker's Respiratory Syndrome."<sup>4</sup>

This condition closely simulates asthma. It begins with a chronic inflammation of throat and pharynx which gradually descends into the bronchial tree. I had observed it many times in my extensive allergy practice among people who had been steady cigarette smokers. I had never attributed it to smoking. These patients cough and wheeze as though they had real allergic asthma. They have pains in chest and arms in conjunction with this cough.

Through a peculiar coincidence I was able to discover the cause of a disease which others as well as myself had encountered many times in their daily practice but had never been able to explain:

I, myself, had suffered from it.

Wheezing in the chest had gradually increased. It was especially noticeable in the morning. Day after day I coughed up heavy mucus. My throat was constantly irritated. I realized it could not be bronchial asthma, a disease to the study of which I had devoted my life's work. The next logical diagnosis to consider was cancer of the lungs.

I was faced with hospitalization for bronchoscopic examination, a rather unpleasant procedure. Reflecting upon the course of my ailment, it occurred to me that my cough and wheezing were usually worse on Monday mornings than during the balance of the week. On Sundays I was in the habit of smoking incessantly; during the week I could only smoke at mealtime, since most of my asthma patients could not tolerate tobacco smoke in my office. I decided to stop smoking. To my surprise, after about three weeks' time, this peculiar disease which had been a source of much concern to me had promptly and completely subsided.

Those who have done research know only too well how

practically every new discovery is subjected to criticism. Most of it comes from individuals with little knowledge of the subject. Critiques, however, are desirable. They stimulate further thought and work. Surprisingly, my report in the A.M.A. *Journal* aroused very little adverse criticism. Numerous physicians throughout the country congratulated me on pinpointing this new disease and its source. Many who read my article recalled cases in which they had made an incorrect diagnosis as had I many times.

Eight years later, two Boston clinicians, Dr. F. C. Lowell and Dr. W. Franklin,<sup>5</sup> followed my lead and reported on the more advanced state of this disease, chronic emphysema. This represents a serious complication interfering considerably with the function of the lungs and even affecting the heart.

One morning a letter arrived from a well-known physician, a consultant to many news magazines and drug companies. He asked me to do some research for one of the cigarette companies for which he acted as intermediary. He suggested that I set up a research program to determine whether or not a newly devised cigarette filter might prevent the disease that I had described. He asked how much money such an investigation would entail.

For a controlled study I suggested that patients, once they had recovered their health, be asked to smoke the particular brand of filtered cigarettes. Bacteriological tests, tissue examinations and lung function studies were to be done before and after the experimental period. I determined the amount of money necessary for those who were to assist me in this project, for the equipment that had to be purchased and for my own services. The research was bound to make considerable demands on my time. Several thousand dollars were involved.

When the work was completed and ready for publication I was told that the company would publish it at some future date. It was to be a portion of a comprehensive re-

port together with two or three other pieces of research by other investigators who had made similar studies. I dismissed the entire subject from my mind in the firm belief that the company's representative would eventually publish it in one of the medical journals which he edited.

This was never done because my report had not shown that the cigarette filter prevented the disease. After several months, when I inquired about its fate, I was assured that the article would be published eventually. After the lapse of many more months I requested the article's return, but no answer was ever forthcoming.

As I was later to realize, the outcome of this research is related to what is happening with respect to research on fluoride:

As physicians we may be confronted with a common disease. We would never suspect its origin or its precipitating cause until someone first clearly pinpoints its manifestations and relates cause to effect. Since I became aware of the ill effect of smoking by the simple expedient of advising a person to discontinue it, many others, like myself, have been cured—and I use this term advisedly. Many of these patients had been incorrectly diagnosed as “intrinsic” or “idiopathic” asthma, i.e. asthma without cause. Indeed this disease has taken many a life without anyone, not even the greatest experts in medicine and pathology, so much as suspecting that cigarettes were the cause.

My experience with the cigarette company demonstrates something much more significant than the establishment of a scientific fact or the discovery of a new disease:

Research which does not prove a predetermined theory is often not published. Its results can be shelved by its sponsor. Even the investigator engaged to carry out research may not ever learn why. Nevertheless, my wife's suggestion that scientists cooperating with industry might abandon their objectivity to do their benefactors' bidding did not shake my faith in their integrity.

A few years later, in 1956, a newspaper report in the *St. Louis Post Dispatch*, May 18, evoked further skepticism about the U. S. Public Health Service concerning their promotion of fluoridation:

The late famous St. Louis, Mo., surgeon, Dr. Evarts A. Graham, had delivered the Roy D. McClure lecture at Detroit's Henry Ford Hospital. Dr. Graham was critical of the U.S.P.H.S. because they failed to warn the public about the hazard of cigarette smoking.

“If there were as much evidence that spinach caused cancer of the stomach, the U.S.P.H.S. would have plastered the country with placards”, Dr. Graham stated.

He expressed the hope that the scientists conducting a \$1,500,000 dollar research program for the tobacco companies “won't set up a smoke screen.”

Dr. Graham “charged the tobacco companies with campaigning to offset lagging sales by starting people smoking at a younger age”, the *Post-Dispatch* reported.

The P.H.S. seemed to accept the explanation of manufacturers of cigarettes that air contamination, not smoking, is the principal cause of lung cancer.

I wrote to Dr. Graham concerning his views on fluoridation. Judging from his own experience, he was convinced that not all was well on the fluoridation front. He blamed the P.H.S. for launching a project fraught with danger.

My experience with the tobacco company had aroused my misgivings about some industry-sponsored research.

My strong rebuke to my wife when she mentioned that scientists might have ulterior motives ended our discussion of fluoridation.

She, however, was not satisfied with my answer. The next morning several letters were ready for mailing, addressed to scientists who had appeared as expert witnesses in opposition to artificial fluoridation at the Washington hearing in February, 1952.

## CHAPTER TWO

### ORIENTATION

My good wife has a searching mind. For years she had been assisting me in gathering literature on my research in allergy, reviewing my case records, editing my scientific writings, which had numbered by then more than 130 publications.

Her mail brought reprints of articles published in scientific journals, statements on fluoride by scientists and lay persons, magazine articles and clippings from newspapers. This soon placed her in a position to bring me up to date on a subject about which I, like so many of my medical colleagues knew very little: the whys and wherefores of water fluoridation.

My interest in the matter was lukewarm. Some of the publications which she had dug up seemed to lack scientific merit. Other articles which did exhibit scientific validity were published in second class medical or dental journals.

She received a rather primitive brochure written by a lay person, a working man, Michael Ambrose, of Pittsfield, Mass. He apparently lacked an advanced education. Nevertheless, in his eager search for knowledge he had accumulated a remarkable fund of information. I contributed materially toward broadening my wife's background. Among other things he had watched the death notices in Grand Rapids, Mich., the first city in the U.S.A. to be fluoridated. By this crude method he attempted to compare the death rates in this fluoridated city with those in nonfluori-

dated cities. Although a rather futile endeavor, it nevertheless indicated his basic understanding of the problem. Had he had statistical training and access to the death certificates in fluoridated cities he might have brought forth data on which, even to date, only fragmentary research exists.

From Mr. Ambrose my wife first learned that the P.H.S. did not consider fluoride one of the essential minerals. As late as 1958\* the Food and Drug Administration did not list fluoride among minerals necessary for life. Again on Aug. 15, 1963, it stated, "Fluoride has not been determined essential to human nutrition."\*\*

In January, 1954, a series of eight articles appeared in the Toronto *Globe and Mail* entitled "Boon or Blunder" by Betty Lee, a staff writer.

These articles constituted the first—indeed one of the few—accounts of both sides of the fluoridation controversy.

The most reliable critics, the writer observed, are those who back their arguments with scientific facts and research. Miss Lee related some of the research unfavorable to the project with respect to both its efficacy and its safety:

Prof. Margaret Cammack Smith and her husband, H. V. Smith, at the U. of Arizona Agricultural Experimental Station, were first to establish, in 1931, that fluoride in drinking water was responsible for "mottled" or Texas teeth.<sup>6</sup> They made their discovery simultaneously with Mr. H. V. Churchill, a chemist of the Aluminum Co. of America, to whom health officials give credit for this discovery.<sup>7</sup> The Smiths proved that as little as 0.9 parts of fluoride occurring naturally in 1 million parts (ppm) of water produces white flecks on tooth enamel, which turn yellow and brown in later life.<sup>8</sup> The Colorado Springs dentist, Frederick S. McKay, was first to bring this enamel defect, "Colo-

\* Ramsay, M. M.: Bureau of Enforcement F. D. A. to Miss N. Logsdon, Decorah, Ia. 9/11/58.

\*\* Lovering, E. M.: Consumer Inquiries Section, F. D. A. to N. M., Wellesley, Mass. 8/15/63.

rado brown stain," to the attention of the U. S. dental profession. For a decade after this discovery, municipal authorities sought to abandon sources of drinking water containing 1 ppm or more which caused this defect.

In 1940 Drs. M. C. and H. V. Smith stated in the *American Journal of Public Health* in an article entitled "Observations on the Durability of Mottled Teeth":

"Although mottled teeth are somewhat more resistant to the onset of decay, they are structurally weak; when decay does set in, the result is often disastrous."

The Smiths sounded an ominous warning, according to Miss Lee: "If intake of fluoride (through drinking water) can harm the delicate enamel organ to such an extent that it fails to enamelize fully the unborn teeth in children, is there any reason to believe that the destructive progress of fluoride ends right there?"

In their St. David, Arizona, survey, where the fluoride content in water ranges from 1.6 to 4 ppm, Drs. Smith found relatively few individuals beyond age 21 in whom caries had not developed; there was a high incidence of extracted teeth in all age groups. Caries once started seemed to spread rapidly. Steps taken to repair the cavities were unsuccessful in many cases. When attempts were made to anchor a filling, the tooth broke away. Extraction was the only course. Drs. Smith noted more than 50 per cent false teeth at ages twenty-four to twenty-six.

"This high incidence of false teeth appeared in all subsequent age groups. Very rarely, adults were found whose teeth, though mottled, were free from caries. It was the exception rather than the rule to find dentitions from which there had been no extractions because of inability to repair carious teeth successfully," Drs. Smith added in the 1940 article.

Under the impact of fluoridation promotion, this important research has fallen into oblivion today. In 1940, however, it constituted an impressive breakthrough in our

knowledge. It was the subject of editorials in the journals of the Amer. Med. Assoc.\* and Amer. Dent. Assoc.\*\*

"The range between toxic and non-toxic levels of fluoride ingestion is very small," Drs. Smith warned. "Any procedure for increasing fluorine consumption to the so-called upper limits of non-toxicity would be hazardous." This was the Smiths' response to the suggestion that fluoride should be added to drinking water.

The *Globe and Mail* articles quoted another scientist, Dr. Charles Dillon, a dentist from Caladh, Fort William, Inverness-Shire, Scotland. He had carefully compared teeth extracted in W. Hartlepool where water contains 2.6 ppm of fluoride naturally with teeth from South Shields where only 0.73-0.85 ppm fluoride was in the water. The pulp chamber of mottled teeth was blocked by calcific matter, conspicuous enough to be demonstrable by X-ray. (Fig.1). In 1956, in the *Dental Digest*<sup>10</sup>, he pointed out that fluoride causes a progressive degeneration of vital tissue in the root and the dental periosteum, the membrane which separates the tooth from the bone. This results in progressive periodontal (gum) disease and in wholesale loss of teeth.

Fluoride's toxic action on teeth, Dr. Dillon demonstrated, is not the same in everyone residing in a natural fluoride area. There are wide individual differences. (Fig. 2). The climate, the geographical area where fluoride appears in water, a person's constitutional and nutritional state, all these factors are involved in the kind and extent of damage fluoride may do to teeth.

There was a big question mark on how much other minerals, especially calcium, phosphate and magnesium contribute to the prevention of tooth decay in areas where fluoride occurs naturally in water.

Even Dr. H. Trendley Dean, one of the pioneer crusaders for fluoridation was hesitant to conclude that fluo-

\* *JAMA*, 123:150, Sept. 18, 1943.

\*\* *JADA*, 31:1363, Oct. 1944.

ride was the only factor involved in decay prevention in natural fluoride areas.<sup>11</sup> He suggested that differences in the mineral composition of water other than fluoride, especially the presence of calcium and phosphorus, were a factor that should not be overlooked.

This point was further illustrated by the research of a Boston nutritionist, Dr. Robert S. Harris, Director of the Nutritional Biochemistry Laboratories of the Massachusetts Institute of Technology and his co-worker, Dr. A. E. Nizel.<sup>12</sup> Of two groups of hamsters, one was fed milk and corn produced in Texas; the other, New England grown corn and milk. The former group developed only half as much tooth decay as the latter group. The fluoride content of Texas food was too minimal to have influenced the condition of teeth. Something other than fluoride must have been involved.

Indeed, in the first magazine article to popularize the fluoridation idea among lay persons, the question whether fluoride or other minerals in food and water were the key to sound teeth was emphasized. The *Reader's Digest*, Feb., 1943, in an abstract of J. D. Ratcliff's article (*Collier's*, December 19, 1942) related that Hereford, Deaf Smith County, Texas, "The Town without a Toothache," "had 2.5 ppm of fluoride in water naturally but fluorine alone wasn't the answer." "In another Texas town with exactly the same concentration of fluorides," the *Digest* stated, "the decay rate, though low, was more than twice the rate at Hereford." Now, in 1965, Dr. A. L. Russell of the Natl. Institute of Dental Research has reported, according to the *Detroit News* of March 17th, that citizens in Colorado Springs "have a very high incidence of dental decay." Its water supply naturally contains as much fluoride as Hereford (2.5 ppm). But the water is low in content of minerals other than fluoride.

Foods in Hereford were "astonishingly high in phosphorus, probably the most vital of all soil minerals," the

article stated. "Carrots contained 50 per cent more (phosphorus) than usual, turnip greens 30 per cent, cabbage and lettuce 60 per cent. Meat and milk were similarly high in phosphorus. Wheat, the chief food product, ran 600 per cent above normal (in phosphorus). Calcium content also was high."

How minerals other than fluoride affect dental health came into focus again in the New Zealand city of Hastings.\* After four and one-half years of fluoridation in Hastings, children—to everyone's surprise—had more tooth decay than children in Napier, the "control city", i.e. the unfluoridated city with only 0.13 ppm of fluoride in water.

After intensive investigation it was shown that traces of molybdenum accounted for Napier's sounder teeth.<sup>13</sup> The question arises whether minerals associated with fluoride, when it occurs naturally in water, should receive the credit for preventing tooth decay rather than the fluoride.

This question was also posed in the *Journal of Dental Research*<sup>14</sup> and later in the *Journal of the A.M.A.*<sup>15</sup> by Dr. C. A. Mills of Cincinnati. His survey of 75 American cities showed that in water containing fluoride naturally "there is always\*\* an accompanying high degree of total hardness." He stated that this was borne out by Dean and associates and added: "So far as human caries statistics are concerned, no greater importance can be attached to the fluorine content of drinking water than to its total hardness."

Dr. Mills could have added that according to the 1950 U. S. Geological Survey the calcium content of fluoridated Newburgh, N. Y., drinking water was 35 ppm, 5 times greater than that of the nonfluoridated control city of Kingston, namely 6.6 ppm; the total dissolved solids were 137 and 30 ppm, respectively. This factor alone should

\* Hawke's Bay *Herald Tribune* 9/16/58.

\*\* Colo. Springs with soft water and fluoride content of 2.5 ppm is a notable exception.

have produced better teeth in Newburgh than in the "control" city Kingston, regardless of the fluoride content of Newburgh's water. The influence of other minerals besides fluoride, nutritional factors and the benefits to teeth from breast feeding have recently received attention in an excellent review by G. Tank, D.D.S.<sup>15a</sup>

Another significant feature was brought to light in the *Globe and Mail* articles: Even though an individual were to drink fluoride-free water he could never escape taking into his body unpredictable amounts of fluoride during the course of a normal meal.

Two Australian dental scientists, Sir A.B.P. Amies and Dr. P. Pincus<sup>16</sup> quoted studies from Dunedin, N. Z. In ordinary infusions of tea there is enough fluoride to contribute from 0.45 to 0.93 mg of fluoride to the daily diet. Thus a tea-drinking person can take into his system approximately 1 mg of fluoride per day from tea alone. This is the amount which health officials consider desirable for prevention of tooth decay; however, in conjunction with waterborne fluoride the total is within the range known to induce mottling of teeth if ingested during early childhood.

Some physicians look upon mottling as a real disease, not an esthetically desirable condition, according to Betty Lee's article in the *Globe and Mail*.

Dr. D. C. Badger, a pediatrician with much foresight, in Hobbs, New Mexico, where fluorides occur naturally at 0.9 ppm, reported in the *American Journal of Diseases of Children*, 1949<sup>17</sup> that 30 per cent of children under her care were afflicted with mottled teeth. She advised parents to provide their children with bottled fluoride-free water up to ages eight or ten.

Prof. T. Gordonoff, Chairman, Dept. of Pharmacology, University of Bern, Switzerland, noted that fluoride in drinking water aggravates certain kinds of goiter. He reported this at the International Physiological Congress in Montreal

in September, 1954. He supported his data by experiments on rats.

Another top scientist, V. O. Hurme, D.M.D., Director of the famous Forsythe Dental Infirmary for Children in Boston, joined in the warning against fluoridation.<sup>18</sup>

"Among the very inadequately studied physical signs of fluoride toxicosis," Dr. Hurme stated in *Dental Items of Interest* in June, 1952, "are inflammation and destruction of gingival and periodontal (gum) tissue. Published and unpublished observations by many men suggest rather strongly that periodontoclasia (gum disease) may be induced or aggravated by certain chemicals, including fluoride."

This conspicuous evidence of fluoride poisoning, Dr. Hurme cautioned, may not always show up as a warning sign. He stated:

"Once enamel formation is completed the intake of fluoride has little or no visible effect on normal enamel. Thus it follows that when the crowns of the third molars are fully calcified, the visible parts of the teeth cease to serve as indicators of excessive fluoride intake."

In the *Journ. of the American Water Works Association*, Vol. 35 (pages 1191-97), 1943, Dr. D. B. Ast, the director of the Newburgh fluoridation experiment, anticipated a trial of ten to twelve years in order "to determine the efficacy and practicability of increasing the fluoride content of drinking water."

The trials in Newburgh, N. Y., Grand Rapids, Mich. and Brantford, Ont. had been under way for only 4 years when Oscar Ewing, Director of Social Security in charge of the P.H.S. gave fluoridation the green light: 58 per cent reduction in tooth decay was claimed. Health officials were encouraged to approach city councils with the question "what are we waiting for?"

According to the *Globe and Mail*, the Canadian Medical Ass'n adopted a report by its *Ad Hoc* Subcommittee at

its 1954 Winnipeg convention. It pointed to the following gaps in fluoride research:

"We don't know enough about physical and oral damage which may be unrecognizable in the absence of dental fluorosis.

"We don't know enough about the toxic effects of fluorine on tissues other than teeth.

"We don't know enough about the effect of fluorine over long periods of time.

"We don't know enough concerning fluorine levels in relation to fluorine bearing food combined with artificially fluoridated water.

"We don't know enough about the relation of nutritional factors to the action of fluorine.

"We don't know enough about the toxicity of fluoride as allied to climate and geography which may increase absorption or diminish excretion."

Indeed every one of these statements which were made 10 years ago is still unanswered today.

Miss Lee quoted Dr. Austin Smith, who was then director of the A.M.A.'s Division of Therapy and Research. He seemed, she said, "to echo many cautions about fluoride" when he referred to wonder drugs in general as follows:

"Unfortunately not all the published reports (of new drugs) are entirely dependable. Errors in work may be reported, erroneous interpretations may be drawn and enthusiasm or wishful thinking may creep into the conclusions. No one can deny that many accidents have occurred because drugs were not properly tested or their actions thoroughly understood before they were used."

These crumbs of knowledge, gleaned from the *Globe and Mail* article, impressive as they were, did not sway me in either direction. True, they constituted evidence unfavorable to fluoridation. Any measure which could eliminate 65 per cent of the dental decay among U. S. children, I felt, warranted support. But did proponents of this meas-

ure disregard the possibility of ill effect? On what basis did the A.M.A. give it their qualified endorsement in 1951?

Mrs. Waldbott came forth with the reprint of a scientific article by Dr. G. W. Rapp, Professor of Biochemistry and Physiology, Loyola University School of Dentistry, published in *The Bur* in April, 1950.<sup>19</sup> It furnished much food for thought. It presented a concise review of the properties of fluoride, its physiological action and its effect on human and animal life.

Fluoride when taken into the system is either imbibed with water or ingested with food. From the stomach and upper bowel it is absorbed into the bloodstream. Fluoride also reaches the bloodstream through inhalation from contaminated air. Some fluoride compounds, Dr. Rapp showed, are more soluble than others. Therefore, they are more readily absorbed from the stomach. The greater the acidity of the stomach content, the faster and more complete is the absorption. If administered in water, fluoride is absorbed more readily than fluoride contained in food.

There is no difference in the fluoride ion itself, Dr. Rapp pointed out. The ion fluoride always remains the same. However, the presence of other elements—in other words the company it keeps—makes the difference with respect to its toxicity. For instance, fluoride associated with calcium, aluminum and magnesium is less toxic than fluoride combined with sodium, hydrogen or silicon in salts which are used in water fluoridation.

Dr. Rapp questioned the effect of other minerals on the action of fluoride:

"What is the response of the body to fluoride that is not accompanied by the other mineral substances invariably found in natural fluoride waters? Do these other substances augment or limit the effective activity of fluoride even though they do not affect its concentration?"

Fluorides are stored in the body especially in bones and teeth, according to Dr. Rapp. Elimination of fluoride from

the body takes place through the kidneys, some through the bowels, the saliva, tears and sweat. After intake of fluoride into the system for a prolonged period, elimination equals or may even exceed that of the daily intake.

Fluoride, the Rapp article stated, affects the enzyme system. Enzymes are chemical substances which mediate the function of every organ. Fluoride affects particularly the phosphate transporting enzymes and therefore interferes with many cell activities, especially with carbohydrate (sugar) metabolism, i.e. breathing of living cells.

Fluoride combines with the calcified structures of the teeth and causes hardening of the tooth enamel. Dr. Rapp emphasized that more fluoride is retained if given in small, multiple doses than when a similar quantity is given in a few large doses.

Referring to mottling of teeth, Dr. Rapp stated:

"It appears to be simply a matter of concentration control in order to achieve either of the two results mentioned, mottling and prevention of decay. Unfortunately the line between mottling and no mottling is an elusive one and the degree of control to be exercised seems to be very fine."

My wife must have sensed that I was impressed by the Rapp article.

"Why," she asked, "is such an instructive article by a competent scientist not published in one of the widely circulated U. S. scientific journals?"

I had no answer to this question. The answer became apparent later, through my correspondence on another matter with Dr. G. F. Lull, Secretary of the A.M.A. In his letter to me dated April 23, 1954, he stated:

"I am aware of the fact that the American Dental Association may only publish what it desires on the subject."

I learned later, to my great astonishment, that the *Journal of the A.D.A.*, as well as other scientific journals, including medical journals of the highest reputation, publish only what they desire, regardless of the scientific caliber of

the article in question.

Another strange thing happened which puzzled me no end. I commended Dr. Rapp on his informative article and asked for additional data. For some unexplained reason, Dr. Rapp was on the defensive. In his reply of June 8th, 1954, he did not answer my specific questions. Instead, his answer used a standard phraseology with which I became familiar in the years that followed when making similar inquiries:

The "mass of evidence afforded by reputable scientific investigators," he assured me, "attests to the inherent non-toxicity of the procedure" (fluoridation).

"I am persuaded by a reputable scientific investigation that the procedure (fluoridation) has merit, so long as it is not construed to be a panacea against tooth decay."

"*I insist that many self-seeking individuals have misquoted me and have taken out of context statements made by me. . . .*" I failed to understand this reply.

Here was a scientist who had presented an excellent review on a complicated subject. He was now not only reversing his previous stand, but even apologizing for having brought valid research to light. Had he actually become convinced during the months which had elapsed since publishing his article, that fluoridation is absolutely safe? Dr. Rapp is Professor of Biochemistry at a school of dentistry. All American dental schools are beholden to the U.S.P.H.S. for grants. Could appeal to group loyalty here have caused Dr. Rapp to abandon his objective approach to the subject? Like most American dental schools, Loyola had endorsed fluoridation.

If this were an isolated case it would have mattered very little. I learned subsequently of other instances wherein scientists, who had presented data unfavorable to fluoridation, withdrew their objections in order to avoid friction with those with whom they were associated.

Dr. Ludwik Gross, Chief of the Cancer Research Unit at

the Bronx Veterans' Administration Hospital, is known as one of the country's most outstanding scholars. He has recently received the 1963 Bertner Foundation Award from the U. of Texas for important contributions to cancer research. Dr. Gross had publicly stated his reasons in a letter to the *New York Times*, April 1, 1957, for disapproving fluoridation. After he was named among other scientists who oppose fluoridation, prior to a referendum in Needham, Mass., he wrote to Mr. J.C.S., Needham, Mass., January 1, 1959, as follows:

"My views on fluoridation have not changed. I still believe that water is not the proper vehicle for distribution of fluorine and that if fluorine is administered, this should be done by other means, in proper dose, and to the proper group of population, that is to children only and for the necessary period of time, not throughout lifetime. I must stress however, that these are my personal views.

"I have a full-time position with the Veterans Administration and I cannot have my name, particularly when associated with my official position, used publicly in such a controversial matter so as not to embarrass the Veterans Administration which has so generously supported my research in cancer and leukemia."\*

The factual data presented in the Rapp article and the information gleaned from the *Globe and Mail* had aroused my interest in this fascinating subject. I decided to learn more about it. As a physician I was naturally interested in preventing tooth decay. Was the widely propagated thesis that fluoride reduces the incidence of tooth decay by 65 per cent truth or fiction? How would fluoride affect the human organism? I recognized that this area of research has an important bearing on human health. Its surface had hardly been scratched.

In the past thirty years during the development of allergy

\* On 7/19/63 Dr. Gross again openly confirmed his opposition to fluoridation in the *New York Times*.

as a specialty, I was intrigued by the many unusual phenomena encountered in allergy, some of which I had helped in a small way to unravel. The study of fluoride's effect on the human organism promised to be more challenging than anything with which I had previously been confronted.

Fluoride, I realized, is not a harmless electrolyte like chloride or iodide. It is an extremely active and toxic ion liable to turn many harmless agents inside and outside of the human system into poisons.

A wide range of studies on fluoride was available in the field of biochemistry; there were many epidemiological statistics; there were case reports of acute intoxication. However, very little was known concerning the long range effect of repeated minute amounts of fluoride on the human organism and its significance in clinical medicine.

I began to wonder whether or not some of the manifestations which we, as allergists, encounter in our daily practice and which do not fit in with allergic phenomena were in any way connected with trace quantities of fluoride, particularly with inhalation of fluoride from the air.

At that time, a Mrs. S. S., a resident of Bay City, Mich., aged 40, was referred to me for allergic studies. She had spastic bowels, gastric disturbances and persistent migraine-like headaches which the family physician considered of allergic origin. My tests failed to indicate food sensitivity.

She stated that every morning upon awakening she was so thirsty that she had to drink several glasses of water. Out of a clear sky she asked me:

"Doctor, could the Bay City water do that to me?"

"What makes you think so"? I inquired.

"For the past two to three years, I have had a continuous desire to drink lots of water."

Neither she nor I realized then that Bay City's water had been fluoridated since 1951.

"When I am away from the city, my mouth and throat

no longer feel dry; the constant thirst, cramps in my stomach and headaches are gone."

The cramps in the stomach and the intestinal spasms usually occurred in the morning after imbibing a few glasses of water to quench her thirst. I learned years later that excessive thirst, so-called polydipsia, accompanied by constant dryness in mouth and throat and polyuria (increased excretion of urine), is a common feature of acute and chronic fluoride poisoning.

At that time I failed to give much credence to her theory. After many years of study, after viewing X-rays, carrying out blind tests and after having gained much more knowledge about this disease, I am convinced that hers was a case of chronic intoxication from fluoridated water.

Drug allergy and drug intolerance in allergic patients had interested me for many years. An otherwise harmless dose of a drug can cause serious difficulties in allergic individuals. Some drugs, even in minute amounts, can induce attacks. In 1933<sup>20</sup> I studied sudden deaths from local and general anesthetics in several Detroit hospitals. I was one of the first to link such deaths with allergy. Like other allergy specialists, during years of practice, I have been consulted by local physicians concerning at least a dozen deaths in asthmatics from a single aspirin tablet. Persons with chronic nasal polyps are especially predisposed to such accidents. They tend to take aspirin tablets periodically for relief of their headaches. An interval of ten to twenty days is particularly conducive to development of allergic shock, similar to the manner in which this phenomenon is induced in the experimental animals. If immediate relief is available, especially large doses of life-saving epinephrine, these patients may recover. Such an attack may be followed by a short siege of pneumonitis,<sup>21</sup> a harmless form of pneumonia.

A condition different from drug allergy interested me

now, intolerance to drugs. To my knowledge, relatively little attention had previously been paid to it.

A young interne gave an asthmatic patient a 1½ grain tablet of Phenobarbital, a harmless sleeping medicine, for relief of a severe asthmatic attack. Within ten minutes he became comatose. His lungs filled up and death occurred within one hour. It was thought that he had died of asthma. However, the manner in which the patient had reacted and the autopsy proved otherwise. Hemorrhages and congestion in the brain, liver and kidneys indicated that the patient had been poisoned by this drug in a dosage harmless to others.

Soon afterwards another experience supported my theory that an allergic person may be less tolerant to drugs than normal people.

Mrs. McD., a patient with asthma associated with an extensive chronic sinus infection had been receiving through her physician intravenous injections of sodium salicylate, a drug closely related to aspirin. This treatment was suggested by an allergist at one of the leading midwestern universities who had found it effective for relief of sinus infections. In the days before antibiotics such a measure was most welcome.

The first two injections caused no ill effect. Two weeks later, within minutes after she had received the third injection, namely ½ gram of sodium salicylate in 10 cc of water intravenously, she developed severe pains in the stomach, nausea, vomiting, and fainted. When I was consulted three hours later, shortly before she expired, there was no evidence of asthmatic wheezing, hives or nasal congestion, symptoms which would have manifested themselves had she been allergic to the drug.

Instead, she showed the earmarks of true salicylate poisoning at autopsy with small hemorrhages in the stomach and in the upper bowels.

Many physicians, especially those dealing with allergic patients, have been faced with similar experiences in their practice.

I decided to look into this case more thoroughly. Animal experiments were initiated at Harper Hospital in conjunction with my associates, Dr. K. Blair and Dr. G. E. McKeever.<sup>22</sup> We determined the minimal lethal dose of sodium salicylate—the smallest dose which would kill the animal—in a “sensitized” and in a “normal” state.

Guinea pigs were given intravenous injections of sodium salicylate. Some had first been made sensitive to horse serum. Other animals used as controls had not received the preliminary sensitizing horse serum injection. The experiments showed that a smaller dose of salicylate will fatally poison animals sensitive to horse serum than normal animals.

My experience with true poisoning from otherwise harmless doses of phenobarbital made me realize that allergic patients, patients with whom I was dealing day in and day out, would be the first to suffer harm from fluoridated water. Research in this area was nonexistent. There was no support for the persistent claims of dentists that an “overwhelming mass of evidence” proved fluoridation absolutely safe. Indeed, I had never heard of any new advance in medicine in which side effects could be ruled out with 100 per cent certainty.

An article by George A. Swendiman, D.D.S.,<sup>23</sup> which appeared in *Oral Hygiene*, September 1951, pinpointed this crucial fact when he quoted the Latin writer, Lucretius:

*“Quod alii cibus est aliis fiat acre venenum.”* “What is food to one may be fierce poison to others.”

By this time my interest was thoroughly aroused. I was eager to learn more, much more, than I could glean from the fragmentary data thus far accessible to me. The Rapp article and the *Globe and Mail* series had made me curious. The experience with my Bay City patient was worthy

of follow-up. My interest in drug sensitivity and drug intolerance inspired further exploration in this area. The two fatalities from drug intolerance pointed to the need for further studies. I decided to do some research on fluoride and its effect on humans.

In the past I had been credited with several basic contributions to knowledge in allergy. I did not anticipate the inevitable repercussions involved in carrying out research on fluoridation—totally different from engaging in research on allergy: I was not aware that it might wreck a man's career.

## CHAPTER THREE

### A FATEFUL DECISION

There were two logical approaches for me to gather preliminary information: To contact the American Medical Association and to ask the local Health Department for all available data. I had reason to believe that I would obtain objective advice from both sources. The Detroit Health Commissioner, Dr. Joseph G. Molner, as well as his two predecessors, Dr. Bruce Douglas and Dr. Fred Meader, had consulted me frequently on matters pertaining to allergy. I was certain of his full cooperation.

In a dinner discussion on fluoridation at our home, Dr. Molner assured me that his statisticians had been checking all data carefully. They had found nothing wrong with them. Fluoridation was effective and safe, he stated. He admitted, however, that the Public Health Service had termed the project a "calculated risk."

He was surprised at some of the facts which my wife had dug up. They evidently had not reached Dr. Molner's desk. My wife referred to the article by James Rorty in the *Freeman*, 1953, which reported the Hearings in Washington, D. C. of the House Select Committee to Investigate the Use of Chemicals in Food and Cosmetics, January to March, 1952, under the chairmanship of James J. Delaney.<sup>24</sup> The Committee included two physicians, Dr. A. L. Miller, former Nebraska State Health Commissioner, and Dr. E. H. Hedrick of West Virginia. Its counsel was Vincent Kleinfeld, one of the ablest and most experienced food and drug attorneys in Washington.

After all testimony had been heard, the Committee which had split wide open on all its other reports dealing with food, fertilizers, and cosmetics, was unanimous in its position regarding fluoridation. It recommended a "go-slow" policy. It pointed to a sufficient number of unanswered questions concerning fluoridation's safety to warrant a conservative attitude. Yet, instead of heeding this advice, the Rorty article stated, both The Public Health Service and the American Dental Association redoubled their drive for fluoridation.

The principal feature which had characterized the promotional campaign up to this date was elucidated in the Rorty article: Promoters attempted to minimize the caliber and the competency of the opposition.

J. Roy Doty, an official of the American Dental Association, complained bitterly in their *Journal* that the Committee had accepted "misgivings of a few individuals who appeared as witnesses in spite of the weight of evidence furnished by such organizations as the American Dental Association, the A.M.A., the U.S.P.H.S., The National Research Council and the Association of State and Territorial Health Officers."

Mr. Rorty continued:

The "few individuals" referred to by Dr. Doty numbered seven scientists whose "breadth of training and experience as toxicologists, clinicians, biochemists, nutritionists and research dentists qualified them thoroughly to appraise the issues involved."

"In contrast, most of the eleven witnesses who testified for fluoridation were qualified to talk solely about teeth; they were neither toxicologists nor doctors of medicine."

Dr. Molner told us of his own investigation. At his request, a committee of dentists, Wayne University professors, technicians and engineers had studied the question in 1950. This committee's report came to my attention several

years later when it was resurrected from the files of Detroit's Municipal Library.<sup>25</sup> The following are pertinent passages quoted from the Report of the Medical Committee:

"1. Soluble fluoride is an extremely poisonous substance, even more so than arsenic, and its addition to the water supply of a large metropolitan area cannot be undertaken without creating certain possible hazards to the public health. With this in mind, your Committee wishes to present these points:

"A. The intake of city water by this age group (children) is highly uncertain because of the established high consumption of milk and fruit juices.

"B. Certain adults have an abnormally high water intake due to occupation, disease and dietary peculiarities. The fluoride intake of this group might become dangerously high.

"C. Certain occupational groups of substantial size in this metropolitan area are already exposed to fluorides. The effect of an additional fluoride intake on the health of these adult groups is unknown.

"D. The effect of prolonged fluoride ingestion on the health of a large industrial population is not clearly established. It will be necessary to extend studies over a period of at least ten to twenty years to determine the possibility of delayed injurious effects.

"2. In view of the above uncertainties this Committee believes that it is undesirable to undertake the fluoridation of the water supply of metropolitan Detroit."

The Committee recommended the consideration of topical application of fluoride to teeth and exploration of the possibility of adding it to milk.

Dr. Molner expressed some concern about whether or not an even flow of fluoride could be maintained throughout Detroit's water system. Indeed evidence published subsequently in the *Journal* of the American Waterworks Association in Oct., 1957, pages 1268-70 and the *American*

*Journal of Public Health*, Dec., 1958,<sup>26</sup> testifies to the validity of his doubts.

Many years later, on June 11, 1962, Mr. Gerald J. Remus, Detroit's Water Board Manager, who had made an unusually thorough study on this question, wrote as follows to the Detroit Common Council:<sup>27</sup>

... "Doubt exists as to whether uniform fluoride concentration could be maintained throughout the more than 6,000 miles of distribution mains in the Detroit system. Data reported in the American Water Works Association Journal reflects this un-uniformity. . . . we checked 482 samples of water taken from eight Michigan cities that fluoridate their supply and we found considerable variation in concentrations."

Our discussion demonstrated that Dr. Molner still favored fluoridation subject to the same provisos which had been established by the Health Department May 3, 1951, namely:

"1. The Health Department now recognizes the public health value of the fluoridation of water.

2. There are very definite risks associated with the introduction of fluoride into a communal water supply from the point of view of workers. Therefore, certain protective measures must be adopted.

3. Baseline studies must be established. At least 5,000 children should be examined annually to determine the amount of good accomplished.

4. Laboratory controls must be continuously run on the water at source and point of usage.

5. Neighboring non-fluoridated communities with similar sources of raw water supply and geographical location should be used as controls.

6. Fluoridation of water must not be looked upon as a complete and only answer for the prevention of dental caries; it is not a panacea, but rather one factor involved in the prevention of dental caries."

## ILLUSTRATIONS

### 1. TEETH FROM WEST HARTLEPOOL, ENGLAND (2.6 ppm)

Calcifications (bone-like depositions) inside of pulp chamber (central cavity). Drawn from X-ray photographs by Charles Dillon, D.D.S., Caladh, Fort William, Scotland.

### 2. FLUOROSED TEETH FROM INDIA

Calcified deposits on the outer surfaces of teeth due to fluoride in water. Drawn from photographs of Professor A. Singh, Patiala, India.

### 4. MOTTLED TEETH

A thirty-two year old asthmatic who always lived in "low (0.1 ppm) fluoride" Detroit. Probable cause: Fluoride in drugs (calcium preparations) or baby foods taken in early life.

### 5. ADVANCED MOTTLING

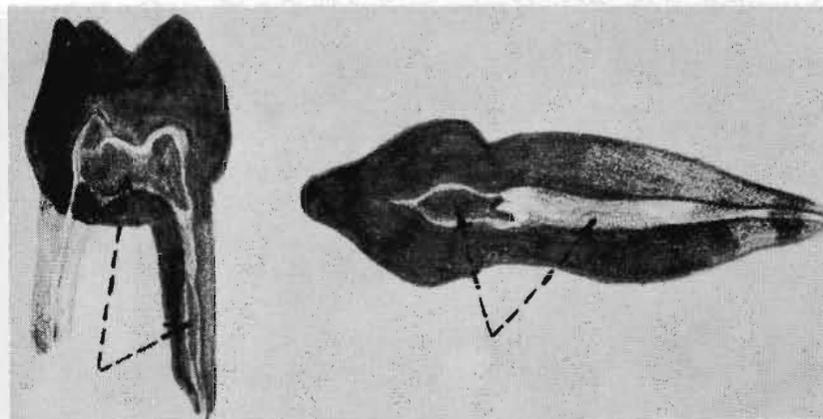
In addition to discoloration, the enamel is marred by irregular defects. Courtesy, Dr. G. Nalbone, Palermo, Italy.

### 9. HYDROFLUORIC ACID "BURN"

In contrast to a true burn so-called fluoride "burns" cause little superficial damage at first, but affect the tissue beneath the skin. Courtesy Dr. H. Wild, Basel, Switzerland.

### 10-11. FLUOROSIS IN CATTLE

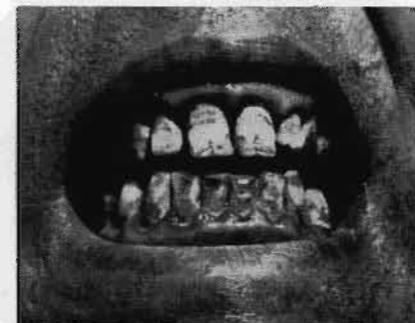
Lameness, painful protrusions on legs, emaciation. Fluoride contaminated forage causes the disease. Courtesy, Professor F. Cohrs, Hanover (Germany) Veterinary Institute.



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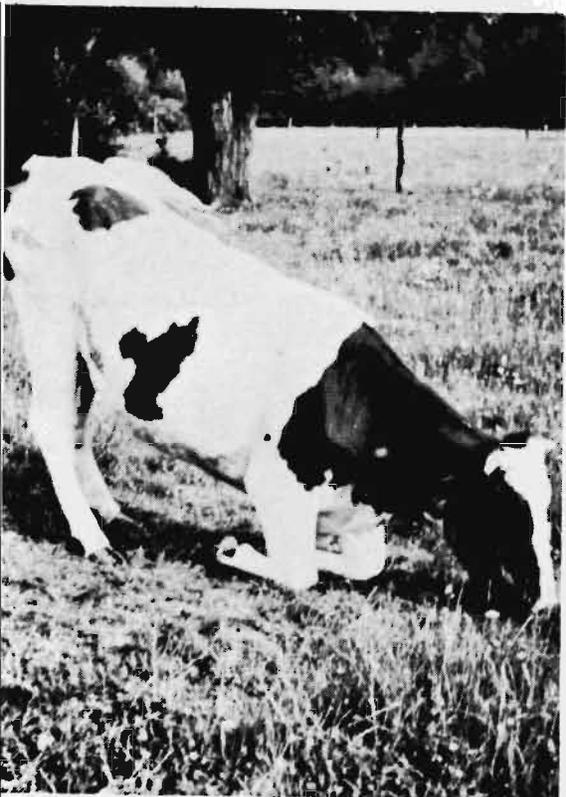
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Our discussion had been constructive. Dr. Molner assured me that he would furnish me with whatever material he deemed convincing and worth-while. I offered him the same courtesy. I made it clear that I was considering a more thorough study of this matter. As an allergist, I was concerned about the long term effect of fluoridation on allergic patients.

Our second approach was to consult the A.M.A. Mrs. Waldbott had an unusual entrée into A.M.A.'s professional staff. It was brought about by a rather fortunate coincidence:

An article appeared in the *Alumnae Magazine* of Vassar College, her alma mater, by two members of President Truman's Committee for the Nation's Health. It presented the case in favor of socialized medicine. In a letter to the magazine's editor published shortly thereafter, Oct., 1949, page 18, Mrs. Waldbott presented her own appraisal of the subject.

The daughter of a Mr. T. A. Hendricks of the A.M.A.'s educational staff, at the time a Vassar student, brought Mrs. Waldbott's letter to her father's attention. He immediately wrote Mrs. Waldbott\* that he considered her letter the "best one-page round-up on a subject which had been much misunderstood and misrepresented that had ever reached my desk". He asked for her permission to reproduce the letter for nation-wide distribution among physicians. She gladly complied with his request.

With this entrée into the A.M.A., Mrs. Waldbott thought she would easily obtain the full cooperation of its staff. She was mistaken. Mr. Hendricks suddenly acted as though he had never heard of her. He transferred her request for information like a hot potato to a "Dr. B." Dr. B's reply did not furnish the information which Mrs. Waldbott had requested. She therefore asked for additional information.

In his reply Dr. B. seemed to be quite impatient: "Of

\* T. A. Hendricks to Mrs. G. L. W. Oct. 12, 1949.

course it is simply silly," he wrote, "to talk about any difference between 'natural' and 'artificial' fluoridation of drinking waters. The fluorides are exactly the same, and have exactly the same effect."\*

This statement is misleading. Of course, the fluoride ion is always the same; its poisonous action, however, is influenced by other minerals associated with it.

Whereas my wife had previously been considered by one A.M.A. official intelligent enough to write an excellent exposé of the shortcomings of socialized medicine, her carefully expressed and logical reasoning on the subject of fluoridation was tossed aside as "silly."

In a letter to the A.M.A. office, I firmly protested this rebuff to my wife. I did not realize at that time that such high handed treatment was an integral part of the promotional campaign, which did not originate in the A.M.A. office or with Dr. B.

It came to the fore in an editorial written subsequently by the A.M.A.'s Secretary and General Manager, Dr. G. F. Lull, June, 1955,<sup>28</sup> when he used such phrases as:

"The unscrupulous opponents of fluoridation."

". . . . . those who take every opportunity to discredit medical science and legitimate public health progress."

Dr. Lull's editorial has been widely utilized for propaganda purposes wherever fluoridation has become an issue.

My correspondence with the A.M.A. secretary\*\* disclosed how little the A.M.A. officials and the membership of the organization actually knew about the subject. On nearly every question concerning the purely medical aspect of fluoridation, Dr. Lull, the A.M.A. secretary, had to refer us to none other than—the American Dental Association (as though dentists were better qualified to evaluate harm to general health than he and the scientific body of the A.M.A.)

\* A. M. A. letter signed Dr. B. to Mrs. G. L. W. 4/8/54.

\*\* Dr. G. F. Lull to Dr. G. L. W. 4/23/54.

This impression was confirmed in a letter to me by Dr. Elmer Hess, who was president of the A.M.A. in 1955. He wrote on August 9:

"I think most of us in the American Medical Association feel that we have to depend upon the American Dental Association and the United States Public Health Service primarily for scientific facts concerning a situation of this kind and I am unable to express an opinion as to whether it is safe or not safe."

Our correspondence had brought into focus how sorely the medical profession was in need of truly scientific information on the systemic effect of fluoride.

It did much more to me. It made me more and more curious. It stimulated an intense interest in this subject.

I decided to write a scientific article for the American Medical Association. I began to spend all my spare time in the library studying the available data. My efforts would furnish factual evidence which could be made available to physicians. A.M.A. officials would then no longer be obliged to resort to opinions and views of dentists and health officials. Surely, once the basic facts concerning fluoridation were recorded in the literature by one of their own members, they would look into the subject more thoroughly before continuing their endorsement.

Dr. Molner's offer to furnish me information soon materialized. I received a *Newsletter*<sup>29</sup> stating the position of the Commission on Chronic Illness regarding fluoridation. This Commission was an independent national agency founded by the American Hospital Association, American Medical Association, American Public Health Association, and the American Public Welfare Association, for the purpose of studying problems of chronic disease, illness and disability. The newsletter approving fluoridation had been sent to every prominent health official throughout the land.

The commission's members were professional and lay persons guided by P.H.S. officials. They included such no-

tables as Miss Sarah Gibson Blanding, President of Vassar College; Leroy E. Burney, M.D., future surgeon general of the P.H.S.; Theodore G. Klumpp, M.D., president of a drug company; The Most Rev. Wm. T. Mulloy; Thomas Parran, M.D., a former surgeon general; Walter Reuther, representing labor; and other civic leaders.

The pamphlet was written by a Committee of three scientists: Dr. Nathan Shock, Chief of the Section on Gerontology of the National Institutes of Health, a branch of the U.S.P.H.S.; Dr. K. F. Maxcy, Prof. of Public Health, Johns Hopkins University, Baltimore; and a noted gerontologist (specialist in diseases of old age), E. J. Stieglitz, M.D.

The composition of this Committee of scientists is worthy of note. In all subsequent investigations of fluoridation initiated for the purpose of obtaining endorsements, whether from professional or from lay organizations, whether on the national, state or local level, so-called "study committees" have been formed. They are guided by one or more outstanding scientists who are thoroughly familiar with statistical surveys furnished by the U.S.P.H.S. and the A.D.A. The less informed Committee members thus receive all their information from promoting agencies. Rarely if ever are scientists with knowledge unfavorable to fluoridation represented on the committee.

The principal feature of the Chronic Illness Report was its acknowledgment that the Commission had carried out no independent investigation. The three Committee members charged with studying the subject had adopted the opinion of another committee, namely the *Ad Hoc* Committee of the National Research Council.<sup>30</sup>

This council, set up by the National Academy of Sciences, consists of top leaders in science in their special fields. It acts as liaison between the Public Health Service and industry. It was organized in 1916 with the cooperation of major scientific and technical societies to enable the scientists of the country to associate their efforts with those

of The Academy in service to science and to the group.

As customary, this body likewise appointed a special "*Ad Hoc* Committee for . . . the Study of Fluoridation."<sup>30</sup>

The nine-member Committee was guided by three scientists two of whom were closely connected with industry, namely Dr. B. G. Bibby, Director, Eastman Dental Dispensary, who had been carrying out research for the Sugar Research Foundation, Inc.;<sup>31</sup> Dr. F. F. Heyroth, Cincinnati's Health Commissioner, and Assistant Director, Kettering Laboratory, University of Cincinnati, an institute sponsored and supported by industry where research on fluoride has been financed by Alcoa and eight other corporations; Dr. H. T. Dean, the "father of fluoridation," who has personally been responsible for obtaining endorsements in at least a dozen national and international organizations. The only physician member of the Committee, Prof. A. McGehee Harvey of Johns Hopkins Medical School, had never carried out research on fluoride. He therefore had to rely on his dental and P.H.S. advisors for background material.

With such a set-up valid scientific evidence unfavorable to fluoridation was bound to be disregarded or presented to the group with adverse comments. Any "neutral" member of the Committee could not have become aware of the true facts without great personal effort.

The Committee based its deliberations according to their Final Report on the evidence of some 30 authors, whose names read like a "who's who" in fluoridation promotion. The only two not linked with a promoting agency were the late Danish scientist, Roholm<sup>32</sup> (Fig. 3), and Dr. P. C. Hodges and co-workers.<sup>33</sup>

Significantly, the National Research Council's Committee was chaired by Dr. Kenneth F. Maxcy, who later became one of the three members of the Study Committee for the Commission on Chronic Illness. Such interlocking of board and committee members of scientific organizations explains how endorsements are brought about through the

**DR. KAJ ROHOLM**  
of Copenhagen, Denmark



October 7, 1902 — March 28, 1948

This brilliant biochemist and physician is considered the world's greatest authority on fluoride. His classic book, *Fluorine Intoxication*, published in 1937, covers all available data on fluoride's effect known up to that time.

*Fig. 3*

influence of a few top scientists. They do not reflect the position of the members whose views have not been canvassed and who in most instances have given the matter little if any consideration.

The most frequently quoted and most impressive endorsements of fluoridation are those of the National Research Council and of the Commission on Chronic Illness. Both represent the same group of scientists.

One item in the National Research Council Committee's Nov. 29, 1951, report deserves special mention. It contains the following information:

"Concurrently (with the decline of tooth decay in Grand Rapids) there has been a slight decline in the caries rate reported by Muskegon with its fluoride-free water supply, 22 per cent in the six-year-olds and 28 per cent in the seven-year-olds. This is unexplained."

Studies on the decay rates in Muskegon had been made simultaneously with those in Grand Rapids, the experimentally fluoridated town. In the 6 and 7 year age groups of the nonfluoridated "control" city a simultaneous reduction in tooth decay occurred. This observation suggests that some factor other than fluoride added to Grand Rapids' drinking water may have been responsible for improving the condition of children's teeth.

Had this observation become generally known, it would have been embarrassing to the health officials conducting the Grand Rapids-Muskegon experiment. Thus upon becoming aware of this development they initiated in 1951 a drive to add fluoride to Muskegon's water.

The precipitous abandonment of the control for the Grand Rapids fluoridation experiment was explained by health officials—as stated by Dr. Philip Jay to the Michigan House of Representatives Committee Investigating Fluoridation Oct. 7, 1963—on the basis that Muskegon's children could no longer be deprived of the "great benefits" of fluoridation. Muskegon citizens' sole source of information concerning what was transpiring in Grand Rapids was the one-sided proponent releases.

Comparisons between Grand Rapids children's teeth and those of a non-fluoridated control city were no longer possible. This tended to weaken the claimed benefits to children's teeth made for this major American fluoridation experiment.

It should be emphasized that the members of the Commission on Chronic Illness and of the National Research Council attempted to arrive at an objective appraisal of fluoridation but must have been unaware of the one-sided

orientation of their committees. The subject is extremely involved. Valid research is difficult of access. It is only logical to consult those who have done most research. To separate the wheat from the chaff, to distinguish genuine research which sets out to find the answer to a question from research designed to "prove" a thesis determined in advance for sheer propaganda purposes is a laborious process indeed.

Let us return to the Report by the Commission on Chronic Illness: The three scientists who were charged with the investigation accepted several highly controversial theories as though they were proven facts. To name a few such claims:

- Fluoride is a trace element in human nutrition—necessary for sound teeth: An *essential* trace element to be so designated must be proven to be required for existence of life. Although a board guided by Dr. F. J. Stare, Harvard School of Public Health, and several other proponent scientists heavily endowed by industry, have listed fluoride among essential minerals, nowhere in the scientific literature has fluoride been proven necessary for maintaining human life. There is no difference in the fluoride content of sound and decayed teeth.\* In other words, decayed teeth are not "deficient in fluoride." Fluoride is not needed for healthy teeth.

Another claim made by the Commission on Chronic Illness:

- Storage of fluoride in the skeleton is of no "functional disadvantage." This statement has also been subsequently disproven in humans.<sup>34</sup> Serious crippling fluorosis has been reported in areas where natural fluoride water levels are less than 1 ppm.<sup>34</sup>

The Report further claimed:

- "Minute" amounts of fluoride present in food and beverages, particularly in tea—which contains 30 to 60 parts

\* For further details see Chapter VII, page 119-121.

of fluoride per million parts of water—are of no significance. Data are available<sup>35-36</sup> which show that food alone can provide amounts of fluoride up to or far above the so-called safe daily amount of 1-1.5 mg.

- An extraordinary statement constituted a part of The Report. It implied that fluoridation must be harmless because more than 3 million people have been drinking water containing fluoride naturally for generations.

Of all problems encountered in medical science, the recognition of the cause of a chronic illness, especially of chronic poisoning, is one of the most difficult tasks, as demonstrated by our experience with smoking. Millions had been smoking for many years before its ill effect was recognized. If physicians are not looking for harm from fluoride they cannot be expected to recognize it.

Since the dental profession was the major promoter of fluoridation, I assumed that dentists were thoroughly familiar with every phase of the subject. I expected to obtain further information by addressing a circular letter to Detroit's dentists, which I did in May, 1954. I asked for expression of their views. This letter was based upon what I had thus far learned. Essentially it presented an answer to the Report by the Commission on Chronic Illness.

Unaware of the explosiveness of this hot political issue and inexperienced in public relations, I had made reference to Oscar Ewing. Shortly after becoming Director of Social Security in charge of the U.S.P.H.S. he had given the green light to fluoridation before the permanent teeth of children born in the pilot cities had erupted. At the Washington, D. C., hearing<sup>24</sup> it was brought out that Oscar Ewing, Alcoa's former legal counsel in that city, as a member of President Truman's cabinet, had committed the P.H.S. to promotion of fluoridation.

For the sake of good public relations one was not supposed to mention such things.

My letter stirred up a hornet's nest. I received many re-

plies; most of them critical, some abusive and unbecoming to members of a learned profession. A few reached a high emotional pitch, others were most illogical.

"Don't you know that dentistry's greatest experts, Dr. Phillip Jay of Ann Arbor, Dr. F. A. Arnold, Jr., Dr. John Knutson, consider fluoridation the greatest health measure of modern times?"

"Aren't people allergic to penicillin, too? Would you abandon penicillin treatment?" (As though anyone would ever have proposed adding penicillin to the water supply for everyone to consume daily for a lifetime!)

"You are an allergist and a physician. How dare you offer an opinion on fluoridation—a purely dental subject?"

There were a few voices in the wilderness: Several dentists were interested in the information which I had furnished to them. They suspected that not all they had read in their journals and heard at their meetings was cricket. They sensed that something strange was going on in the promotion of fluoridation. They realized that ordinarily genuine advances in dentistry are handled quite differently. They asked, why are not both sides, the pros and cons, discussed openly in dental journals and in dental meetings as is customary with new advances in dentistry? They were aware that every new measure in medicine or dentistry is bound to have some side effects. Some knew that fluoride was a treacherous poison. How had it suddenly become a "nutrient," they wondered.

Their uniform demand was, "Please don't quote me."

Subsequently, when several Detroit physicians joined me in forming a group to study fluoridation a local dentist approached every one of them. This group was short lived. Each member in turn received his share of harassment and embarrassment. One of these men was the dean of Detroit's pathologists, the late, beloved Dr. Plinn Morse; another, Dr. Ralph Pino, who had taken an active part in the affairs of

the Michigan State Medical Society and the A.M.A.; a third, a greatly respected and highly reputed Detroit internist, the late Dr. William H. Gordon.

One internist, still practicing in Detroit, received a warning from a member of his hospital staff. Should he continue to publicly oppose fluoridation he would jeopardize his consultant practice, even his hospital staff appointment. He was profoundly distressed. Reluctantly he withdrew. He had no other choice.

I learned subsequently that intimidation and harassment of opponent professional men by dentists and health officials is another major feature of fluoridation promotion. To quote the *Journal of the American Dental Association* of May, 1955,<sup>37</sup> from a letter by the late journalist George Sokolsky:

"I find that as many of those whom I interviewed who are members of your association are opposed to the process as favor it. I also find that they live in terror of being quoted. They tell me that they may be brought up (before the ethics committee) on charges should I quote their names. I regard such intimidation of any citizen for whatever reason as un-American. I should like to see a Congressional Committee investigate this whole subject."

The Public Health Service has spent thousands of dollars for so-called "research" to "discover" what motivates fluoridation opponents. Social scientists call opponents "unsound," "erratic" and "hard to comprehend." Such views indicate that these scientists have not had access to the genuine case against fluoridation. They have based their opinions upon one-sided information given them by proponents.<sup>38</sup>

Shortly after I had written the circular letter to dentists, representatives of the Detroit District Dental Society requested the Council of my medical society to censure me. To oppose fluoridation, they claimed, was unethical. It should

not go unpunished. Two members of the Council subsequently told me what went on during that meeting behind closed doors.

After a brief discussion, one of the Council members set the tone: If one of our members has knowledge on a subject about which we know very little and if he does not bring it to our attention—that would be reason for censuring him. The Society promptly dropped the matter as did societies in Dayton, Ohio,\* and in Greenwich, Conn.\*\*

This experience had cooled my enthusiasm for the study of fluoride's action on the human organism. I was obliged to re-appraise my situation before going farther. I had to decide whether I should continue looking into the matter or simply drop the subject for good. Persistent open opposition to fluoridation was bound to affect my practice adversely.

Up to this time I was not aware of having ever made enemies. Most of my colleagues, I assumed, had considered me competent. They respected my contributions to the advancement of my own specialty. All of a sudden a large segment of Detroit dentistry, little acquainted with medical research, was questioning my competence. Under such circumstances could I continue to practice medicine? True, I had hosts of satisfied and grateful patients. Numerous physicians were referring their allergic patients to me. Would these physicians be influenced by the wild stories which were already being circulated about me?

There was another side:

Should I drop this extremely challenging study? Should I disregard the very patients for whom I had taken up the cudgel?

My friends told me: "It isn't worth while!"

I had just been elected vice-president of the American College of Allergists, one of the two leading national scien-

\* Dr. J. J. Shea to Dr. G. L. W. 7/25/55.

\*\* Greenwich (Conn.) *Time*, Editorial 5/6/63.

tific organizations devoted to the study and teaching of allergy. This was solely due to having made important research contributions to this specialty. I had never taken an active part politically in this or in any other organization. Nevertheless, I was in line for the presidency. Any activity in opposition to fluoridation would almost certainly preempt my becoming president.

"Am I a coward?" I asked myself. "Can I be intimidated?"

Actually these considerations were minor. My curiosity had been aroused. I wanted to learn more about fluoride. I was interested in its effect on those to whom I had devoted my life's career, especially the patients with chronic asthma. Here was a completely virgin field of endeavor. I was thinking of some of the unfortunates who had been extremely allergic to iodide. How much worse would their illness become were they obliged to ingest, day in and day out, trace quantities of fluoride, another halogen much more toxic than iodide?

Few scientists were in as strategic a position as I to produce the sorely needed evidence. My research background of many years, my financial independence and my indifference to political emoluments, the high repute in which I was held by my patients and by my colleagues in the community, throughout the country — and internationally — surely they could withstand a campaign of disparagement and slander which had already begun. I could not stop now.

I decided to go on.

## CHAPTER FOUR

### MEDICAL EVIDENCE

The first step in research on a scientific subject is to find out what is known about it in the available literature. This study was fraught with indescribable difficulties.

In spite of literally thousands of publications on the dental, biochemical and statistical phase of fluoridation, little research was available on its medical aspect. Textbooks on pharmacology dealt mostly with acute intoxication from fluoride, particularly with poisoning resulting from homicide, suicide and accidental ingestion of fluoride salts.

There was only casual mention of chronic poisoning which is termed fluorosis. It is characterized by mottling of teeth and by skeletal changes. The white spots or opacities of mottled enamel, which in later life tend to turn yellow, brown and even black\* are recognized as an enamel defect due to absence of the cementing substance and to irregular formation of the enamel rods, the building structure of the tooth (Fig. 4, 5).

I spent many months at the library searching through the literature and collecting reprints, abstracts, doctors' dissertations, foreign correspondence. I consulted biochemists and dentists in order to clarify points with which I, as a physician, was not too familiar. I sought advice from statisticians for their interpretation of available Public Health Service surveys. I studied microscopic sections of teeth and bones, the organs most conspicuously affected by fluoride. I even took up the study of Italian and Spanish in order to

\* According to T. Ockerse and B. Wasserstein (J.A.D.A., 50:536, 1955), such pigmentation may be due to subsequent deposition of manganese in the enamel.

acquire at least a reading knowledge of such sources. I had already covered the French and German literature.

The outcome of this extensive work was a review article designed to summarize the basic data on the subject.<sup>39</sup>

As a physician the following questions concerned me primarily:

1. Can intake of fluoride into the human body be regulated through the water supply so that benefits can be gained without accompanying harm?
2. Are the benefits of fluoridation overrated?
3. Is there danger of disease from artificially fluoridated water?
4. Is the medical profession aware of the manner in which fluoridation is being promoted?

Whereas the first three points were strictly confined to the scientific aspect of the problem, point four was destined to lead into the realm of politics and was bound to detract from the value of a scientific article.

In my naiveté, I felt that in view of all my tedious work, I was not only justified but duty bound to present to my colleagues all the information which I had unearthed particularly since few of them could have had access to it. Some knowledge of the political implications, I reasoned, was an essential contribution to the understanding of the whole fluoridation problem. To my great surprise, I soon learned that revealing its political aspect was bound to antagonize many members of my profession.

In the scientific portion of the paper I demonstrated that action in the human body differs from that in a test tube and in animal experimentation. To rely upon averages instead of studying individuals is fraught with danger. For instance, in blood samples from persons in artificially fluoridated Newburgh, N. Y., fluoride levels varied as much as 900 per cent from one person to another<sup>40</sup> as shown by Dr. H. C. Hodge and his co-workers at the University of Rochester, N. Y.

I brought out in my paper that the U.S.P.H.S. had not recommended an exact daily dose. They were advocating a concentration of fluoride in drinking water, an unprecedented procedure either for preventive or treatment purposes. A concentration of 1 mg of fluoride in 1 thousand milliliters of water or 1 milligram per liter supplies 1 to 1.5 mg a day, provided a person drinks not more than 4 glasses, the average amount of water per day. However, it is generally known that a person afflicted with diabetes or kidney disease drinks much more than what is considered average. If his kidneys are diseased he stores more fluoride than average. If he happens to be allergic he cannot tolerate as much as an "average" individual. In fact, there is no such thing as an "average" individual. No two persons are alike.

There is also the problem of fluoride reaching our system through sources other than water, especially food, drugs and contaminated air. Amounts of fluoride thus introduced into the system might rise far above the recommended average. The amount of fluoride absorption is unpredictable.

"It all averages up," we were told. Yet no one knows what happens to the person who deviates from the average and whose fluoride intake is much higher than average. Is he expendable?

In my article I dealt at length with the dental statistics from Newburgh and Grand Rapids:

Such outstanding scientists as Dr. V. O. Hurme, the Director of the famous Forsythe Dental Infirmary for Children in Boston, had pointed to numerous pitfalls.<sup>18</sup> To name a few: Lack of standardization of the methods employed in gathering data, the personal bias of the examiner, the inadequate control of the studies, the relatively short time of observation of the effect of fluoride accumulation when a whole lifetime is concerned.

In 1959 these features were further elucidated by

Phillip Sutton, D.D.S.,<sup>41</sup> a research fellow at University of Melbourne Dental School in a book entitled, "*Fluoridation, Errors and Omissions in Experimental Trials.*"<sup>41</sup>

How personal bias enters into setting up dental statistics was demonstrated by two well-known researchers, Drs. J. C. Boyd and N. E. Wessels.<sup>42</sup> They showed that repeated examinations of the same tooth by the same examiner at different times resulted in an entirely different interpretation from one examination to another. Dr. D. F. Radusch reported a deviation of 89% in the average number of cavities when 33 patients were examined by eight dentists.<sup>43</sup>

In the interpretation of the official P.H.S. dental statistics, another point should be taken into account: Children who have had periodic examinations of their teeth were, at the same time, alerted by dental health authorities to the importance of good dental hygiene, daily tooth care, good nutrition and avoidance of sweets and soft drinks. How much did such measures influence the statistics which purport to show that fluoridation by itself achieved a 65% reduction in tooth decay? How much was actually due to the fluoride and how much to other supplementary measures?

How much danger to health fluoridation entailed, no one knew. Two fatalities from fluoride in water naturally were recorded in the literature, one in the U.S.A. in 1943<sup>44</sup> and the other in Argentina in 1939.<sup>45</sup> Prior to 1945, the beginning of the Grand Rapids experiment, there had never been any question but that fluoride had caused these deaths. In an effort to dispel fears, proponents of fluoridation now claimed that kidney ailments with which these patients were afflicted, not fluoride, had been responsible.

It is true, thus far no ill effect had been reported from artificial fluoridation. Yet, extensive research demonstrated that the fluoride ion, although the same whether in water naturally or otherwise, has in conjunction with calcium aluminum and phosphates a different effect from fluoride combined with sodium.<sup>46</sup> Research had proven that more

fluoride is stored in the system when it is present in water than when in food;<sup>47</sup> that the malnourished are more susceptible to poisoning than the well nourished.<sup>48</sup> High fat consumption makes a person more susceptible to poisoning.<sup>49</sup>

There were additional signs that fluoridation is hazardous: All chronic poisoning due to persistent intake of minute doses is extremely difficult to diagnose. It may require years of ingestion of a drug before the first signs can be recognized. Moreover physicians are not alerted to the disease. They would have great difficulty in identifying harm from drinking water.

A drug ordered by a physician can be discontinued at will. Ill effect from it, therefore, can be demonstrated much more readily than that from drinking water which is consumed day in and day out. Were one to discontinue drinking fluoridated water for only a few days this might not be sufficient to relieve the symptoms. It may take weeks or months until enough of the accumulated fluoride is eliminated from the body for the symptoms to clear up.

There were other reasons why physicians could not be expected to diagnose the disease. In two municipalities of greater Detroit which had been fluoridated for a number of years, Grosse Pointe Farms and Highland Park, hardly a physician was aware that he personally was drinking artificially fluoridated water. Were these men to encounter poisoning from fluoridated water in their practice, they could not relate the disease to drinking water if they were unaware of fluoride's presence in the water.

With respect to the diagnosis, the two most conspicuous manifestations of chronic fluoride poisoning, mottled teeth and thickening of bones, do not necessarily occur in every person with chronic poisoning. Mottling develops only during the formative period of tooth enamel, before the tooth has erupted. The characteristic bone changes occur late in the disease. The Danish biochemist and physician, Kaj Ro-

holm, observed that 9.3 years was the average period of exposure to relatively large amounts of fluoride before increased calcium deposition in bones was demonstrable by X-ray.<sup>32</sup> From the Punjab province in India where fluorosis is endemic<sup>50</sup> it is reported that it would take as long as 30 years for the first signs of intoxication to develop. On the other hand, the Italian scientist, Prof. Frada, University of Palermo,<sup>51</sup> observed abnormal X-ray findings in bones after eighteen years. Animal experiments carried out in 1943 by Kettering Laboratory scientists in Cincinnati have demonstrated that the early skeletal changes of fluoride poisoning are not always detectable by X-ray.<sup>52</sup>

My research led me into the area of mortality statistics. Would they provide a clue to the degree of damage from continued intake of fluoride? Could the incidence of deaths from cancer, heart disease, diabetes, stroke, etc. in a high fluoride area, compared with deaths in areas with little or no fluoride in water, tell the story of harm from fluoridation?

The basis for such statistics are death certificates. Every physician knows how difficult it is to unequivocally establish causes of death, both the principal and the contributing causes. Especially in sudden death, the physician usually is obliged to guess at the diagnosis.

Several years ago I had tried to carry out a survey on asthma based on the study of death certificates. On checking the case histories of a few of the deaths listed as asthma, the cooperating P.H.S. statistician and I soon realized that in many instances the individuals proved to have suffered from an entirely different disease which simulated asthma. The study was therefore abandoned.

Even after an autopsy, pathologists and clinicians are frequently at a loss to establish the exact cause of death. Granted that a correct diagnosis was made, we are still a long way from identifying the disease with its cause. Who, for instance, could prove the connection of a certain liver

or kidney ailment or a heart disease with a single noxious agent such as fluoride? Pathologists rarely, if ever, test these organs for fluoride.

Perhaps the greatest difficulty encountered in a study of mortality data is the matter of control, i.e. individuals who have not been taking any fluoride into their system in comparison with those who are drinking artificially fluoridated water. Genuine controls were impossible to find because fluoride accumulates in every human body even in communities where there is little or no fluoride in water.<sup>53</sup> The older a person, the more fluoride he has stored from food, drugs and from inhalation of contaminated air. Therefore, there cannot be any genuine controls. There is no way of knowing how much fluoride a given person has incorporated in his system.

All these data which I had gathered with such great effort, I thought, would be of interest to the American Medical Association.

Dr. Austin Smith, editor of the *A.M.A. Journal*, published my article, "Smoker's Respiratory Syndrome," April 18, 1953.<sup>4</sup> He personally considered the research important enough to be the subject of an editorial in his journal.\* Thus familiar with the caliber of my research I assumed that he would be receptive to my article. I phoned Dr. Smith at A.M.A. headquarters in Chicago:

"I have just completed an extensive review of the literature pertaining to fluoridation. Some of my data have never been brought to the attention of the medical profession. If I were to send the article might the Journal be interested in publishing it?"

"Of course, we are always interested in new information. What is the title of your paper?" Dr. Smith inquired.

Aware that it might terminate our telephone conversation, I hesitatingly disclosed the title to him:

"Medical Evidence *Against* Fluoridation."

\* Editorial, *J. A. M. A.* Jan. 23, 1954, page 340.

Judging from his silence, he no doubt was somewhat taken aback. After a brief pause he explained:

"You know, I assume, the position of the American Medical Association on this subject. We have endorsed fluoridation. Any contribution on this subject must therefore first clear the policy making body of our organization."

I was about to register my dismay at his reply. During my long medical career it had never occurred to me that politics could possibly affect the publication of scientific data. Scientific journals continuously publish new data, some reaffirming, some conflicting, all in an effort to present the truth. Why should a scientific paper which he had not even read have to be submitted to the policy making body of the AMA composed of surgeons, internists, urologists, pediatricians, etc.? There was so little knowledge on this subject that House of Delegates members would have had difficulty in properly assessing my data. Shouldn't my article stand or fall solely on its scientific merits?

I promptly regained my composure. With an air of forced calmness, I asked him as a personal favor to me to examine my article and render his opinion because I did not want to run afoul of politics.

Of course, he was happy to do so.

On July 9, 1954, I received a letter in which he advised me not to submit the paper to the *A.M.A. Journal* for the following reasons:

1. I had done no original research. 2. It had come to hand too late. It would have been "more effective" had he received it earlier.

It seemed that by that date the AMA's position was already so firmly established that only original data proving harm would interest the editor.

This made sense to me. My article was a review of the literature. I reported no original research. I could not take issue with Dr. Smith's reasoning.

Nevertheless why had he also suggested that I send my

paper to the House of Delegates, the policy making body of the AMA, or to the Council on Pharmacy and Chemistry which was the advisory committee to the Board of Trustees? Shouldn't the membership of the AMA, most of whom are practicing physicians, be given the opportunity to hear both sides which would enable them to make their own decisions instead of being obliged to rely upon the views of a limited number of scientists, some of whom were closely connected with the U.S.P.H.S.?

I could not help but recall the action of the Commission on Chronic Illness with which I noted a close parallel. Instead of giving the membership the full information and allowing them to determine the Commission's position, an Advisory Committee made the decision for them on the basis of one-sided information. For the second time an organization which had taken a stand on fluoridation did not apprise its members of both sides.

Instead of submitting the article to another medical journal I first contacted its editor. I asked Dr. Joseph Garland, editor of the *New England Journal of Medicine*, whether or not he would be interested in an article on "Medical Evidence Against Fluoridation of Public Water Supplies". In his blunt reply July 2, 1954, Dr. Garland indicated that "the profession hereabouts (Boston and environs) is pretty well sold on fluoridation . . . ."

This reply brought the realization that the subject had already become such a political issue with the medical profession that it would be impossible to have the article published in any American medical journal. Even though it presented no original data, I felt that it was an important and timely contribution. I therefore had it printed at my own expense. I sent it to members of my medical society and to some Detroit dentists.

Its reception was diversified. Some physicians, even a few dentists, congratulated me on having accumulated data which was totally new to them. They were grateful for the

information which my article conveyed. Subsequently it reached dental groups outside the U.S.A. As a result of this publication, I was invited by an Argentinian dental organization, *Federacion Odontologica*, to present my data to their national Congress to be held in Mar del Plata, Oct. 1-4, 1958. Unfortunately I could not appear in person because of the expense involved, but my paper was read to the assembled dentists.

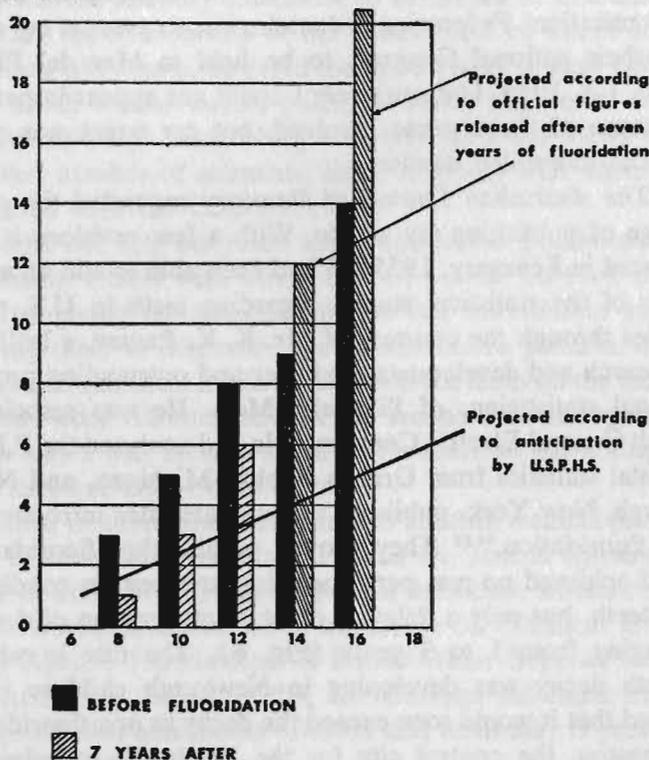
*The Australian Journal of Dentistry* requested the privilege of publishing my article. With a few revisions it appeared in February, 1955.<sup>59</sup> I had been able to add an analysis of the statistical studies regarding teeth in U.S. pilot cities through the courtesy of Mr. K. K. Paluev, a brilliant research and development engineer and outstanding professional statistician, of Pittsfield, Mass. He was associated with General Electric Company. He had analyzed the P.H.S. dental statistics from Grands Rapids, Michigan, and Newburgh, New York, published seven years after introduction of fluoridation.<sup>54,55</sup> They proved to him that fluoridation had achieved no real permanent improvement in condition of teeth, but only a delay in onset or recognition of decay, ranging from 1 to 3 years (Fig. 6). The rate in which tooth decay was developing in Newburgh children indicated that it would soon exceed the decay in non-fluoridated Kingston, the control city for the Newburgh experiment.

He permitted me to incorporate in *The Australian Journal of Dentistry* article two of his graphs (Fig. 6), which he had prepared for his testimony in Washington, D.C., in May, 1954, in support of HR 2341, a bill to make it illegal to add fluoride to drinking water.

Additional critiques of the glowing reports on decay prevention in the fluoridated pilot cities had appeared by then. T. M. DeStefano, D.D.S., a dentist from New Jersey, recorded in the *Bulletin* of the Hudson County Dental Society, Feb., 1954,<sup>56</sup> an analysis of the Grand Rapids, Muskegon Study by a N. Y. professional statistical firm, Standard Audit

# K. K. PALUEV'S GRAPH

NUMBER OF  
D.M.F. TEETH



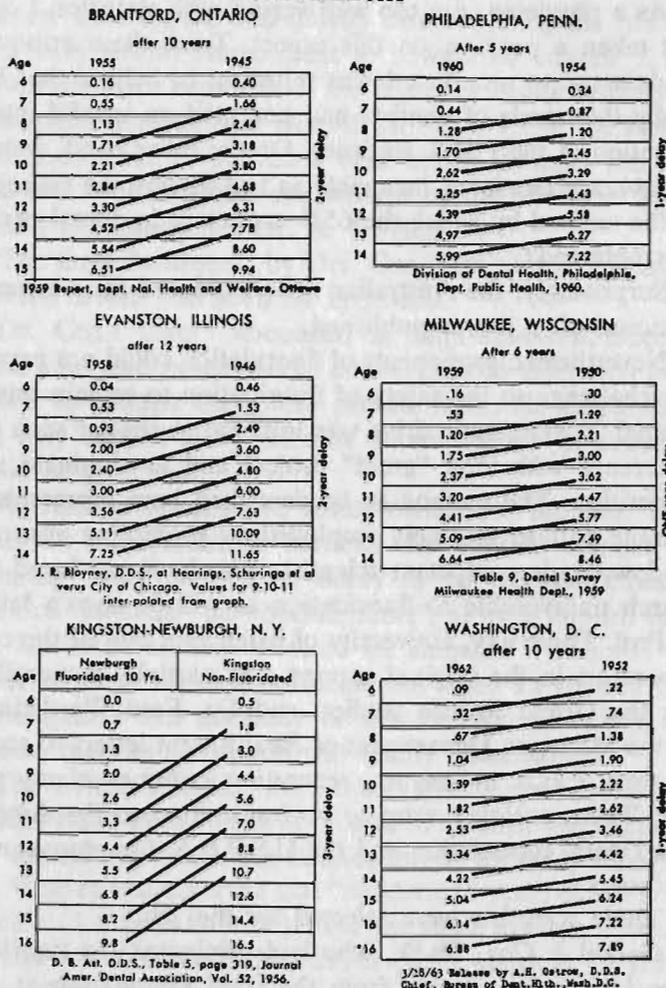
Projected and observed averages of decayed, missing and filled (DMF) permanent teeth per child.

Fig. 6

and Measurement Service, Inc.\* It pointed out that the data presented by the P.H.S. scientists were "raw", "not capable of being checked;" the sampling design of the experiment was "embarrassingly conspicuous by its absence"; that "variations were not accounted for"; and that the authors

\* 89 Broad Street, New York 14, N. Y.

# GRAPHS BASED ON OFFICIAL PHS STATISTICS SHOWING 1 TO 3 YEAR DELAY IN ONSET OF TOOTH DECAY



WHENEVER OFFICIAL PHS FIGURES ARE RELEASED AND ANALYZED BY INDEPENDENT STATISTICIANS, THEY SHOW A POSTPONEMENT BUT NO PERMANENT REDUCTION IN INCIDENCE OF TOOTH DECAY (DMF-DECAYED, MISSING, FILLED TEETH.)

Graphs — Courtesy of Charles Klint, Fresno, California.

Fig. 6a

gave "no attention to the possible operation of other factors which might affect the health of children's teeth."

As a physician, not too well versed with statistics, I had not taken a position on this aspect. True, these critiques made sense to me. Yet, I was reluctant to believe that literally thousands of dentists had accepted an invalid interpretation of the P.H.S. statistics. On the other hand, wasn't the average dentist as incapable as I to discern the fallacies in the method by which the 65% reduction in dental caries was obtained?

Surprisingly, the Australian article aroused little adverse criticism after it was published.

Nevertheless, proponents of fluoridation could not permit my challenge to the safety of fluoridation to remain unanswered. A systematic drive was initiated to shatter such interference with their "great" project and to eliminate my opposition. The method to be described here represents a definite pattern routinely employed by promoting agencies to downgrade competent scientists who have produced research unfavorable to fluoridation as will be shown later.

Prof. Philip Jay, University of Michigan, one of the collaborators in the original surveys and partially responsible for the Grand Rapids studies, and Dr. Fred Wertheimer of the Michigan Department of Health, sent letters to some of their P.H.S. colleagues, requesting critiques of my paper. These critiques were to be transmitted to the American Dental Association and the U.S.P.H.S. for propaganda purposes.

Three scientists were selected for the job:

Gerald J. Cox, Ph.D., who had originated the fluoridation idea using a grant from the Buhl Foundation at the Mellon Institute, Pittsburgh, and who was then Professor of Biochemistry at U. of Pittsburgh's School of Dentistry; Dr. F. J. McClure, at that time probably the most noted scientist on fluoride and biochemist at the National Institute of Dental Research; Dr. A. L. Russell, another National In-

stitute of Health scientist. The replies by these consultants two of which were addressed to Dr. Jay, one to Dr. Wertheimer, were copied and quietly distributed by the Michigan State Health Department to newspaper editors. I received the three copies from the editor of *Inside Michigan*, a magazine published in Detroit. In Nov., 1954, the editor had undertaken to publish a brief article of mine side by side with a promotional one written by the Michigan State Health Commissioner, Dr. A. E. Heustis.

The three "critiques" by Drs. Cox, McClure and Russell differed in tone and scientific approach.

Dr. Cox's letter\* abounded in unprofessional, indeed, slanderous statements and in undocumented assertions presented as though they were proven facts. He disparaged not only me but every scientist quoted by me with whose views he disagreed.

A German scientist, A. Kantorowicz, for instance, had observed no correlation between the fluoride content of drinking water and dental decay in 18 German cities.<sup>57</sup> Dr. Cox criticized "his childish effort"; he even implied that Dr. Kantorowicz had "selected his subjects" (patients) in order to make his statistics come out right. In view of the thoroughness and accuracy of this German scientist's research, such an accusation was totally unwarranted.

The British scientist, Dr. Robert Weaver, who made a careful study in the cities of N. and S. Shields, was accused of "attempting to hamper fluoridation by his delay theory." Dr. Weaver had observed that "children 15 years of age in S. Shields (1.4 ppm fluoride) have the same average amount of caries as children in N. Shields (0.25 ppm) at 12 years of age."<sup>58</sup>

The two American authors, Linsman and McMurray, who deserve much credit for reporting the first death<sup>44</sup> from fluoride water in the U.S.A. were, according to Dr.

\* Letter to Dr. Fred Wertheimer, Michigan State Health Dept., Lansing, undated.

Cox, "so inept that they could not detect the presence of fluoride in normal bone."

Dr. Cox even accused the British scientists, Kemp, Murray and Wilson<sup>59</sup> who reported severe mottling from 0.3 to 1.3 ppm fluoride in water naturally, of having "misplaced the decimal point." "The fluoride content at Bamptom may have been 3 to 13 ppm", Dr. Cox claimed. (According to the official Water Board figures Drs. Kemp and co-workers were correct).

Speaking of me, Dr. Cox stated:

"He can never be strictly honest." "He attempts to falsify."

Such mottling of teeth, which occurs at 0.9 ppm and which Dr. Cox considers harmless, is, in his words, a "pathological process only in a pathological mind".

"Waldbott *would have been* among those to oppose vaccination against smallpox, chlorination of drinking water and pasteurization of milk if he had chosen to read the opposition literature."

This latter remark was curious indeed. At the very time when I received a copy of this letter, I had volunteered like other members of the Wayne County Medical Society to administer polio vaccine for the Board of Health in one of Detroit's public schools.

Dr. Cox repeated the threadbare slogans: "almost complete absence of decay in fluoride areas," or "three million have been drinking fluoridated water in this country all their lives with 0.9 ppm or higher." This, according to Dr. Cox, a scientist, constitutes proof of fluoridation's safety.

I was again reminded of my patients afflicted with chronic emphysema due to smoking. For years I had encountered numerous patients with this ailment which neither I nor any other physician had attributed to smoking until I myself had suffered from the early stage of this disease.

Dr. Cox concluded his letter by referring to a footnote in my article. I had stated that this was "a preliminary com-

pilation of data which will be followed up by a survey of cases of fluorine intoxication from drinking water". With the assurance of a prophet he categorically asserted: "He will find no such cases from water with fluorine at the 1 ppm level."

Since Dr. Cox is a biochemist, he does not have personal contact with patients as physicians do. When in 1939, at the Mellon Institute, he first suggested that fluoride should be added to drinking water, he presented no sound factual data to back up his theory.<sup>60</sup> Previously the emphasis had been on removing fluoride from water. Dr. Cox's research on animals had indicated that up to 20.6 ppm fluoride in the diet of pregnant and lactating rats did not benefit the teeth of offspring<sup>60a</sup> and that humans are more sensitive to fluoride toxicity than animals.<sup>60b</sup>

The other two letters addressed to Dr. Jay, by F. J. McClure, Ph. D., dated Sept. 29, 1954, and by A. L. Russell, D.D.S., Sept. 28, 1954, both of the National Institutes of Health, were written in a conservative, less emotional vein. They were confined to scientific critiques of my data and to the defense of their own position.

Some of Dr. McClure's statements made at that time have subsequently been proven erroneous. For instance, at the concentration of 1 part per million, he maintained, the difference in solubility between sodium and calcium fluoride was not a factor in their "physiological availability". In other words, he claimed that the two compounds behave alike with respect to their absorption from the stomach into the bloodstream and their deposition in body tissues.

This idea has been a major bone of contention in fluoridation promotion. It implies that sodium fluoride, artificially added to drinking water, is no more harmful than fluoride naturally occurring in water where it is almost always associated with buffering minerals and much higher concentrations of calcium ions which tend to counteract fluoride's toxic action.

Dr. McClure was not aware that typical mottling of children's teeth occurs from fluoride-containing foods,<sup>86</sup> vitamin preparations<sup>61</sup> and fluoride-contaminated air<sup>62</sup> even when water is practically fluoride-free.

Dr. McClure acknowledged that amounts added to drinking water were "inconsequential" compared to fluoride exposure in certain industrial operations. Nevertheless, he minimized the hazard due to exposure to fluoride-contaminated air. He claimed that industry takes adequate precautions to prevent fluoride damage.

Whereas precautions are being taken, they are far from adequate. Only a year later, on September 17, 1955, a family of three was awarded \$38,292.90 by a Federal Court in Portland, Oregon,\* because of serious damage to the health of each by fluoride which escaped from the smokestacks of Reynolds Metals Company's Troutdale aluminum plant and contaminated the atmosphere. They had suffered damage to liver, heart and kidneys. In Tampa, Florida, I had the opportunity to examine persons with similar damage from fluoride which had emanated from chimneys of phosphate factories.<sup>62</sup> These patients showed fluoride levels in urine in amounts far higher than that considered harmless. Figure 7 shows urinary fluoride levels which on one day reached 30 mg as compared with between 0 to 1 mg, on the average, in other cities (see page 95).

Dr. McClure claimed that at 1 ppm fluoride's behavior differs from that at higher concentrations, as though this "magic concentration" could alter the action of a toxic chemical.

Subsequent research by Drs. Patricia Wallace-Durbin of Berkeley, Calif.,<sup>63</sup> and P. H. Phillips,<sup>64</sup> at the Agricultural College, University of Wisconsin, Madison, showed that fluoride storage in rats takes place when there is as little as 1 ppm in drinking water.

In his letter, Dr. McClure was defending his own studies

\* Portland *Oregonian* 9/17/55.

on 5 young men.<sup>65</sup> He claimed to have observed that 90 per cent of fluoride taken into the system was eliminated in urine and sweat. Other scientists, for instance M. J. Wagner and J. C. Muhler,<sup>66</sup> have found much greater retention of fluoride in the body than he.

The third letter addressed to Dr. Jay from Dr. A. L. Russell maintained that in Boulder, Colorado, without fluoride, dental caries was 25 times higher than in Colorado Springs with 2.5 parts per million fluoride in water naturally. He conceded, however, that five-sixths of Colorado Springs' population was afflicted with mottled teeth. According to his letter "there were 3 or 4 times as many teeth lost in Boulder (without fluoride) as in Colorado Springs". In his published report, however, in 1951, he stated<sup>67</sup> that "3rd molars had been excluded from all data (Boulder and Colorado Springs) so far presented". This is significant. An analysis of his published figures regarding 3rd molars revealed that in "high fluoride" Colorado Springs, 19 times as many third molar teeth were lost as in "low fluoride" Boulder, because of malposition or crooked position of teeth.

In this connection it is of interest that, since 1935, an unknown number of Colorado Springs children had not been drinking Colorado Springs water with 2.5 ppm of fluoride. In 1957, two health officials, Dr. N. F. Gerrie and F. Kehr, reported in one of the official P.H.S. journals<sup>68</sup> that local dairies, on the advice of pediatricians and dentists, had been delivering low fluoride (0.2 ppm) bottled water to Colorado Springs homes for the past twenty-two years. Many families purchased this water.

These facts raise serious objections to the validity of Dr. Russell's assertions expressed in his letter to Dr. Jay.

Like Dr. McClure, Dr. Russell insisted that mottled enamel "is of no consequence at 1 ppm."

This statement has been echoed and re-echoed. It has

## ILLUSTRATIONS

### 12. FLUORSPAR ( $\text{CaF}_2$ )

Bright crystals of many different colors, extensively used in industry, especially for the production of hydrofluoric acid.

### 13. CRYOLITE ( $\text{Na}_3\text{AlF}_6$ )

Utilized in the manufacture of aluminum.

### 14a, 14b. FLUORIDE DAMAGE TO PLANTS

Marginal destruction ("basket" and "spoon" formation) is characteristic of damage from fluoride. (Sulphur dioxide, the other major air contaminant, affects mainly the ribs and center of leaves.) Courtesy, Dr. L. Gisiger, Swiss Government Agricultural Experiment Station, Liebefeld, Bern.

14c, 14d. Apples, beginning to form, and Beech leaves damaged by fluoride fumes. Courtesy, Dr. K. Garber, State's Institute of Botany, Hamburg, Germany.

### 19. FLUORIDE DAMAGE TO BEES

Destruction of bees by fluoride contaminated air near a Swiss aluminum factory. Courtesy, Dr. L. Gisiger.

### 20a, 20b. FLUOROSSED BONES

Bones of cattle which had grazed on fluoride contaminated forage near a German superphosphate factory. New bone formation in the periosteum (tissue covering the bones) near joints and in ligaments induce pain and crippling. Courtesy Professor P. Cohrs, Veterinary School, Hanover, Germany.



12



14a



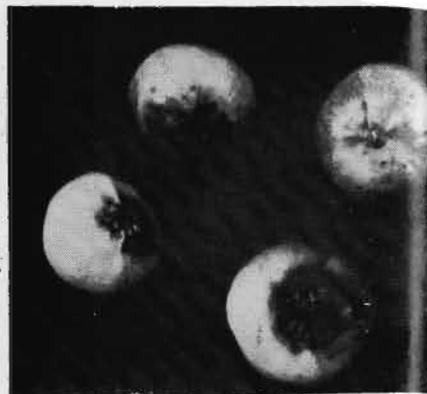
13



14b



14c



14d

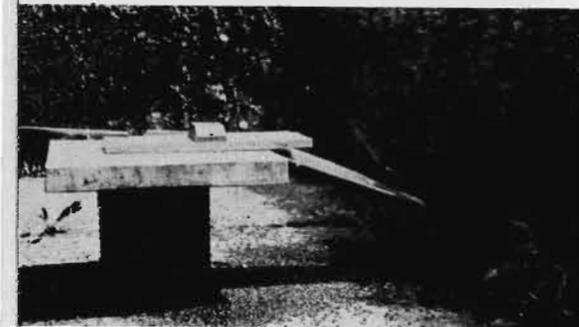
20b



20a



19



been accepted as gospel without questioning merely because it issued from someone in authority. To disprove that mottling is of no consequence one need only examine the microscopic sections of such teeth which show a defect in the enamel tissue. In the words of the great pioneer, Dr. H. V. Smith, "Mottling, no matter how mild, is an external sign of internal distress."<sup>69</sup>

The suggestion that mottling is "desirable" from the esthetic point of view originated at the Fourth Annual Conference of State Dental Health Directors with the P.H.S. and the Children's Bureau, Washington, D.C., June 6-8, 1951, where officials were briefed in the strategy of fluoridation promotion.<sup>69</sup>

The transcript of the minutes of this conference had come to my attention through the courtesy of Congressman T. M. Pelley, from the state of Washington. The late Frank Bull, D.D.S., Wisconsin Dental Director, the principal speaker at the meeting, had instructed his fellow dental health officials how to answer citizens' protests that mottling, the first sign of chronic fluoride intoxication, will result from fluoridation:

"Now we tell them this, that at one part per million dental fluorosis brings about the most beautiful teeth that anyone ever had. And we show them some pictures of such teeth. We don't try to say that there is no such thing as fluorosis even at 1.2 parts per million which we are recommending" (page 24 of the transcript of the minutes.)

The above-mentioned letters by Drs. Russell, McClure and Cox were sent to the ADA in Chicago. Instead of pursuing the traditional method of openly criticising a scientific publication through the journal where it was published, L. S. Kleinschmidt, M.S., Secretary of Council of Dental Therapeutics, American Dental Association, prepared a dossier about me based on the three letters: It was issued on March 4, 1955, entitled "Information about

\* H. V. Smith to Dr. G. L. W. 1/3/64.

George L. Waldbott, M.D., F.A.C.P." It subsequently became a part of a mimeographed brochure called "Comments on Opponents of Fluoridation," disseminated by the Bureau of Public Information of the American Dental Association.

This dossier accused me of intellectual dishonesty and incompetence. I was grouped with lay opponents, one of whom was alleged to have escaped from a mental institution, the other was claimed to be an imposter.

Subsequently, wherever I raised my voice against fluoridation, this dossier always showed up like a steady companion. It was made available by the American Dental Association through local dentists and by the U.S.P.H.S. through local health officials. It was sent to fluoridation committees of district dental societies. It was handed to newspaper editors, physicians, dentists, medical editors, officials of medical societies, key lay persons, leaders of clubs and organizations, wherever and whenever there was need for countering my data. It reached the desks of the Svenska Dagbladet, Stockholm, Sweden; the Berner Bund, Switzerland; the New Zealand Fluoridation Commission. It showed up in Germany, in Holland and in hundreds of communities in the U.S.A from Jacksonville, Florida, to Boston, Mass.; from New York City to Seattle, Washington.

Rarely, if ever, was I aware where it had appeared until it was too late to reply to the allegations.

The American Dental Association advises dentists and scientists not to debate fluoridation with opponents.<sup>70</sup> The dossier and the public image created by it justified dentists and other promoters in resolutely denying me an opportunity to publicly counter their claims regarding fluoridation.

The dossier accomplished much more: On several occasions when I sent an account of my research to a medical journal or when I wanted to be heard at a medical meeting, this dossier was placed in the hands of the journal's editor or the program committee chairman of the medical

society by its P.H.S. "consultant" or through a local dentist via the State Board of Health.

My experience with the publication of the article in the *Australian Journal of Dentistry* taught me a lesson. The title, "Medical Evidence Against Fluoridation" was poorly chosen. A positive approach to the subject was needed, namely new original data which would shatter some of the extraordinary promotional statements constantly emanating from the A.D.A. and P.H.S. headquarters.

In spite of the efforts by the two proponent organizations to eliminate me from the fluoridation battleground, my article gained me the reputation of a conscientious and thorough student of the subject among many of my colleagues—certainly among those in the habit of arriving at their own conclusions without relying upon so-called "authorities" to do their thinking for them.

## CHAPTER FIVE

### THIS IS FLUORIDE

Nowadays there are few people who have not heard of fluoridation of public water supplies. Many, however, have only a vague concept about fluoride, what it is and how it acts. Some lay persons have the mistaken notion that fluoride "purifies" and "disinfects" the water like chlorine. In Richmond, Va., for instance, the Utilities Department budget provides for fluoridation under the heading of "purification expenses."\*

Most physicians are unaware of how fluoride affects the human body. The younger generation which has received its medical education under the shadow of fluoridation promotion has been taught that fluoride is a "nutrient", that a mottled tooth is a harmless abnormality without significance other than that it might not be esthetically pleasing.

At the time of Christ, a Roman poet, Marcus Valerius Martialis<sup>71</sup> (40-104 A.D.) referred to mottled teeth in one of his poems when he described the teeth of Thais, a courtesan and companion of Alexander the Great, as follows:

"Thais habet nigros, niveos Laecania dentes.  
Quae ratio est? Emptos haec habet, illa suos."

"Thais has black teeth, Laecania has snow-white teeth."  
"Why? The latter has teeth that have been bought,  
the former has her own."

\* Richmond, Va. *News Leader* 5/30/58.

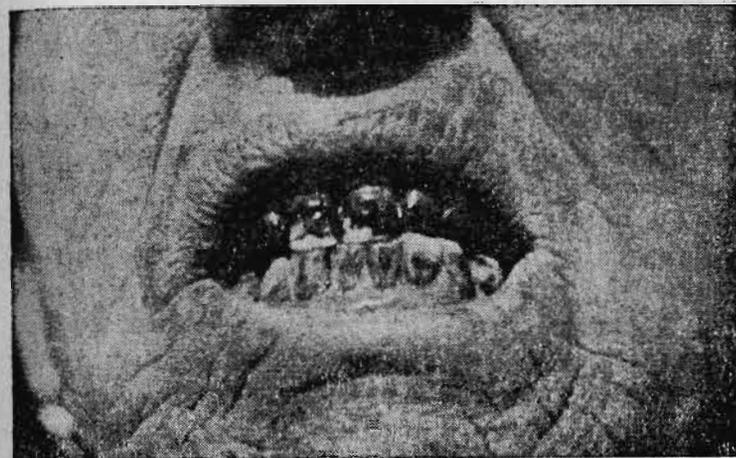


Fig. 8. Mottled teeth in Italian peasant (Courtesy Prof. Frada, Univ. of Palermo).

This is undoubtedly the first reference to ill effect from fluoride. Martialis had been residing in Italy. He was familiar with stained teeth, varying in color from yellow to brown and black. (Fig. 8) Such teeth are as prevalent today in the same volcanic areas of Italy as they were in the days of Martialis. Contemporary Italians call such defective teeth "Denti Scritti", "marked teeth" or teeth which have been "inscribed."

It took nearly 2000 years to discover that this abnormality was mainly due to intolerance to fluoride in water, food and air.

In the U.S.A. black teeth were first reported<sup>72</sup> in 1901 by J. M. Eager, an officer of the U.S.P.H.S., then stationed in Naples, Italy, among Italians who had emigrated from nearby Pozzuoli. Eager attributed "the disease to emanations of subterranean fires, either fouling the atmosphere or dissolved in drinking water." Earlier mention of mottling is cited by Dr. F. B. Exner in "*The American Fluoridation Experiment*."<sup>127a</sup>

In Italy such teeth at that time were called *Denti di Chiaie* after Professor Stefano Chiaie, a physician living near

Messina, Italy, where the drinking water ran through lava.<sup>72</sup> He was among the first to describe this defect of tooth enamel in detail.

In Germany the history of fluorine dates back to 1670. The artist, Schwanhard, observed an unusual phenomenon<sup>82</sup> in Nurnberg, the ancient city of craftsmen. While experimenting with the colorful, transparent fluor spar, fumes emanated which corroded glass. He had treated the fluor spar with sulfuric acid. The fumes were the highly corrosive and poisonous hydrofluoric acid which today constitutes one of the most useful chemicals in industry. Not until 1771 did the chemist Scheele produce a solution of hydrofluoric acid in water.<sup>82</sup> Two years later, the French chemist Thénard reported, for the first time, that this acid corroded the skin and induced severe burns.<sup>82</sup> (Fig. 9)

The term "fluorine" (French "le fluor") was first used by the famous Italian scientist Ampère in a letter dated August 25, 1812, to Sir Humphrey Davy.<sup>72a</sup> The latter recognized that hydrofluoric acid contains the element fluorine, a member of the halogen family. Others are bromine, iodine and chlorine. *Fluere* in Latin means to "flow". The term fluorine refers to its use as a flux in smelting of metal.

In 1803, Dominico Morichini made another significant discovery. He demonstrated the presence of fluoride in a fossil tooth of an elephant disinterred in the vicinity of Rome.<sup>82</sup> This discovery gave rise to a lively controversy among scientists: could the fluoride content of bone provide a clue regarding the age of the fossil? It was assumed that calcium salts in bones attract fluoride from the soil. Some thought the more fluoride thus attracted, the older the fossil might be. Archeologists, however, were unable to accept this theory.

In 1851, the 32-year old Belgian chemist, Louyet, died from a lung disease due to inhalation of fluoride gases, the first recorded fatality.<sup>82</sup>

Fluoride research was further stimulated by the famous

chemist, Gay-Lussac. In 1805, for the first time, he demonstrated fluoride in human teeth. However, not until 1886 was the pale yellow fluorine gas successfully isolated by Moissan.<sup>82</sup> This element remained largely a useless laboratory curiosity until World War II when its great potentialities and unlimited uses in industry became apparent.

In 1845, an unusual illness was noted in animals grazing in a volcanic area in Iceland, following eruption of the volcano, Hekla.<sup>82</sup> They developed bony protrusions on their legs and ribs, painful joints, lameness and deterioration of general health (Fig. 10).

Many animals died of acute poisoning within a few weeks. Strangely enough, however, the majority remained in good health until the following year. Emaciation, decreased milk production, general weakness and inability to use their limbs, thickening of the joints and development of bony protrusions especially on the legs and jaws characterized their illness. Young animals were more adversely affected than older ones. They showed damage to their teeth with staining and abrasions. When these same animals were confined to the barns and were fed hay produced prior to the eruption, their disease promptly subsided, except for the dental manifestations.

In 1927, Bartolucci<sup>78</sup> described the same disease among cattle on a farm close to a superphosphate factory in Italy. The cattle became thin, the coat coarse and lifeless. The animals lay down and got up with difficulty. They limped and stood with curved, stiff back and stiff hindquarters. Tender swellings appeared at the joints. Four to five months later there was thickening of the ribs and bones of head and shoulders. They died of malnutrition due to gradual cessation of appetite, a characteristic feature of this disease.

Since that time numerous battles have been waged in various countries between farmers residing in the vicinity of factories and the respective corporations involved. In

spite of evidence implicating fluoride, industry attempted to prove that causes other than the poisonous fluoride fumes were responsible for the loss of livestock and produce.

In 1937, a new era of fluoride research began. Dr. Kaj Roholm, a Copenhagen biochemist and clinician, in his classical book gave the world its most thorough account of fluoride's effect on animal and human life.<sup>32</sup> He encountered fluoride contamination of the air in and near a cryolite quarry. He proved unequivocally that fluoride induced the above described disease, both in domestic animals and in human beings. The data which he presented remain the foundation of our present day knowledge of fluoride's effect.

The element fluorine is an extremely poisonous gas. It freezes at  $-220^{\circ}$  Centigrade.<sup>73a</sup> It differs from the other halogens, iodine, bromine and chlorine because of its extreme reactivity. Although elemental fluorine exists as a diatomic or two-atom molecule, its atoms have a strong affinity to other elements. This makes fluorine gas dangerous to handle and difficult to contain. Wood or rubber held in a stream of fluorine bursts into flame. Even asbestos, a fire-proof agent, reacts so vigorously with fluorine that it becomes incandescent. Platinum, another very stable element, is slowly attacked by fluorine.

Because of its extreme reactivity, the harnessing of fluorine gas has been most difficult. Containers made of nickel, copper and steel are attacked by it. They, in turn, become coated with a layer of copper fluoride or iron fluoride which protects them from further corrosion.

Nowadays fluorine gas is shipped in plastic containers. Curiously enough, Teflon, a fluorine-containing plastic, is one of the most suitable materials for this purpose. Thus, this gas which for many years had no commercial use, has in recent years, been harnessed for many purposes. One of its new experimental roles is the firing of rockets in our missile program.

At  $-188^{\circ}$ , fluorine gas condenses to a liquid. When liquid

fluorine combines with hydrogen the reaction is so powerful that it can produce a temperature of  $5000^{\circ}\text{C}$ .

Very widespread in nature, fluorine is estimated as 13th in abundance among the earth's elements.<sup>74</sup> Fluorine's strong tendency to combine with other elements accounts for two characteristic properties: It tears molecules apart to form new combinations. It can enter into a multitude of highly complex compounds.

The three most common sources of fluorine are the minerals fluorspar or calcium fluoride with the chemical formula  $\text{CaF}_2$ ; the aluminum compound cryolite or  $\text{Na}_3\text{AlF}_6$ ; the complex mineral apatite, containing calcium and phosphates.

Fluorspar, sometimes called fluorite, is a beautiful, transparent, cube shaped, glass-like crystal (Fig. 12). Its wide variety of colors runs the gamut from clear transparency to green, blue, yellow, purple, brown or blue black. It is rarely pink or red. It is found in veins of limestone and sandstone.

The largest deposits of fluorspar are located in Iceland, Mexico, England and Germany with some in Newfoundland.<sup>75</sup>

In the United States, fluorspar is found near the border between Kentucky and Illinois, in California, Montana, New Mexico and Colorado. It was estimated in 1956 that the Illinois-Kentucky fluorspar district<sup>76</sup> had a deposit of more than eight million tons.

The chemical industry is the largest consumer of fluorspar, particularly in the manufacturing of hydrofluoric acid. In steel production, fluorspar functions as a fluxing agent and assists in the refining process.

Fluorspar is also used in opalescent glass, iron and steel enamelware, in refining of lead and antimony and as a catalyst in manufacturing high octane fuels. Because of its low index of refraction and low dispersion of light, clear colorless fluorite of optical quality is used for apochromatic

lenses. A variety known as Blue John from Devonshire as well as other types have been used for ornamental vases.<sup>75</sup>

Cryolite, a compound of fluoride, aluminum and sodium ( $\text{Na}_3\text{AlF}_6$ ) (Fig. 13) is found mainly in Greenland where it is deposited through volcanic eruptions. Large deposits also occur in USSR, Spain, and Colorado. It has a melting point of about  $1000^\circ$  Centigrade and disintegrates easily when heated. Therefore it is in great demand as a flux for electrolytic production of aluminum. Cryolite can also be produced synthetically from fluorspar.

Apatites are probably the world's greatest source of fluorides because of their abundance. Chemically the apatites are calcium phosphate combinations of the formula  $\text{Ca}_{10}\text{X}_2(\text{PO}_4)_6$ , where X represents either fluoride, chloride or the hydroxide ( $\text{OH}^-$ ) ion. Apatite is present in phosphate fertilizer derived from deposits in Florida, Tennessee, South Carolina, and from other continents, especially North Africa and the West Indies. It occurs in volcanic rocks.

In recent years, numerous fluorine compounds have become increasingly important chemicals in industry. Their use ranges from automobile bearings which never need greasing to replacements for diseased or ruptured blood vessels in the human body; from clothing that resists stains to cancer drugs. Indeed, there is no end in sight to further expansion of fluorine's industrial uses. (Table 1).

All this development has taken place during the past thirty years. Throughout the early part of the twentieth century, up to the thirties, fluorine compounds constituted useless by-products of many industrial processes, such as the manufacture of aluminum, of superphosphate fertilizers, of steel, magnesium, beryllium, zirconium, enamel and bricks. Their only commercial outlet was as an insecticide and rodenticide.

During the forties fluorine compounds began to enter the refrigerant, aerosol, lubricant and plastic fields. Fluorine

Table 1

SOME USES OF FLUORINE COMPOUNDS

In Manufacturing	In Other Industries	In Drugs
Aluminum	Welding (Flux)	Steroids
Steel	Cleaning	Tranquilizers
Enamel	Refrigerant	Diuretics
Pottery	Preserving Wood	Antimetabolites
Glass	Hardening Cement	Antihistaminics
Bricks	Aerosol Propellant	Anesthetics
Phosphate Fertilizer	Optical	Androgens
Beryllium	Rust Removal	Estrogens
Tantalum	Lubricant	Calcium-Phosphorus
Niobium	Oil Refining	(Contaminant)
	Plastics	Caries Prevention
	Separation of	
	Uranium Isotopes	
	Missile Propulsion	

was also introduced into pharmaceutical preparations for the purpose of reinforcing their action.

After 1950, the use of fluorine expanded rapidly into the area of nuclear energy and missiles. Scientists working on the atomic bomb found that fluorine was the most effective element for extracting vital uranium 235 atoms from natural uranium. Once means for dealing with this violent element had been devised, the groundwork was laid for further expansion of fluorine's use in numerous commercial processes.

Hydrofluoric acid (HF) is the key to many chemical processes. It is produced in larger quantities than any other fluorine compound. It dissolves on contact every metal except gold and platinum. It is therefore used in etching, frosting and polishing glass, electroplating, cleaning copper and brass. Furthermore, it is employed in the making of filter paper and carbon electrodes, galvanizing metals, as an antiseptic in breweries and distilleries. In the chemical laboratory, sodium and ammonium fluoride are used for many analytical methods.

The fluorocarbon gases, carbon compounds containing fluorine, are ideal as refrigerants. They are nontoxic, odorless, stable and noncorrosive. They do not constitute a fire hazard.

Two gases familiar to the consumer, Freon and Genetron, are used in three-fourths of all refrigeration and air conditioners made today. They also constitute the bulk of aerosol sprays. Their production has risen from 34 million container units in 1951 to 928 million such units in 1962, an increase of over 2700 per cent.

Fluorocarbon plastics are noninflammable, insoluble in organic solvents and stable to chemical agents. They possess a high resistance to heat and are excellent dielectric materials. They are fabricated into special gaskets and packings, pump liners, tubing, pipe, wire, cable coating, nonstaining cloth and many other items.

Teflon is the most important fluorocarbon plastic. It has a waxy surface with a low friction factor. Because it is non-toxic and durable, it has been used extensively in surgery to replace blood vessels and heart valves. It is molded into bearings which exhibit the property of natural lubrication. As a coating on rollers and pans used for processing food, it prevents sticking. Automobile manufacturers use Teflon for bearings in power steering assemblies and for coating the sockets of ball joints. These joints will never require a drop of grease or oil.

The space industry has provided a new market for Teflon. Oil evaporates to a gas in the vacuum of outer space. Teflon is unaffected by a vacuum and is therefore valuable as a lubricant in spacecraft.

The pharmaceutical industry has discovered that fluorine reinforces the action of many drugs. Frequently the efficacy of a drug depends on how soon the body fluids attack its molecule and thus destroy the drug's action. By looking for the weak point in the drug's structure and inserting the fluorine atom at this point, chemists have reinforced its action and made it more resistant to attack from body fluids.

Fluorosteroids are Cortisone-like preparations used in the treatment of arthritis and allergic diseases. Fluorouracil effectively delays the growth of cancer. It is especially use-

ful in cancer of prostate and bladder. Other fluorine-containing compounds are antihistaminics, tranquilizers, anesthetics and diuretics. The last mentioned increase the flow of urine through the kidneys and thus counter the development of edema (fluid accumulation in the system).

Fluorine compounds are widely used in color photography and as insulating and cooling dielectrics.

Many of the newer heat and metal resistant ceramics contain sodium fluoride and calcium fluoride. Because of their special dielectric properties, fluorine compounds are used as binders, abrasives and insulating material.

Chemists have added fluorine to elastomer compounds, stretchable materials used as rubber substitutes.

During air and gas drilling, silicon tetrafluoride ( $\text{SiF}_4$ ) gas is used to seal off bore holes when there is a threat of flooding. The gas injected into the well penetrates into permeable water zones. Combining with water it forms an acid, fluosilicic gel. This blocks the porous structures.

In their constant search for new products, manufacturers have frequently been stymied. Having developed a new product, it could not be released because of its toxicity to prospective users and to their own factory workers. Therefore, the toxicity of fluorine has been the subject of intensive studies. Manufacturers have spent millions for research in their own laboratories and have furnished large grants to universities to explore fluorine toxicity.

The element fluorine and many fluorine compounds are extremely poisonous. Other compounds are inert and completely innocuous. For example, the nerve gas Sarin, a fluorophosphate designed for chemical warfare is so toxic that it was abandoned during World War II for humane reasons. Fluoroacetates, salts of fluoroacetic acid, are also extremely toxic. They are used as rodent exterminators. Sir Rudolph Peters, University of Cambridge, England, who has carried out considerable research on these substances was commissioned by the British government to deter-

mine the source of death of cattle in Africa. He stumbled upon a poisonous plant called Gifblar (*Dichapetalum Toxicarium*) from which he isolated fluoroacetate, a "delayed convulsant". Even as little as 0.6 mg of fluoroacetate can kill a 10-pound dog.<sup>75</sup> At first, after swallowing this poison, the dog appears to be in perfect health; eight to ten hours later he develops fatal convulsions. In 1960,<sup>77</sup> Peters found another equally poisonous group of substances in gifblar, a fluorofatty acid.

On the opposite side of the toxicity scale are such compounds as the refrigerant gas Freon or the plastic Teflon. The latter is so stable and innocuous that, when used to replace blood vessels, it can remain in the human organism for years without ever causing the slightest harm.\*

The problem before scientists, then, has been to find the dividing line between the harmless and the poisonous fluorine compounds.

Chemistry distinguishes between two major groups of compounds, organic and inorganic. In organic compounds, the fluorine atom forms a tight bond with the carbon atom. The more strongly the two atoms are linked together, the more inert and, as a rule, the less poisonous the molecule. In many toxic organic compounds, therefore, fluorine contributes less to the toxicity of the compound than does the remainder of the molecule.

For this reason toxicologists have devoted most of their research to the behavior of inorganic fluorides, especially sodium fluoride (NaF) in which fluorine is loosely linked as a negative (F<sup>-</sup>) ion with sodium (Na<sup>+</sup>) or, in the chemist's terms, is more dissociated than in organic compounds.

In water fluoridation we are only concerned with inorganic compounds. The more soluble compounds, such as

\* When heated above 300° Celsius, Teflon gives off an extremely poisonous gas called perfluoroisobutene. A cigarette laid on the edge of a sheet of Teflon became contaminated with enough of the plastic to cause the person smoking the cigarette to become violently ill and die.<sup>78</sup>

Table 2

COMPARISON OF SOLUBILITY OF SOME IMPORTANT INORGANIC FLUORIDES

Compound	Fluoride Content %	Solubility at 25° C.
		per 100 cc.
Sodium Fluoride	45.46	4.210
Calcium Fluoride	48.63	0.0017
Sodium Silicofluoride	60.57	0.759
Potassium Silicofluoride	51.70	0.176
Barium Silicofluoride	40.68	0.024
Cryolite	54.26	0.039
Synthetic Cryolite	52.50	0.063

See page 2 of Roholm's book.<sup>32</sup>

Table 3

COMPARISON OF TOXICITY OF INORGANIC FLUORIDES\*

Extremely Toxic	Gaseous Hydrogen Fluoride	HF
	Silicon tetrafluoride	SiF <sub>4</sub>
	Solutions of hydrofluoric acid	HF
	Hydrofluosilicic acid	H <sub>2</sub> SiF <sub>6</sub>
Very Toxic	Easily soluble fluorides and fluosilicates:	
	Sodium fluoride	NaF
	Potassium fluoride	KF
	Ammonium fluoride	NH <sub>4</sub> F
	Sodium fluosilicate	Na <sub>2</sub> SiF <sub>6</sub>
	Potassium fluosilicate	K <sub>2</sub> SiF <sub>6</sub>
Moderately Toxic	Ammonium silicofluoride	(NH <sub>4</sub> ) <sub>2</sub> SiF <sub>6</sub>
Moderately Toxic	Almost insoluble fluoride compounds:	
	Cryolite	Na <sub>3</sub> AlF <sub>6</sub>
	Calcium fluoride	CaF <sub>2</sub>

\* See page 264 of Roholm's book.<sup>32</sup>

sodium fluoride (NaF), sodium silicofluoride (Na<sub>2</sub>SiF<sub>6</sub>) or hydrogen fluoride (HF) can be dissolved to give a more concentrated solution than the less soluble compounds, such as cryolite (Na<sub>3</sub>AlF<sub>6</sub>) and calcium fluoride (CaF<sub>2</sub>). Table 2 presents the degree of solubility and Table 3 illustrates the poisonous action of the important inorganic fluorides.

Hydrofluoric acid assumes an unusual role among fluoride compounds. Most of it penetrates the body surface as an un-ionized compound. Once it is anchored to the body tissues and diluted with body fluids its two ions, hydrogen and fluoride, dissociate. Free fluoride ions are given off. Therefore, hydrofluoric acid burns leave the superficial layers of the skin temporarily untouched. At first, fluoride's

poisonous action takes place below the skin where it causes disintegration of tissue and severe pain. As the process continues, the skin itself becomes ulcerated (Fig. 7).

Dr. Roholm<sup>32</sup> divided the inorganic fluoride compounds into four categories according to their poisonous effect:

1. First and foremost are the fluoride gases which include the very toxic hydrogen fluoride (HF) and silicon tetrafluoride (SiF<sub>4</sub>).

2. Solutions of these gases in water such as hydrofluosilic acid and hydrofluoric acid are likewise extremely toxic.

3. Easily-soluble fluorine salts such as sodium fluoride (NaF), potassium fluosilicate (K<sub>2</sub>SiF<sub>6</sub>), and ammonium silicofluoride ( (NH<sub>4</sub>)<sub>2</sub>SiF<sub>6</sub> ) have a high degree of toxicity.

4. Fluoride compounds which do not dissolve readily such as cryolite and calcium fluoride are much less poisonous.

What does all this mean in terms of water fluoridation? Isn't the dilution of 1 part of fluoride ion in one million parts of water (or an average individual intake of 1 to 1.5 mg of fluoride per day) present in water "absolutely harmless" no matter whether the compound is sodium fluoride, sodium silicofluoride or hydrofluoric acid?

It is true, a few glasses of fluoridated water are not likely to produce acute sudden poisoning although, as will be seen, there are exceptions among allergic people who suffer temporary harm even from this small amount. They are the same unfortunate people who may develop an allergic attack from minute amounts of a drug harmless to others such as a single aspirin tablet. These are cases of acute (sudden) poisoning. In water fluoridation we are concerned with *chronic* poisoning from continuous daily intake of minute amounts in drinking water, a condition called by scientists "fluorosis".

Before elaborating upon chronic poisoning, another

phase of the toxicity question requires clarification.

Most people are accustomed to thinking that water is the only source whence fluoride reaches our system. This is far from the truth. Through inhalation of fluoride-contaminated air, through food and drugs we are constantly taking into our bodies small amounts of fluoride. In some industrial areas both the air and food can be contaminated by fluoride to the extent that intake from these sources alone far exceeds the amount taken in from fluoridated water. It is therefore difficult if not impossible for even the most competent scientist to compute how much fluoride enters a particular individual's system.

For example, when a piece of wood or coal is burned, the smoke contains minute amounts of fluoride. Most factories eject fluoride from their chimneys, some more, others less. Next to sulfur dioxide, fluoride is considered one of the most dangerous air contaminants especially near phosphate fertilizer, aluminum and steel plants, enamel and brick factories. Many metropolitan areas are thus contaminated by airborne fluoride. It emanates from the chimneys in three forms: as a gas such as hydrogen fluoride, as solid or "particulate" fluoride (such as sodium fluoride) or as mists or vapors. The latter are formed when gaseous fluorides, mainly hydrogen fluoride, and fluosilicic acid are dissolved in fine water droplets.<sup>79</sup> Formation of fluoride vapors, therefore, depends on the air's humidity.

Two great disasters were attributed to air contaminated mainly by fluoride. In December, 1930, sixty persons lost their lives in the Belgian Meuse Valley and an unknown number, perhaps several thousand, developed upper respiratory diseases, asthma and emphysema. Dr. Van Leuwen<sup>80</sup> of the University of Leiden, Holland's greatest authority on asthma, and Dr. Roholm<sup>81</sup> proved after extensive studies that fluosilicate in association with sulfur dioxide gases was responsible.

In 1948, in Donora, Pa.,\* twenty persons died. An independent study for the Borough of Donora by Philip Sadtler, reported in *Chemical and Engineering News*, 1948, showed that fluoride was the major culprit. In the blood of victims fluoride concentrations were twelve to twenty-five times higher than in blood of normal persons.<sup>82</sup> Vegetation north of Donora was severely damaged. Herbivorous animals in the region showed evidence of fluoride poisoning.

The corporations whose factories were involved denied that there was abnormal exposure to fluoride. The denials of the U. S. Steel Corp. were supported by U.S.P.H.S. scientists as reported in *Public Health Bulletin* 306, Washington, D.C. 1949.<sup>83</sup> However, these scientists failed to offer a satisfactory explanation. The findings of a team of scientists at Cincinnati's Kettering Laboratory have not been published.<sup>84</sup>

Ordinarily in large cities there is up to 0.025 parts per million\*\* of fluoride in the air.<sup>85</sup> At this concentration a person would inhale into his system about 1/2 milligram of fluoride a day.\*\* In the City of Baltimore where a fertilizer factory was located, health authorities recorded 0.08 parts per million.

On the surface this appears to be an extremely small amount. We must realize, however, that such amounts, sometimes much more, sometimes less, enter our system through the nose, sinuses and lungs day in and day out. Fluoride gradually accumulates because only a part of it is eliminated from the system. This was illustrated in a study by Herman in the *Journal of Urology*.<sup>85</sup> In New York City where the water supply contains only a trace of fluoride (0.1 ppm) relatively large amounts of fluoride were found in kidneys, bladder and skin of persons with

\* Donora was founded by and named for Wm. H. Donner and Nora Mellon, the wife of Andrew Mellon, founder of Alcoa.

\*\* As hydrogen fluoride.

kidney stones.

The officially reported figures on fluoride in the air released by the Kettering Laboratory<sup>85</sup> are "averages." At certain seasons, especially in midsummer, fluoride values may be much higher in certain locations and under certain conditions. Furthermore, most available information upon which these figures are based came from scientists working with grants provided by the involved industry. When a committee of independent citizens and scientists studies air contamination their results are usually different<sup>86</sup> as shown by the Report of the Florida Air Pollution Commission from the Tampa, Fla., area in 1959.

To determine exactly how much fluoride is in the air at a given time scientists must reckon with a wide variety of factors. Methods of fluoride analysis and the procedure of trapping the air vary from one laboratory to another. The same investigator will find widely different fluoride values from one hour to another. Relying upon "averages" does not give a true picture of air contamination by fluoride.

A scientific study involving air pollution must answer the following questions:

How distant is the area under study from the contaminating source?

What are the direction and force of prevailing wind currents from hour to hour?

What are the fluctuations in barometric pressure and prevailing humidity?

Has rain washed out the contaminant and cleared the air temporarily or is fluoride more dispersed because of dry and warm weather?

Is the location under study surrounded by high hills which induce upward wind currents<sup>87</sup> and thus protect it from contamination? (Thus an area much farther away from the contaminating factory may show higher fluoride levels than a nearby one.)



cated in a volcanic area in Kenya, E. Africa, is known<sup>91</sup> to contain as much as 2800 ppm or 0.28 per cent (Table 4).

A study by T. Thompson and H. H. Taylor in 1933<sup>92</sup> reveals that sea water contains between 1 ppm and 1.4 ppm of fluoride. This is high compared with levels of iodine, phosphorus and arsenic. In some sea water, fluoride levels are higher. For instance, water in the Persian Gulf contains as much as 8.72 ppm.<sup>93</sup>

When it rains, the water takes up minute amounts of fluoride from the atmosphere, usually less than 0.02 ppm.<sup>94</sup> This figure, too, varies widely. From an air polluted area in Germany, analysis of rainwater showed up to 3.4 ppm.<sup>90</sup> In a fluoride-contaminated area in Blount County, Tennessee, 0.02 ppm was reported;<sup>92</sup> near a phosphate fertilizer plant in Florida, as much as 2.1 ppm.

With the addition of fluoride to U.S.A. water supplies, drinking water has become another major source of fluorine intake into our system. With a concentration of one part of fluoride in one million parts of water, a fluid intake of 1000 or 1500 milliliters (or 1 to 1½ quarts)—presumably the “average” among healthy persons<sup>95</sup>—would supply between 1 mg and 1.5 mg of fluoride, according to McClure.<sup>95</sup> This amount of fluoride would be provided by four to six glasses of water a day, or its equivalent in soups, coffee, stews, etc.

People in hot climates<sup>96</sup> habitually drink much more water than in cool climates. Persons afflicted with kidney disease, diabetes or chronic infections, those involved in strenuous occupations under conditions of heat such as farmers, foundry workers and soldiers drink more than the average amount of water.<sup>97</sup> Fluoride intake through drinking water cannot be measured or controlled and is therefore unpredictable from one person to another.

Difficult as it is to estimate how much fluoride John Q. Citizen is inhaling from the air and how much he has imbibed with his drinking water during the past 24 hours,

it is impossible to determine how much he has ingested with his daily food.

An “average” typical American diet is estimated by Dr. McClure to contribute about 0.3 to 0.5 mg of fluoride<sup>95</sup> per day to the total daily fluoride ration. These estimates are far from reliable since varying conditions cause wide differences from person to person. Nearly every food contains fluoride, some less, some more than is present in fluoridated water.<sup>98</sup>

How much fluoride is present in a certain food item depends upon where it is produced, whether it is grown in dry or wet season, on the method of processing and preparation and on many other factors.

Plants receive their fluoride from two sources, the soil and the air. Through the fine hair roots of the plant, fluoride is transmitted from the soil into the stem; little reaches the leaf. Sandy soil induces a higher fluoride uptake than clay; wet and acid soils more than dry and alkaline soils. Since phosphate fertilizers contain between 1 and 3 per cent fluoride, fertilized tuber plants, such as potatoes, beets, radishes, etc. are more susceptible to fluoride contamination from the soil than from air contamination.

The second mode of fluoride distribution in a plant is from the air. When fluoride is dispersed in air from chimney smoke, from volcanic eruptions or from insect sprays, it settles on leaves, permeates through fine pores between the cells of a leaf into the ribs and tends to burn the margins and tip of the leaf (Fig. 14a; 15b). Leafy vegetables such as lettuce, cabbage, and fruit are therefore especially subject to damage from air contamination. Their outside structures contain more fluoride than their inner parts. Turgid plants take up more fluoride than wilted ones (Table 5).



When vegetables are boiled in fluoride-containing water, for instance, the fluoride becomes more concentrated.<sup>101</sup>

Chemical preservatives upon which much attention has been focused in recent years, additives and insecticides constitute additional sources of fluoride in food. In Newfoundland a fluoride-containing bone meal used in flour adds about 1 mg to the daily diet of the inhabitants.<sup>85</sup>

Physicians are unaware of the fluoride content of most calcium preparations. When prescribing calcium tablets during pregnancy a physician doesn't realize that he is, at the same time, administering an unknown amount of fluoride. Fluoride is considered an undesirable contaminant of calcium preparations, according to R. Feltman and G. Kosel.<sup>61</sup>

Insecticides as already mentioned are one of the hidden sources of fluoride: A large sized apple sprayed with a fluoride-containing insecticide provides, on the average, as much as 1 mg of fluoride, according to Dr. M. C. Smith,<sup>84</sup> University of Arizona, Department of Agriculture. This is equal to the amount contained in 4 glasses of artificially fluoridated water.

Many people have peculiar food habits which may add unexpected amounts of fluoride to their daily intake. The German medical journal, *Deutsche Medizinische Wochenschrift*, in 1959<sup>102</sup> reported the case of advanced skeletal fluorosis (chronic poisoning of the skeleton). The patient obtained practically his entire daily intake of water from a mountain spring which he mistakenly deemed to be especially conducive to health. His physicians discovered that this water contained 7.5 ppm, a dangerous concentration of fluoride. His system had absorbed as much as 11 to 12 mg of fluoride daily.

Newfoundland inhabitants have two unusual habits which furnish them much more fluoride than is considered average: 1. They are surrounded by the sea. Therefore, their diet consists largely of fish. Two Toronto scientists,

reported in the *Journal of Dental Research*<sup>36</sup> that fluoride from this source averages as much as 1.74 mg per day. 2. As good Englishmen, they drink a great deal of tea, averaging about 6 cups a day. This adds another 1 mg to their diet. With another 1 mg per day of fluoride contained in bread through a common additive, their daily ration reaches the danger level. In spite of this, efforts are being made to add fluoride to their drinking water. This would contribute another 1.5 mg.

The above facts point up the insurmountable difficulties faced by those attempting to determine how much fluoride a person takes into his or her system in 24 hours. No matter how many averages are presented to physicians and how carefully the statistical studies are executed no one can possibly predict how much fluoride a given person will consume daily from food, much less from drinking water.

Let us now find out what happens to fluoride once it has entered the human body. Scientists are following one of two methods in order to obtain the answer to this question.

They measure the total amount of fluoride consumed in 24 hours from all food and drinks and compare it with measured amounts of fluoride eliminated through kidneys and bowels. This approach is somewhat unreliable because additional, although small, quantities of fluoride are eliminated through other avenues, namely through sweat, saliva and tears.

In 1891, two German pharmacologists, Brandl and Tappeiner,<sup>103</sup> first employed this idea. During a period of slightly less than two years they had fed a dog a total of 400 grams of sodium fluoride. This is less than one pound. During the two experimental years 330 grams were eliminated through kidneys and bowels. Of the 70 grams retained in the body, the bones and cartilage contained about 60 grams (2 ounces), the skin approximately 1.2, muscle 1.84, the liver 0.51 grams.

Although this early experiment was carried out with

methods not considered accurate today, it reflects to a remarkable degree our present day results with newer and more sensitive methods of fluoride analysis.

The second approach is employment of the radioactive tracer technic. Radioactive fluoride, known as  $F^{18}$ , is imbibed with water or injected into a vein. A measuring device traces the amount of radiation emanating from  $F^{18}$ . Thus it determines exactly in which organs the radioactive fluoride localizes, how much is retained and how much is eliminated. In these experiments all information must be obtained in less than 2 hours because of the rapid disintegration of  $F^{18}$ .

Radioactive tracer studies were first employed on sheep by a group of Australian veterinary scientists<sup>104</sup>; later, in 1954, on rats by Dr. P. Wallace-Durbin<sup>68</sup> under the auspices of the Atomic Energy Commission in Berkley, California; and more recently on two human subjects by Dr. W.D. Armstrong and his colleagues at the University of Minnesota as reported in *Proceedings of the Society for Experimental Biology and Medicine*, Vol. 104, 1960.<sup>105</sup>

These studies have given us a reasonably accurate account of the fate of fluoride in the human organism. Within 10 minutes after its entry,  $F^{18}$  is detected in the blood stream. Approximately fifty minutes later the maximum concentration in the blood stream is reached.

When fluoride is inhaled through the upper air passages and lungs it is equally as quickly taken into the blood stream.<sup>106</sup>

In the blood, the fluoride ion is tightly anchored to albumen, one of the two protein groups. Some fluoride, however, is transported in the blood as a free ion, not attached to any other element. The extremely minute "free" or "dissociated" fluoride ions easily permeate the walls of the tiny capillary blood vessels. Thus they reach the cells of various organs, especially of bones. The acidity of the blood, its carbon dioxide and calcium content and the composition

of the tissue fluids, largely determine how much fluoride reaches the tissue.

In bones and teeth, fluoride is built directly into their crystalline structure called apatite. During the growing process animals retain more fluoride than when their growth is completed. Young children, therefore, will retain more than older persons.

Formerly it was assumed that most fluoride accumulates in hard tissues, namely bones, teeth and nails. We now know that the extremely small and diffusible fluoride ion can permeate into any tissue of the body, sometimes in rather large quantities. Much is stored, for instance, in the aorta, the main artery of the heart, in the ligaments and, under certain conditions, in the skin, bowels, kidneys, liver, muscles and other organs.

Table 6  
FLUORIDE IN TISSUE AND ORGANS

In Patient with Kidney Stones According to Herman and co-workers <sup>68</sup>		In Persons Living in Air Contaminated Areas According to Call and co-workers <sup>107</sup>	
	PPM		PPM
Skin	10 - 290	Brain	0.2 - 6.1
Prostate	0 - 86	Thyroid	0.1 - 23.5
Kidneys	0 - 181	Kidneys	0.2 - 10.0
Bladder	0 - 185	Heart	0.1 - 8.1
Nails	10 - 186	Aorta	0.6 - 258.0
Fat	0 - 145	Lung	0.6 - 17.0
Hair	13 - 171	Liver	0.2 - 5.6
Kidney Stone	5 - 1575	Spleen	0.2 - 8.6
		Pancreas	0.3 - 8.2

Why and under what circumstances fluoride settles in such vital soft tissues remains an enigma. There are other wide gaps in our knowledge of the metabolism of fluoride.

Are there people who deviate sharply from the usual pattern?

Are there predisposing, perhaps inherited, factors in some of their organs which cause them to retain more fluoride than others?

How much do malnutrition, food habits, presence of diseases or functional impairment of the organs in question affect fluoride storage?

How much damage can be expected from the presence of this violent poison in such organs?

Through the studies by Dr. Joseph C. Muhler of the University of Indiana, and Dr. Paul H. Phillips at the University of Wisconsin, some of the factors which affect fluoride deposition have been brought to light.

They demonstrated that in the company of calcium, aluminum, magnesium and phosphates present in food or water, fluoride's uptake from the stomach into the blood is retarded.

When the stomach is unduly acid, as for instance in persons with stomach ulcers, the fluoride ion is more rapidly and more completely absorbed than in a less acid stomach. On the other hand, once fluoride has reached the upper bowels with their alkaline content, less absorption takes place than in the stomach. In this case, instead of entering the bloodstream, some fluoride leaves the body with the bowel content.

When fluoride is swallowed with food, less reaches the blood stream than when taken in water. This is particularly applicable to milk. Its high calcium and protein content tends to bind fluoride and slow down its absorption. Less fluoride is absorbed from a solid salt or a tablet than when fluoride is dissolved in water.

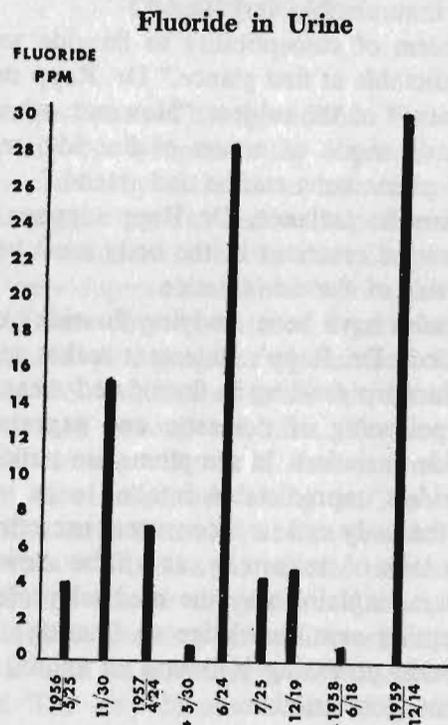
Continuous feeding induces greater retention of fluoride in the body than interrupted feeding. Hence, when a water supply is fluoridated, the consequent continuous fluoride consumption is more harmful than occasional intake through food or air contamination.

The foregoing demonstrates how widely fluoride absorption and elimination varies from person to person. Fluoride storage is further influenced by the dose administered, the

person's age, the amount previously retained in the body and other factors.

Some investigators<sup>66</sup> have reported retention of 37 to 48 per cent of a given dose, others more, others less.

To determine what wide variations occur, I have administered to several patients 15 mg of sodium fluoride as a test dose. This minute dose is roughly five times the daily



\* Absent from fluoride contaminated area

In a contaminated Florida area, a person with ill effect from fluoride eliminated up to 30 ppm one day, about 4 ppm on others.

Fig. 7

amount recommended for prevention of tooth decay. One patient eliminated through the kidneys as little as 3.6 per cent in twenty-four hours, another 99.5 per cent.

These erratic variations explain why inconsistencies occur in every phase of fluoride research. They also explain why many statistical studies purporting to prove fluoridation safe are of little value when the investigators fail to consider the innumerable variables.

"The problem of susceptibility to fluoride seems to be rather unpredictable at first glance," Dr. Rapp stated in his excellent review<sup>18</sup> of the subject. "However, when one considers the basic mode of action of fluoride, most of the symptomatic phenomena can be understood."

In non-scientific parlance, Dr. Rapp suggests that unexpected and varied reactions in the body must be anticipated as the result of fluoride's action.

To those who have been studying fluoride's effect upon the human body Dr. Rapp's statement makes sense. In patients with fluorosis residing in fluoridated areas, as well as in chronic poisoning of domestic and experimental animals, the wide variations in symptoms are striking. This is due to fluoride's unpredictable intake, to its varying distribution in the body and its inconsistent excretion from the system. This lack of uniformity, as will be shown in subsequent chapters, explains why the medical profession is so slow in accepting new knowledge on fluoride's effect. One case of fluoride poisoning is bound to exhibit manifestations different from another.

## CHAPTER SIX

### ON THE TRAIL

The moment I entered the fluoridation arena I was aware that I had only one weapon at my disposal, one on which proponents constantly claimed to have a monopoly: the ability to carry out careful and well-documented research. I intended to conduct the battle exclusively on this level. It was the only approach acceptable to a scientist.

This, it became obvious, entailed a great handicap. Several experiences with program committees of medical societies in the U.S.A. indicated to me that fluoridation could not be discussed among scientists. Proponent scientists avoided open debate.\* Dr. C. H. Patton, President, American Dental Association, addressing the 91st annual meeting of the California Dental Association called fluoridation "not debatable."\*\* Unlike all genuine advances in medicine, fluoridation was never openly and freely aired at scientific meetings by panels with equal representation of both sides so that both its advantages and disadvantages could be weighed. The only debates on the subject were taking place on the political front before city councils, legislators, parent-teacher meetings, women's clubs and the like. Here the scientific approach was to no avail.

I had considerable training and background in clinical research as distinguished from experimental research. I

\* Philip Jay, D. D. S., U. of Mich. to Dr. G. L. W. 10/15/54.  
See also: Pennsylvania State Health Dept. Brochure, Guide #5.  
\*\* San Francisco *Examiner* 4/17/61, page 5.

had been credited with describing several phenomena in clinical allergy, which, up to that time, had either not been recognized or had not been traced to their cause. In contrast to the biochemist, the pharmacologist or statistician, I had practical clinical experience with patients. In 1954, my clinic records numbered more than 20,000 patients whom I had personally attended. All had suffered from sensitivity of one kind or other. Many were intolerant or allergic to drugs.

Allergic individuals could be expected to be among the first to suffer ill effect from fluoridation. Yet, no test was available to clearly pinpoint sensitivity to simple chemical substances. Skin tests for drugs are notoriously unreliable. True, if a patient has a contact dermatitis, an allergic skin disease from substances in contact with the skin, one can apply a patch test. Neither patch, scratch nor intradermal skin test (injection into the skin) would have been helpful in establishing a diagnosis of allergy to fluoride. Some of the more complicated blood tests for drug sensitivity were either not sufficiently conclusive or not yet properly elaborated for clinical use.

In the fall of 1954, I had an unusual experience. A lady from Highland Park, Michigan, 35 years old,<sup>200</sup> was referred to me by one of my patients. She complained of constant nausea, frequent vomiting and pain in the stomach area, diarrhea and pains in the lower back. Her general health had deteriorated in the past year to the point that she was bedridden. Her dentist had diagnosed the white and brown stains on her teeth as mottling due to fluoride. When she told me that a doctor had suggested that her present illness might be related to Highland Park's fluoridated water, I was skeptical. Indeed, the disease did not bear the slightest resemblance to the usual concept of fluoride poisoning with which I had become familiar from my studies. Chronic fluoride poisoning, I had learned, was characterized by changes in the bones, by calcification of ligaments

and muscle assertions and by arthritis especially in the lower spine.

Two features in this lady's story caught my attention. She had asthma during the ragweed season and her teeth did show mottling of the kind which the medical literature identifies with fluorosis.

But, what of it! Highland Park's water could not have mottled her teeth. Mottling occurs only during the tooth forming years up to age twelve, prior to tooth eruption. Highland Park's fluoridation started in 1952, when she was thirty-three. If it was fluorosis of teeth, she must have acquired it in childhood while living in a natural fluoride area.

The lady brought her two children with her to my clinic. Their teeth, indeed, exhibited the white dull enamel disturbance described as mottling due to fluoride. This was a different matter. They had been drinking Highland Park's fluoridated water during their tooth forming years.

The mother's background was most revealing:

She had passed blood from her kidneys and uterus. Her eyesight had gradually deteriorated. She had what is called "scotomata" or "moving spots" in her eyes indicative of an organic disease of the eye. She had hemorrhages in the skin and reported a progressive weight loss.

She had a constant and, at times, unbearable pain in her head. The muscular power of her hands and arms had diminished. She was unable to securely grasp certain objects. When she was doing her laundry, for instance, garments often dropped from her hands. Potatoes, which she was peeling, slipped from her grip. She often lost control of her legs. Gradually she had to give up her housework and was confined to bed during most of the day. She had lost her faculty of coordinating her thoughts, became incoherent, drowsy, forgetful.

All this was suggestive of a serious brain disease. Could she be afflicted with a brain tumor? The urinary bleeding,

hemorrhages on the skin, and the diarrhea did not fit in with this diagnosis.

It did not seem to me that a single disease could be responsible for such a multitude of varied complaints. The only feature that linked her case vaguely with fluoride was the mottling of teeth. In her childhood she had resided in China where white-spotted teeth among children were common and where the teeth of many adults had taken on a yellow and brown stain.

I needed consultation and a careful clinical work-up for the diagnosis of this unusual case. The patient was hospitalized. Some of Detroit's most highly reputed specialists were called in for consultation: A neurologist to explain the brain symptoms; an orthopedist for the backache; an ophthalmologist for the eye disease; a hematologist to explain the hemorrhages of the skin, uterus and bladder; a cardiologist, an endocrinologist, a specialist in metabolic diseases and a gynecologist to evaluate the individual symptoms which were covered by their specialties. Every one of them was as puzzled as I. With one exception all considered it a serious illness; the one suggested that this disease might be imaginary.

This in itself was remarkable: Frequently when a disease cannot be diagnosed by physicians they seek some explanation and tend to consider it psychosomatic. Indeed a psychosomatic element prevails or is liable to be superimposed upon every illness. Therefore it is not uncommon for some to call an otherwise unexplained illness imaginary.

The case became more puzzling when the X-rays of bones, especially the pelvic bone and spine, failed to show the expected fluoride changes. Whereas the radiologist had noted minor thickening in bones, he could not commit himself definitely.

Certain laboratory tests indicated some basic illness: The blood calcium level was slightly above normal, namely 11.6

mgm per 100 cc of blood serum.

If this was fluoride poisoning, would an examination of the 24-hour urine specimen for fluoride help to establish the diagnosis?

I soon found out that a single fluoride analysis would cost me \$40.00. I could not burden the patient with this expense. I had pledged myself never to accept compensation for services to patients who consulted me about an illness which they suspected was due to fluoride. My principal interest in these patients was to obtain new information. I have kept the slate clean to this day. The fee to me from hospitalization insurance was to be turned over to the hospital's interne fund.

The Detroit chemist who at that time was working for a health department assured me that he could do the job during his free time more thoroughly than through his department. I was to pay the bargain price of \$60.00 for the two analyses. This I did.

One analysis showed 1.38 mg of fluoride in the 24 hour specimen, the other a few weeks later 1.37 mg. Actually this expensive examination proved very little. It showed that she was eliminating some fluoride, perhaps slightly more than average in a fluoridated town. It did not tell me how much and for how long fluoride had been stored in her system or whether or not she was still consuming fluoride from water and other sources. No matter how much or how little fluoride is eliminated from the kidneys, the harm which fluoride causes during its passage through the body and through vital organs can be determined only by one approach: Careful and thorough clinical observation of the patient.

Until completion of the preliminary tests in the hospital, the patient was instructed to use fluoridated Highland Park water which she brought to the hospital with her. After the tests were completed, she drank Detroit water containing

little fluoride (0.1 ppm). Within as short a time as two days the stomach symptoms and headaches improved appreciably.

Neither in the hospital nor after her discharge was she given any medication whatever. She was instructed to strictly avoid fluoridated water not only for drinking but also for cooking her food. She was also asked to avoid tea and seafood because of their high fluoride content. Vomiting and abdominal pains cleared up within one week. The headaches and the eye disturbance disappeared gradually in a most dramatic manner. She described a complete change in her personality. In two to three weeks her mind began to clear. The muscular weakness disappeared suddenly. For the first time in two years she was able to go about her household duties without having to stop and rest. Within a four-week period she gained five pounds in weight.

Subsequently she was subjected to a series of tests in my office which definitely proved the relation of her disease to the Highland Park water. She was given test injections of fluoride into the skin and fluoride water by mouth. Water without fluoride was used in the same manner hypodermically and by mouth as controls. She did not know which water contained fluoride. The fluoride solutions induced severe symptoms, the fluoride-free control samples had no effect.

My experience with this patient taught me more than I could have learned from reviewing 1000 statistical studies. This was a case of serious progressive illness. Judging from the overall picture it would have terminated fatally within a few months. In case of death even the most competent physician would not have attributed it to fluoride.

To maintain that this disease was not organic, that the patient was neurotic, that hemorrhages in the skin, kidneys and uterus, retinitis leading eventually to blindness, could be on a psychosomatic basis would have been illogical.

I was struck by certain features which rarely occur in other diseases: The more water the patient drank the thirstier she became. The deterioration of her brain function was progressive. The painful numbness in arms, hands and legs and the arthritic pains in the spine were worse upon awakening in the morning. After a night's rest one would have expected the reverse.

Never before had I witnessed the reproduction of a classical attack of migraine headaches. One milligram of fluoride—the amount called the optimal daily dose—accomplished this.

The slight but definite disturbance in the calcium and phosphorus metabolism was more revealing in view of reports in medical journals that fluoride interferes with the action of these vital minerals.

Could something other than fluoride have caused the disease, perhaps another kind of poison in the water? This question was definitely settled by the ease with which this disease could be reproduced at will with extremely small doses of fluoride, without the patient knowing the nature of the test. She had given me permission to carry out any test I saw fit.

I was eager to further pinpoint certain laboratory and other diagnostic features of this disease by studying the behavior of calcium, phosphorus and magnesium in the system, the activity of enzymes before and after administering a test dose of fluoride and by tracing her brain waves. These plans came to an abrupt end when the lady suffered a new sudden episode of severe pains in head, muscles and spine following another experimental dose of fluoride. The severity of this condition caused me to refrain from further tests of this kind. The patient recovered completely without any treatment other than elimination of Highland Park water for drinking and cooking her food.

The variety of manifestations which this illness presented troubled me. At that time I was not yet aware that fluo-

ride, once in the blood stream, can actually settle in any organ of the body. This likewise accounts for the great diversity of symptoms in chronic poisoning from other toxic agents such as arsenic or lead. Here, too, dominating the picture are a few specific major symptoms which can be associated with numerous other, unexpected, manifestations.

A new experience was soon to enlighten me further on this disease.

In November, 1954, I visited Saginaw, Michigan, in order to interview and examine some thirty people who had suspected ill effect from drinking fluoridated water. Saginaw citizens had just voted to discontinue fluoridation. Was the water really responsible for this illness? Nine of the thirty people described a disease which in every respect conformed to that of the Highland Park case.

Some had experienced relief when away from Saginaw for a week or two. All noted gradual improvement after fluoridation was discontinued. Most of these people had not been aware that they were drinking fluoridated water until they were confronted with voting for or against it.

On examining these persons, I felt that a few were not justified in their suspicion. Others suffered from bladder and bowel symptoms which at that time I did not relate to fluoride and therefore dismissed from further consideration. Subsequent studies indicated that I was wrong. I should have given these patients further attention.

In one of the nine patients, Mrs. H. M., age 49, the resemblance to the Highland Park case was particularly striking. She, too, had mottled teeth. During early childhood she had lived in a Canadian village where other inhabitants, including members of her own family, had "stained" teeth.

In addition to the constant gastric distress and muscular pains, she described the loss of control of arms and particularly of the legs which frequently "collapsed under her". One of the most annoying symptoms was the persistent dryness in her mouth which led to frequent mouth ulcers

which her physicians were unable to explain. Because drinking more water aggravated the dryness she eventually associated her illness with the Saginaw water. In October, 1953, when she learned that the water was fluoridated she began to use distilled water for drinking and for cooking. Within four to six weeks the illness had completely subsided.

Another typical case was that of a 42 year old salesman, Mr. R. M., with the same illness. His condition invariably improved when he was on sales trips away from Saginaw. He was about to give up his job because the gradually increasing pains and weakness in his hands prevented him from grasping the steering wheel of his car. He, too, eventually found out that Saginaw's water was fluoridated and became well upon discontinuing its use.

Whereas the evidence in these cases was convincing, it would not have satisfied a scientist who required further substantiation through careful examination and re-examination. This requirement was fulfilled in the case reported in *Confinia Neurologica*, Vol. 17, 1957:

Little W. J., 12 years old, was one of the thirty people whom I examined. He had been suffering from convulsions for two to three years with increasing severity in recent months. After fluoridation had been discontinued, the seizures had gradually subsided.

This case was so different from what I had learned about fluoride poisoning that I would not have given it a second thought had it not been for his unusual teeth. They bore some resemblance to mottling. They appeared crippled, underdeveloped, partially deprived of enamel. Dentists call such teeth "hypoplastic". Causes for hypoplastic teeth are fever, nutritional disturbances and in an advanced stage chronic fluoride poisoning.

The patient's physician, Dr. W. P. M. of Saginaw, Michigan, a capable general practitioner, had seen this boy during one of his spasms. Unlike an epileptic attack the patient

remained fully conscious. Convulsions can be induced by fever, low blood sugar, advanced kidney disease and various other irregularities.

The description of these episodes and the appearance of his teeth suggested a disturbance in the calcium metabolism. I was not aware at that time that so-called tetaniform convulsions due to low blood calcium are a feature of acute fluoride poisoning in persons who use fluoride for homicidal or suicidal purposes. Fluoride is known to attach itself to calcium wherever it can find it in the system.<sup>32</sup> In some persons fluoride induces excessive calcium loss through the urine.

The patient entered a Detroit hospital. A pediatrician, a neurosurgeon and a dentist were called to help establish the diagnosis. Although these consultants were less informed about fluoride poisoning than I, they settled the case for me. I accepted their diagnosis. This illness, they decided, was epilepsy and had no connection with fluoride poisoning.

The neurosurgeon had been most conscientious. He carried out test after test. He finally did exploratory surgery on the child's brain in an effort to locate the area of disturbance and to view and remove the suspected lesion, perhaps a tumor. To his surprise he found none.

By that time, because I had totally abandoned the idea of damage from fluoride, I failed to ask the surgeon to save some of the bone particles which would have been available for fluoride analysis. Excess fluoride in the skull bones would have provided confirmatory evidence that fluoride had caused this disease.

Several weeks after the boy had left the hospital, I received the results of the urine analysis for fluoride. The 24-hour specimen contained 4.4 mg. Since the boy was no longer drinking fluoridated water, he must have stored an unusual amount of fluoride in his system, which was now being eliminated.

The excess elimination of fluoride and the failure of the neurosurgeon to find a cause for the convulsions induced me to reconsider the diagnosis. The boy was re-admitted to the hospital for additional studies.

This time I consulted Dr. Gabriel Steiner, Professor at Wayne State University, one of the few Detroit neurologists.

He diagnosed the boy's illness as tetany. The diagnosis hinged on the fact that the convulsions had been confined to one side of the body. The previous consultants had not been aware that this condition, common in epilepsy, also occurs in convulsions due to a calcium disturbance, a rare condition known as hemitetany. That the child remained conscious during the attacks was confirmatory evidence for Dr. Steiner's diagnosis.

After elimination of fluoridated water, the child had no further attacks. The fluoride levels of his urinary specimens gradually decreased to zero. Unfortunately, we could not obtain blood for calcium and phosphorus determinations during an attack. They might have further confirmed the diagnosis.

After the child's first admission my reputation in the hospital had received a jolt. Several pediatricians joked in the corridor about my "strange" diagnosis. In all their reading they had been assured that fluoridation was absolutely safe.

Two other members of the hospital staff criticized me for even considering the possibility of fluoride poisoning. The result of the first urine analysis for fluoride, they were told, was faulty because the urine was collected in a metal container. I should have known, they were told, that this interferes with the correct measurement. It is true, I now realize that specimens for fluoride analysis should always be collected in a plastic container. Metal, like calcium, attracts fluoride. This error, however, would have worked in favor of my diagnosis. Had some of the fluoride in the specimen been lost to the container the original amount

in the specimen would have been even higher than that reported to me.

Why was this case so different from the Highland Park case?

Events in medicine are unpredictable. For instance, if a person is intolerant to iodide, he may develop one of three entirely different diseases, namely, a toxic goitre, acne (a skin eruption), or an acute swelling of the salivary glands. Whereas all these diseases are due to the single item iodide, rarely if ever, do two of them occur in the same person. Why this is so, no one knows.

Nevertheless, there was a common denominator with the Highland Park case, namely the disturbance of the calcium-phosphorus metabolism. As will be shown later, this is significant in chronic fluoride poisoning.

Soon thereafter I had a curious experience. I had a phone call from Racine, Wisconsin. A lady who had learned of my interest in fluoride wanted to be hospitalized in Detroit. She believed that she was being poisoned by fluoridated drinking water.

In the hospital the house staff cooperated with me in giving her a careful and thorough examination. The patient, a frail woman in her early forties, exhibited vague symptoms, dryness and irritation in her nose and throat, pains in her chest. All laboratory and clinical tests were negative. There was no indication that fluoride had any bearing on her illness. Whereas I intended to keep in touch with her family physician and to follow up on this case in the future, at the time I was reasonably sure that she had not suffered ill effect from drinking fluoridated water.

When the patient was ready to leave the hospital she had no cash nor credit to defray the hospital bill, some \$270.00, even though she carried hospital insurance. Since I wanted to spare her undue delay, I advanced her the money. I made no charges for my own services.

For several months there was no response to my request

for reimbursement of the hospital bill. Instead, the patient asked for my diagnosis and a detailed description of my findings. I stated in my report to her physician that there was no indication of fluoride poisoning.

Instead of an acknowledgment of my report and the return of my loan, out of a clear sky a letter arrived from the patient's attorney, who, as I later learned, was a strong fluoridation advocate. He asked me to drop my demands for the money which I had advanced to her. After much correspondence the matter was finally straightened out and the money returned to me.

I have often wondered whether this strange episode was designed by some fluoridation proponent who was intent upon proving me overzealous. Had he hoped that I would commit myself to an unwarranted diagnosis of fluorosis?

Another case which came to my attention at that time was that of Mrs. G. D. C., age 30, from Tecumseh, Michigan. When she first entered my office, I was impressed by her poker back posture, typical of fluorosis. I had seen illustrations of this posture in medical journals (Fig. 15). Due to constant arthritic pain in the lower spine her back had become curved and immobilized. Her facial expression reflected the mental deterioration which she had undergone in recent months.

Otherwise the clinical picture was similar to that of the Highland Park case with cramps in stomach and bowels, colitis, pelvic hemorrhages, painful numbness in arms and legs, migraine-like headaches unresponsive to medication, and mental deterioration.

In the hospital, objective findings of four specialists were early changes in the retina of the eye (beginning blindness) and evidence of hyperparathyroidism, a disease linked with a disturbance of the calcium-phosphorus metabolism.

Mrs. C. completely recovered by eliminating fluoridated water for about 6 weeks. I admitted her a second time to

## FLUOROSIS IN INDIA



Typical posture of victims (poker-back). In this endemic area, water contains fluoride naturally at 0.6 to 12 ppm (mostly below 3 ppm). Courtesy, Professor Amarjit Singh, University of Patiala.

*Fig. 15*

the hospital for further studies. This time I hoped to study certain laboratory features in greater detail.

Shortly after her admittance she became embroiled in an argument with one of the nurses, a strong believer in water fluoridation. As is so often the case, this subject aroused strong emotions. When I reached the hospital to settle the matter, it was already too late. She had packed her bag and was leaving the hospital before a single test had been carried out.

In Charlottesville, Virginia, fluoridation was discontinued in October 1955. Here, too, a number of people had complained of illness which they attributed to fluoridated water. During my visit to Charlottesville a few weeks later, one of the ladies guardedly described her husband's illness to me. In view of his remarkable improvement after fluoridation was abandoned, she wondered whether or not his disease could have been connected with the water. Hes-

itatingly she confided that one of her husband's physicians had termed his disease psychosomatic, which made him reticent to discuss his illness with anyone. Reports of his case from two hospitals and three physicians showed that extensive studies had been made but that the disease had not been diagnosed.

A leading clinic in the East concluded that this man's bladder trouble was due to a prostate enlargement. The prostate gland was removed but the symptoms persisted. The frequently occurring sudden collapse of his legs while walking had puzzled his physicians. The onset of his personality changes coincided with the beginning of fluoridation in Charlottesville. He had lost his ability to concentrate; his memory began to fail. He became depressed. His energy diminished. He finally became bedridden. A consultant psychiatrist had attributed his mental deterioration and loss of memory to a progressive organic disease, but was unable to link it with any known illness.

On examining the patient I found that his illness was identical with that of the Highland Park case. Like her, he had suffered from partial palsy in arms and legs. Some earmarks of the disease persisted, but by now, judging from the medical reports, they were much less prominent than previously. Complete recovery ensued.

Within a short time new cases were brought to my attention. Some of them I was able to follow up on my own, on others I obtained data from family physicians. In some, a follow-up was impossible.

All these observations provided a valuable background for me. I took a closer look at my own allergic patients, many of whom were residing in fluoridated cities of Michigan and neighboring states.

I began to notice that the teeth of some of my patients, children and adults, were mottled. Previously when I saw such teeth, not being aware of their significance, I had failed to pay attention to them. The case histories indicat-

ed that most had never resided in an area where the water contained more than a trace of fluoride (0.1-0.2 ppm). The mottled enamel could have been caused by fluoride in food or in air, or by calcium preparations contaminated with fluoride. I myself had formerly prescribed these preparations to asthmatic children before more effective measures were available.\*

One of my goals was to work out a plan by which to unequivocally establish who in a given population could be expected to suffer ill effect from fluoride in water, food and air. In this endeavor I encountered many obstacles.

I asked myself how observations could be communicated to the medical profession once my cases were properly evaluated and documented. The prejudice of many of my colleagues, with whom I discussed my experiences, was appalling. I had been confronted with attempts by proponent scientists to prevent a free airing of the subject at medical meetings and in medical journals. I had noted that all discussions on the subject were confined to committees and councils which were consistently guided by representatives of promoting organizations or by scientists in the employ of industry.

Although I anticipated that the road ahead would be arduous, I did not realize that I was to run against a solid stone wall.

\* In rare cases mottling can also be due to such chemicals as selenium and to certain antibiotics.

## CHAPTER SEVEN

### THE LINE UP

In the mythology of ancient Greece, Uranus, the Father Heaven, and Gaea, the Mother Earth had twelve children, six sons and six daughters. They and their descendants were the Titans who ruled the world. They represented all that is good and all that is evil. They were powerful and mighty gods. They were worshiped and—feared.

Our present world has its Titans too. They have a grip on our daily life and they guide our actions. They can shape our destiny. Most of what they accomplish is good; some of their deeds are bad like those of their namesakes in old Greece. Eventually they themselves will vanish but their achievements will survive.

Who are these Titans?

The gods of our modern age are the Great Authorities in whom many people trust and whom some fear. They, too, are powerful and mighty. They have contributed much to the advance of our civilization. Like all human beings they are not without faults.

A careful study of the origin of fluoridation and its promotion leads directly into the paths of potent industries, outstanding and respected scientists, influential public officials who have been won for the cause. They seem to warrant our trust, because of their great accomplishments in some areas. They are Titans in science and industry. Their monetary power, their reputation, their political influence, their grip on the public through the conventional media of

communication reaches into every corner of the U.S.A. and indeed of the whole world. They mold public life, its social, educational, economic and scientific structure.

On July 7, 1951, in *Chemical Week*, a publication for the chemical industry, the following news item appeared on page 14:

"All over the country, slide rules are getting warm as waterworks engineers figure the cost of adding fluoride to their municipal supplies."

"... only one per cent of the nation's water is now treated with fluorine. Thus the market potential has fluorine makers goggle-eyed."

"Standing to benefit from the boom are chemical companies and equipment firms."

Potential beneficiaries named in this article were:

"General Chemical, Harshaw Chemical Co., Blockson Chemical Co., American Agricultural Chemical Co., Aluminum Co. of America, Davison Chemical Corp. and Baugh Chemical Co."

"It adds up," *Chemical Week* continued, "to a nice piece of business on all sides and many firms are cheering the

## THE PARTHENON

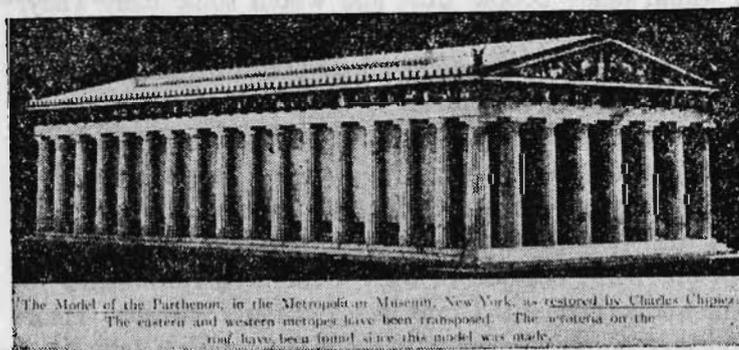


Fig. 16

U.S.P.H.S. and similar groups on as they plump for increasing adoption of this particular application." *Chemical Week* obviously failed to realize how many additional industries would eventually gain financially from the unexpected boom.

Overlooking the ancient city of Athens stands the Parthenon (Fig. 16), the majestic Greek temple, one of the most magnificent structures in the world. Dedicated to Athena, Goddess of Wisdom, it is devoted to the worship of all Greek gods.

One of Pittsburgh's most stately edifices is the Mellon Institute. Built in 1937, in the style of the Parthenon (Fig. 17), it, too, is a Temple of Wisdom devoted to the advance of knowledge and to gods of our day.

The Mellon Institute is one of the most expensive research buildings in the world. Every possible piece of apparatus necessary to work on such varying subjects as shaving, food, cigaret technology or insecticides is available to its staff. Its accomplishments are great. Its scientists are among the world's best.

Andrew W. and Richard B. Mellon, then the owners of the Aluminum Corporation of America founded the Mellon Institute in 1911. *Life Magazine*, May 9, 1938, described on page 48 the Mellon Institute as an

"Intellectual holding company and a laboratory for applied science open to the U. S. businessman."

"When a manufacturer is in trouble, for example, finds the market for his goods is shrinking, he goes to the Institute. For \$6,000 or more he gets a fellowship entitling him to employ a scientist for a year and use laboratory facilities," *Life* stated.

"The scientist's job is either to improve the product or to find a new use for it."

In the early thirties, Alcoa and other manufacturers of aluminum were in trouble, serious trouble. They had a waste product, sodium fluoride, which represented a serious dis-

## THE MELLON INSTITUTE



Fig. 17

posal problem.\* It could not be dumped on the ground because it poisoned vegetation, animals and humans. Alcoa's Vancouver, Washington, plant was fined in 1950 for dumping fluoride into the Columbia River and poisoning domestic animals.\*\*

Fluoride was the culprit in other extensive litigation throughout the country. Fluoride gases and solids escape from smokestacks and settle on vegetation in the immediate surroundings and many miles distant. They poison vegetation, livestock and humans (Fig. 19, 20). Alcoa shared this problem with a number of other corporations.

\* When aluminum is dissolved in molten cryolite, some fluoride escapes into the air as hydrofluoric acid. Sodium fluoride and alumina remain in the bath, according to Davenport, S. J., and Morgis, G. G., U. S. Bureau of Mines Circular 7687, U. S. Dept. of Interior, June, 1954, page 8.

\*\* Seattle Times 12/16/1952.

For instance, on August 25, 1961, W. S. and May Meader near Pocatello, Idaho, obtained a judgment in the U.S. Court of Appeals, Ninth Circuit, against Food Machinery and Chemical Corp. for the sum of \$57,295.80 and against J. R. Simplot Co. for \$4,246.41. Their factories emitted fluoride. The Meader trout farm and fish hatchery was seriously damaged by solid and gaseous fluoride compounds. The court record shows that "eggs were worthless," they did not hatch properly; "loss of adult fish was very great at times"; "young fish died in the hatchery where fish had never died before"; malformations occurred; "customers were lost." "During the week after rains the Meaders were hauling away about a ton of dead fish per day." Fluoride levels in water samples from the Meader hatchery ranged between 0.5 and 4.7 parts per million.

Many of such law suits were settled out of court. In Blount County, Tennessee, prior to Jan. 1, 1953, Alcoa had made up the loss of income incurred by 141 farmers and cattle raisers.\* A new suit charged that the poisonous fluoride fumes "damaged farmlands, injured registered cattle," making them unmarketable, caused premature deterioration of teeth, stiffness of joints, knots on ribs, loss of appetite and general retardation of growth.\*\*

Paul M. Martin, rancher, near Troutdale, Oregon, has obtained three judgments since 1946 against Reynolds Metals Company, another aluminum manufacturer. He lost seventy head of cattle per year due to fluoride fumes.\*\*\* A Federal court jury assessed \$38,292.90 in damages. In the Martin vs. Reynolds Metals suit it was proven, for the first time, that fumes from an aluminum reduction plant had damaged human health.\*\*\*\*

According to the *Portland Oregonian*, October 15, 1957,

\* Knoxville, Tenn., *Journal* 5/7/1958.

\*\* Knoxville, Tenn., *Journal* 7/30/55.

\*\*\* Portland, Ore., *Reporter* 9/12/61.

\*\*\*\* *The Oregonian* (Portland) 9/17/55.

seven other aluminum, metals and chemical companies\* joined Reynolds Metals to obtain a reversal of the judgment. Fred Yerke, a Reynolds' attorney, "contended that if allowed to stand, the verdict would become a ruling case, making every aluminum and chemical plant liable to damage claims merely by operating." The verdict did stand. The U. S. Court of Appeals upheld the decision against Reynolds 5 to 1.\*\*

Other settlements were made by Reynolds Metals Company's Troutdale Aluminum plant to Fairview Farms for \$3,000,000 plus costs because — as stated in *The Oregonian* on January 12, 1961 — of damage to dairy herd, loss of forage, loss of milk supply and land depreciation.

Earl Reeder at Sauvies Island received \$20,000 from Alcoa's Vancouver factory for damage to his cattle.\*\*\* Mr. and Mrs. Julius Lampert won their suit against Reynolds Metals Co. Troutdale plant for fluoride burns to their gladiolus crops as reported in the *Lewiston, Idaho, Morning Tribune*, February 6, 1962.

These are but a few of the numerous law suits which could be cited. If damage to vegetation and livestock was so costly, for how much more would these companies be liable in litigation arising from illness to humans residing near their factories? Research had to be instituted to "prove" that small amounts of fluoride are harmless to health.

The Mellon Institute was the logical place for companies to seek aid. Other scientific institutions, especially the Universities of Tennessee, of Cincinnati, and of Wisconsin, likewise received research grants to assist these corporations in defending their interests.

A flood of scientific articles issued from these universi-

\* Aluminum Company of America, Kaiser Aluminum and Chemical Corp., Harvey Aluminum Corp., Monsanto Chemical Corp., Olin-Mathieson Chemical Corp., Victor Chemical Company and Food Machinery and Chemical Company.

\*\* *Cleveland Press* 6/6/58

\*\*\* *Portland, Ore., Reporter* 6/26/62.

ties between 1940 and 1960. Most of them acknowledged financial support to nine\* companies for research grants. All these companies faced similar difficulties.

"When the research is satisfactorily completed," *Life* states, "all discoveries are turned over to the manufacturer exclusively."

Thus, findings incriminating to the companies need not be reported to the medical and veterinary professions.

Much of this research led to significant and valuable contributions to our knowledge on fluoride.

For studies on the cause of dental decay, G. J. Cox, Ph.D., a Pittsburgh chemist, during 1933-1940 received support from the Henry Buhl, Jr., Foundation at Alcoa's Mellon Institute, and from the Sugar Institute Inc.\*\* In the 1939 *Journal of the American Waterworks Association*, Dr. Cox<sup>60</sup> was the first scientist to implement Dr. Dean's suggestion to add fluoride to water supplies.

Up to this time the majority of the several thousand publications on fluoride had dealt with fluoride's hazard to health. Health officials had been considering reduction or "complete removal of fluoride from food and water."<sup>60</sup>

Heretofore fluoride had been recognized as one of the most violent poisons. Dr. Cox was first to propagate the idea that fluoride "may be specifically required for tooth formation."<sup>109</sup>

In his 1939 report<sup>60</sup> Dr. Cox's theory that fluoridated water could protect teeth against decay was based upon evidence provided by another outstanding exponent of fluoridation, Dr. Wallace D. Armstrong, professor of biochemistry, University of Minnesota. Dr. Armstrong and his collaborator, P. J. Brekhus, had claimed in 1938 that their analysis of tooth enamel showed less fluoride in decayed

\* Aluminum Co. of America; American Petroleum Inst.; E. I. du Pont de Nemours; The Harshaw Chem. Co.; Kaiser Aluminum and Chem. Corp.; Pa. Salt Mfg. Co.; Reynolds Metals Co.; Tennessee Valley Authority; and Universal Oil Products Co.

\*\* *Butler, Pa. Eagle* 12/8/59.

than in healthy teeth.<sup>110</sup>

In 1948, this conclusion was contradicted by F. J. McClure, Ph.D., Chief of the National Institute of Dental Research.<sup>111</sup> McClure used Armstrong's method and found that the differences in fluoride for sound and carious teeth were not significant.

In 1951, Dr. McClure<sup>112</sup> repeated his work. This time for some unaccountable reason his data purported to strengthen Dr. Armstrong's sagging theory. On the other hand, several scientists, among them Dr. T. Ockerse of South Africa in 1943,<sup>113</sup> Dr. J. S. Restarski of the U.S. Navy in the same year,<sup>108</sup> and Dr. Paul Pincus, Melbourne, Australia, in 1952<sup>114</sup> had produced evidence contrary to that of Armstrong and to McClure's 1951 conclusion. They found no difference in the fluoride content of sound and carious teeth.

In 1963, twenty-four years later, Dr. Armstrong himself took another look at his original research as published in the *Journal of Dental Research* in 1938. His reinvestigation<sup>114b</sup> convinced him that he had misinterpreted his early data. He realized that "the sound tooth of an older person demonstrated that its composition had been adequate—to resist caries;" and that "fluoride content of enamel increases as a person grows older." Dr. Armstrong acknowledged that "age as a factor in fluoride content was not then (in 1938) appreciated."

In other words, he now realized that the sound teeth with a high fluoride content in the 1938 report came from older persons: the teeth had stored fluoride due to age.

Thus the very study which constituted the sole evidence upon which Dr. Cox had based his recommendation that fluoride should be added to drinking water has now, after twenty-four years, been proven erroneous.\*

\* In spite of this fact, Dr. Armstrong asserted Dec. 13, 1964, in an interview by Minneapolis Tribune staff writer, Victor Cohn, page 14B, that "sound teeth contain more fluoride than decayed teeth."

In spite of this meager evidence Dr. Cox lost no time in implementing his theory on the practical level. On Sept. 20, 1939, he advocated fluoridation for the city of Johnstown, Pa., more than 5 years before the Newburgh and Grand Rapids experiments were initiated. Ever since, he has been actively promoting it before chemical and dental groups, Parent-Teachers' associations and city councils.

In the early 1940's\* Dr. Cox became a member of the Food and Nutrition Board of the National Research Council. He prepared for them several summaries of the literature on dental caries in which he advocated fluoridation and thus became one of The Experts.

From 1944 to 1948, Dr. Cox was research chemist for Corn Products Refining Co., Argo, Ill.,\*\* which, like other sugar processing industries, was a potential advocate of fluoridation. In 1962, he was appointed to the Pennsylvania Drug, Device and Cosmetics Board,\*\*\* to "administer a 1961 legislative act in the registration and regulation of organizations and persons distributing drugs" (including fluoride). This placed him in a position to serve in an advisory capacity to the State Health Department.

Scientists look with awe and pride upon another temple of knowledge: the Kettering Laboratory, Department of Preventive Medicine, of the University of Cincinnati (Fig. 18).

\* In 1943, Dr. F. A. Arnold, Jr., of the National Institute of Dental Research in Bethesda, Md., took up Dr. Cox's suggestion. He advocated fluoridation in the *Journal of the American Dental Association*, Vol. 30,<sup>114a</sup> on the basis of Dr. Cox's experiments and the Armstrong-Brekhus fluoride analyses of tooth enamel. He acknowledged the possibility of cumulative toxic effects (p.507) but casually dismissed it as "rather remote."

\*\* Butler, Pa. *Eagle* 1/28/59.

\*\*\* Pittsburgh *Post Gazette* 4/4/62.

## THE KETTERING LABORATORY

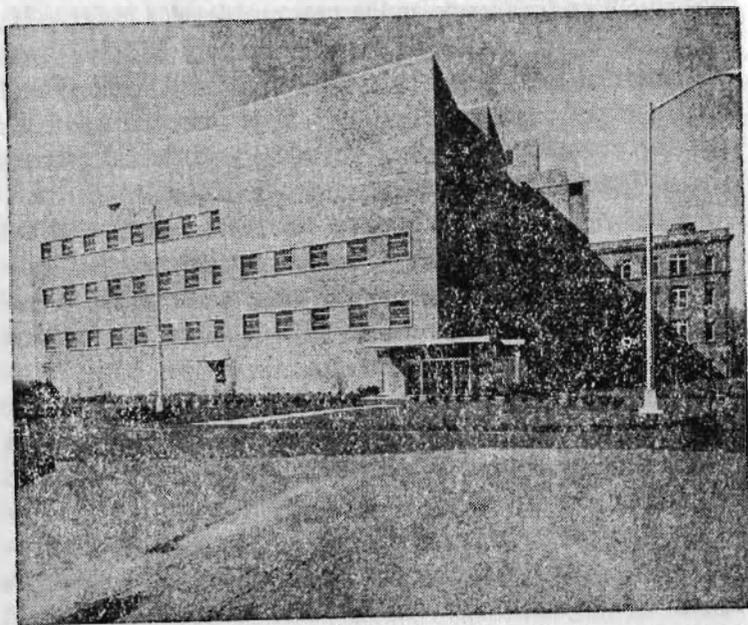


Fig. 18

Founded in 1930, by the Ethyl Gas Company, Frigidaire, and DuPont de Nemours to study health hazards in industry, the Kettering Laboratory has made valuable scientific contributions. Its chief, Dr. Robert Kehoe, one of the country's outstanding scientists, has played a key role in controlling lead poisoning in industry.

In recent years a large part of the Laboratory's facilities have been devoted to the study of fluoride. As at the Mellon Institute, findings are made available to the professions and to the public only upon approval by the donor of the grant. Article 8<sup>116</sup> of the contract agreements between the corporations and the Laboratory provides that the University "disseminate for the public good any information obtained. However, before the issuance of public reports or scientific publications, *the manuscripts there-*

*of will be submitted to the Donor for criticism and suggestions. Confidential information obtained from the Donor shall not be published without permission of said Donor.*" The interpretation of the term "confidential information" is left to the company.

Kettering scientists, Drs. Wm. Machle and E. J. Largent, have made extensive studies on fluoride metabolism in animals and humans, H. E. Stokinger, PhD., on its toxicology. J. Cholak, Ph.D., is an authority on fluoride analysis. An annotated bibliography by Irene R. Campbell of the Kettering Laboratory<sup>116</sup> published in 1958 has provided priceless information to students of fluoride.

Yet, these scientists are, as much as anyone else, subject to human limitations: They tend to be emotionally tied to those who support their work.

Most of the 8,660 scientific articles in the annotated bibliography<sup>116</sup> testify to fluoride's hazards to health. It is therefore difficult to understand how Dr. Kehoe can state publicly that "the question of the public safety of fluoridation is nonexistent from the viewpoint of medical science."<sup>117</sup>

Dr. Largent is now consultant for Reynolds Metals Company. His book entitled *Fluorosis* is designed, as he indicates in the preface, to aid industry in law suits arising from fluoride damage.<sup>118</sup>

Another center of fluoride research is the University of Indiana, Bloomington. Its professor of biochemistry, Joseph C. Muhler, D.D.S., is an outstanding proponent of fluoridation.

In Charleston, S. C., a vote on fluoridation was scheduled for June 11, 1963. A few weeks previously Dr. Muhler, at a scientific session on preventive dentistry, predicted, according to the *Charleston Evening Post*, May 22, 1963.

"..... a revolution in dentistry that will eliminate cavities and enable dentists to do the type of work they

prefer and make more money doing it.”

Dr. Muhler stated:

“Gallup polls in ten large cities of the United States show that dentists who engage in such preventive programs (fluoride application to teeth and fluoridation) make more money. These surveys show that dentists who are freed from having to fill cavities, have longer vacations, can afford to take trips to Europe, have more children, own bigger houses and buy their wives fur coats.”

Even by the wildest stretch of the imagination it is difficult to follow Dr. Muhler’s reasoning and to conceive how a dentist can make more money by filling less cavities.

Nevertheless, Dr. Muhler’s research has led to a significant expansion of our knowledge on fluoride. It has also led to the endorsement by the American Dental Association of “Crest,” Procter and Gamble Company’s stannous fluoride toothpaste.\*

Procter and Gamble had granted him and his department \$500,000 for fluoride research.\*\*

When the American Dental Association recognized “Crest,” Dr. Muhler was awarded the title of “Research Professor in Basic Sciences, a new laboratory and freedom to work on his chosen projects” as noted in the *Detroit Free Press*, August 2, 1960.

At the A.D.A. convention in Los Angeles, October, 1960, some of its officials were sharply criticized according to the *Los Angeles Times*. It was implied that they had profited from the immediate rise in Procter and Gamble stock following the unprecedented dental approval. According to the *Tampa Tribune* of August 2, 1960, Procter and Gam-

\* The original endorsement was announced in August, 1960. Subsequently, as the result of criticism by dentists and competitive toothpaste manufacturers, A. D. A. officials insisted that they had merely given their “approval” and had “recognized” Crest’s value in providing some protection against tooth decay, as reported in the *A. M. A. News* of 1/23/61.

\*\* Evansville, Ind. *Courier* 12/3/60.

ble stock rose \$8.00 per share following announcement of the endorsement.

As the result of A.D.A.’s endorsement, sales of “Crest” had doubled by the following May, as the *Wall Street Journal* reported on May 4, 1961. It moved into second place in sales gaining 25 per cent as its share of the \$235 million a year retail toothpaste market. Colgate’s share, still the largest, dropped from 31 per cent to 27 per cent.\*

“Studies show that the individual administration of fluoride,” Dr. Muhler declared in Charleston, “advanced by some as preferable to wholesale use of fluoride in public water supplies is impractical. The effectiveness of a fluoride pill lasts only about twenty minutes, whereas fluoride in the water is spread out over the entire day. To achieve the same benefits with a pill,” he added, “you would have to take a fluoride pill every eight minutes.”

Again one needs to stretch his imagination. A fluoride tablet provides an exact dosage. It can be discontinued at the age of ten after tooth enamel is formed and at any other time should there be ill effect. Why would taking 1 or 2 fluoride tablets per day not be preferable for those who desire it to drinking fluoridated water which provides fluoride in unpredictable amounts?

When fluoride toothpaste was first marketed in 1955, a warning was required that it not be used in areas where the water supply is fluoridated.\*\*

A later decision stipulated that each tube should carry the warning note:

“Not to be used by children under six.”

Both regulations were instituted because the P.H.S. recognized the obvious danger of an overdose from simultaneous absorption of fluoride from water and from toothpaste.

In 1958 both regulations were abandoned, even though

\* *Wall Street Journal* 8/9/61.

\*\* *Chemical Week* 7/6/57.

no adequate research was available to prove beyond doubt that the overdose hazard no longer existed.\* Indeed subsequent studies by Dr. W. S. Weisz in the *Journal for Dentistry for Children*, October, 1962,<sup>119</sup> question the efficacy and safety of a toothpaste containing fluoride.

By recommending simultaneous use of a fluoride toothpaste and water fluoridation, Dr. Muhler completely reversed the original condition for marketing this product.

Significantly, he himself was not too sure of the benefits of either one, when he stated at the American Dental Association convention in Los Angeles, October, 1960:

"We don't think that fluoride toothpaste alone or fluoride in drinking water or topically applied alone will prevent cavities. We say that a combination of these together with proper diet and toothbrushing will reduce the number of cavities."

Who can say for sure that the last two mentioned, proper diet and toothbrushing (using a neutral dentifrice without fluoride), will not do the job of reducing the number of cavities far more safely and efficiently?

A toothpaste without fluoride has proven, under careful testing, to produce equally as good results as a fluoride toothpaste.\*\* Research by Dr. L. S. Fosdick of Chicago's Northwestern University has shown that regular dental care with a neutral, nonfluoride dentifrice will reduce tooth decay by 63 per cent.<sup>120</sup>

A conflict between the P.H.S. which has staked its reputation on fluoridation, and fluoride toothpaste manufacturers was apparent. Wide acceptance of fluoride toothpaste and fluoride-containing tablets might logically constitute a substitute for, and spell the end of, fluoridation. In order to offset the competition from fluoride toothpaste and tablets, were fluoridation exponents obliged to compromise?

Regardless of what transpired, the A.D.A. approved

\* *Drug and Allied Industries* June 1958.

\*\* Alameda, Cal. *Times Star* 3/8/63.

Crest. Dr. Muhler began to plug for both Crest and fluoridation. Procter and Gamble staged for the American Dental Association an expensive one-hour TV program over CBS.\*

More companies were "looking goggle-eyed" than the seven named in *Chemical Week* referred to on page 114. The toothpaste manufacturers and drug companies could not have found a ready market for their fluoride products had it not been for the research designed to promote fluoridation of water supplies.

There is a parallel between the promotion of Crest, Procter and Gamble's stannous fluoride toothpaste, and that of Adeflor, the Upjohn (Kalamazoo, Mich.) Company's fluoride-containing vitamin drops recommended for decay prevention.

Upjohn provided research grants to Dr. F. J. Margolis,<sup>121</sup> a Kalamazoo, Mich., pediatrician and associates to determine the daily water consumption of young children in widely separated areas of the U.S.A. These scientists found that children consume, on the average, less than one pint of water per day, some as little as two ounces. This observation was recently confirmed by Canadian health officials, Dr. G. H. Bonham and co-workers, who surveyed drinking water patterns in young children in Prince George, B. C.<sup>122</sup>

These surveys irrevocably prove that children do not receive the recommended dose of fluoride through drinking water upon which the fluoridation hypothesis rests. The one part per million concentration was established by the National Institute of Dental Research<sup>95</sup> on the premise that the daily water intake in children averages about 4 glasses providing 1 mg of fluoride ion per day.

Recognition by the profession that children receive far less than this recommended amount of fluoride through drinking water would deal a vital blow to fluoridation. On

\* *New York Times* 8/22/61.

## ILLUSTRATIONS

### 21. BIRTH DEFECTS FROM FLUORIDE

X-rays of rats whose mothers were fed large doses of sodium fluoride during pregnancy. Birth defects such as the absence of forepaws in the second animal have been recorded by Dr. Charnot of Rabat, Morocco, a pioneer in fluoride research. The spinal curvature in the two lower animals and the elongated, curved upper (incisor) teeth are characteristic of fluorosis in rats. Animal on top is normal control.



21

### 24. SKELETAL FLUOROSIS

X-ray of knee joint in fluorosis from drinking water. Dark areas (thickened bone) alternating with light ones (osteoporosis or bone softening). Courtesy, Dr. J. F. Raffaele, Buenos Aires, Argentina.

### 25. SKELETAL FLUOROSIS

Pelvic bones showing irregular outline of the bony surface (arrow). The dark areas in the bone represent excessive hardening. The "feather-like" shadows outside of bone surface represent calcified ligaments. Courtesy, Dr. Christian de Sepibus, Sion, Switzerland.

### 26. SKELETAL FLUOROSIS

X-ray of portion of breast bone (sternum) of Linsman-McMurray case, showing thickening of bone (2) compared with normal bone (1). Courtesy, Dr. Joseph Linsman, Beverly Hills, Calif.

### 29a, 29b. DAMAGE IN RHEINFELDEN

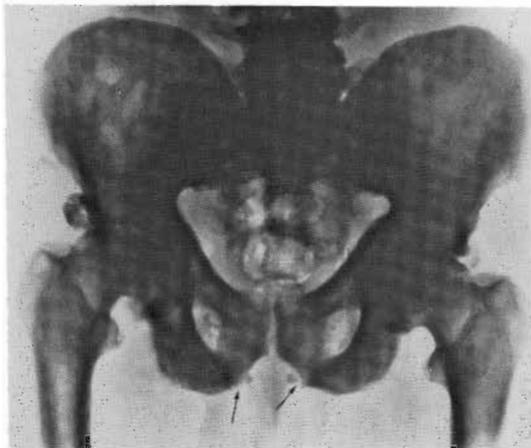
Dying Beech and Chestnut trees due to fluoride from nearby factory. Note: Regeneration of leaves but absence of sprouts. Courtesy, Dr. L. Gisiger, Bern, Switzerland.



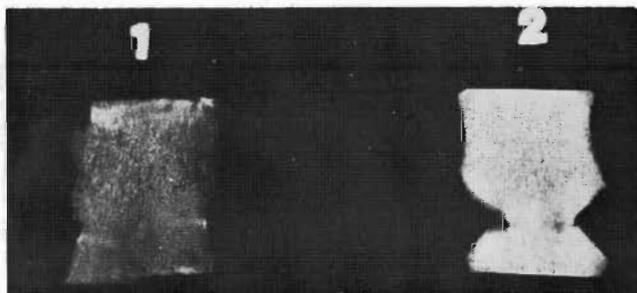
29b



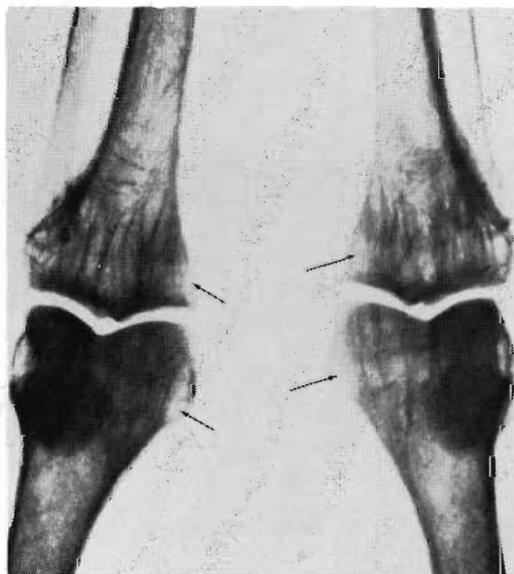
29a



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26



24

the other hand, the P.H.S. realized that it would be too risky to administer 1 mg of fluoride in Adeflor drops in addition to the daily 1 mg or more already being consumed by some from drinking water.

On Nov. 14, 1962, the P.H.S. issued a public warning in Ann Arbor through Dr. Philip Jay. Reporting his Michigan Annual Pharmacy lecture at Ann Arbor, *Drug News Weekly*, Nov. 14, 1963, quoted him under the headline, "Unsupervised Use of Fluoride Items Held Hazardous," as follows: "In areas already supplied with fluoridated water use of added supplements is not only unnecessary but definitely contraindicated."

In August, 1963, the *A.M.A. News* advised caution and in September, the Newton, Mass., health director, Dr. H.M. Greenleaf, likewise warned against use of fluoride supplements where water is fluoridated.\* Such advice against use of fluoride pills was bound to hamper the sale of Upjohn's product just as had the original regulations regarding fluoride toothpaste.

A pharmaceutical company cannot afford to antagonize the powerful P.H.S. and its Food and Drug Administration. Upjohn's colored film\*\* promoting fluoridation of water supplies with Dr. F. J. Stare acting as master of ceremonies parallels Procter and Gamble's \$250,000 one-hour long TV show celebrating the A.D.A.'s National Children's Dental Health Week featuring Henry Fonda.\*\*\* Both companies are marketing a product competitive to fluoridation. Both presentations would appear to have been a goodwill gesture to mollify the P.H.S.

In the Upjohn film this appeasement was done rather awkwardly:

\* Newton, Mass., *News-Tribune* 9/27/63.

\*\* This film was presented by Chester Tossy, D. D. S., of the Mich. State Health Dept. Oct. 7, 1963, at the hearing before the Mich. State House of Representatives Committee on Fluoridation at Cadillac Square Bldg., Detroit, Mich.

\*\*\* *New York Times* 8/22/61.

Obviously children are not receiving through water their quota of fluoride claimed to produce sound teeth. Yet the film extols the "beautiful teeth" of children who have been drinking Kalamazoo's fluoridated water for many years.

One must conclude: The sound teeth in Kalamazoo are the result of much less fluoride than that considered "optimal" (most desirable) by the P.H.S. or some factor other than fluoride—perhaps improved dental hygiene and a campaign to limit intake of sugar and sugar products.

As awkward as Dr. Margolis' explanation of the cause of Kalamazoo's "beautiful" teeth is the P.H.S. warning against Adeflor and other fluoride-containing products:

Dr. Greenleaf emphasized in Newton, Mass., on Sept. 27, 1963: "Although there is a wide margin of safety, those residents of Newton who have been taking fluoride pills or drops should now discontinue their use concurrently with the start of its [sic] delivery in the water."

How can there be a "wide margin of safety" if 1 mg of fluoride in water is desirable and an additional 1 mg in pills or drops is hazardous enough to require a special warning by health officials?

Besides drug, toothpaste and chemical interests, other industrial groups had reason to be "goggle-eyed" in contemplation of fluoridation.

P.H.S. *Publication 62*<sup>123</sup> named fourteen corporations as suppliers of fluoride feeders for communities throughout the United States. The cost for such equipment and its potential installation in Detroit alone was estimated by Water Board Manager, G. J. Remus, at \$500,000.\* Detroit is only one of numerous large U.S.A. cities. Installation and future maintenance throughout the country is bound to involve sizeable sums of money.

The sugar industry is likely to profit more by fluoridation than any other industrial group. Their organization, The Sugar Research Foundation, Inc., consisting of about 130

\* G. J. Remus to Detroit Common Council 6/11/62.

corporations producing and processing sugar and sugar products had long been interested in finding methods of preventing tooth decay without curtailing sales of their products.

The Foundation's 1950 seventh annual report<sup>81</sup> expressed its aim in dental research as follows: "To discover effective means of controlling tooth decay by methods other than restricting carbohydrate (sugar) intake."

This goal of preventing tooth decay without decreasing sugar consumption warranted the expenditure of large research grants to universities. Mothers who are convinced that fluoride renders teeth resistant to decay, will not limit their children's consumption of sweets. Indeed, two of the institutions most vociferous in fluoridation promotion, the Dental Schools of Harvard and the University of Rochester, have been recipients of the Foundation's grants.

It is difficult to establish why the Western Electric Company issues a pamphlet promoting fluoridation;<sup>124</sup> why the Carrier Corporation in Syracuse comes out publicly for fluoridation, but refuses to present the other side.\* Doubtless they are motivated by public spirit and concern for the nation's welfare. Members of their medical departments perhaps have not familiarized themselves adequately with the facts, particularly the many reports of fluoride's ill effects. Nor do they realize that most, if not all money available to U. S. scientific institutions for fluoride research flows from organizations interested in promoting fluoride. Financial support is rarely, if ever, forthcoming to U. S. scientists working independently of industry and government.\*\*

\* W. T. Lane, Vice-Pres., Carrier Corp., Syracuse, N. Y., to Dr. G. L. W. 8/15/60.

\*\* According to the *Pittsburgh Post Gazette*, Nov. 21, 1963, Dr. Charles V. Kidd, Associate Director for Training at N.I.H., be- moans the fact that research grants go to universities with strings attached and, therefore, "universities cannot maintain their freedom."

Interestingly, the corporations which originally sponsored fluoridation have remained in the background in recent years. As early as January, 1950, Alcoa had advertised fluoride for addition to water supplies in the *Journal of the American Water Works Association*, Vol. 42, before adequate studies were available claiming to prove either its efficacy or safety. Once the P.H.S. began to promote fluoridation they discontinued their advertisements. On May 22, 1957, Alcoa's Chemical Sales Manager H. P. Bonebrake stated in a letter to C. A. Barden of Oberlin, Ohio, that they were not promoting fluoride for water fluoridation nor selling it "directly to any municipality."

The Sugar Research Foundation, Inc., withdrew its support after providing a total of \$57,000 to biochemist J. H. Shaw, another leader in fluoride promotion, at Harvard's School of Dental Medicine. Dr. Shaw<sup>125</sup> had shown that all sugars induce decay. "We should cut down on sugar consumption, particularly candy," he stated to *Time's* reporter on January 13, 1958.

Corporations no longer need to promote fluoridation. The U. S. Public Health Service and the American Dental Association are now carrying the ball:

Officials of the A.D.A. and P.H.S. were the first to become convinced by research carried out at the Kettering Laboratory, Mellon Institute, Universities of Rochester, N.Y., and Minnesota, that fluoridation was a safe and effective tooth decay preventive.

These two organizations are the true giants among the Titans. They represent knowledge, power, organization, financial strength, political know-how and, what counts most, authority. Their officials, especially their public relations counsellors, have become The Experts.

The U.S.P.H.S. is a branch of the Department of Health, Education, and Welfare. The powerful Food and Drug Administration and the National Institutes of Health at Bethesda, Md., are two of its divisions.

Table 7

U.S.P.H.S. GRANTS TO COUNTRIES WHERE FLUORIDATION IS BEING PROMOTED IN DOLLARS

	1958*	1960**	1963***
CANADA†	8,640	810,621	1,237,365
DENMARK	27,297	101,067	439,704
EIRE	19,078	62,250	78,730
NETHERLANDS	56,945	175,436	289,320
NORWAY	14,875	129,286	258,528
SWEDEN	87,600	507,570	1,509,011
SWITZERLAND	5,259	44,288	892,606
UNITED KINGDOM	232,035	900,048	2,751,326

†According to the *Globe and Mail*, Toronto, April 1, 1965, the total in research grants awarded to Canada in 1963 by U.S. National Institutes of Health was \$2,300,000.

\*Public Health Service Grants and Fellowships, U.S. Dept. of H.E.W., P.H.S. Publ. No. 621 (1958).

\*\*Publ. Health Service Grants and Awards, P.H.S. Publication No. 777, Part I (1960).

\*\*\*Publ. Health Service Grants and Awards, P.H.S. Publication No. 1079, Part I (1963).

The National Institute of Dental Research is the best equipped and staffed dental research center in the world. Through distribution of grants to dental schools in the U.S.A. and in many countries abroad (Table 7) its scientists are closely linked with scientific dentistry as well as health ministries throughout the world. Local, state and county health departments rely on the P.H.S. for research information and for monetary assistance.

The American Dental Association, intimately associated with the P.H.S., reaches into every town, large and small, in the United States. P.H.S. officials hold interlocking memberships on boards, committees and councils of the American Public Health Association and numerous other scientific organizations. P.H.S. representatives maintain close liaison with Congress, the Army, the Navy and the Air Force. Their link with industry is the National Research Council.

The American Medical Association has a permanent P.H.S. representative at its headquarters in Chicago. P.H.S. officers are members of all important scientific committees and councils of the mother organization in Chicago as well as county and state medical societies. They are represented

on editorial boards of every important medical and dental journal in the U.S.A. P.H.S. public relations officials are in constant contact with press, radio and television, their medical writers and commentators. Needless to say, P.H.S. officers and scientists can easily sway the thinking of leaders of scientific organizations and mold public opinion by virtue of the prestige of their position.

The yearly budget for fluoridation promotion is difficult to estimate. It is safe to say that it runs into millions. Two giants in Congress, J. A. Fogarty, Chairman of the House Subcommittee on Appropriations, Dept. of H.E.W., and Lister Hill, member of the Senate Appropriations Committee, were in continuous rapport with the P.H.S. They supported this organization in Congress regardless of whatever financial demands it made. For their yeoman service championing increased appropriations for dental research, these two congressional leaders received Lasker Awards in 1959\* upon the recommendation of the Surgeon General.

The question arises, what made the A.D.A. and U.S.P.H.S. promote a measure which they themselves labelled a "calculated risk" at the beginning of the fluoridation drive?

The P.H.S. is traditionally a government agency for prevention of disease. Originally the P.H.S. was established to protect society from the spread of contagious diseases. In contrast to medicine, preventive dentistry has made relatively little progress in recent decades. For years it has been searching for measures to combat tooth decay, a serious health problem.

The P.H.S. was eager to adopt the fluoridation idea because at first glance it seemed to be the answer to their prayer. In their enthusiasm they initiated its promotion without first making adequate studies to learn about its possible harm.

\* *Time*, 10/19/59.

Some claim that P.H.S., like every public agency with unlimited resources, wishes to enlarge its sphere of influence. Indeed in 1953 the P.H.S. Surgeon General, Leonard Scheele, addressing a conference of state and territorial health directors, called fluoridation but one example of "mass application methods for controlling non-infectious diseases." He predicted that "such a community-wide attack (by the P.H.S.) on 'far more serious diseases than dental decay probably will be forthcoming after laboratory tests have paved the way.' "\*

Others blame Oscar Ewing, the former Alcoa attorney, who as Social Security Administrator gave fluoridation the green light only four years after the initiation of the ten to fifteen year experiments in Grand Rapids, Mich., and Newburgh, N. Y. At that time the permanent teeth of children born under fluoridation had not as yet erupted.

Regardless of what motives were at play, P.H.S. officials undoubtedly took their premature position on fluoridation because they were convinced that they were serving the nation's welfare. Once vigorous promotion of fluoridation had been initiated, it was difficult or well nigh impossible for them to reverse their position in spite of new research which established its hazard.

Whom else did the Titans recruit in implementing their new project? There are three kinds of promoters. Each has his own area of influence:

The scientist who has done original work on fluoride.

The professional, scientific and medical news writer who is impressed by the scientists' work.

The misinformed, who adopts views of others without making an independent study on his own.

#### 1. The Scientist

As to the first group, the number of scientists endowed with research grants for fluoride research is legion. They

\* Patterson, N. J., *Evening News* 11/6/53.

were chosen for this task because of their competence and their position of prestige in scientific organizations.

Only a few names can be mentioned here.

The late H. Trendley Dean, D.D.S., called the "Father of Fluoridation," had related the incidence and severity of mottled teeth to the natural fluoride content of drinking water. According to his classification of mottled enamel<sup>126</sup> the low-level category, "very mild," involves less than one-quarter of the tooth's surface. He disregarded the fact that even a minimal degree of this imperfection of the tooth's enamel constitutes a disease process, an external sign of internal distress.

Dr. Dean, through his membership on numerous boards and committees of scientific organizations, national and international, obtained single-handed at least a dozen endorsements, as noted in Table 8.

Table 8

ENDORSEMENTS DUE TO EFFORTS OF DR. H. T. DEAN

U. S. Public Health Service  
The American Dental Association  
The American Public Health Association  
The Association of Public Health Dentists  
The Association of State and Territorial Health Officers  
The International Association for Dental Research  
American Epidemiological Society  
The National Research Council  
Federation Dentaire Internationale  
The American Association of Dental Editors  
The American Medical Association  
The Army and Navy Dental Schools

His final accomplishment was his appearance in Ireland where, according to the *Dublin Evening Herald*, April 13, 1960, he was honored by the Irish Dental Society. Through his persuasion, Ireland's Minister of Health introduced compulsory fluoridation throughout the country, the first and only country to do so.

Another promoter, who has been active in technical, chemical and engineering groups, is A. P. Black, Ph.D., Prof. of Chemistry at the University of Florida, at Gaines-

ville. Dr. Black has been personally responsible for the introduction of fluoridation in many Florida communities, in some as early as 1949,\* before any data from the fluoridation experiments were available.

His son and daughter-in-law, C. A. and L. V. Black were president and vice-president, respectively, of Black Laboratories, Inc. They supply plans, specifications and fluoridation equipment to cities.\*\* While president of the American Waterworks Association, Dr. Black, in collaboration with H. T. Dean, D.D.S., obtained this organization's "permissive" resolution at its 1949 convention. In an article published in the World Health Organization's *Newsletter*,<sup>127</sup> Dr. Black promoted fluoridation throughout the world.

Dr. F. J. Stare of Boston, Mass., occupies a unique position in fluoridation promotion. His Department of Nutrition at the Harvard School of Public Health receives approximately \$200,000 from the food industry and \$400,000 from various government agencies per year.\*\*\*

Through his prolific writings in medical journals, his association with a great school of medicine and through his membership on policy-making committees in scientific organizations, he wields a powerful influence among scientists, especially the medical profession. Through his column, syndicated in 40 newspapers, he molds the thinking of a large segment of the lay public.

When articles unfavorable to fluoridation appear in scientific journals or in lay magazines, Dr. Stare rarely fails to reply with the customary promotional claims. Under the claim of countering quackery in medicine, he appears before legislative bodies and scientific organizations where, in his enthusiasm, he has made many assertions unsupported-

\* Testimony before the Florida State Board of Health, Jacksonville, Aug. 20, 1955.

\*\* Tampa, Fla. *Sunday Times* 12/16/51.

\*\*\* *Medical Tribune* Nov. 15, 1963, Page 4.

ed by facts. In the *Journal* of the A.M.A. of Dec. 2, 1961, page 926, he called those whose position regarding fluoridation differs from his own "misinformed, stupid or dishonest." Few scientists, therefore, dare to challenge the veracity of Dr. Stare's claims.

"I don't pretend to be an expert on fluoride metabolism," Dr. Stare declared before a committee of the Ottawa Legislature, Feb. 27, 1964.\*

Actually he has not published original research on fluoride for more than 25 years nor has he had clinical experience with patients through practicing medicine.

It would serve no useful purpose to enumerate the many additional scientists or to name the corporations under whose aegis their research was carried out.

However, one scientist is worthy of mention because he was one of those who did maintain his full independence in spite of endowment by industry and the P.H.S., namely Dr. Paul H. Phillips, Agricultural School, University of Wisconsin, Madison. Next to the Danish scientist, Roholm, Dr. Phillips has carried out some of the most valuable research on fluoride metabolism.

## 2. The News-Writer

The second group of promoters are professional people who have not personally been engaged in fluoride research: Medical news writers, physicians and dentists of stature. Too busy to study the subject themselves, they have taken a superficial glance at the research presented to them by exponents of fluoridation. They tend to rely upon conclusions, but fail to independently evaluate the intricate and involved data on their own.

Outstanding among these are two famous pediatricians, namely Cleveland's Dr. Benj. Spock and the late Dr. H. F.

\* Stare, Dr. F. J. Before the Voluntary Committee on Health of the House of Commons and the Senate, Ottawa, Ontario, Canada, 2/27/64.

Helmholtz of the Mayo Clinic; the late Dr. L. I. Dublin, an expert on insurance statistics; the renowned heart specialist, Dr. Paul Dudley White. Even some of the most discriminating scientists can be swayed by the constant flow of propaganda material, as shown by the position of Dr. Walter Alvarez, one of the country's best known medical writers and editor of a magazine for physicians. When my book on *Contact Dermatitis*<sup>2</sup> appeared in 1953, Dr. Alvarez spontaneously wrote to me that he considered my book "a classic for many years." When I sent him some of my data on poisoning from fluoride on which I had received favorable comments from leading scientists here and abroad he failed to give them any attention. Yet in his column he persistently promotes fluoridation while he often reiterates that he himself has made no study of the subject;\* that he must trust "the authorities." At least once he has named Dr. F. J. Stare as his "authority."\*\*\*

## 3. The Misinformed

The third group of promoters carries the ball because of emotions or for political and, in some instances, for business reasons.

A former Detroit councilman\*\*\* with no medical background wrote a promotional pamphlet to counter a carefully documented critical review by F. B. Exner, M.D., Seattle, Washington, whose fastidious study<sup>127a</sup> over many years has pinpointed numerous fallacies in the promotional scientific literature. This lay person's pamphlet has been widely distributed by the American Dental Association as though it had scientific value.

A Detroit clubwoman has appeared before many groups plugging for fluoridation. In a stereotype manner she re-

\* Alvarez, Dr. Walter C.: *Des Moines Tribune* 12/19/64, page 4.

\*\* *St. Louis Globe Democrat* 10/10/62.

\*\*\* Lincoln, James H.: *Fluoridation of Water*, Dec. 1956.

peats the names of organizations which have endorsed it. She cites former Presidents Eisenhower and Kennedy and Dr. Spock as endorsers, as though these men were authorities on the subject. In July, 1963, she received an award from the Detroit District Dental Society for her "civic-minded efforts."\*

Often promoters are sincere public-spirited citizens who are convinced that the many scientists to whom they look for guidance cannot be in error. Mrs. Mary Lasker, for example, is the Vice-President of a national promotional group, the Committee to Protect Our Children's Teeth, Inc., and president of the Lasker Foundation.<sup>128</sup> In addition to Senator Lister Hill and Representative John Fogarty, at least one medical columnist has received the Lasker award in recognition of profluoridation efforts. He is Don Dunham, the writer of a series of promotional articles for the *Cleveland Press*, October, 1950.

A Detroit newspaper editor addressing the Detroit Women's City Club on January 18, 1963, implied that those who oppose fluoridation are "haters" responsible for inciting controversy in the community.

Everyone who has followed the fluoridation battles in U. S. communities is familiar with the local promoter, usually a dentist or a physician. He is a shrewd debater, immaculately dressed, able to call every politician by his first name, proficient in the art of lobbying. At public debates he carries with him a book written by two Ann Arbor health officials.<sup>129</sup> It catalogues all possible objections which opponents are likely to bring up and serves as his guide in refuting them.

It is virtually impossible for a president or secretary of a medical or dental society to speak out openly against fluoridation. Many express their opposition when they discuss the subject privately. Were they to do so openly, it might

\* *Detroit Dental Bulletin* July, 1963.

constitute the end of their political career in professional societies as indicated to me in a letter by one of Michigan's most outstanding physicians\* who was once selected as "Physician of the Year".

Another motive for promotion of fluoridation was presented to me by a representative of one of the country's leading labor unions who visited my office in order to examine some of my data on poisoning. He acknowledged to me that my position was sound. His organization, however, he confessed, cannot afford to jeopardize good relations with the U. S. Public Health Service. It, therefore, continues to promote fluoridation.

With this powerful array of groups and organizations led by the American Dental Association and the U. S. Public Health Service, supported by industry and by outstanding scientists in their employ, with constant coverage by the nation's leading newspapers and magazines and with persistent support by politicians striving for power, who are the people on the other side of this unending struggle?

Rarely do newspaper articles on fluoridation fail to designate opponents as falling into certain categories.

In one of the early versions, presented by Dr. G. J. Cox in the *Michigan State Dental Journal* of January, 1953,<sup>130</sup> there were five categories: "Uninformed"; "Misinformed"; "Those with Something Else to Sell, Either Ideas or Goods"; "Crackpots"; "Various Combinations of the Above." In recent years, new attributes have been designed and duly recorded in the *Journal of The American Dental Association*, Nov., 1962.<sup>131</sup> Opponents are linked with groups which have been stigmatized as anti-Negro, anti-semitic, anti-children, anti-everything. Sociologists in schools of social science have been given grants to write treatises in order to convince the public that opponents are unsavory people with a "sense of deprivation" and "alienation from society."<sup>132</sup> A Detroit newspaper in an editorial

\* J. S. D., M. D., to Dr. G. L. W. 12/11/57.

July 26, 1963, referred to opponents as "A small but noisy band of obstructionists."

Actually, those with whom I have been fortunate enough to become acquainted are the cream of this nation's citizenry. They are self-sacrificing, intelligent, independent in their thinking, able to distinguish truth from fiction, willing to stand up and be counted. They are vitally interested in the prevention of tooth decay and in the health of their fellow citizens.

Pamela Haxton of Detroit, an eleven-year old asthmatic child, had an assignment in school on fluoridation. In the public library she found ample promotional material, but scant information unfavorable to fluoridation. Somehow she managed to obtain valid facts on the opponent aspect. Her report truly presented both sides. The whole class as well as the teacher and the principal became convinced that fluoridation was undesirable.

Mrs. Lucy Stevens is the wife of a former Ohio Appeals' Court judge. In 1955 his court decided in favor of fluoridation in the Cleveland case, Krause vs. City of Cleveland. Subsequently Judge Perry Stevens learned that much pertinent information had not been presented to the court.\* His wife became an ardent worker disseminating the truth in her own city, the State of Ohio and throughout the nation. Mrs. Stevens spends much of her time and large portions of her income for this purpose.

Mrs. Patricia Rodney, a young matron with four children of Birmingham, Michigan, has thoroughly studied many phases of the medical and dental aspects of fluoridation. When she asked some of Metropolitan Detroit's most prominent physicians about their views on fluoridation, most of them acknowledged that they knew little about it. By furnishing them with scientific data which had heretofore not been accessible to them, those who were willing to

take the time to examine it became readily convinced of the validity of the opponent case.

Miss A.M.A., dependent upon Philadelphia's Public Welfare, suffered ill effect from drinking fluoridated water. When she appealed to the City Health Commissioner for medical advice concerning her illness, he bluntly told her that fluoridation has been proven harmless and that her trouble must be caused by something other than fluoride. He did not investigate her case. The family is hard put to purchase the necessary food because a portion of her welfare allowance must be used to obtain fluoride-free water.

Mr. B.E.A. in Middleboro, Mass., up in his eighties, has been using a sizeable part of his meagre old age pension to counter the propaganda for fluoridation. Single-handedly, he has been responsible for several rejections of fluoridation in his area.

Dr. and Mrs. L. of San Antonio, Texas, are opposing fluoridation. Mrs. L. and her daughter who formerly resided in unfluoridated New York City, habitually spent the winter months in Miami, Florida, where they had always enjoyed perfect health. In 1954, shortly after their arrival in Miami, both became ill with a serious stomach and bowel disorder. They had to cut their vacation short. Upon returning to New York City their illness promptly subsided. When in 1955 Mrs. L. and her daughter returned to Miami the disease recurred. It again cleared up promptly upon returning to New York.

In 1956, Mrs. L. was about to support the fluoridation drive in New York City, when she learned for the first time that even in minute amounts fluoride can cause the kind of stomach and bowel upsets which had plagued her in Miami. Upon further investigating, Dr. L. proved that the disease with which they had been afflicted was due to Miami's fluoridated water.

The 90-year old Miss M.M., Evanston, Illinois, suffered agony from drinking Evanston's fluoridated water. Upon

\* Letter to Akron, Ohio, *Beacon Journal* 10/14/56.

changing to distilled water she recovered completely from her serious illness without any other treatment. She is so concerned about helping her fellow men and imbued by public spirit that she has made arrangements with her minister and her physician to have a complete study made of every part of her body after her demise.

In a little town near Oslo, Norway, two ladies, Miss B.B. and Miss S.M., crippled with arthritis, are aware that fluoride contributes to calcification of tendons, ligaments and joints. They have been constantly searching for more and more facts about fluoridation with which to enlighten their fellow citizens. As the result they have been subjected to disparagement even by intimate friends.

The ranks of opponents include people from every walk of life, of every creed, color, economic and intellectual status. Outstanding Catholics, Jews, Negroes, Italians, Poles are among the leaders opposed to fluoridation, who have actively helped to spread the truth. They range from top scientists, waterworks engineers, past presidents of the A.M.A., deans of dental schools, Nobel prize winners to housewives. They have no organization, no grants from corporations. When fluoridation raises its head in a community, people band together to alert their fellow citizens to facts which they have accumulated. These groups are usually without guidance by scientists, and without funds. They lack political know-how. They are not familiar with current promotional methods nor with the art of public relations.

Little Pamela Haxton did such a good job convincing her classmates, her teacher and her school principal of the truth about fluoridation that one of Detroit's metropolitan papers was contacted to write a brief story about it. Pamela's exhibit was to go to Cobo Hall along with another presenting the proponent view. Her teacher suddenly became hesitant. Such a story would place her school in the limelight. It might even jeopardize her future advancement.

Therefore, Pamela's exhibit and the interview with the reporters were termed "too controversial." Plans to invite the President of Detroit City Council, Mr. Ed. Carey, to view the exhibit on fluoridation at the school did not materialize.

The principal chose the easier, more comfortable course; she acquiesced to group thinking. She backed away from the whole idea.

This story with variations has been the order of the day in many places in the U.S.A.

Little Pamela against the Titans.

## CHAPTER EIGHT

### IN QUEST OF KNOWLEDGE

In order to learn more about the effect of fluoridated water in humans, I reviewed research in three areas:

1. The effect of fluoride in controlled doses on experimental animals.
2. The available reports on fluoride poisoning in domestic animals, mostly cattle and sheep, feeding on fluoride-contaminated forage.
3. Data on acute and chronic fluoride poisoning in humans.

The classical book by Kaj Roholm<sup>82</sup> represents the guidepost regarding all research on fluoride. Dr. Roholm's research showed that fluoride is a systemic poison. Its action is not confined to bones and teeth. It is liable to settle in any organ of the body and to cause damage there. Like oxalic and citric acid it deprives the body of calcium, a vital element necessary to life. It interferes, at least in the test tube, with the activity of many enzymes. Some are adversely affected at a concentration as low as 1 part in 15 million parts of water. Enzymes are protein substances necessary to the functioning of vital organs.

#### 1. Experimental Animals

Geneva, Switzerland, had been a center of fluoride research. Well known scientists such as Professors Askanazy and Ruitishauser had made extensive studies on this subject.

A young physician, Dr. F. deSenarclens, reported significant experimental work in 1941.<sup>133</sup> He administered fluoride in large doses to two goats daily for a period of 235 days. One received a total of 45 grams (1½ ounces) of sodium fluoride; the other, 72 grams of calcium fluoride, another fluoride salt. Both animals developed the bone disease called fluorosis. In other experiments on rabbits, rats and guinea pigs, he described in detail how fluoride disturbs the calcium and phosphorus levels in the blood and the alkaline phosphatase, an enzyme involved in bone growth. He presented a classical description of the microscopic appearance of the organs damaged by fluoride in the experimental animals. He observed goiter, chronic inflammation of the lining of the stomach and changes in the sex organs. One of the two goats had a spontaneous miscarriage during the course of the experiment.

It took me more than two years to locate Dr. deSenarclens and to obtain his dissertation. When I visited him in Geneva, he arranged a meeting with Dr. Ruitishauser, professor of pathology, and Dr. A. J. Held, a consultant on fluoride for Swiss industrial concerns. This conference furnished me with valuable information on the subject, especially with respect to my own cases.

During the conversation Prof. Ruitishauser stated that my data on poisoning would be of interest to the Swiss Academy of Medicine. I was thus afforded an opportunity to explain the manner in which my reputation before this august body had already been besmirched, and presentation of my data prevented. During a discussion on fluoridation Oct. 27, 1956, in Neuenburg, Switzerland, scientists had cited some of my work on fluoride poisoning from drinking water. Subsequently, a Dr. T. Hürny of Bern, one of Switzerland's most vigorous promoters of fluoridation, quoted extensively from the A.D.A. dossier, which alleged that I had claimed to have discovered "Loeffler's Syndrome."<sup>134</sup>

Prof. Loeffler, a Swiss clinician, had described an un-

usual type of allergic pneumonia similar to, but not identical with, the allergic lung disease which I had first reported in 1934 in the A.M.A.'s *J. of Diseases of Children*.<sup>135</sup> At no time did I so much as imply that I was the discoverer of Loeffler's Syndrome. This maneuver was evidently intended to prejudice against me not only Prof. Loeffler but also his many friends and admirers present at the meeting. Subsequently I had an opportunity to explain to Prof. Loeffler that Dr. Hürny's story was a fabrication.

This experience represents one of the methods employed in fluoridation promotion to discredit opponent scientists in the eyes of their colleagues.

From Dr. deSenarclens, I received his entire collection of microscopic sections of organs and X-rays of his experimental animals. With this extraordinary gift, I could study the disease first hand, at leisure, in my home.

At Bedford College, a venerable girls' school in the heart of London, I had another fruitful visit. In its stone basement was located the laboratory of Dr. Margaret Murray, a biochemist who has studied fluoride's effect for many years.

She and two of her collaborators, Drs. J. Y. Bowie and G. Darlow,<sup>136</sup> had observed in cats that sodium fluoride profoundly inhibits the production of stomach juice. They reasoned that this discovery might possibly be utilized in treating stomach ulcer<sup>137</sup> which is usually accompanied by excessive stomach acidity. No such cure for stomach ulcer, however, materialized. Doses of fluoride which depressed the flow of stomach juice induced small hemorrhages in the lining of the stomach and in the upper bowels of their animals. My discussion of these experiments with Dr. Murray and her collaborators furnished an explanation for the stomach and bowel disturbances which I had frequently encountered in my patients afflicted with fluorosis from drinking water.

At that time I was not aware of other fluoride research

under way in London. Two British scientists, Drs. Arnold Sorsby and Ronald Harding at the Royal Eye Hospital of London, subsequently reported that fluoride in large doses damages the eyes. They injected sodium fluoride into the veins of rabbits and produced degeneration of the retina, the internal lining of the eye vital to vision.

Their work published in 1960 in the *British Journal of Ophthalmology* brought out a feature that runs through the fluoride literature: The eye disease which they produced did not occur in every animal so treated.<sup>138</sup> Only 17 of their 115 rabbits developed the disease. A protective mechanism must be present in some animals, lacking in others.

Competent eye specialists had determined that some patients with fluorosis were afflicted with beginning retinitis, a degenerative disease of the retina. Interestingly, only three out of thirty patients exhibited this disease.

Scientists have also focused attention upon how kidneys are affected in chronic fluorosis. A Danish dentist, Dr. J. J. Pindborg of Copenhagen<sup>139</sup> and Dr. A. L. Ogilvie, a scientist at the University of California, College of Dentistry,<sup>140</sup> demonstrated that the kidneys can be the site of extensive damage from fluoride. When fluoride was withheld from Dr. Pindborg's animals, the kidneys began to improve. Dr. Ogilvie's studies revealed damage likewise to the parotid gland which produces saliva, and to the pancreas, the gland involved in the production of insulin.

These experiments demonstrated that many organs are liable to be adversely affected by fluoride. Since thus far clinicians engaged in medical practice have not been alerted to the possible harm from fluoridated water, a physician encountering such illnesses would not be likely to link them with fluoride.

Important fluoride research has issued from a Japanese medical school, Tokushima University, near the Aso volcanic district where the water contains fluoride from 6 to 13 ppm.<sup>141</sup> Here Prof. Tokio Takamori and his co-workers

studied individuals with mottled teeth and fluoride-induced bone disease. In children with advanced mottling they found reduction in growth and development, changes in the blood and delay in the eruption of teeth.<sup>142</sup> They linked mottled teeth with a trend to heart disease.<sup>143</sup>

In pursuance of these observations, Prof. Takamori's teams carried out numerous animal experiments: They observed fluoride damage to heart muscle<sup>144</sup> especially in animals deficient in Vitamins A and D. They showed that fluoride decreases the energy building glycogen in the muscles,<sup>145</sup> and that it adversely affects the function of kidneys in rabbits.<sup>146</sup>

Dr. Mitsugi Hirao, another member of the group, produced anemia and abnormal changes in the bone marrow by fluoride.<sup>147</sup> He recorded an increase in blood platelets, an indication of a disturbance in the clotting mechanism of blood. These experiments correlate with observations which I have made on three patients with fluorosis whose blood platelets ranged from 625,000 to 1,230,000. — 250,000 is considered normal.

All these experiments were executed with Japanese thoroughness and efficiency. Nevertheless, they are rarely mentioned in U. S. medical publications.

Another body of fluoride research originated in France. In 1931 the veterinarian Dr. H. Velu observed mottled enamel in a large population group due to fluoride in Morocco's phosphate mines. His work stimulated other French scientists, Drs. A. Charnot, René Truhaut, H. Cristiani, and Dean René Fabre of the Faculté de Pharmacie, University of Paris, to explore the many complexities of fluorosis. Prof. Truhaut was one of the early students of fluoride in food.<sup>148</sup> Dr. Charnot observed that sodium fluoride administered to rats tends to harden the bones whereas calcium fluoride softens them.<sup>149</sup> He also noted deformities in rats born of mothers who had been fed fluoride in large doses (Fig. 21).

During my visit with Dr. Velu, he presented me with an

historical document, namely his sole remaining original article about the identification of "darmous" (fluorosis) in North Africa with fluoride. Because of his many personal annotations and comments this treatise constitutes another museum piece in my collection of documents on fluoride.

In the U. S. A. the extensive experimentation by Dr. J. C. Muhler, University of Indiana, and by Dr. Paul H. Phillips of the University of Wisconsin has contributed materially to our understanding of the absorption and storage of fluoride in the body under various conditions. Recently Dr. Muhler has been studying the effect of fluoride deposition in soft tissue. This research may eventually turn out to be of major importance in our understanding of fluoride's action. It points to damage to many organs which, heretofore, had not been related to fluoride.<sup>150</sup>

The wide variety of organs liable to damage by fluoride is further documented by Drs. Wm. Machle<sup>151</sup> and later, by H. E. Stokinger<sup>152</sup> at the Kettering Laboratory, who exposed guinea pigs, rats, rabbits and monkeys to fluoride fumes and produced serious damage to kidneys and liver. Some contracted ulcers in the mouth, others degenerative changes in the testicles. Unfortunately, the Kettering scientists did not proceed to relate their findings to human health by adequate follow-up studies on humans. As is so often the case in fluoride research, thoroughly executed and valuable animal experimentation could lead to significant progress in medicine, were the knowledge gleaned from it correlated with clinical observations on humans.

In addition to these experimental data, involving relatively large doses of fluoride, much research is available on damage in domestic animals from minute doses taken on a long term basis.

## 2. Domestic Animals

My first experience with the veterinary problem occurred during a visit with Prof. F. Liegeois at the Brussels

Veterinary School in 1958. Here I saw living examples of sheep poisoned by fluoride due to air contamination from nearby factories. Their teeth were brown and black, chipped off and worn down, their gums were swollen and ulcerated, their jaws diseased. I was impressed by the painful arthritic joints, by the visible protrusions on their bones called exostoses, by the declining nutritional state of the animals which eventually led to their death.

Prof. Liegeois had been studying fluoride's effect on the calcium metabolism. He showed me his collection of fluorosed bones and teeth. We discussed the manner in which fluoride affects the calcium balance in animals.

Subsequent conferences with Prof. Paul Phillips at the University of Wisconsin, Madison, Prof. C. F. (Shorty) Huffman at Michigan State University, Prof. F. Cohrs of the Veterinary Institute of Hanover, Germany, and Dr. A. L. Obell at the Veterinary Institute, Stockholm, Sweden, furnished me the opportunity to expand my knowledge about the manner in which airborne fluoride damages cattle, horses and sheep.

There is a persistent controversy among scientists on whether or not diarrhea, damage to hooves, reduction in milk, abortions, stillbirths and lack of fertility in cattle constitute a part of the picture of fluorosis.

Opinions and the interpretation of the available research data vary according to whether the scientist represents the farmer or industry. Much research on this subject has been designed expressly for the protection of corporations involved in litigation. Few studies have been made to protect the farmers' interests.

In damage suits against air contaminating industries the following conditions have rendered it difficult to assess correctly the available evidence:

- In exposed areas, there are always days or months when little or no fluoride is present in the air or on the forage. Fluoride determinations of hay or air samples taken

at such times are likely to convince the court that the amounts of airborne fluoride in the involved area were too low to have injured the cattle.

- Vegetation and livestock, many miles distant from an air contaminating factory may, under certain conditions, suffer as much or more than in areas closer to the source.<sup>87, 88</sup> Due to climatic and topographic conditions fallout of fluoride may occur far distant from a given factory, making it difficult to pinpoint the source of the trouble.

- The elaborate techniques used in studies sponsored by industry are so impressive to judge and jury that they are likely to overlook the fact that controls in such studies are invariably inadequate; that the limited number of experimental animals observed cannot reflect conditions throughout a large herd; that the extensive laboratory data quoted by industry-employed scientists are often meaningless because of the wide inconsistencies in fluoride metabolism, as noted in Chapter V.

In Scotland,<sup>153</sup> in India,<sup>154</sup> and at the University of Tennessee<sup>155</sup> experiments have been carried out to determine to what extent protective minerals lessen the threat of fluoride poisoning in cattle. Vitamin C, calcium, aluminum salts have been added to the animals' forage. Thus far, only limited success has been achieved in preventing fluorosis.

### 3. Poisoning in Humans

The background gleaned from animal experimentation and fluoride poisoning in domestic animals led to the third approach in my studies, namely the exploration of fluoride toxicity in man.

*Acute* poisoning can result from a single large dose of fluoride either swallowed or inhaled through the lungs. The bulk of cases reported in medical journals are accidents. Rodent exterminants, sodium fluoride or sodium silicofluoride, have been mistaken for an edible substance which

they resemble, such as salt, flour, sugar, starch, baking powder, powdered milk and laxative salts. Occasionally they have been intentionally used for homicidal or suicidal purposes. Two teaspoons of sodium fluoride or one teaspoon of sodium silicofluoride can cause severe illness and even death.

Acute poisoning from a single dose manifests itself at first with violent, bloody vomiting and extremely severe cramps in stomach and bowels. This stage is rarely attributed by physicians to its cause. It has been erroneously diagnosed as "ptomaine poisoning" or "intestinal flu." Subsequently the patient develops numbness and cramps in arms and legs, convulsions and shock.

When the victims come to autopsy, hemorrhages and erosions are found in the lining of the stomach and upper bowels. Little else can be considered characteristic of this kind of poisoning. As in other kinds of poisoning, blood and tissue fluid accumulate in the brain, kidneys, liver and other internal organs. Fluoride is found in the stomach and bowel content and in some of the internal organs. There may be excess fluoride in blood and urine. Also, low calcium levels in blood have been reported.

In a monograph entitled "Acute Fluoride Intoxication" published as Supplement 400 to *Acta Medica Scandinavica* in 1963, I have reviewed the essential data of this disease.

During the past thirty years, eleven mass poisonings have been recorded. Data on some appear in Table 9.

I have described one such mass poisoning. Fortunately it resulted in only one fatality:<sup>156</sup>

On December 19, 1960, at a Rotary dinner in St. Johns, Michigan, the cook mistook a can of roach powder which contained sodium fluoride for baking soda and added it to the dough of banana cakes. Forty to fifty persons became ill, mostly with minor stomach upsets. The cook, a sixty-nine year old woman, tried to relieve her own stomach distress by taking a few teaspoonsful of the same batch of

Table 9

MASS INTOXICATIONS BY FLUORIDE REPORTED IN THE MEDICAL LITERATURE

Authors who reported mass poisoning	Year	Where they took place	Fatalities	Sources
Heydrich	1935	Kiel, Germany	2 out of 14 who became ill	Sodium silicofluoride added to cake instead of sugar
Geiger	1936	San Francisco	3 out of 21	74% sodium fluoride added to pancakes
Anonymous	1940	Pittsburgh, Pa.	21 out of 40	Sodium fluoride mistaken for pancake flour
Lidbeck et al	1943	Salem, Oregon	47 out of 263	Roach powder in scrambled eggs—17 lbs. in 10 gal. of eggs
Black	1961	St. Johns, Mich.	1 out of 40-50	"Baking powder" in banana cakes

roach powder in the belief that it was sodium bicarbonate. She died within a few hours.

The most severe accident on record occurred in the Oregon State Hospital at Salem in 1943.<sup>157</sup> Two hundred sixty-three inmates took ill, forty-seven of them fatally, after eating scrambled eggs. An assistant of the cook had mixed approximately seventeen pounds of a poisonous compound with ten gallons of eggs. The identity of the poison, a roach powder containing 90 per cent sodium fluoride, was not established until approximately twenty-two hours had elapsed. This demonstrates how difficult it is to diagnose the cause of such mishaps. Only a few of the inmates had rejected the contaminated eggs because of a salty, soapy taste. Some complained of numbness of the mouth after swallowing the eggs.

Most fluoride compounds are tasteless and odorless and for this reason have been used for homicidal purposes. Through the courtesy of a Kansas City physician, I was able to study the autopsy material in two such homicides.

On October 14, 1959, a forty-three year old man and his

wife were rushed in a dying state to St. Luke's Hospital in Kansas City. Their daughter had added a few teaspoons of sodium fluoride to a grape drink. In the lining of their stomachs I observed the kind of ulceration which Dr. Murray in London had demonstrated to me in her experimental rabbits.

Among the unusual cases of poisoning related in the medical literature is the death of a three and one-half-year old girl who swallowed a pellet of rat poison which she thought was candy.<sup>158</sup> The amount of sodium fluosilicate was only about 0.6 grams, less than 1 quarter of a teaspoonful. At the other extreme, there is the case of an adolescent girl who had swallowed 35 grams, more than an ounce of sodium fluoride, to commit suicide.<sup>159</sup> Luckily she vomited most of it and thus survived after a stormy illness. These two instances illustrate the wide differences in the fatal dose from person to person. Whether or not poisoning occurs is influenced by the particular compound, the patient's age, his individual response, the promptness and amount of re-gurgitation following the accident, and other factors.

In several cases on record the poison did not adversely affect the stomach: A thirty-nine year old patient, hours after he had swallowed the poison, suddenly developed shock and convulsions. He died without any warning.<sup>160</sup>

During their convulsions, these patients retain full consciousness. This suggests that the seizures are not epileptic but so-called tetaniform convulsions due to low calcium levels in blood of the type previously described in my patient from Saginaw (page 105) due to persistent intake of minute amounts of fluoride in water.

In several of the poisoning cases reported in medical journals the illness was dominated by hives. Fluoride like the other halogens can produce various kinds of allergic phenomena.<sup>156,188a</sup>

In contrast to *acute* fluoride poisoning with large doses, the medical reports on *chronic* poisoning from persistent

intake of minute doses are principally concerned with teeth and bones.

In industry, only a limited number of cases of poisoning due to fluoride as an air contaminant have come to light. For understandable reasons, industrial physicians who encounter such cases avoid publicity. They rarely report them in medical journals. If litigation is threatened, the case is usually settled out of court.

In addition to Roholm's classic description, a few instances have been recorded from Scotland,<sup>161</sup> Norway,<sup>162</sup> and in the U.S.A.<sup>163</sup> Damage to health is minimized in these reports. Essential details are lacking.

Abnormal bone changes were demonstrable by X-ray<sup>161</sup> in 56 out of 437 workers in an aluminum plant near Fort William, Scotland. As in Roholm's cases, some workers complained of stomach and intestinal disorders and of cough. However, no attempts were made to carry out detailed clinical studies concerning these complaints. Perhaps it was not realized at that time that stomach disorders constitute a major part of chronic fluoride poisoning. Interestingly, school children living near the Fort William factory, exposed to fluoride fumes, had mottled teeth.

The first report of fluorosis from drinking water came in 1935 from Dr. F. Speder, an X-ray specialist of Casablanca, French Morocco. He described in detail<sup>164</sup> the bone changes in seven cases in the Moroccan phosphate areas. He attributed the disease to fluoride in food and water. He also observed extensive calcium deposits in lymph glands throughout the body.

About the same time (1937), a British health officer, Dr. H. E. Shortt,<sup>165</sup> discovered an extensive belt of fluorosis in southern India. This led to investigations of dental and skeletal fluorosis by a team of scientists under the leadership of Prof. C. G. Pandit. Most wells in the area contained less than 3 ppm of fluoride, but some as much as 6.7 ppm.

Subsequently, numerous medical reports of serious crippling from fluoride naturally in water have appeared from India, Italy, South Africa, East Africa, Argentina, Arabia, China and Japan (Table 10). In India, large segments of the population are affected. In recent years, Dr. A. H. Siddiqui<sup>166</sup> of Hyderabad first carried out systematic studies.

Seven of his thirty-two cases from the Nalgonda area showed evidence of hearing disturbances, others of kidney disease. The concentration of fluoride in water ranged from 5.2 to 11.8 ppm.

Table 10  
REPORTS OF FLUOROSIS IN NATURAL FLUORIDE AREAS

Authors	Country	Number of Cases	F <sup>-</sup> in PPM In Water
Speder 1936	Morocco	7	
Di Cio et al 1939	Argentina	1	
Capizzano et al 1939	Argentina	9	
Mascheroni-Reussi 1940	Argentina	3	2, 15, 16
Pandit et al 1940	India	887	0.6 to 6.7*
Silva et al 1940	Argentina	34	
Ockerse 1941	S. Africa	8	11.78
Linsman-McMurray 1943	Texas, U.S.A.	1	1.2 to 5.7
Raffaele 1944	Argentina	1	
Khan-Wig 1945	India	1	"very high"
Lyth 1946	China	4	2.4 to 13.1
Frada-Mentesana 1953	Sicily	49	3.0 to 5.0
Walters 1954	Arabia	9	2.0 to 8.0
Hamamoto 1954	Japan	25	6.0 to 13.0
Garibaldi 1954	Italy	2	3.0
Murthi 1955	India	1	1.2 to 11
Rao 1955	India	1	7.2
Siddiqui 1955	India	32	5.2 to 11.8
Nalbone-Parlato 1957	Italy	1	5
Werbelloff-Sender 1958	S. Africa	1	
Fichardt et al 1958	S. Africa	1	1.2 to 14
Odenthal-Wieneke 1959	Germany	1	7.5
Azar et al 1961	Arabia	2	0.8 to 3.45
Pinet et al 1961	N. Africa (Souf)	49	
Jackson 1962	S. Africa	22	2.6 to 13.0
Singh et al 1963	Panjab, India	55	1.2 to 14.2
Kumar and Kemp-Harper 1963	Arabia	19	6.0(asNaF)
Frada et al 1963	Sicily	63	Up to 5.2

\*Mainly 1 to 3 ppm

For references see Waldbott<sup>84</sup>

Table 11

Author	COUNTRY	INCIDENCE OF FLUOROSIS F- Content of Water Supply In PPM	No. of Inhabitants	Afflicted with Fluorosis
Macheroni, Reussi <sup>148</sup>	Argentina	not stated	154	14 or 9%
Hammamoto et al <sup>141</sup>	Japan	6 to 13	247	25 or 10%
Pandit et al <sup>60</sup>	India	0.6 to 6.7*	1192	887 or 74.4%

\* Mainly 1 to 3 ppm.

In 1958, Prof. A. Singh's attention was drawn to fluoride when he investigated the cause of palsy in 200 patients, twenty-one of whom were seriously crippled with spinal arthritis and paralysis of arms and legs. Their bones were thickened, ligaments and tendons calcified (Fig. 20-25). Fluoride concentration in bones ranged from 700 to 7000 ppm (dry weight); in urine from 2.3 to 13.4 ppm and blood from 0.5 to 6.1 ppm (average 1.5 ppm). Prof. Singh observed an unusual condition on the teeth of his cases. Bone-like deposits at the outer surface of the roots tended to loosen the teeth in their sockets, predisposing them to gum disease (Fig. 2).<sup>167</sup>

From a different part of the world, an oasis in the Sahara, comes a similar report by Dr. Pinet and co-workers.<sup>168</sup> Here the water contains between 2.8 and 4 ppm of fluoride naturally. Because of extreme heat, inhabitants drink more than average amounts of water. A detailed diagrammatic description of the bone changes in the spine disclosed a disease process closely resembling the spinal changes frequently encountered in old age, in our country, where it is attributed to aging.

In other tropical areas such as Saudi Arabia, Dr. H. A. Azar and co-workers<sup>93</sup> were confronted with fluorosis of bones from drinking water containing as little fluoride as 0.8 to 3.4 ppm.

In Italy's volcanic areas near Mt. Vesuvius and Mt. Etna, conditions differ from those in the tropics. Here the climate is moderate; people do not drink excessive amounts of water. Malnourishment which tends to aggravate fluorosis is not more frequent than in many areas of the U.S.A.

## ILLUSTRATIONS

### 22. SKELETAL FLUOROSIS

X-ray of forearm in skeletal fluorosis from Northern Sicily where water contains fluoride naturally at 3 to 5 ppm. The grotesque protrusions from the surface of the bone represent newly formed bone of poor quality. The marked density of bone in the center narrows the bone marrow space and tends to interfere with its activity of forming blood corpuscles. Courtesy, Dr. G. Nalbone.

### 23. SKELETAL FLUOROSIS

The ligament between the two bones of the forearm is a favorite seat for new bone formation in fluorosis. Courtesy, Dr. L. Werbeloff, Groote Schuur Hospital, Cape Town, South Africa.

### 27. CALCIFIED ARTERY IN FLUOROSIS

Linear shadow at left of bones represents calcification (hardening) of an artery. Similar cases reported in patients at only twenty-five years of age. Courtesy, Dr. G. Nalbone.

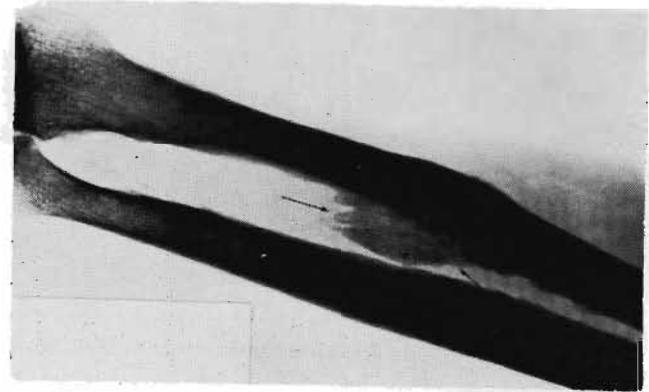
### KENHARDT'S DISEASE

Bone deformities reported from Kenhardt, South Africa, simulate, but are unrelated to, rickets. They were proven to be caused by fluoride naturally in water.

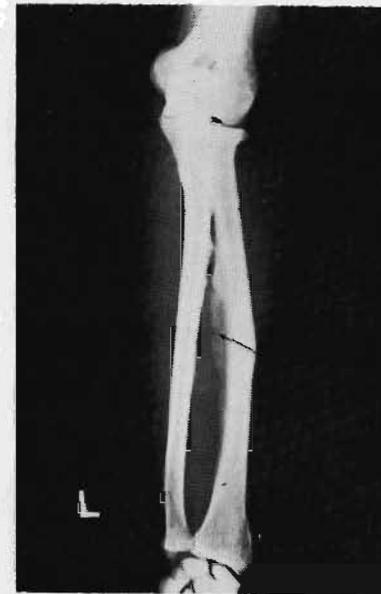
31a. Initial stage in a two and one half year old colored girl whose mother had been drinking 2.6 ppm fluoride in water for several years prior to child's birth. The girl has been drinking this water since birth.

31b. Twelve year old boy with the same history as case "31a."

31c. Advanced stage in a four year old girl. For the first three years after birth she drank water containing 10 ppm fluoride; subsequently water with 4 ppm of fluoride. Courtesy, Professor D. G. Steyn, Atomic Energy Board, Pretoria, South Africa.



22



23



27

Kenhardt's Disease



31a



31c



31b

Yet in Italy fluorosis is common. In 1961, Prof. G. Frada, University of Palermo, afforded me an opportunity to examine some of his patients. He and members of his staff escorted me to several villages of northern Sicily where the water supplies naturally contained fluoride between 3 and 6 ppm. These patients had characteristic arthritis in the spine and other joints. Many had chronic stomach and bowel disturbances. Prof. Frada<sup>169</sup> has recently been studying premature calcification of arteries in his country as reported in *Minerva Medica*, 1963, a heretofore completely unexplored area in fluoride research. Like hardening of ligaments, calcification of arteries prevalent in aging persons might conceivably be related to a gradual accumulation of fluoride throughout a person's lifetime.

Judging from the many reports, fluorosis assumes a different picture depending upon where it occurs.

Such variations are not unexpected from area to area. They can be accounted for by the mode of living in the respective countries, the general state of nutrition, ingredients other than fluoride in water and soil. In India where malnutrition and unsanitary conditions prevail, palsy of arms and legs is more prevalent than in other countries. In southern Italy where people live largely on fish, fruit and spaghetti, about one-half of the cases are afflicted with stomach and bowel disorders, whereas palsy is rare. In North Africa dates and bananas are the staple food. Here the changes in the skeleton occur early; few, if any, other disturbances are described. In the Kenhardt area of Africa, a disease has been described characterized by deformities in the legs resembling rickets and causing rheumatic pains.<sup>170</sup> (Fig. 31). Scientists have been searching for some other factor prevailing in that area which they believe potentiates and modifies the effect of fluoride in water.

In discussing fluorosis from drinking water in the U.S.A. it is desirable to review the death of the twenty-two year old soldier, previously mentioned,<sup>44</sup> who had resided in

three Texas cities most of his life where fluoride in water ranged from 1.2 to 5.7 ppm (Table 12).

Table 12  
FLUORIDE CONCENTRATION IN WATER  
IN THE LINSMAN-McMURRAY FATALITY

The soldier resided for where water contained fluoride at PPM	7 yrs.	2 yrs.	7 yrs.	2 yrs.	3 yrs.	(Average Per year)
Misprinted version:	12.0	5.7	4.4	trace	4.4	(6.6)
Corrected version:	1.2	5.7	4.4	trace	4.4	(3.4)

In the Army Hospital in San Antonio, where he was admitted because of a chalazion (stye), routine X-rays disclosed extensive calcium deposits in bones, joints and ligaments, particularly where muscles are attached to the bones. The soldier eventually succumbed to a kidney ailment. At autopsy, his bones showed an extraordinary accumulation of fluoride, as much as 8,000 ppm (Fig. 26).

A lively controversy has arisen regarding the cause of his death. Proof that fluoride in water was responsible for the fatal kidney disease would constitute the most potent indictment of fluoridation. The attending physician, Dr. Joseph Linsman, stated that he was unable to decide whether or not the kidney disease was due to excess fluoride intake.

At the age of fifteen the patient had suffered an injury to one of the kidneys. Had there been permanent kidney damage the Army would have rejected him for service. Furthermore, only *one* kidney had been injured whereas at autopsy *both* kidneys had nearly completely disintegrated. As a rule, damage to one kidney does not harm the other. Since research shows that fluoride naturally in water does damage kidneys,<sup>166,171</sup> it is logical to conclude that fluoride caused death. Nevertheless, whether fluoride originated the kidney disease or whether the weakened kidney, unable to efficiently eliminate fluoride from the system, led to fluoride poisoning is like deciding which comes first—the chicken or the egg.

There was another bone of contention: The concentration recommended for fluoridation is 1 to 1.2 ppm. Had this man, with one damaged kidney, died of fluoride poisoning precipitated by drinking water containing fluoride naturally at 1.2 to 5.7 ppm, it would demonstrate that fluoridation provides no margin of safety.

The P.H.S. literature quoted the concentration of fluoride in the town of Spur, Texas, at 12.0 ppm. Dr. Cox, the originator of fluoridation referred to this case<sup>172</sup> in the *Journal of the American Dental Association* as one "with a history of exposure to 12 ppm in water." During my search of the literature I learned that the original report in the *Journal of Radiology*<sup>44</sup> contained a printing error. In a subsequent issue of the same *Journal*, Vol. 41, page 497, Drs. Linsman and McMurray had corrected the 12 ppm concentration to 1.2\* ppm (Table 12).

This is a horse of a different color. 1.2 ppm is the concentration widely proclaimed by the U.S.P.H.S. as absolutely safe. Even after the error was publicly called to the attention of the P.H.S., their scientists continued to cite 12.0 ppm in their article<sup>173</sup> as the correct figure.

The erroneous "12 ppm" served as a powerful propaganda weapon in the promotion of fluoridation. Strange as it may seem, this misprint was utilized, on one occasion, to raise doubts regarding my intellectual honesty:

I had submitted an article on fluoride's effect to the *Michigan State Medical Journal* in 1955. I mentioned the Linsman-McMurray case, using the corrected 1.2 ppm concentration. The Michigan State Health Department showed the editor the original article with its misprint of 12.0 ppm, thereby implying that I was the one who had intentionally distorted the truth.\*\* The editor failed to personally check

\* A later report by the U.S.P.H.S.<sup>89</sup> gives 2 figures for the fluoride concentration in Spur, namely 1.4 to 3.1 ppm.

\*\* Dr. Wilfred Haughey, Editor *Mich. State Med. Journ.* to Dr. G. L. W. 4/22/55.

the page in the journal, cited in my bibliography, on which the correction had appeared — and refrained from publishing my article.

There was another sidelight to this case. The late Dr. F. F. Heyroth, P.H.S., and Kettering Laboratory scientist, after stating in his review article that the Linsman-McMurray case occurred from drinking water containing fluoride at 4.4-12 ppm, mentioned that “a somewhat similar case had been reported from South America.”<sup>174</sup> His wording led the reader to conclude that the fluoride concentration in the second case was near 12.0 ppm—far above the so-called safe concentration—not around 2 ppm as reported by the Argentinian author.<sup>45</sup>

In the promotional literature the high concentration implied a wide margin of safety to the medical and dental profession and that there could not possibly be any harm at 1 ppm. Dr. G. F. Lull, Secretary of the AMA, must have based his opinion on the alleged high natural fluoride concentration of water in the two cases when he wrote to me on April 23, 1954.

“It is a well known fact, however, that no untoward effects are shown in individuals taking as high as 10 parts per million in the water supply.”

For years I attempted to obtain the original Argentinian publication and to communicate with its senior author, Prof. C. Reussi of Buenos Aires. I finally obtained copies of his article through the Argentinian Embassy. To my delight it was accompanied by another carefully documented case report by Dr. J. F. Raffaele<sup>175</sup> of the same city. Both articles had been written to warn Argentinian citizens against the hazards of fluoride in water.

By a strange coincidence, within a week after I had received the two documents, at the International Congress of Internal Medicine in Philadelphia in 1958, I came face to face with a gentleman on whose lapel I read the name “Reussi”. He was amazed to find someone in this far away

land who had been looking for him for so many years. Stimulating discussions with Dr. Reussi followed about this and eight other cases of fluoride poisoning which he and his colleagues had described.

Dr. Reussi's case was a twenty-three year old woman with an ectopic bladder, a birth defect in which the bladder was misplaced outside the abdominal wall. It had induced a kidney disease which caused greater than average skeletal storage of fluoride. Unfortunately, in the two cases, those of Linsman-McMurray and of Reussi, organs other than bones were not analyzed for their fluoride content. Just how much fluoride had accumulated elsewhere in the body, particularly in this patient with a lifelong kidney disease, would have been of extraordinary interest.

In their survey of 117 persons in a natural fluoride area, Drs. Reussi and Macheroni<sup>45</sup> found nine with marked skeletal changes.

Dr. Raffaele's case was a young man with extensive arthritis of the spine associated with severe pains. His higher than normal blood calcium level indicated a disturbance of the vital calcium-metabolism which Dr. Raffaele attributed to fluoride.

The data on experimental fluoride poisoning; the personal observations which I had made on fluorosis in domestic animals; the extensive study of acute poisoning in humans, especially the nature of stomach and bowel disorders and the occurrence of hives, an allergic condition; finally, a careful review of the many scientific papers on chronic poisoning, gave me the desired background to interpret what I had observed clinically. With this background, I proceeded with my research. Particularly I sought means to establish criteria on how to distinguish chronic fluoride poisoning from the various ailments which simulate it.

## CHAPTER NINE

### FACING THE PUBLIC

Once I had acquired some knowledge on fluoride, it was inevitable that I would be dragged into the political controversy whether I liked it or not. My first experience in addressing a public gathering on fluoridation turned out to be embarrassing.

A lady, obviously cultured and intelligent, phoned me from Akron, Ohio. Could I address a friendly group of citizens at her home, she asked. Her name was Mrs. Irene Harrison. She had contacted several Akron physicians opposed to fluoridation but none felt qualified to speak. One of them had suggested my name to her. He had learned that I was studying the subject.

I saw nothing wrong with acceding to her request. My medical society had asked me many times to address lay groups on the subject of allergy. Scientists in favor of fluoridation were constantly addressing lay groups.

I was somewhat taken aback when she asked what fee I would expect for speaking. Fluoridation had interested me as a scientist. I had been looking into it in order to satisfy my intellectual curiosity. I would not expect to be recompensed for speaking on this subject.

When Mrs. Waldbott and I arrived at Akron's airport, a chauffeur with a Cadillac awaited us. He drove us to a palatial mansion in the center of Akron. Mrs. Harrison, he said, was the daughter of F. A. Seiberling, founder of the Goodyear Tire and Rubber Company and the Seiberling Rubber Company.

The home, baronial Stan Hywet Hall, reminded us of an English castle. It was set far back from the road, with stately lawn, majestic trees, formal gardens and statues. Mrs. Harrison welcomed us and showed us to our room. The furnishings were replete with antique art pieces, paintings and sculptures by old masters, every one a collector's item.

My wife was so intrigued by what she saw that her mind wandered far afield from fluoridation. She even failed to note the way up the spacious stairway, through the corridors to the bedroom assigned to us. Later, upon retiring, she had difficulty in finding her bedroom.

At dinner we met Mrs. Harrison's brother, Mr. Seiberling, and other invited guests. The dinner conversation turned toward antiques and the history of the place. The Seiberlings had personally selected most of the art treasures on their frequent European trips. The mansion, the park, and the antiques were about to be donated to the City of Akron. F. A. Seiberling, the father, now in his late nineties, was confined to bed in a wing of the home, with nurses in constant attendance.

His son narrated how F. A. Seiberling, after many ups and downs in business, had bought an old rickety plant in Akron with \$13,500 of borrowed money. Here he built bicycle tires by hand. He named his company after the founder of the rubber industry, Charles Goodyear, an Englishman, who died penniless in 1860. F. A. struggled from day to day to meet his payrolls and to defray the cost of materials. With the advent of the automobile tire he climbed to success. Then came the depression years, 1920-21. The company went into the red to the tune of sixty million dollars. An eastern banking house, after long and frustrating negotiations, provided new working capital. With it went control of the company. Mr. Seiberling was squeezed out, soon to found his own rubber company.

While this conversation was going on, people began to

arrive. They made their way into the mansion's spacious ballroom where an organ recital was under way.

I had consented to share the rostrum with a Mr. Rollin Severance from Saginaw, Michigan, whom I had met at dinner that evening for the first time. He was a successful tool manufacturer, most fastidious about the accuracy of his statements. He had rallied a group of Saginaw citizens to the cause against fluoridation. This brought upon him the usual fate of opponent leaders: A violent campaign by members of the dental profession to disparage him.

As first speaker, I confined my discussion to the scientific data I had gleaned in my survey of the literature.

Mr. Severance's talk focussed upon an extraordinary document which he had just secured: The Minutes of the Fourth Annual Conference of State and Territorial Dental Health Directors with the P.H.S. and the Children's Bureau in Washington, D. C. June 6 to 8, 1951.<sup>69</sup>

He had contacted numerous government agencies for a photostat of these minutes. Finally, he was told Sept. 22, 1953, by L. H. April, Chief, Public Inquiries Branch, P.H.S., that the minutes "were recorded for administrative use only, and are not available for distribution." Following the initial release, the minutes were designated strictly "classified." Eventually Mr. Severance did secure a photocopy from a Seattle citizen whose Congressman, T. M. Pelly, had given her the copy assigned to him. This document revealed facts vital to the understanding of the promotion of fluoridation.

At the Conference, J. W. Knutson, D.D.S., Asst. Surgeon General, Chief, Division of Dental Public Health, presided. Surgeon General Leonard Scheele made welcoming remarks. The late Frank Bull, D.D.S., Wisconsin Dental Health Director, briefed his fellow state dental health directors on how to put fluoridation across in communities. Dr. Bull instructed those at the Conference how to "build a fire under" the local medical and dental societies,

how to obtain endorsements, how to win the press, how to use civic organizations ("The PTA is a honey when it comes to fluoridation"—page 45 of the *Minutes*), how to persuade chemists and engineers (he referred to them as "astrologers") and how to play one group against another. He advised the attending health officials to ridicule all opposition.

In their enthusiasm for a new project this kind of promotion would not have been objectionable had the Conferrees not acknowledged at the same time that they had no convincing evidence of fluoridation's efficacy in prevention of tooth decay nor had they proof that it was safe.

"This toxicity question," Dr. Bull acknowledged, "is a difficult one. I can't give you the answer on it." "When you get the answer. . . please write to me at once, because I would like to know" (page 25).

At the Conference Dr. Bull acknowledged that there was vigorous opposition to fluoridation by many scientists (pages 53-55). He told his colleagues concerning the defect of tooth enamel known as mottling, the first sign of chronic systemic poisoning by fluoride: Describe such teeth due to drinking fluoridated water as "pearly egg shell white," and as "the most beautiful teeth that anyone ever had" (page 21).

"We don't say there is no such thing as fluorosis even at 1.2 parts per million which we are recommending (page 24). We have got to have an answer. Maybe you have a better one."

Mr. F. J. Maier, senior sanitary engineer, Division of Public Health, disclosed that a considerable number of children drinking fluoridated water would have mottled teeth: "Some 10 to 20 per cent fluorosis in a fluoridated community would not be objectionable" (page 65), he said. An even larger percentage of mottling has now been officially reported in the experimental cities as shown in Table 13, composed from data gleaned exclusively from dental and

Table 13  
INCIDENCE OF MOTTLED TEETH DUE TO FLUORIDES IN WATER

City	PPM Fluoride in Water	Children Examined	Mottling Observed	Degree of Mottling	Reference
Newburgh, N. Y.	1.2	438	17.8%	46 questionable 26 very mild 6 mild	Journal Amer. Dent. Ass'n Vol. 52, page 323, 1956
Grand Rapids, Mich.	1.0	419	23.39%	61 questionable 30 very mild 7 mild	Journal Amer. Dent. Ass'n Vol. 65, page 611, 1962
Kewanee, Ill.	0.9	123	47.2%	43 questionable 13 very mild 2 mild	P.H.S. Publ. 825, page 131, 1962
Chandler, Ariz.	0.8	95	57.8%	37 questionable 9 very mild 6 mild 2 moderate	P.H.S. Publ. 825, page 79, 1962
Tucson, Ariz.	0.7	316	62.02%	143 questionable 38 very mild 10 mild	Public Health Reports Vol. 68, page 503, 1953
Marion, Ohio	0.4	263	42.2%	5 moderate 96 questionable 13 very mild 2 mild	P.H. Rep. Vol. 57, page 1165, 1942

According to H. T. Dean, "Classification of Mottled Enamel Diagnosis," Journal American Dental Association 21: 1421-26, August, 1934, "very mild" indicates that 25% of the tooth's surface has been adversely affected; "mild" 50%; "moderate" the entire surface. "Severe" mottling denotes corrosion, pits deeper and often confluent, stains widespread, ranging from chocolate brown to almost black. The above data pertaining to the same survey first appeared in Public Health Reports August 7, 1942. Some have been reprinted in P. H. Reports Vol. 68, pages 503 and 504 and in P.H.S. publication 825, 1962.

public health publications. In Grand Rapids, Michigan, after seventeen years of fluoridation 19.3% of white and 40.2% of Negro children had "fluoride opacities" (mottled teeth) according to the *Journ. of the American Dental Assoc.*, Vol. 65, page 610, 1962.

"We never use the term 'artificial fluoridation,'" Dr. Bull cautioned: "There is something about that term that means a phoney—we call it 'controlled fluoridation'" (page 24). Dr. Bull advised his fellow dental directors that, no matter what developed, fluoridation must always be hailed as a great success: "Now, why should we do a pre-fluoridation survey? Is it to find out if fluoridation works? We have told the public it works, so we cannot go back on that" (page 35).

The conferees established a policy of bypassing citizens' wishes in the matter. They advocated that fluoridation should not be submitted to a vote:

"If you can, I say if you can because five times we have not been able to do it, keep fluoridation from going to a referendum" (page 47), Dr. Bull advised.

All this constituted reason enough for designating the Minutes of this Conference strictly classified. It is worthy of note that every one of the directives laid down at this Conference was subsequently carried out to the letter not only in the U.S.A. but throughout the world.

In reporting this briefing session to the citizens assembled in the ballroom that night, Mr. Severance harshly criticized health officials who participated at the Conference for disregarding the fate of individual citizens.

The next day, the May 25, 1954, Akron *Beacon Journal* repeated the term "quack" used by Mr. Severance to designate one of the health officials. Since I had shared the same platform, readers of the account were bound to infer that I too approved of this designation for the official in question. It implied to the readers of the *Beacon* that all professional men promoting fluoridation were included.

This episode embarrassed me no end. It has caused some of my Akron colleagues to look upon me with disdain even to this day.

A feature deserving special attention in Mr. Severance's talk was his reference to the Grand Rapids mortality statistics. He had studied the death rates in Grand Rapids, Mich., fluoridated since 1945. According to the 1950 U. S. Census, deaths in Grand Rapids, the most widely publicized experimental town, had risen sharply after 4 years of fluoridation. Deaths from heart disease, cancer, intra-cranial (brain) disease, diabetes and hardening of the arteries had increased from 25 to 50 per cent over those in Michigan as a whole. This information was published in the *Grand Rapids Press* on July 28, 1955.

Four separate efforts had been made by the health department to explain the rise in mortality:

1. The data were retabulated under new headings according to anatomical location of the respective disease. This relieved the load of deaths in the cancer category. For instance, cancer of the stomach and of the brain were no longer tabulated as cancer but as disease of the stomach or as "intra-cranial lesions," meaning any disease above the jaw.<sup>176</sup>

2. The Health Department claimed that the rise in deaths was due to an increase in population. However, Dr. A. L. Miller, U. S. Congressman, formerly Nebraska State Health Commissioner, pointed out that between the 1940 and 1950 U. S. census the Grand Rapids population had increased by only 7.8 per cent,\* deaths by 25 to 50 per cent.<sup>177</sup>

In order to counter this evidence, the Grand Rapids Health Department presented revised Michigan population figures. To provide an increase in population corresponding

\* Miller, Dr. A. L., U. S. Representative from Nebraska, former Nebr. Health Commissioner to Prothro, Dr. W. B., Director Dept. of Publ. Hlth., Grand Rapids, Mich., May 26, 1952.

with the increase in deaths, five different methods of estimating were used between 1940 and 1950. They implied a general exodus of people from Grand Rapids in the early 40's and a corresponding influx back to the city just prior to the '50's. However, Mr. Severance checked the school census records in order to determine whether such a migration had occurred. He proved that no substantial change in population had taken place during these years, thus voiding the health department's claim.

3. The health department made another claim: The high death rate pertained to all of Kent County instead of solely to Grand Rapids.

Before fluoridation, according to the official U. S. vital statistics, the death rate in Grand Rapids and in the balance of its Kent County was practically the same as the national average. Had the death rate in Grand Rapids followed the pattern of the nonfluoridated portion of Kent County, there would have been some 600 less deaths in the city\* by 1950 after four years of fluoridation.

4. Finally the Grand Rapids Health Department claimed that *prior* to fluoridation the Grand Rapids death rate had been higher than the U.S.A. averages.

Again Mr. Severance demonstrated no significant differences in the ratio of city deaths to deaths in the county at the time of the 1940 census, but a radical difference in 1950. Using official figures, he revealed that in 1950 three out of ten of all city deaths were in excess of the 1939-40 city-county ratio.

\* San Francisco (partially fluoridated since August 2, 1952; completely since July, 1955) is another U. S. city where comparisons with nonfluoridated surrounding areas are possible. According to the *San Francisco News-Call Bulletin*, page 23, Dr. Ellis Sox, City Health Commissioner, reported on July 29, 1964, that San Francisco continues to have the highest death rate and lowest birth rate in the state and nation. The nonfluoridated Bay area death rates, per 1000 population in 1963, were 9.3 in Alameda County, 6.5 in Marin, 6.6 in San Mateo — against 13.3 in San Francisco, the *Bulletin* stated.

Regardless of what position one takes on this question, Mr. Severance deserves credit for having brought these facts into the open and to the attention of the public.

A few months after the Akron meeting I consented to appear at one of the Toledo radio stations. I, alone, was to debate fluoridation with two proponents. As I later came to recognize, this arrangement is routine in fluoridation promotion—one opponent pitted against two or three proponents. One of the proponents happened to be a friend of mine, an allergist. He was president of the local medical society. A few years previously he had taken care of my practice during my absence from Detroit. Here, I felt, was my opportunity to convince my friend of the project's hazards. He had known me for years. He was fully conversant with the calibre of my research in allergy. His allergic patients as well as mine would be among the first to suffer damage from fluoride. Yet, to my dismay, I learned that he was unwilling to listen—his mind was made up. Prior to my arrival he had already taken such a strong position in favor of fluoridation that his viewpoint seemed to be unalterable.

In Dayton, Ohio, several opponent physicians asked me to speak over the radio. One of them, employed in a hospital, soon realized that his position might be jeopardized by openly opposing the Public Health Service. The other members, due to protests by local dentists, were summoned to appear before their medical society. This dampened their enthusiasm for publicly expressing their convictions.

I was to debate the issue at a radio station with a P.H.S. official who had initiated the drive for fluoridation shortly after he had moved to Dayton. The station's policy was to discuss the format of the broadcast sufficiently in advance to satisfy all participants. I arrived early as instructed. However, neither of the two commentators showed up until actual broadcast time. This made it impossible for me

to forestall a rigged setup. Some of the questions posed were loaded.

Again I asked myself, should I continue to expose myself to repeated embarrassment in public? The research in which I was engaged was bound to suffer if I became politically involved. Moreover, I was not given to politics nor to the quick repartee needed in the political arena. I would be continuously exposed to the innuendo of professional politicians.

Yet, citizens in numerous cities were anxious to obtain data on fluoridation which were not accessible through the usual news media. Since practically all research grants originated with proponent organizations or promoting industry there were few scientists with research experience to present the opponent case. True, numerous physicians were opposed to fluoridation, but they dared not register their views openly. Some lay persons had accumulated a wealth of valid data. They were amply qualified to debate the subject with proponent scientists and to competently counter their claims. Unfortunately they lacked the titles and degrees necessary to impress the American public. How could I refuse these people?

In pondering this question I could not help recalling an experience which occurred in October, 1954. A. E. Seyler, D. D. S., the representative of a Detroit dental society rang the doorbell of my home. He had learned that I had encountered cases of poisoning from fluoridated drinking water. He and his colleagues, he told me, were eager to learn about my research. Would I honor them by appearing at a meeting of the Eastern Dental Club at the Whittier Hotel, November 1, 1954?

I had reason to be suspicious of his motives. Why would a dentist, especially the leading promoter in the Grosse Pointe area, be interested in this purely medical subject? I had already asked several medical societies for an oppor-

tunity to present my data to the general membership. They had not taken any action.

Dr. Seyler assured me that my work was of vital interest to dentists.

Would I be the only speaker, I inquired?

No, he replied, there would be two discussants, one an official of the American Dental Association in Chicago, the other from the Michigan State Health Department, Lansing. I was confronted with the arrangement, two against one, customary in fluoridation promotion.

Nevertheless, his proposition intrigued me. I assumed that the two men would be scientists. I was so sure of my subject that I would not have hesitated to tackle an Albert Einstein.

I volunteered to limit my presentation to twenty minutes. Dr. Seyler's plan that each of the discussants be given time equal to that allotted to me did not seem fair, in view of the fact that the meeting, according to Dr. Seyler, was scheduled for the purpose of featuring my evidence. Why should the discussion consume twice as much time as my presentation? Dr. Seyler pointed out that the two gentlemen were coming a long way, one from Chicago, the other from Lansing. Eventually I acceded to his persuasive arguments.

I asked for assurance that each speaker be held to his time limit and that my full qualifications be read as I presented them to him so that the dentists would learn about my scientific training and background in research.

This Dr. Seyler promised me faithfully.

On my arrival at the Whittier Hotel, J. Roy Doty, Ph.D., Secretary of the American Dental Association's Council on Dental Therapeutics was briefing the Dental Club's officers on how to conduct the meeting.

The Chairman introduced his Chicago guest with much oratory about his former positions, accomplishments, background and qualifications. Based on elaborate graphs and

charts difficult for many to comprehend, Dr. Doty gave a lengthy discourse on the "great benefits" of fluoridation. He took considerably more time than the 20 minutes allotted to him. The next speaker, Chester Tossy, D.D.S., dental health official and promoter of fluoridation for the Michigan State Health Department, with little or no research experience on fluoride, read a speech prepared by his department. It implied that practically every statement made by me in my survey of the scientific literature on fluoride misconstrued or distorted the available evidence. It was designed to convince the audience that I was not only incompetent but medically dishonest. By the time the two speakers had finished, many in the audience had heard enough and began to leave. Whatever I said fell on deaf ears.

My qualifications were not read. The Chairman introduced me about as follows:

"Our next speaker will be Dr. G. L. Waldbott, a Detroit physician who has also carried out some research."

After I had finished, the two men who had already used much more than their allotted time proceeded to downgrade my work further. It was close to midnight when, as a gesture of fairness, I was given a chance for rebuttal in a near empty hall. The misinformation about my data had been so overwhelming and all-encompassing and the hour was so late that an attempt to reply would have been futile. With slight variations the pattern of this meeting has been repeated wherever dentists or scientists have dared to publicly face proponents.

The meeting had achieved its purpose. Some of my friends who, prior to the meeting, had studied the scientific articles from which I had quoted were now so confused that they felt impelled to re-examine them. They wondered whether the printed words which they had read in scientific documents had disappeared from the pages.

To crown the performance, the chairman handed me a

gallon bottle of whisky, a token of his society's appreciation of my eagerness to be led to the slaughter. I had no choice but to accept it. To refuse would have been ungracious.

The bottle stood untouched for several years in a cupboard of my home as no member of the family cared to be reminded of that occasion. One morning I noticed that all but a few drops of the whisky was gone. A maid had just been discharged because of the strong odor of liquor that had permeated our home too often when she was around. At least someone had profited from my discourse on fluoridation before the Eastern Dental Club at the Whittier Hotel.

The following fall brought another disappointing experience in Oroville, California. I was to appear before the State Public Utilities Commission Oct. 20 to 22, 1955, as an expert witness on behalf of the California Water Service Co. Without prior consent of the water users, this company had refused to carry into effect instructions of city officials to add fluoride to Oroville and Butte County water supplies.

I had spent many hours preparing myself for the occasion. It was difficult for me to arrange my office routine so that I could absent myself long enough to make the trip.

The P.H.S. paraded numerous proponent health officials before the Commission, many of them without research experience on fluoride. Some of these witnesses merely stated that the organizations they represented had endorsed fluoridation. On the second day the referee announced he would not be able to complete the hearing; that only proponent witnesses would give testimony at this session and that the hearing would have to be resumed at a future date.

The long trip to California for which I had paid out of my own pocket had been in vain. Nevertheless, it did serve one good purpose. I had learned much about the

weakness of the case for fluoridation. Dr. F. A. Arnold, Jr., Director of the National Institute of Dental Research, U. S. Public Health Service, acknowledged on the witness stand that he had no proof of the safety of fluoridation, that he "couldn't possibly have."

Dr. H. Trendley Dean, the "father of fluoridation," under cross-examination was forced to acknowledge that the graphs and charts, upon which he had based his theory that fluoride makes teeth decay-resistant, were invalid according to standards which he himself had established. These standards were: an unchanged water source and continuous exposure of the children under observation.<sup>176a</sup>

However, the sheer weight of titles and numbers of public health officials, professors at universities who were recipients of P.H.S. grants, political dignitaries of dental and medical organizations who appeared as so-called expert witnesses inevitably influenced the decision in favor of fluoridation, a pattern characteristic of future court actions in other U. S. cities and abroad.

Many people in this country look upon anyone who has risen to the top of his profession as an authority on all matters. Had Claire Booth Luce, the noted writer and diplomat, George Meany, the President of AFL-CIO, and Richard J. Daley, Mayor of Chicago, taken the time to avail themselves of all the facts about fluoridation and had they examined them on their own, they would not have permitted their names to be used for its promotion. Yet, they endorsed the project. Similarly, a popular movie star who publicly expresses his views on a subject with which he is only superficially conversant often carries more weight and reaches more people than the most competent scientist who has made a time-consuming, painstaking study of an involved scientific subject.

Views of respected community leaders who have accepted the word of friends or colleagues; opinions of judges, un-

able to differentiate between valid scientific studies and research carried out to prove a predetermined thesis; statements by policy-making members of a medical or dental organization; plus persistent downgrading of scientists who have produced evidence unfavorable to fluoridation, have all effectively swayed public opinion in this country. In the past, abuse and ridicule have been the fate of many who have been critical of practices in medicine which eventually were proven hazardous as documented by the Australian Professor of Chemistry, John Polya, in his recent book, *Are We Safe?*<sup>177a</sup>

I had not fared too well, thus far, in my endeavor to assist those who needed help. I now realized more than ever that on the political level my efforts could never meet with success. Although I was not cut out for politics, I was headed straight for the public limelight. I again resolved to devote all my spare time to research.

Was it possible for me to abide by this decision and to ignore the urgent pleas of those who had few others to whom to turn?

## CHAPTER TEN

### A MIGHTY WEAPON

In spite of the vast accumulation of data in the scientific literature indicting fluoridation, news releases in the nation's press almost invariably lauded the project. Week after week new glowing reports about fluoridation issued from Grand Rapids, Mich., from Washington, D. C., or from the Chicago American Dental Association headquarters, persistently extolling the 65 per cent reduction in tooth decay and emphasizing its absolute safety.

In the fall of 1953 my wife made an effort to comment on one of these releases in a letter to the *Detroit News*.

The editor of the *News*, Mr. Harry Wade, was a friend of ours. She felt, if anyone, he would know that her statement had a solid basis. He would read it with an open mind and publish it among letters to the editor.

His answer was brief and decisive. He stated that both sides of the issue had already been thoroughly aired in the columns of the *News*.

We took no further action until about a year later when I telephoned Mr. Wade and pointed out to him that there has been no opportunity for rebuttal to any of the more recent promotional releases. His reply sounded reasonable:

"We report news items," he stated, "we are not a crusading newspaper. Should there be news events unfavorable to fluoridation we would publish them. If 100 physicians, for instance, were to openly oppose fluoridation, this would be newsworthy."

I offered to write an article or a letter for the *Detroit News* based solely on the research in which I was engaged.

"Aren't new data, with which the public is unfamiliar, news items", I inquired.

"This," Mr. Wade pointed out, "would place me in the category of a crusader."

Indeed, I found out later when a newsworthy event did take place, namely the meeting of the Eastern Dental Club at the Whittier Hotel, Mr. Allen Schoenfeld, *Detroit News* science writer, did report objectively about the meeting in his paper.\*

On the other hand, a few months later, out of 112 Detroit physicians and dentists canvassed, eighty-three signed a petition requesting Gov. G. M. Williams to halt promotion of fluoridation in Michigan. This important news event was given little, if any, publicity in the Detroit metropolitan papers.

Nevertheless, I was grateful that Mr. Wade had at least displayed interest in and understanding of my position. He gave me some valuable suggestions on newspaper publicity and public relations, an area on which I had been completely uninformed. They served me in good stead in later years.

I shall never forget his advice: "In whatever you write try to attract your adversary! Don't antagonize him. Don't make enemies of those who hold him in high regard. Concentrate on the positive rather than attempt to negate his arguments."

Nevertheless, his newspaper, like many others in the nation, leaned heavily on information emanating from proponent sources. Perhaps this was due to sparsity of news events unfavorable to fluoridation, perhaps to improper handling of available material indicting fluoridation. Perhaps there were other reasons.

One thing was obvious: The usual sources of informa-

\* *Detroit News* 11/2/1954.

tion on scientific data concerning medicine and dentistry were the Public Health Service, the American Dental Association and the American Medical Association. These organizations happened to be in the proponent camp.

The opposition, on the other hand, was disorganized, without funds to obtain public relations counsels. Opponents were constantly being disparaged and presented to news editors as "unscientific," "emotional" people who lacked public spirit. Since the inception of fluoridation, this has been a major feature of the promotional campaign instigated by the American Dental Association.<sup>178</sup>

The rejection of her letter to the *Detroit News* emphasized to my wife the urgent need to obtain and disseminate factual data to counter the constant flow of promotional material. Some kind of a permanent news medium devoted to carefully documented, scientific information on fluoride would constitute a potent weapon for those opposing fluoridation in this never ending struggle. It would show the people in Seattle what was going on in New York City on the fluoridation front.

Because I was too much involved in my medical practice I could not devote any time to such a venture. Mrs. Waldbott had some background in scientific writing. She had assisted me in preparing many of my medical publications ever since we were married. Her main interests had been science, fine arts, antiques and of course the education of our two daughters. She had no training in or experience with newspaper work. She was unaware of how to write copy and compose pages. She had no idea how to distribute a newspaper nor had she any business experience. There was no money available, no talent that she could consult, no organization which could have assisted her. She knew of no one to hire.

In this dilemma she had a lucky break. At a banquet of the Michigan State Medical Society's annual meeting we happened to sit next to a news reporter, Russell Clanahan.

We discussed fluoridation. He decided to attend a staff meeting at the Grosse Pointe Cottage Hospital where I had been invited to present my first case of poisoning from drinking Highland Park fluoridated water.

He must have been impressed with my presentation. He was surprised that no information of this kind had reached his newspaper. He displayed a personal interest in assisting us. He even proposed writing the story of fluoridation for a popular magazine, and spent several months examining documents which my wife had thus far accumulated. I had already approached several nationally circulated magazines about publishing an article written by myself and discovered that all without exception were strongly in favor of fluoridation; that they would under no circumstances consider publishing anything unfavorable to it. Mr. Clanahan's article had to be shelved.

Sensing that there was virtually an iron curtain on this subject, Mr. Clanahan proposed the issuance of a monthly newspaper on fluoridation as a public service, to deal mainly with facts not easily accessible through the conventional channels of communication. Mr. Clanahan had many thoughts about how to make the paper pay for itself.

While pondering these matters, he told us that he was about to sever his present connections. He offered his services as editor of the newspaper. With two extra rooms in my clinic, one could be used as his office, the other might be set aside for my wife. His salary demands were modest. For the first few months my wife decided to underwrite his salary. He was to introduce her into the secrets of becoming a co-editor. In case the income did not defray his expenses, she might eventually have to take over as editor.

There were many unsolved questions. They remained unsolved throughout the eight years of her editorship:

Without accepting advertisements how could the newspaper ever pay for itself? How would my patients react to a newspaper office located in rooms of my clinic? Would

my wife's name as editor prejudice physicians against me? By this time the word fluoridation had become a red flag to many physicians as well as to lay persons.

These questions did not concern me too much. My practice was sufficiently secure to survive the loss of a substantial portion. I did not anticipate, however, that the identification of the newspaper with my office was to make me a target of abuse by some of my best friends in the medical profession.

Mr. Clanahan was helpful, indeed. He selected the name, *National Fluoridation News*, and the paper's format. He arranged for the masthead and other details. After shopping around he found an inexpensive printer who turned out to be most cooperative and loyal to the cause.

The question of the editor's salary constituted a major problem. It soon became obvious that income from subscriptions was insufficient to defray even the printing costs, much less the editor's salary and the distribution. Numerous copies of each issue were given free of charge to interested persons. This was one of the purposes for which *NFN* was established.

After two months Mr. Clanahan accepted a better paying position. It now became incumbent upon my wife single-handed to be editor, writer, composer, proofreader, gatherer of news, librarian and even distributor of *NFN*.

The beginning was rough. Not the least of her handicaps was her lack of journalistic experience. Gradually here and there she picked up bits of knowledge.

One of my patients, an editor of a neighborhood paper, was kind enough to give her some hints on how to write an article:

"The key to the article should be contained in the first sentence. There should be a brief summary at the end."

At a medical meeting, a reporter whom we met instructed Mrs. Waldbott how to word the headlines and what type to use. She showed her how to compose a page, to select

heavy captions for the top, lighter ones toward the bottom.

On a trip to Europe, a young journalism student whom we met on the ship advised her about what to include and what to omit from an article.

A patient who had just completed a course in journalism at Cass Technical High School wrote a constructive three-page critique of one of the issues of *NFN*. "Don't abbreviate words in the headlines," she advised. "Include cartoons for relief from solid type; balance dark type with light type."

An executive in the public relations office of one of the Detroit automobile manufacturers suggested the use of better paper and of illustrations. My wife could not follow his suggestions because she was already overextending herself financially.

A friend volunteered to set up a card index which made it possible to locate data from back issues.

Throughout her editorship she was able to support all her statements with documentary evidence. Nearly every article contained the references to original sources. When errors were brought to her attention on this complicated subject, they were promptly corrected in the following issue. Typographical errors were kept to a minimum, a remarkable record in view of the fact that the editor had to do all her own proofreading.

The one thing the paper lacked was a distribution system. The editor was too busy with her other manifold duties to give any thought to this aspect of her job or to look for financial assistance. Every month the newspaper faced a deficit of several hundred dollars, which she had to defray from her own pocket.

In addition to current news items *NFN* published abstracts and critiques of research studies regardless of whether or not they favored the cause. To this day they constitute a reliable source of scientific information.

To give some brief examples:

*NFN* reviewed a 1950 U.S.P.H. survey in American Samoa by U.S.N. Capt. F. L. Losee, which reported that healthy teeth occur where there is little or no fluoride in drinking water.<sup>84</sup> *NFN* summarized animal experiments in the *Journal of Nutrition*, 1954, by Drs. J. H. Shaw, biochemist at Harvard School of Dental Medicine, and R. F. Sognaes, which demonstrated that minerals other than fluoride "are major factors in determining the difference between sound and carious teeth" in rats.<sup>179</sup>

Other items published by *NFN*: Prof. A. Kantorowicz of Honef, Germany, surveyed communities in North Rhine-Westphalia. He concluded that the incidence of tooth decay is not related to fluoride content of drinking water.<sup>57</sup>

Dr. J. C. Muhler, Prof. at University of Indiana, Bloomington, found that less fluoride is retained in the body if calcium, magnesium, iron and phosphate are added at the same time as fluoride to drinking water of rats.<sup>180</sup> These four minerals present in water would, therefore, profoundly affect the action of fluoride.

When in Napier, New Zealand, with little or no fluoride in water (0.13 ppm) children's teeth had less decay than in artificially fluoridated Hastings, molybdenum<sup>13</sup> was determined to be mainly responsible.

Other items in *NFN* dealt with reports of damage to plumbing and heating equipment due to fluoridated water:

In Miami, Florida, by February, 1957, a water heater company had replaced under warranty approximately 5000 water heaters due to leakage since fluoridation started in 1951,\* compared to about 100 replacements during the four years prior to 1951. After establishing that the quality of the steel was unchanged, and after ruling out other possible causes, the company could not but attribute the corrosion to fluoride added to drinking water.

A Toronto manufacturer of hot water tanks, in business

\* L. H. Phillip, Pres. Miami Water Heater Co. to Dr. Marvin Smith, Miami, 2/22/57.

for over 40 years, had routinely given a 20-year guarantee with every boiler. Toward the end of 1962 he expressed his intention to discontinue sales to Brantford (fluoridated since 1945) because 90 per cent of all corrosion instances brought to his attention were connected with range boilers installed in Brantford and neighboring areas. Previously, boiler failures due to corrosion had always been negligible from even the hardest water.\*

In Riverhead, N. Y., fluoridation started in 1954 according to a letter Oct. 24, 1964, by J. P. Riesdorff, the Water District Superintendent. By 1959, corrosion problems had become so severe that it was impossible to wash clothes clean. Twice, when fluoridation was discontinued, the trouble disappeared only to return when fluoride was again added to the water. Every conceivable means was tried to no avail to correct the trouble while retaining fluoridation. Fluoridation was finally terminated in March, 1963.

*NFN* revealed how the P.H.S. attempted to discredit other reports of damage to plumbing. They would have constituted a serious setback to fluoridation promotion had they been widely publicized.

Other articles disclosed some of the shortcomings in the current proponent literature:

*NFN* demonstrated that the St. Louis Medical Society's Report on "Water Fluoridation,"<sup>182</sup> February, 1954, had ignored important studies unfavorable to fluoridation; it had quoted exclusively from the available literature advocating it. Much space in this report was devoted to disparagement of leading scientists as well as conscientious public-spirited lay persons, in order to neutralize the impact of their evidence.

As no research had been carried out to prove fluorida-

\* Letter by H. A. Morton, Coulter Copper and Brass Co., Ltd. to Mrs. Ann Burton, Toronto, 11/14/62. The damage was attributed to fluoridated water, not to excessive water pressure as subsequently claimed by the company.

tion safe, the authors of the report relied upon negative evidence. They quoted health officials as follows: "We have not observed. . ."; "There is nothing in our statistics to indicate. . ."; "I am not aware. . ." They claimed that there was no need for an investigation of possible harm: To look "for trouble where none was to be anticipated," is "a luxury" (page 127), they maintained.

*NFN* pointed out that many of the sixty-seven references in this report's bibliography, consisted of personal communications—that is, personal opinions or undocumented arbitrary statements, mostly by health officials.

For example, *NFN* attempted to obtain substantiation for the claim that fluoride provided on an individual basis through tablets, milk, salt or other means would have profound disadvantages peculiar to each mode of administration. After much time, extensive correspondence and perseverance, a memorandum by Dr. R. E. Shank<sup>188</sup> of Washington University, Dept. of Preventive Medicine and Public Health, was finally unearthed. It merely expressed Dr. Shank's personal opinion without providing any research in substantiation of his assertion.

A significant document which would not otherwise have come to the public's attention was reported in detail by *NFN*, May, 1961. It was issued undated by the Pennsylvania Dept. of Health. It instructed health officials and other promoters "How to Appeal to the People on Fluoridation."<sup>184</sup> It showed that promotion of fluoridation is not based on scientific facts, but depends largely upon public relations experts to mold public opinion. It advocated the use of every conceivable means which would achieve the desired ends.

Designated *Guide #5*, it gave the following advice: Establish your case upon endorsements! Ridicule opponents! Appeal to bandwagoning, emotion and even to religious faith! Persuade city fathers and mayors! Prevent the issue from coming to a vote! Avoid open debate! It implied that

sound scientific evidence unfavorable to fluoridation should be disregarded.

These methods, which originated on the national level at the Fourth Annual Conference<sup>69</sup> in Washington, D. C., 1951, have been carried out to the letter in most towns and communities throughout the U.S.A. wherever fluoridation has become an issue.

Many specific instances of how these devices were implemented were presented in *NFN*:

In Kansas City an ordinance to fluoridate the water was before City Council.\* To avoid publicity—the ordinance would have required alerting the public before action could have been taken—the City Council passed a surprise resolution on 9/22/61 which they considered “administrative,” not subject to a vote.

Subsequently more than 18,000 signatures—twice the number required by law—were submitted requesting a referendum.\*\* Yet the Council denied the vote. The water was fluoridated. Kansas City citizens were obliged to take their case all the way to Missouri’s Supreme Court. It held that fluoridation is “legislative.” Because it represents a new policy, it is subject to a referendum. The court ordered the city to stop fluoridation or submit the question to a vote of the people.\*\*\* On 8/4/64 Kansas City citizens voted 38,826 versus 33,194 to abandon fluoridation after two years’ operation.

P. H. S. reporting the “Status of Fluoridation” in the U. S. A. 1954-56<sup>185</sup> estimated that in only 5 per cent of fluoridated cities had the people been permitted to signify their wishes by public vote.

Chicago’s City Council had adopted its controversial fluoridation ordinance 37 to 8 on 6/17/54. On December 23 they voted 43 to 2 to ask the state’s authorization of a pub-

\* Kansas City *Star* 9/23/61.

\*\* Kansas City *Star* 9/9/63.

\*\*\* Kansas City *Times* 1/15/64.

lic vote. The bill to permit a referendum passed both houses of the state legislature.\* However, on July 18, 1955, Illinois Governor Wm. G. Stratton vetoed it.

In explanation the Governor stated that the question was “highly controversial” and that men trained in the health profession are “not in full agreement.”

“A referendum cannot establish or destroy a scientific fact,” he added, according to the *Chicago Daily News*, July 18, 1955. The Governor’s logical answer would have been to postpone action regarding fluoridation until scientific research had either proved it safe or not safe.

According to the Washington, D.C., *Daily News*, 11/23/57, the nation’s capital was fluoridated in 1952 without legislative authority, at the request of former Water Commissioner, J. F. Donahue. He had been urged by the Health Dept. to adopt it. Four little words were tacked onto an appropriation bill for the Washington Aqueduct, namely “and fluoridation of water.” Nobody caught the “point of order.” This was accomplished in a great hurry a few days before a well-qualified congressional committee recommended “GO SLOW” regarding addition of fluoride to water supplies because of too many unanswered questions (see details in Chapter I).

In La Grange, Illinois, on July 13, 1959, the village board voted 5 to 1 to disregard a petition signed by 1203 citizens who requested repeal of the board’s resolution to fluoridate water supplies.\*\* The signatures represented more citizens than had voted in the previous election. When the vote eventually took place on 4/9/60, city officials spent \$1,000 of tax money for disseminating promotional literature. The resulting vote favored fluoridation.

Shrewsbury, Mass., had been fluoridated for thirteen years. In an attempt to abandon it a courageous dentist, Gerald Racine, D.M.D., mailed a letter to each resident call-

\* *Chicago Daily News* 7/18/55.

\*\* *Suburban Life*, LaGrange Park, Ill., 7/16/59.

ing attention to mottled teeth in the town which he had observed among his patients. He stood his ground in spite of numerous abusive phone calls and harassment by his colleagues who urged him to retract his letter.

One hour after a U.P.I. news release, broadcast over WBZ, alleged that Dr. Racine had rescinded his letter, he declared in a taped interview with broadcaster Streeter Stuart that he had done no such thing. Nevertheless, promoters employed a telephone campaign and paid radio ads on Worcester stations asserting that Dr. Racine's letter was a hoax. The Worcester *Telegram* also disseminated the false release. The truth, when subsequently published, came too late to influence the vote. The opponents lost. Shrewsbury's water supply remained fluoridated.

In Atlantic City, N. J., citizens had already rejected fluoridation 2 to 1 by public vote in 1954. Through the efforts of local dentists, City Commissioners were persuaded to disregard the people's mandate. On 12/7/56 they passed an ordinance to introduce fluoridation without a vote and without adequate advance notice. "Commissioner R. S. Jackson said that fluoridation had been started without public announcement to head off unfounded complaints," the Philadelphia *Inquirer* reported on April 1, 1958, under the headline "Fluorine Sneaked into Water."

Until 1964 San Francisco was the only large U. S. fluoridated city where citizens had had a chance to vote on this issue. In 1952, 114,000 voted for fluoridation, 87,000 against it. However, due to the ambiguous wording of the ballot most citizens did not know what the vote was about. The ballot read:

"Shall the City and County of San Francisco add chemicals to prevent or arrest dental decay to the water furnished the people of San Francisco by the San Francisco Water Department?"<sup>186</sup>

Neither the word fluoride nor fluoridation was used.

*NFN* reported how in Binghamton, N. Y., Cincinnati, O. and Vancouver, B.C., physicians' names were included in newspaper advertisements as advocating fluoridation, some of whom were deceased, some had moved away, some had told their patients that they did not favor fluoridation. Subsequently several physicians protested publicly that they had never given permission for their names to be so used.

Dover Foxcroft, Maine, has established a remarkable record. Between 1954 and 1962 fluoridation has been defeated six times; five times by secret ballot, once by show of hands at a Town Meeting.\*

In numerous U.S. cities such as Ottawa, Ill.<sup>a</sup>, Mason City, Ia.<sup>a</sup>, Fort Walton Beach, Fla.<sup>b</sup>, Riverside, Calif.<sup>c</sup>, Fort Worth<sup>d</sup>, Houston<sup>e</sup> and Dallas<sup>f</sup>, Texas, fluoridation has been promoted by dentists where the water already contained the recommended amount of fluoride. Dr. L. G. Matthews, the promoting dentist in Chester, Va., announced that "Tooth decay among Chester children is about as bad as anywhere else." Subsequently he found out, to his embarrassment, that the well water contained 2 ppm fluoride naturally<sup>g</sup>.

Although Fort Worth city water already contained 0.1 to 1.8 ppm according to the P. H. S. publication *Natural Fluoride Waters*,<sup>89</sup> its Council had voted for fluoridation in August, 1953. Later they reversed their position. Dallas and Houston have both, in the past, been subjected to fluoridation promotion. Houston has been cited<sup>187</sup> as one of the big cities adding fluoride to drinking water supplies. Now all three, Fort Worth, Dallas and Houston, are named in a

\* Piscataquis *Observer*, Dover-Foxcroft, Maine, 3/5/62.

a. Highland Park *News*, Des Moines, Ia. 8/11/55 — b. Playground *News*, Fort Walton, Fla. 1/10/52 and 10/7/54 — c. Los Angeles *Times* 8/31/53 — d. Fort Worth *Star Telegram* 3/3/54 — e. Springfield (Mass.) *Union* 4/1/54 — f. Dallas *Morning News* 2/12/59 and 2/13/59 — g. Syracuse, N. Y. *Herald Journal* 5/15/52.

nationwide P.H.S. release of June, 1963,\* as cities which have "natural fluoridation." Nevertheless, in Fort Worth, dentists again started promoting fluoridation in Sept., 1964.\*\*

In Mason City, Iowa, the promotion suddenly subsided when Dr. Chas. Henshaw, State Dental Health Director, reported in the *Des Moines Register*, on 2/19/54, that mottled teeth were already apparent among school children. The water contained 0.5 to 0.6 ppm fluoride; some wells which came into use during the summer showed as much as 3.5 ppm.

Mt. Pleasant, Michigan, was cited in the *Saginaw News* July 3, 1959, by the Michigan Dept. of Health as one of fifty Michigan cities whose water supply contained "enough natural fluoride" "to prevent tooth decay." Yet, artificial fluoridation had already been put into operation in 1957.

Confirmation of such experiences by health officials is found on page 65 of the minutes of the Fourth Annual Conference.<sup>69</sup> F. J. Maier, Senior Sanitary Engineer, Division of Public Health stated: "There have been several instances where groups have promoted fluoridation of the local water supply only to find that the supply already contained the optimum amount." Obviously in none of these cities was there any indication that the natural fluoride content of the water had made children's teeth sounder than where it was lacking in water.

In New Kensington, Pa., the water contained 0.9 ppm. Health officials insisted upon adding 0.1 ppm to bring the fluoride level to 1 ppm,\*\*\* as though the exact concentration could be maintained at all times within 0.1 ppm.

The practice of introducing fluoridation without citizens' knowledge originated with the director of the Newburgh experiment, Dr. Ast, who advised in the 1943 *Journal of the*

\* Kenosha (Wisc.) *News* 6/3/64

\*\* Fort Worth *Star Telegram* 9/20/64

\*\*\* New Kensington, Pa. *Daily Dispatch* 9/23/57.

*American Water Works Association*, Vol. 35, page 1196, avoidance of public discussion before the plan had been "sold to key citizens." Whenever fluoridation is freely discussed, citizens are likely to learn both sides of the question and reject it.

According to the *Royal Oak Tribune*, Jan. 21, 1959, Dr. Fred Wertheimer, Michigan State Dental Health Director, boasted that seven communities had initiated fluoridation during the past year. He said the names of these communities are "top secret" as far as the department is concerned. Council President James A. Otto of Springfield, Minn. called fluoridation of Redwood Falls' water supply "Council's best kept secret." "Not even wives of council members knew. At least mine didn't," he commented for the local *Advance Press*, July 3, 1959.

A widely used promotional story has been circulated about Akron, O.; San Francisco, Calif.; Newburgh and Elmira, N. Y.; Charlotte, N. C.; E. Lansing, Mich.; Brantford, Ont., and many other places. It goes like this: Citizens swamped city hall with complaints of illness due to drinking fluoridated water when, to everyone's dismay, it was discovered that somehow fluoridation had not, as yet, been put into operation.

Since the same events are alleged to have occurred in many cities and since, according to the story, after introduction of fluoridation in the above-named cities no further complaints were registered, the veracity of the story is doubtful.

*NFN* has written to numerous municipalities, to newspapers and radio stations for the name and address of at least one person who had so complained. No substantiation has ever been forthcoming. Therefore, it appears that the story was fabricated for the express purpose of discrediting, in advance, illness likely to occur in some citizens from drinking fluoridated water.

*NFN* has reported instances of air and river contamina-

tion by fluoride. Waste effluents from superphosphate plants in Florida's Peace River basin caused the fluoride content of the river water to rise to 46 ppm during 1957 through 1961, thus seriously endangering Arcadia's drinking water supply.\*

In The Dalles, Oregon, fruit crops and orchards have been damaged by fluoride fumes from a neighboring aluminum factory.<sup>188</sup> Nevertheless, citizens of The Dalles, who were already inhaling excess fluoride from contaminated air, are likewise obliged to drink fluoridated water. Tampa citizens, who are constantly exposed to fluoride fumes from nearby phosphate fertilizer factories, have been repeatedly subjected to fluoridation promotion since 1951.\*\* On 11/6/62 they rejected fluoridation overwhelmingly by referendum.

Among early subscribers to the *NFN* were the American Dental Association and public health agencies in Switzerland and Sweden. At first the editor was pleased that these organizations were apparently interested in learning from *NFN* facts with which they were not familiar. She dared to hope that this paper would make a dent in their promotional efforts. It did not take long for her to learn their purpose in subscribing. They aimed to counter the facts which *NFN* was disseminating.

*Changing Times* is outstanding among nationally circulated magazines which have indulged in attacks against *NFN*. In November, 1961, it published a vitriolic article without permitting an opportunity for clarification of the issues involved.

It is not my purpose to reflect unfavorably on the editorship of any magazine. Their sources of information on dental health are the A.D.A. and the P.H.S., the two most

\* *Tampa Tribune* 9/15/61.

\*\* *Tampa Tribune* 1/5/56; 10/19/62, *Tampa Times* 3/7/56; 9/27/61.

reliable organizations on dental or medical subjects other than fluoridation. Magazine editors publish what they believe is the truth.

Unwarranted abuse was heaped upon *NFN* by Sweden's key promoting scientist, Dr. Ingve Ericsson, Professor at the University of Stockholm's School of Dentistry. He is recipient of large P.H.S. research grants. He became an exponent of fluoridation while working at the University of Minnesota in the laboratory of Dr. W. D. Armstrong, one of the most vigorous U. S. promoters of fluoridation.

At a medical meeting on Nov. 4, 1958, Prof. Ericsson made the following statement which was published November 26, 1958, in *Nordisk Medicine*, the official journal of the Swedish Medical Society:

"This paper *NFN* is in fact non-profit and idealistic to such an extent that it pays one cent a word for anti-fluoridation articles."

The background of this statement is worth recalling: A newspaper writer had answered an advertisement to write articles for *NFN* during the interim between Mr. Clanahan's and my wife's editorship. Given some material, she was asked to compose, on a trial basis, a few short articles each two to three inches long. Should she fail to qualify, a fee totaling \$20 to \$25 was stipulated. Because her writing was unsatisfactory, she was not hired. Subsequently my wife, to her consternation, received her bill amounting to several hundred dollars. Lacking a written agreement, in order to dismiss this unpleasant experience from her mind as promptly as possible, she had no choice but to pay it.

Now, three years later, in 1958, Prof. Ericsson's reminder in *Nordisk Medicine* added insult to injury by implying that my wife could afford to pay thousands of dollars for just one issue of *NFN*. It is noteworthy that such an incident was considered of interest to a medical society in a far distant land.

By 1962 the expense had depleted much of her personal savings and had become so burdensome that she was no longer able to carry on. On Jan. 1, 1963, she turned over the subscription list and the running of the paper to Ethel Fabian, the new editor and publisher, and to the N.Y. City Committee for Protection of Our Water Supply.

Ironically, the last issue that she edited dealt with the Detroit City Council's vote to fluoridate the metropolitan water supplies. It showed how several new City Councilmen were elected with the support of fluoridation promoters; how an Asst. Surgeon General of the P.H.S.\* and other top advocates came to Detroit from Washington, D.C., to sell city officials on the idea of fluoridation without permitting any opportunity for the opponent view to be heard; how, subsequently, representatives of all news media, press, radio and TV, were invited by the local dental society to an elaborate luncheon\*\* where, again, only the pro side was presented, instead of both sides on an equal basis. A lay person with no scientific background was asked to present the case against fluoridation. He was highly emotional. Through his incoherent statements, he became the laughing-stock of all present. He was widely quoted by the local press and televised on major networks as though he were a true representative of the opposition. This kind of a public image of the opposition is created by the proponents for promotional purposes. Its pattern prevails throughout the country.

In many U.S. cities, *NFN*, furnished free of charge, was the principal weapon by means of which fluoridation was defeated. My wife's files contain numerous letters of gratitude from every corner of the globe for her assistance in this great struggle. Included are commendations by dentists, physicians, scientists, editors. Her most cherished letters were written by persons who had suffered illness from drink-

\* Detroit News 3/6/62.

\*\* Detroit Free Press 6/28/62.

ing fluoridated water and were grateful for her help in getting fluoridation discontinued in their cities.

Has Mrs. Waldbott accomplished what she had set out to do? Was the weapon powerful enough to make a permanent dent in this never ending struggle?

This much is true: *NFN* has unearthed a vast array of facts which otherwise would never have come to light. It has provided the answer to many unsolved questions. The facts, disclosed by this paper, have become a part of the permanent collection of several libraries. They constitute an enduring record of events from 1955 through 1962. Only the future will tell if and to what extent Mrs. Waldbott was successful in disseminating the truth.

## CHAPTER ELEVEN

### PROGRESS AND ROADBLOCKS

On July 9, 1954, Dr. Austin Smith, then editor of the *Journal* of the American Medical Association, wrote to me that original data were needed more than anything else in fluoride research. He could have further qualified this statement: It is clinical research that is sorely needed, observations on an individual's response to fluoride, both in health and disease. How does a patient with diabetes, with arthritis, with kidney disease or with allergy react to fluoride, one of the most active chemicals in existence?

I heeded Dr. Smith's advice. Shortly after he made this suggestion to me I began to accumulate carefully documented original data. Some have been published<sup>34,62</sup>; some are being processed for publication; some, as is so often the case in clinical research, could not be completed.

An opportunity for studies offered itself on September 11, 1962, when the city of Windsor across the river from Detroit began fluoridation without the knowledge of citizens. Two weeks later the press announced the event to the public.

Mrs. M. H., age fifty-seven, a nurse, and Mrs. E. K., age thirty-eight, had been in a habit of drinking one to two glasses of water before breakfast. For some unknown reason, they suddenly experienced abdominal cramps and vomiting immediately after their customary morning drink. During the course of the day, they developed headaches, pains in the lower spine, numbness and pains in arms and

legs. Formerly they had never had such discomfort. At the time they were not aware that Windsor's water was being fluoridated.

Mrs. H.'s physician, Dr. F. S., at first suspected a stomach ailment. His treatment was of no avail. After several weeks of careful observation he advised her to discontinue drinking fluoridated water. He considered it the source of her trouble, yet he requested her not to disclose his diagnosis to anyone lest it jeopardize his position in the eyes of some of his colleagues, especially Windsor's Medical Officer of Health. Mrs. K. related the illness to the water on her own.

Both patients recovered promptly upon eliminating fluoridated water.

Mr. D. H., age fifty-nine, and Mrs. I. C. W., age fifty-seven, presented a similar story. In addition to the stomach and intestinal disorders, they noted a slowly progressive deterioration of their mental acuity: They stated that they became forgetful and lost their power to concentrate.

A few observations of this kind would be of little significance. It can rightly be said that more data are needed to establish the relationship of such an illness with fluoride. However, these observations become highly significant when numerous patients from many fluoridated cities have essentially the same experience and when this disease correlates with the symptoms of experimental fluoride intoxication.

The following are cold facts:

The patients had no idea what had caused their illness. They did not even know that fluoride had been added to their town's drinking water. However, the onset of their illness, as determined later, coincided with the addition of fluoride to their water supply. The symptoms were, with minor variations, a combination of gastrointestinal, bladder and neuromuscular disturbances simulating a disease called hyperparathyroidism. The latter is due to a disturbed calcium-phosphorus metabolism. Some experienced

arthritic pains, some ulcers in the mouth and a tendency to hemorrhages. The symptoms gradually disappeared when the patients eliminated fluoridated water for drinking and cooking. In some individuals, recovery took place when they were away from home for extended periods, visiting in non-fluoridated cities. In other words, this otherwise chronic progressive disease cleared up without medication when, unbeknown to the patients, fluoridated water was avoided.

Nowadays when biochemical and laboratory tests are often being overemphasized by physicians, scientists require controlled data to prove the relationship of a new illness to its cause.

Several approaches were possible:

1. Extensive consultation with specialists to rule out other diseases.
2. Biochemical and laboratory data on patients in order to determine features characteristic of chronic fluoride poisoning.
3. Analysis of body tissue for fluoride.
4. Test doses of fluoride under controlled conditions using fluoride-free water for comparison.
5. The double blind test to remove all doubt that the illness could have been caused by any substance other than fluoride. Its technique was outlined to me, as follows, by the editor of the *AMA Journal* in a letter dated April 2, 1958:

"One very obvious method for testing the validity of the diagnosis would be to place the patient on a fluoride-free water supply until the symptoms have subsided. Then, unbeknown to the patient (and to the physician), add 2.2 parts per million of sodium fluoride to the water."

2.2 ppm of sodium fluoride in water is equal to 1 ppm of fluoride, the concentration recommended for fluoridation, or about 1 to 1.5 mg a day.

In order to eliminate any chance of personal bias, I attempted to have Windsor physicians proceed with tests on the patients whom I had examined on December 17, 1962. Eight members of the Essex (Windsor) County Medical Society met at the home of one of their colleagues at which time I presented a review of my research on fluoride. I particularly emphasized the available diagnostic approach. In spite of intense interest in the subject and in my research, they hesitated to carry out some of the tests which I had recommended.

Because of the position taken by their Medical Officer of Health and because of strong feelings among some of their colleagues they wished to avoid conflict and the resultant publicity.

One of them did, however, arrange to carry out a double blind test on one of the nine cases:

The patient was a thirteen year old schoolgirl (C.D.) who developed increasingly severe migraine-like headaches starting in mid-September. Simultaneously, she had pains and numbness in arms and legs, and a distinct deterioration in her mental alertness. She became too ill to attend school. Because of her headaches, her eyes were checked by a specialist. A consultant neurologist ruled out the possibility of a brain tumor. A series of tests to determine whether the headaches were due to allergy were inconclusive.

On the advice of another patient who had been similarly afflicted, the child stopped drinking Windsor water. Her condition began to improve immediately. After ten days her symptoms had completely subsided. However, on Mondays and Thursdays the headaches recurred when she inadvertently quenched her thirst with Windsor tap water after gym classes. The recurrences were avoided when she carried her own drinking water to school. As a final proof that fluoride caused the illness, the disease was subsequently reproduced by a double-blind procedure performed under the guidance of the Windsor physician.

Everyone who has carried out research has experienced repeated disappointments and frustrations before achieving success. Close to his goal, roadblocks may appear which prevent him from carrying his work to its final conclusion.

The major obstacles to my work have been lack of cooperation by physicians and patients:

Most physicians are eager to assist. However, physicians are sharply divided in their views regarding fluoridation. Some of them are as emotional on this issue as lay persons. Contracting enemies among those who disagree, thus impairing their standing among some of their colleagues, could lead to curtailment of their practice, particularly if it depended upon work referred to them by other physicians.

Lack of cooperation by patients was the other great obstacle in my work.

Once a patient is cured of his disease, only an exceptionally idealistic person will willingly undergo the time-consuming and sometimes painful tests involved in reproducing the illness by the double-blind method for experimental purposes.

The following experiences illustrate such difficulties:

Mrs. C. A. B., age sixty-nine, another Windsor case, had a severe skin eruption on hands and face since mid-September. Like other halogens such as bromide and iodide, some fluoride is eliminated through the sweat glands of the skin. Under certain conditions, halogens induce skin eruptions, particularly allergic skin disease. Fluoride has recently been identified with erythema multiforme,<sup>188a</sup> a troublesome skin disease, in workers who inhaled fumes from fluoride-containing welding fluxes.\*

Mrs. B.'s skin lesions disappeared when she eliminated Windsor's fluoridated water. They promptly recurred when

\* One brand of welding flux analyzed recently contains 300,000 ppm or 30% of fluoride.

she resumed it two weeks later. When I examined her in Dec., 1962, she still had several residual areas on face and hands. Judging from the size of the remaining eruption, the patient must have suffered considerably. This time I planned a different approach. I hoped to secure a tiny specimen of the skin for a biopsy. Excess fluoride in this area of the skin would indicate that it was responsible for the lesion. I had already obtained specimens from several other patients which were to serve as "controls." The patient agreed to the plan: She was to resume drinking Windsor water. The moment the eruption re-appeared she was to see a surgeon for removal of the tiny specimen and of another piece of healthy skin as an additional control.

Just prior to the date decided upon she phoned to tell me that she could not go through with the plan. She did not mind the biopsy, but she had suffered so much during her illness that she could not face the ordeal of deliberately bringing about a recurrence.

Other patients had been so thoroughly convinced by their dentists of the absolute safety of fluoridation that they vigorously rejected even the suggestion that it could cause harm.

Miss M. L., for instance, who had been under my care for some time for an allergic disease, developed a progressive, generalized arthritis soon after fluoridation was instituted in Windsor. The disease caused much pain and disability to this young, attractive woman.

Miss L. ignored my suggestion that she eliminate fluoridated water temporarily, on a trial basis. Instead, her internist administered large doses of a cortisone drug, the conventional treatment for arthritis. This drug caused her to gain weight due to water retention in her system. She developed the characteristic "moon face." The joint disease, however, failed to respond. In despair she heeded my advice. The arthritis began to improve and gradually sub-

sided. When I requested her to undergo substantiating tests by resuming fluoridated water, she feared a recurrence of her painful ordeal. She refused.

Frustrating, too, was my experience with a nineteen year old Ann Arbor student who suffered from retinitis, a serious eye disease. The eye specialist called me in consultation to determine whether or not allergy was involved. My examination and tests ruled out this possibility. The condition had started shortly after the young man began drinking Ann Arbor, Mich., fluoridated water. Two British scientists, Drs. Sorsby and Harding,<sup>138</sup> had produced retinitis experimentally in rabbits by sodium fluoride. I had encountered retinitis in three well substantiated cases of poisoning from fluoridated water.\* This stimulated my interest in the case.

I recommended urinary and blood determinations for fluoride as an initial test. The patient had read so many news releases claiming fluoride to be a harmless "nutrient" that he brushed aside my suggestion for a follow-up along these lines.

These were but a few of the many obstacles in gathering data on individual patients. Nevertheless, evidence was eventually obtained which unequivocally established serious harm from drinking fluoridated water.

Among the numerous patients encountered with poisoning from fluoridated water, at least fifteen were thoroughly studied.

A most striking case is that of Mrs. W. E. A., age sixty-two, residing in a non-fluoridated town. She developed the disease repeatedly on trips to fluoridated Washington, D.C., and Richmond, Va. At the time she had never heard of fluoridation. Always, within a few days after her return

\* In the *British Medical Journal* of Aug. 8, 1964, the same disease has been attributed to fluoride by two British scientists, Drs. Geall and Beilin. A 55-year old man who was given 20 mg of sodium fluoride three times a day for 6 weeks in treatment of osteoporosis became permanently blind in one eye.

home, her illness began to clear up. This made her suspect that something in the water might be the source of her trouble. Upon inquiry, she learned that both cities were adding fluoride to the water supplies.

After she had completely recovered, the illness recurred upon using fluoridated toothpaste. Another time, a tranquilizer, trifluoroperazine, prescribed by her physician, precipitated the same disease. It soon became obvious to her physician that fluoride in the tranquilizer was responsible.

She had not been aware that the toothpaste, the tranquilizer, or the water in Washington, D. C., and Richmond, Va., contained fluoride. Therefore, her illness could not have been imaginary.

After she had regained her health, she received an intradermal (into the skin) injection of fluoride equivalent to the daily amount recommended for children's teeth. She was not informed, in advance, of the nature of the test. Within one-half hour she developed excruciating pains in the abdomen, diarrhea, and allergic nasal congestion, the same group of symptoms from which she had suffered on previous occasions from fluoridated water, fluoride toothpaste and the fluoride-containing tranquilizer. Subsequently double-blind tests were carried out by her own physician, Dr. C. D. M. of Memphis, Tenn., who again confirmed that fluoride was responsible for the disease. During one of these procedures, following use of the fluoride-containing tranquilizer, she became so severely ill that Dr. M. decided to refrain from further testing.

A former professor at the University of Florida, in Gainesville, Mr. F.L.P., age sixty-one, consulted me upon returning from a visit to Florida about a disease which had baffled his physicians. He had excruciating pains in the head and arthritis in the lower spine, and certain visual disturbances. He had recently become suspicious that something harmful in drinking water might be responsible. After he had moved from Gainesville, Florida, to Detroit, he had gradually re-

covered without treatment. Five years later, in 1956, when he returned to Gainesville for a brief visit, the disease promptly recurred. More than ever convinced that something in the Florida city's water was the culprit, he learned upon inquiry that Gainesville water had been fluoridated, whereas Detroit's water supply contained only 0.1 ppm of fluoride naturally. He underwent extensive clinical tests and blind studies. Consultant physicians ruled out other diseases. They felt that fluoridated water had, indeed, caused the illness.

After complete recovery he moved back to Gainesville. He remained in good health as long as he used distilled water for drinking and cooking. Within two days of attaching to his faucet a filter which was reputed to remove fluoride from tap water, his illness recurred. Its severity gradually increased. Analysis of the filtered water for fluoride showed that it contained 1.8 ppm on one day, 1.2 on another.

Once I had become acquainted with this disease, I encountered additional cases presenting a combination of gastric and intestinal disorders with characteristic neuromuscular and arthritic manifestations, often associated with lower urinary tract disturbances and skin eruptions.

Whereas these symptoms occur individually in many other diseases, their combination is not frequently seen. Nevertheless, additional criteria to identify this disease were needed, especially laboratory and biochemical data.

In 1956, I reported in *Acta Medica Scandinavica*<sup>189</sup> a thoroughly documented case of beginning rheumatoid arthritis in a 43 year old man, Mr. R. R., from Bloomfield Hills, a Detroit suburb, where fluoride occurred naturally in water at a concentration of 0.8 ppm.\* He eliminated about ten times as much fluoride in his urine as is considered normal. Simultaneously, he lost through his urine

\* More recently, Dr. Rich and co-workers of the University of Washington noted arthritis due to small doses of fluoride.<sup>190</sup>

an excess of calcium, a vital mineral necessary for life. His water source, a private well, contained fluoride naturally at 0.8 ppm. When he stopped consuming this water, the calcium loss and the arthritis ceased gradually in proportion to the decline of fluoride in his urinary specimen. After he completely recovered, the disease was reproduced by a double blind method:

He received three identical bottles of water labeled #1, #2 and #3. To one of the bottles enough fluoride had been added to provide 1 mg in one teaspoonful. This is the daily dose recommended for dental decay prevention. Only the druggist, neither the patient nor I, knew which one of the three bottles contained the fluoride. He took one teaspoonful daily from bottle #1 with a glass of distilled water the first week, from bottle #2 the second week and from bottle #3 the third week. Although fluoride is colorless, tasteless and odorless, he promptly discerned which bottle contained the fluoride because his arthritic pains recurred.

This test, called double blind because neither the patient nor the physician knows which bottle contains fluoride, was utilized in dealing with all subsequent patients. It unequivocally proved that fluoride and no other substance caused the illness and that it was not imaginary.

Another approach to the study of fluoride's effect on the human body was the analysis of vital organs for their fluoride content. An organ which contains excessive amounts of fluoride is likely to be harmed by it. Here, too, my preliminary experiences were laborious, costly and—disappointing. With persistence, however, I eventually obtained significant results.

My first experience of this kind concerned Mr. R.A.H., a thirty-five year-old engineer. He had been exposed to inhalation of beryllium in his work with fluorescent lamps. In January, 1944, he was transferred to Fort Wayne, Ind., where fluoridation was initiated on July 31, 1951.

He expired on June 10, 1953, from a wasting disease

with lung and gastric disorders, weight loss and visual disturbances.

Subsequently the family consulted me in order to learn whether contact with beryllium combined with imbibing fluoridated water could have caused his illness. Beryllium fluoride, an extremely poisonous substance, might have formed in the system and produced a progressive disease. Beryllium poisoning may not become manifest for weeks and months after exposure to the poison has ceased.

After studying the autopsy record at Fort Wayne and following conferences with the examining physicians, I submitted some of the lung sections to a nationally known expert on beryllium, Dr. G. W. Schepers, then at Saranac Lake, N. Y., Laboratory, for his opinion. He found a lung tumor identical with those which he had produced in rabbits with beryllium fluoride.<sup>191</sup>

The family decided to have the body exhumed so that some of the organs could be analyzed for fluoride and beryllium. Because neither one was found in excess, I concluded that neither fluoride nor beryllium had accounted for this patient's death. Not until 1963 did I learn that the absence of beryllium in tissue of organs does not exclude the possibility of poisoning.<sup>192</sup> With increasing knowledge on the subject, I now realize that I should not have disregarded the diagnosis of chronic beryllium fluoride poisoning merely because his organs no longer contained fluoride or beryllium. Indeed, it is most likely that poisoning by beryllium fluoride was the cause of death because of the characteristic tumor in the lungs.

On October 11, 1956, I was consulted by a lady from Racine, Wisconsin. Her husband (C.E.B.), age thirty-five, was dying in the Milwaukee Veterans' Hospital from a mysterious disease which had baffled physicians in this and two other hospitals where studies had been previously made. The disease involved many organs, particularly the stomach, the bowels and the neuromuscular system. It

resembled in many respects the disease in the study of which I had been engaged. I received transcripts of the complete records from the three hospitals, with the results of every investigation that had been carried out. I also obtained, through the hospital's cooperation, a urinary specimen for fluoride analysis. The patient expired a few weeks later, on January 22, 1957.

The autopsy disclosed amyloidosis, a rare disease, characterized by deposition in many organs of a chemical, called amyloid. The pathologist found several other abnormalities, namely, a malignant lung tumor, diseased parathyroid glands, a kidney disease and a terminal pneumonia.

After reviewing all available data with the pathologist and with clinicians at the Veterans' Hospital, I was satisfied that fluoridated water (1 ppm) which the patient had been consuming for six years was not primarily responsible for his death. However, it had a definite bearing on his illness for the following reasons:

1. There was considerable storage of fluoride in his system. By measuring the daily fluid consumption, it was shown that through water alone the patient had consumed about 3 milligrams of fluoride a day. Since his urine specimen contained only 1/10 of 1 mg, the major portion of the fluoride consumed must have been retained in the system.
2. The patient lost an unusually large amount of calcium in his daily urinary specimen, on one occasion as much as 1335 mg (up to 250 mg is normal).
3. The tumor in the lungs, probably the primary source of this patient's disease, contained 29.0 ppm of fluoride (29 mg per 1000 grams of tissue). This was far more than the fluoride levels usually encountered in lungs, which is less than 1 ppm. His bones contained only four times the amount of fluoride present in the tumor. Normally, bones store 300 and more times fluoride than other organs.

The excessive retention of fluoride in the system, its accumulation in the lungs and the disruption of the calcium balance pointed to fluoride as a contributing cause of death.

The high fluoride level in the lung cancer brought up a question which I was eager to explore:

Does cancer tissue contain more fluoride than healthy tissue? Should the answer be positive, it would be of interest to scientists who are trying to conquer cancer.

I discussed this problem with Dr. E. P. Pendergrass, the President of the American Cancer Society whom I met at a medical convention. At his suggestion I made an application to the Society for research funds. My project was clearly defined: I planned to obtain specimens of lung cancer from a local hospital.

As in other large hospitals, there were no facilities to carry out fluoride analyses. In the city of Detroit, where City Councilmen have voted to fluoridate the water supplies, only two laboratories are known to me which carry out fluoride determinations on whose accuracy I could rely. However, both are closely linked with a fluoride-promoting industry and the P.H.S. Most of my analyses had been carried out by George Kosel, an exceptionally well-qualified chemist of the Passaic, New Jersey, General Hospital. It was hoped that an initial pilot study on ten cancer patients and ten control cases without cancer would disclose whether or not this research warranted further studies on a larger scale. I estimated the cost for tissue analyses at about \$10.00 each, and the total expense for the study at approximately \$2,000. The American Cancer Society indicated to me that the money would be forthcoming. The pathologist of the hospital considered the project worthwhile and was eager to furnish the cancerous lungs.

However, there was a fly in the ointment: Several members of the hospital's medical executive staff committee were diehard proponents of fluoridation. They had already

committed themselves publicly to the thesis that fluoridation is absolutely safe.

At the committee's request, the hospital administrator informed me that my research did not meet with their approval because it would be partially carried out in a New Jersey hospital. Whether their decision was prompted by a belief that my project would not lead to tangible results or that the hospital might somehow be dragged into the fluoridation controversy or that my research might produce evidence in conflict with their own position, I never learned. I had solely requested the hospital to furnish ten specimens of cancerous lung tissue and ten non-cancerous specimens for comparative analysis.

The upshot of this incident was that I had to continue to defray all expenses for my research out of my own pocket.

I was able, however, to examine tissue from other organs in a series of cases through the cooperation of some of my colleagues. Some of these data have been published in my monograph, *Fluoride in Clinical Medicine*.<sup>84</sup> In specimens taken from diseased areas of the skin, fluoride levels ranged up to 300 ppm, whereas adjoining normal skin analyzed as a control contained very little fluoride, usually less than 1 ppm.

Moreover, biopsy specimens of ulcers of the mouth of unknown origin from five persons were analyzed for their fluoride content. In ulcer tissue from one of them, a welder, 6.08 ppm fluoride was found whereas in four other persons specimens of the lining of the mouth were fluoride-free. The welder's urinary fluoride level was high, namely 4.2 ppm (normal 0.1 to 0.3). Considerable fluoride was being eliminated for as long as three weeks after he had ceased to be exposed.\*

Another project in which I was engaged was the exam-

\* The fluoride content of fluxes, according to analysis of eight different brands, ranges from 0 to 300,000 ppm (30%).

ination of eye lenses for fluoride. They had been removed surgically because of cataracts. The lens tissue in 14 was free of fluoride, but in two specimens extraordinarily high fluoride levels were found, namely, 77.3 ppm and 176.0 ppm. Such unusually high values raise the question whether or not some cataracts are related to fluoride.

My interest in cataracts had been aroused by the study of a French scientist, Dr. R. Weekers,<sup>193</sup> who demonstrated in 1941 that in cattle and rabbits sodium fluoride interferes with the normal composition of the lens, especially its carbohydrate (sugar) metabolism.

In addition to having fluoride determinations made on cataract lenses, specimens of skin and lining of the mouth, I carried out a program of analyzing for fluoride, the major soft tissue organs in ten individuals. One of them, a patient from Highland Park, Michigan, Mr. W. B. D., forty-five years old, had died under mysterious circumstances in 1962. He had been under my observation from Feb. 19, 1959, to Oct., 1959. The diagnosis of poisoning from drinking fluoridated Highland Park water was unequivocally confirmed by a series of urinary fluoride determinations, by other laboratory studies, by consultation with leading Detroit specialists and, finally, by repeated double blind tests.

On Oct. 2, 1962, Mr. W. B. D. was found dead in bed. He had been free of symptoms since 1959 when, according to my advice, he began to use distilled fluoride-free water for drinking and cooking. However several weeks before his death he had started to use a filter which, he assumed, eliminated fluoride from his tap water. A check on this filter after his death, by a Detroit water engineer, revealed that the filter was ineffective. It had not removed all the fluoride. The question arose whether some of the fluoride removed by the filter from the water could have accidentally recontaminated the water and poisoned him. Since the patient had been proven to be unusually intolerant

to the drug, a relatively small amount could have caused his death.

I received specimens of his organs for fluoride analysis. The coroner found none of the poisons which are usually responsible for sudden death on the body, namely, alcohol, barbiturates, carbon monoxide and cyanide.\* His report recorded no test for fluoride. Before giving his final verdict, the medical examiner told me that he noted a large amount of blood in the stomach. He stated that the heart was normal. In the official autopsy protocol, however, death was attributed to heart disease, although no evidence of a coronary or other preexisting heart abnormality was recorded.

Fluoride determinations of twelve organs done for me by Mr. Kosel were unrevealing. This is not unusual in acute poisoning. Two Philadelphia physicians, Drs. Gettler and Ellerbrook<sup>194</sup> who studied five cases of sudden poisoning due to single doses of fluoride, reported very small amounts of fluoride in liver, kidney, heart, brain, namely 0.2 to 0.8 ppm. Other tests which I had done on the body disclosed an extremely low calcium level of the blood, namely 4.4 mg per 100 cc (normal 9-11). This finding is similar to that reported by others in acute (sudden) fluoride poisoning as shown in Chapter VIII.

The low calcium level in the blood, as well as the presence of blood in the stomach, constituted strong evidence that the patient did die of acute fluoride poisoning. Yet, one missing link was needed without which it was impossible to complete the diagnosis: This corpus delicti was the stomach content. The medical examiner was unable to provide it for fluoride analysis because of the excessive disintegration of the stomach following the death.

This case demonstrates the great difficulties with which physicians are constantly confronted in establishing a

\* Zawadzki, E. S., M. D., Wayne County Medical Examiner, to G.L.W. 1/10/63.

diagnosis and relating cause to effect. For this reason I continued to search for new criteria which would assist in pinpointing the diagnosis.

Excess fluoride in urine and blood have been used by biochemists as an indicator of fluoride intake into the body. However, because of wide variations in a person's tolerance to the drug due to age, state of nutrition, dietary habits, occupation, etc., it is not possible to set up iron-clad reliable standards for what are normal, and what abnormal, levels of fluoride in urine, blood, bones and other organs.

Dr. H. C. Hodge, of the University of Rochester, an ardent exponent of fluoridation, has claimed that no harm can occur unless at least 5 mg per liter (5 ppm) of fluoride is present in the urine.<sup>195</sup> This concept, although widely publicized in medical journals, is based on this scientist's arbitrary view; it is not supported by factual data.

In pursuance of this idea, I had more than 200 urine samples analyzed for fluoride. The daily fluoride elimination in allergic persons, particularly in those intolerant to fluoride, was compared with that of individuals who had suffered no ill effect from drinking fluoridated water and of individuals residing in non-fluoridated areas. At no time was there any correlation of their symptoms with the level of fluoride in their urine. In other words, the amount of fluoride present in a person's urine does not indicate how susceptible he is to damage from fluoride. In fact, those who eliminate little or no fluoride in their urine might, under certain conditions, accumulate relatively large amounts in vital organs, as did patient C.E.B. of Racine, Wisconsin (page 210).

Thus, my intention to use urinary fluoride as a criterion came to naught.

Another approach was pursued. According to Dr. Ro-holm,<sup>32</sup> fluoride tends to withdraw calcium from the system. Simultaneous determinations of calcium and fluoride in

the daily urine specimens, I reasoned, should indicate to what extent fluoride disturbs the system's calcium balance. This procedure, I hoped, might turn out to be the desired tool for establishing whether or not a given person is susceptible to harm from fluoride.

Forty-eight persons suspected of fluoride poisoning and fourteen normal individuals cooperated in this study. They were placed for three days prior to the test on a carefully measured controlled diet; some diets contained 2000 mg calcium (high calcium diet), the others 137 mg (low calcium diet). Each was given 15 mg of sodium fluoride in water, by mouth. This is equivalent to 6.8 mg of fluoride, an amount small enough to be relatively harmless in a single dose, yet large enough to be detected in the urine 24 to 48 hours later. The amount of calcium was determined in the same specimens.

In carrying out new, untried research, one idea often leads to another: For example, when given by mouth, the total dose of fluoride does not enter the bloodstream. An unknown quantity leaves the system through the bowels and does not reach the blood. In order to obviate this possibility and to by-pass the stomach, sodium fluoride was injected directly into the bloodstream in thirty-four patients.

The results were most enlightening.

Five patients had slight side effects, three suffered more severe reactions, mostly nausea, vomiting, migraine-like headache and visual disturbances from this minute dose of fluoride. However, the severity of these symptoms could not be attributed to increased calcium elimination through the urine. Contrary to my expectations, calcium in the urinary specimens did not parallel the amount of fluoride as it had in the arthritis patient R. R. from Bloomfield Hills, described on page 208.

Interestingly, several persons eliminated an unusually large amount of urine, as much as 6 liters, after the test

dose compared to their customary daily elimination of one to two liters. Excessive thirst (polydipsia) and excessive urinary production have been reported in fluoride poisoning from much larger doses.

Since this method did not provide conclusive findings, another method was devised to determine whether or not a person can tolerate fluoride in minute doses. Calcium and phosphorus levels were determined in the blood following an intravenous dose of 15 mg of sodium fluoride.

Again, the results were erratic. In several persons there was a significant fall in blood calcium and blood phosphorus, in others a marked rise after the intravenous test dose of fluoride. At first these results were disappointing to me because they lacked consistency. However, as I learned more about how fluoride affects the human organism, I realized that nothing other than inconsistent results should be anticipated. The wide variations from one person to another in fluoride's absorption, storage and elimination related to many variables, especially age, sex, state of health and nutrition, previous exposure to, or intake of fluoride—all make for inconsistent results.

The basic lesson from any work on fluoride is the fact that no two persons respond alike.

My studies on fluoride and calcium elimination had an aftermath:

Drs. Muhler and Wagner, University of Indiana, Bloomington, followed my procedure using six normal persons for their tests. They obtained similar results: Excretion of fluoride and calcium after a given test dose was inconsistent.

Their article, published in the *Journal of Dental Research*, Vol. 38, page 1078, 1959,<sup>66</sup> revealed a much more significant result than that which they set out to find. Yet, they and other exponents of fluoridation have paid little attention to what this research really disclosed:

Their six "experimental persons" eliminated only about one-third of the fluoride given to them in the test. This is a

far cry from the usual claims made by the P.H.S. based on work by Drs. E. J. Largent<sup>196</sup> and F. J. McClure<sup>65</sup> who reported that only 10% to 25% of ingested fluoride is retained in the system.

I set up additional projects designed to enlighten me further about fluoride's action on the human body.

For instance, I skin-tested more than 2000 allergic patients in my Clinic with a 1% solution of sodium fluoride. One per cent solutions of sodium bromide and sodium iodide, injected simultaneously as a skin test, served as controls.

In most cases fluoride reacted much more strongly than the two companion halogens. The usual response to the injected fluoride solution is an irritated area on the skin. In four patients, however, I noted a strong so-called "wheal" reaction, the same kind as that seen in hay fever patients sensitive to ragweed. The significance of these reactions with respect to the patient's tolerance is difficult to assess.

A number of food items, drugs and volatile household products were analyzed for their fluorine content. These studies have furnished interesting results, but have not yet been processed for presentation in medical journals.

Having been alerted to the effect of fluoride, I observed in some of my patients that fluorine-containing drugs may induce side reactions closely simulating fluoride intoxication. This is contrary to the view currently accepted by the medical profession. It is generally believed that the fluorine and carbon atoms in these drugs are so closely tied together that fluoride ions do not dissociate from the molecules. Thus it is assumed that chemically-bound fluorine remains innocuous because it is eliminated through the kidneys in the same combination as consumed.

However, at a chemical laboratory in Cambridge, England, I was shown the fluoride analyses of a patient's urine who had been taking a tranquilizer containing 16 per cent

of fluorine. This drug, taken three times daily for three months provided a total daily intake of 2.4 mg of fluoride. The patient was suspected of ill effect from fluoride while using the drug. Analyses for "free" fluoride (not bound to other atoms) in the daily urine samples obtained September 13 to 15, 1962, ranged from 1.86 to 2.76 mg. These amounts represented 76 and 90% respectively of the total fluorine (bound and as fluoride ion) present in the urine on the above mentioned dates. Since other major sources of fluoride intake were ruled out in this patient it must be concluded that fluoride did split off from the drug's molecule and thus caused damage.

Another experience indicated to me that fluorine in a drug may lead to fluoride storage in the system. One of my own patients, Mrs. J. T., age forty-two, residing in low fluoride (0.1 ppm) Detroit had been taking a fluorine-containing corticosteroid drug (one of the active principles of adrenal glands) for 8 years when she first consulted me for asthma on August 20, 1963. Six weeks after discontinuing the drug she was still excreting 1.46 mg per day (0 to 0.3 mg is normal). It was not until three months later that the urine became free of fluoride. The persistent elimination of fluoride after she had discontinued the drug constitutes evidence that over the years considerable fluoride may have been released from the drug and stored in the system.

On August 24, 1962, the chief surgeon of one of the leading hospitals in the South consulted me about a nine-year old boy, W. B. B., Jr. Severe hemorrhages from the stomach necessitated removal of a large part of the child's stomach. After recovery and return home, the boy promptly suffered another hemorrhage so severe that a part of the upper bowel had to be removed. Careful questioning revealed that he had taken a fluoride tablet for prevention of tooth decay, several hours prior to the second hemorrhage. Could the hemorrhages have been due to the tablet which

contained about 1/2 (0.4823) mg of fluoride, the surgeon inquired?

Fluoride ion reacts with hydrochloric acid in the stomach and forms hydrofluoric acid, the corrosive agent which causes ulceration and hemorrhages in the stomach and upper bowel in acute poisoning. The ulcer formation, as stated before, does not take place immediately upon contact of hydrofluoric acid with body tissue, but first begins to form beneath the area of contact.<sup>197</sup> This explains why several hours may elapse before the hemorrhages start.

Upon examination of the microscopic sections of the boy's stomach and upper bowel, I found an unusual condition beneath the lining of the stomach, called teleangiectasis (widening of small blood vessels). The investigation concluded that the fluoride tablets precipitated the hemorrhages in this otherwise harmless condition.

This case demonstrates how a poisonous substance, harmless to many, can cause serious damage to some.

Recently, death due to liver damage has been reported in the medical literature in ten cases from a new, widely employed anesthetic containing 28% fluorine.<sup>198</sup> There is a controversy as to whether these deaths were caused by the anesthetic or occurred coincidentally. In an effort to determine whether or not the three fluorine atoms present in the molecule might have been responsible, I obtained liver tissue in four of the ten cases for fluoride analysis.

In a sixteen year old girl who died within thirteen days after surgery, there was as much fluoride in the liver (3.98 ppm) as has been noted in acute fluoride poisoning by Drs. Gettler and Ellerbrook.<sup>194</sup> In the other three cases the fluoride levels in the liver were within normal range. The long interval between the surgery and their deaths could have provided the system a chance to rid itself of the fluoride after doing its damage to the liver tissue.

These studies which I have carried out indicate that

fluoride's role in poisoning from drugs requires much more investigation. Currently it is a virgin field.

Because of the many handicaps and roadblocks, especially because of limited funds, I was only able to scratch the surface of some of the problems in which I was interested. Nevertheless, it has given me an appreciation of the importance of fluoride in many disease processes and it has contributed, in a small way, to our knowledge of fluoride's effects. It has already stimulated others to search for facts to which little or no attention had been paid in the past.

## CHAPTER TWELVE

### COUNTERATTACKS

In 1959, I discussed my data on chronic fluoride poisoning from drinking water at the Pasteur Institute, Paris, with one of France's greatest authorities on calcium-phosphorus metabolism, Dr. G. Milhaux. He showed much interest in my work, but warned:

"You are swimming against the stream. Are you prepared to face the consequences?"

The research in which I was engaged constituted the most powerful evidence against fluoridation. It incontrovertibly proved that fluoridation is hazardous to health.

My research constituted an indictment of those who had initiated the fluoridation program without first securing proof of its safety. It also indicted the multitudes who had permitted themselves to be carried along by the current—who had blindly accepted the word of "authorities" or so-called fluoridation study committees without making their own independent investigation.

In recent years only a few scientists in the U. S. A. had produced research indicative of harm from fluoride, notably Dr. Alfred Taylor, University of Texas; Dr. I. Rapaport, formerly of the Psychiatric Institute, University of Wisconsin; Dr. Clive McCay, Cornell University College of Agriculture, Dept. of Animal Husbandry; Father Sullivan of Boston University; Dr. Reuben Feltman of Passaic General Hospital, Passaic, New Jersey. Their work could be "eliminated" more easily than mine. They were linked

with institutions dependent on the P.H.S. and the U.S. Dept. of Health, Education, and Welfare.

My position was different. I was independent.

Moreover, I had publicly challenged the practices prevailing in fluoridation promotion. I had openly dared to question the validity of research sponsored by the most powerful medical organization in the world, the U.S.P.H.S.

In 1955 I had submitted an article on fluoridation to the editor of the *Ladies Home Journal*. At first he was inclined to publish it. Sensing the fury of the controversy, he compromised by publishing a letter in the May, 1955, issue, page 6, accompanied by one written by the U.S.P.H.S. Surgeon General, Leonard Scheele, now the head of a pharmaceutical company.

Referring to the poisoning which I had encountered, I challenged the P.H.S.:

"The Public Health Service is moving heaven and earth to deny the existence of these cases instead of investigating them."

Such an affront to this mighty organization demanded immediate measures. The Public Health Service, trusted throughout the U.S.A. by every citizen, by Congress and the President, had many big guns and heavy ammunition at its disposal to neutralize the impact of my evidence. These guns were set up on both the political and the scientific front:

The editor of the *Ladies Home Journal* received a tongue lashing by Dr. G. J. Cox, of Pittsburgh, the originator of the fluoridation idea. In a mimeographed brochure<sup>199</sup> distributed by the A.D.A. entitled "Is There a Case Against Fluoridation?", Dr. Cox stated:

"They (*The Ladies Home Journal*) could have prevented the loss of millions of teeth by referring these letters to competent critics."

Dr. Cox's philosophy is characteristic of the entire fluoridation campaign: The people should not be given

both sides of this issue. "Competent critics," i.e. public relations counsels of the A.D.A. and the P.H.S., the two promoting agencies, must shield them from facts unfavorable to fluoridation.

I will mention just a few examples of other efforts by promoting agencies to scuttle my work because the story of this struggle would be incomplete without recording some of these experiences.

On the political front health officials in fluoridated communities denied that fluoridated water could cause poisoning. The strongest denial came from Dr. G. C. Weidner, health commissioner of Saginaw, who at the time of my conference with him in Saginaw had not been aware of the many reports available in the medical literature of harm from fluoride in water naturally. Nor had he realized that Saginaw citizens had become ill from artificially fluoridated water. Nevertheless, in the *Pontiac Press* of April 1 and 2, 1955, Dr. Weidner categorically stated that Saginaw's fluoridated water had never caused illness to anyone. His successor, Dr. Richard S. Ryan, acting health officer, followed up Dr. Weidner's statement in a widely publicized letter\* to Dr. Gordon Bates, Canada's chief promoter of fluoridation.

"There has been no epidemic of fluorine poisoning in Saginaw. For emphasis, I repeat, there has been no epidemic."

I checked with some of the Saginaw individuals whose illness I had studied. I learned that the local health department had made no inquiries at any time concerning their illness.

On the other hand, in Highland Park, Michigan, the health commissioner Dr. James Nunn did do some investigating. He had learned through relatives of my patient, Mrs. M.E.J.,—the first case of poisoning from artificially fluoridated water reported in the literature—

\* *HEALTH*, Toronto, Ont., March issue, 1958.

that she was emotional when speaking about fluoridation. From this description the health commissioner deduced that her disease had a psychosomatic or imaginary basis. Obviously, he was not aware that she exhibited such clear-cut physical manifestations as internal hemorrhages and retinitis. Who would not become emotional upon learning that fluoride which had been added to her drinking water without her consent was the sole cause of a serious, near fatal illness? To maintain her health she must secure distilled water which she can ill afford to buy. To remain unemotional after such an experience would be abnormal indeed.

Another salvo on the political front was fired by the Michigan State Health Commissioner, Dr. Albert E. Heustis. In a letter dated June 6, 1955, publicized widely by the U.S.P.H.S., he accused me of shirking my duty as a public-spirited physician because I had refused to turn my patients over to his department for examination. Actually in my reply to him on June 7, 1955, I had stated:

"I shall be more than pleased to present my material to an *unbiased group of my colleagues* at any time."

Since Dr. Heustis is the key promoter of fluoridation in the State of Michigan, since neither he nor anyone else in his Department have had any research experience with fluoride's systemic effect and since he holds a political office, I felt that examination of my patients by Michigan health officials could only serve to confuse the issue.

I had made a trip to Lansing during the summer of 1955 to request Michigan's Governor G. Mennon Williams to establish a committee of scientists independent of political affiliations for the purpose of objectively appraising my data.\* I had already reported my observations of fluoride poisoning from drinking water in two medical journals. Moreover, I had repeatedly requested an opportunity to present my data to the membership of

\* Letter by Dr. G. L. W. to Mr. Lawrence Farrell, Secy. to the Governor, State Capitol, Lansing, dated 9/20/55.

local and national medical societies and to hospital staffs, the conventional way to introduce new scientific findings to the medical profession. These requests were denied.

New efforts were made to counter the effect of my work. According to a standard pattern a letter had to be obtained from someone whom the uninformed citizen would look upon as an authority. A statement by the Assistant Executive Secretary, Mr. A. H. Luthmers of the American Academy of Allergy, not a physician, appeared in the Manchester, Conn., *Herald* of April 2nd, 1959:

"To my knowledge there are no reports of allergic or toxic reactions to fluoride other than the reactions of hardening of tooth enamel."

The officers of the organization had not authorized him to speak for them nor had they knowledge of how the statement originated. When the president of the Academy, Dr. F. C. Lowell of Boston, became aware of it, he wrote me on April 23, 1959:

"So far as we are aware there has never been any formal expression of opinion by the American Academy of Allergy concerning toxicity of fluorine in drinking water."

Investigation revealed that Mr. Luthmers had expressed a personal opinion in a letter dated May, 1956, to a Stamford, Conn., physician. Mr. Luthmers himself stated that the letter was not written for publication.\*

There was reason to believe that the request for the Luthmers' statement did not originate on the local (Connecticut) level, but was obtained according to a definite pattern through directives from top promoters, either from Washington, D. C., or Chicago.

At the hearing before the St. Louis, Missouri, County Council at Webster Groves on October 11, 1957, for instance, Dr. Willard Bartlett, the local promoter, likewise announced that St. Louis allergists had "not seen

\* Luthmers, A. H. to G. L. W. 5/12/59.

any allergy to fluoride." Actually none of them had ever considered the possibility that fluoride might cause allergic reactions.

Had they been asked twenty years ago whether or not they had seen a case of emphysema from smoking they would also have replied in the negative. Today their reply would be different.

In not a single instance did these efforts to neutralize the impact of my research constitute a bona fide criticism of my data. Instead proponents attempted to cast doubt upon my scientific competence.

Since I held no office or job within the reach of P.H.S. influence I could not be threatened with dismissal. Such practices, incredible as they may seem, are not uncommon in fluoridation promotion.

V. O. Hurme, D.M.D., director, for many years, of Boston's Forsythe Dental Infirmary for Children resigned his position because "restriction of his academic freedom on the question of fluoridation was repugnant" to him.\*

Dr. Jonathan Forman of Columbus, Ohio, editor of the *Journal* of the Ohio State Med. Assoc. for more than twenty-five years was abruptly dropped, according to the *Columbus Citizen*, November 13, 1958, because of his open stand against fluoridation.

Early in 1954, a scientist of New York City who wishes to remain anonymous had opposed fluoridation over the radio. The following day the Dean of the Dental School, New York University, with which he was connected, informed him that his services were no longer needed. When the professor threatened to publicize the reason for the dismissal, the university promptly dropped the matter.\*\*

The disparagement by the Milwaukee Health Director, Dr. E. R. Krumbiegel, in the *Milwaukee Journal* of No-

\* Hurme, V.O., D.M.D. to G.L.W. 8/9/59.

\*\* Personal communication W. W., M. D.

vember 8, 1955, which has been propagated in the A.D.A. dossier, had failed to silence me. Indeed, I had paid little attention to the abusive statements about me which had become increasingly numerous. Therefore, more effective measures to eliminate me from the fluoridation scene had to be devised. Bigger guns had to be trained at me and my evidence.

It began with a visit by Dr. Heinrich Hornung, a health official of Marburg, Germany. None other than a Torch-supported Detroit welfare agency had made arrangements for his trip to Detroit.

Dr. Hornung, one of Europe's most fanatical promoters, was sponsored in the United States by the American Council on Education\* for the purpose of "studying" fluoridation. His itinerary included the key battle areas in the fluoridation struggle: Bethesda, Md., Bartlett, Tex., Grand Rapids, Mich., Newburgh, N. Y., and—my clinic in Detroit.

Dr. Hornung arrived carrying a bouquet of red roses for my wife. With pleasure he accepted the hospitality of my home. Knowing that Germans enjoy the out-of-doors, I took him to my farm near Pontiac where I showed him deer tracks, foxholes and modern milking equipment. I also showed him, at my clinic, some of the data which I had accumulated in connection with the 52 cases of poisoning from fluoridated water, a report of which was about to appear in a leading European medical journal, *Acta Medica Scandinavica*.<sup>189</sup>

Some individuals had written letters to me describing their illness. Before embarking upon a study of their cases, I had mailed them a questionnaire for the purpose of determining which to eliminate and which to carefully investigate. The questionnaire served solely for screening purposes. From their answers I decided whether or not it was warranted to contact the family physician and the

\* Cassidy, Florence G., Secy. Committee for Foreign Visitors, United Community Services to Dr. G. L. W. Oct. 18, 1955.

hospitals, where they had been under observation, for further substantiation of the diagnosis. I personally examined most of the fifty-two persons. Some were hospitalized in Detroit for thorough observation and consultation.

On March 24, 1956, Dr. Hornung sent me the copy of a letter which he had directed to Frederick S. McKay, Colorado Springs dentist. This letter was subsequently published in the *Journal of the American Dental Association*.<sup>201</sup>

Dr. Hornung described what he claimed to have seen in my office:

"Dr. Waldbott," he stated, "is an excellent ('*ausgezeichnet*') scientist in the field of allergy, but on the question of fluoridation his scientific reasoning is tarnished constantly by an emotional bias."

"Dr. Waldbott distributed a questionnaire in which 'leading' questions were listed, and whenever a single one of these questions was answered positively by one of the recipients of the questionnaire, mostly elderly ladies, this was recorded as proof (!) of poisoning by fluoridation," Dr. Hornung continued.

"During a luncheon in Bartlett, Texas, where the drinking water contains 8 ppm of fluoride, I requested that the mayor of Bartlett read the symptoms listed in Waldbott's questionnaire. I wanted to ascertain whether such symptoms occur in a town with a comparatively high fluoride content in its water supply. The response was hilarious. A participant in the discussion declared laughingly: 'Now I know why my bulldogs can't catch the ball.'"

There was every reason to expect a hilarious response not only from the Bartlett citizens but from every dentist in the U.S.A. who read Dr. Hornung's version of my questionnaire in the *Journal of the A.D.A.* I could hardly believe my eyes when I read the nonsense which he attributed to me and which he had interpolated into my questionnaire:

"Numbness in thumb, little finger or end phalanx of forefinger; small black moving spots in the field of vision; chronic skin erosion (!); hypersensitivity of mucosa and burning sensation in both eyes; eczema between fingers and toes; itching, dryness in the oral cavity; brittle nails; hives; gastritis and atrophy of the liver (!), especially during summer (!); dull headaches in forehead; pains in the cranial region; backache; falling out of hair; pains in arms and ankle joints; frequent disturbance of the faculty of thinking, and improvement immediately after change of domicile."

Dr. Hornung must have lifted out of context and attributed to me some of the patients' own descriptions in their replies to my questionnaire.

"Dr. Waldbott's questionnaires," Dr. Hornung continued, "were distributed (by Dr. H.) in Marburg, Germany, a city where drinking water contains hardly any fluoride (0.2 ppm), but where it has been chlorinated for years."

In his questionnaire Dr. Hornung substituted the words "chlorine" and "chlorination" for "fluorine" and "fluoridation." He implied that on the basis of answers received (had he followed my method of diagnosis) one half of Marburg's population would have been poisoned from chlorinated water.

I first learned that this letter had appeared in the Sept., 1956, issue of the *Journal of the American Dental Association* from a Detroit *Free Press* reporter. It was the subject of a nationwide news release on August 31, 1956.

Did I have anything to add, the reporter inquired?

This distortion of facts and the manner in which it was propagated caught me completely by surprise. Any off-hand remarks would only have further damaged my position.

The next day the Detroit *Free Press* featured my "so-called" research on fluoride poisoning and my "emotional" approach to the subject of fluoridation.

To this day I am still amazed at my complete unaware-

Table 14  
 SAMPLING OF NEWS MEDIA WHICH PROPAGATED THE HORNING STORY

Newspapers	Foreign Newspapers	Medical and Dental Journals	Books	Letters
<b>Domestic</b> Saginaw News, 8/31/56	<b>Foreign</b> Andover (Eng.) Advertiser 1/4/57	<b>Medical and Dental Journals</b> Journal Amer. Dent. Assoc. 53:325, 1956.	<b>Books</b> Commission of Inquiry, Fluoridation of Public Water Supplies, Wellington, New Zea- land, 1957, p. 101	<b>Letters</b> V. L. Diefenbach, D.D.S., P.H.S. to R. L. Jones, Jonesville, Ohio, 1/31/58
Detroit Free Press, 8/31/56	De Nederlandse Geneente, S'Gravenhage, Holland, 2/3/62	ADA News Letter, 8/31/56	Report to Des Moines City Council by Dr. J. F. Speers, 1959, p. 38	Dr. Diefenbach to H. D. Donahue, U.S. House of Representatives, 1/24/58
Worcester, O., Daily Record, Oct., 1956	Berner Tagesblatt, Bern, Switzer- land, 12/29/62	Zahnärztliche Mitteilungen 59:268, 1959	Year Book of Dentistry, 1958, p. 137	Dr. Diefenbach to E. L. Miszak, Norwich, Conn., June, 1963
Grosse Pointe News, 10/11/56	Der Bund, Bern, Switzerland, 2/3/63	Nordisk Med. 6:25, 1959	Liberty (magazine) Toronto, June 1957, p. 48	J. W. Krupp, D.D.S., Rock Island, Ill., to G. L. W. 11/17/61
Bar Harbor, Maine, Times, 10/25/56	Postgraduate Medicine 26:648, 1960	Nutrition Reviews, 19:259, 1961.	Radio Station W/BZ, Boston, Oct. 23, 1963	F. Bruce Rice, Chief Dental Health Officer, World Health Organization to A. Natismith, Kingston, Ont. 7/18/62
Tonawanda, N.Y., News, 10/24/57				John Knutson, D.D.S., Asst. Surgeon General, P.H.S. to James Rorty, 8/9/56
New Canaan, Conn., Advertiser, 4/3/58 and 4/17/58				
Manchester, Conn., Evening Herald, 9/2/59				

ness concerning the real purpose of Dr. Horning's visit. I considered this man a scientist. Due to my German upbringing and education the thought would never have crossed my mind that a health official's motives could be political rather than scientific. His gift of roses to my wife had convinced me that he was a gentleman. It was perhaps my German background which made me assume that a scientist, a German, and a gentleman could only be interested in science and truth.

The American Dental Association and the P.H.S. utilized this letter for all that it was worth. The Horning story was duly propagated wherever fluoridation raised its head (Table 14). Whenever my name was mentioned in connection with fluoridation, the local promoting dentist or health official handed the story to the newspaper or the local fluoridation committee.

The letter was reprinted from Connecticut to California—from Maine to Florida. It appeared at public hearings, in the press, over the radio, in Australia, New Zealand, Holland, Germany, England, Sweden, Switzerland, in medical and dental journals.

The editor of the New Canaan, Conn., *Advertiser* published editorials on April 3rd and 17th, 1958, on "Waldbott's Cases" under the paradoxical caption of "Public Information Service."

Whenever the U. S. Public Health Service received inquiries from citizens, scientists or scientific organizations concerning Dr. Waldbott's research, V. L. Diefenbach, D.D.S., acting Chief, Education and Information Services, Division of Dental Public Health, responded with standard enclosures featuring the Horning letter in connection with other material equally misleading. It resulted in labelling anything I said as "unconvincing" and "unscientific" regardless of the fact that Dr. Horning in his letter had designated me an "excellent scientist" in my

own specialty. Needless to say each editor gave the story his own slant.

Indeed, this device accomplished its purpose: It completely neutralized the powerful evidence which I had produced.

Curiously enough, in spite of his flagrant abuse of my hospitality, Dr. Hornung continued to woo my "friendship." Months after he had written his letter, I received a greeting from him written during one of his vacations: "As true scientists," he stated, "we may differ in opinions, but we may still remain good friends." On one occasion he sent me a postal card from my home town, Speyer, Germany. I often wondered whether or not he went there on an official mission to research my background from the cradle to obtain more material for another letter to some of his American friends.

Only once did I see Dr. Hornung again. I was invited to speak to a group of physicians at the behest of the Health Department of the City of Frankfurt, Germany. He had little to say at the conference. After the meeting, however, I saw him gesticulating to several physicians who had heard my talk. Was he explaining to them why bulldogs couldn't catch balls in Bartlett? Was he trying to convince his listeners of the competence of Bartlett's mayor to assess the illnesses of his townsmen?

On the advice of my attorney I initiated steps for a libel suit against the *Journal of the American Dental Assoc.* Its editor promptly offered me space in the *Journal* of Dec., 1957, page 873, for a reply to the Hornung letter.<sup>181</sup> At that time I had had very little experience with legal matters. Instead of answering Dr. Hornung's slanderous implications I thought it preferable to give the dentists positive information about my recent research. This gentle approach, however, proved to be ineffective. Even after a second clarification had appeared, this time in the A.M.A.'s *Archives of Environmental Health*, Vol.

4, page 459, April, 1962, the P.H.S. spokesman persisted in propagating the Hornung fabrication.

The device of visiting a scientist for the purpose of discovering a means by which to downgrade him publicly and thus neutralize the impact of his research is frequently employed in fluoridation promotion:

During the course of a series of experiments on cancer, Alfred Taylor, Ph.D., at the Biochemical Institute, University of Texas, one of the nation's most respected cancer researchers, observed that water fluoridated at 0.44 ppm shortened the life span of cancer-prone mice. Although Dr. Taylor emphasized that his conclusions were tentative, two P.H.S. officials called on him in his laboratory, Drs. H. T. Dean and H. Andervont. Subsequently the P.H.S. pronounced Dr. Taylor's experiments invalid because, in addition to water, the pellets fed the mice also contained fluoride.<sup>202</sup>

In subsequent experiments,<sup>203</sup> Dr. Taylor eliminated the basis for the P.H.S. criticism and confirmed his previous observations. This time the feed contained only minute amounts of fluoride. In a series of 12 experiments, involving 645 mice, 1 ppm fluoride in water reduced the life span by 9%.<sup>203</sup>

In spite of the statistically significant evidence obtained from this unusually large number of animals, proponent scientists continue to quote the earlier (1951) preliminary tentative experiments and their critiques. They keep disregarding the final (1954) results.

In order to further neutralize the impact of Dr. Taylor's work, research by Drs. J. J. Bittner and W. D. Armstrong of University of Minnesota<sup>204</sup> was given wide publicity. Because too few mice were involved, the results of their experiments were not conclusive.

Numerous other methods have been devised to forestall an objective appraisal of, and to eliminate, valid research unfavorable to fluoridation:

A mimeographed release by the University of New Mexico through Roland Dickey, Director of the University of New Mexico Press, Albuquerque,\* designated as invalid research carried out by members of its own staff, Drs. J. D. Clark and E. W. Mann.

In 1938, the two scientists had published the first statewide survey of water sources in which fluoride occurs naturally using a grant from the State's Department of Health with federal assistance. Of 157 communities, thirty-five had shown that fluoride in their water supplies was "above the danger point of 0.9 ppm, averaging from 1.1 to well above 12.0 ppm of fluoride." The authors set up a "dividing line of the toxic and nontoxic levels" at a concentration between 0.8 and 1.0 part per million.

After fluoridation in Newburgh, N. Y., was initiated in 1945 with a concentration of 1.2 ppm of fluoride, a danger point of 0.9 ppm would have impeded its promotion. Hence, the University of New Mexico's release declared the scholarly work of the two men "hopelessly out of date." The University's spokesman, Mr. Roland Dickey, maintained that it "should be accepted by no one as authoritative on the subject of the addition of fluorides to water supplies."

Similarly, the Vice-President of the University of Texas, Dr. Chauncey D. Leake\*\* issued a statement Oct. 1, 1951, denying responsibility for Dr. Alfred Taylor's valuable research carried out at his own university. Such action is unprecedented in medical research.

Again there are indications that this action did not originate with the respective universities but with a few top scientists in the Dental Branch of the P.H.S. which, through its ability to withhold research grants, can control

\* Dickey, R. to Mr. G. E. Radcliffe, Kingston, Ont. Enclosure dated 3/7/52.

\*\* Leake, Chauncey D. to Dr. Edward Taylor, State Dental Director, Austin, Texas, 10/1/51.

their lifeline.

In January, 1964, a sociology student at a midwestern university who wishes to remain unidentified canvassed, as part of her college thesis, 400 members of the local medical society regarding fluoridation. Of 267 replies, 49 per cent were for fluoridation, 34 per cent against and 17 per cent undecided. If this information had become public property, it would have seriously hampered fluoridation promotion in the area. The assistant dean, prompted by the fluoridation chairman, wrote a letter berating the student for allegedly abusing the good name of her school. As is customary, a copy of this letter was sent to the local fluoridation promoter.

Through prompt and decisive action, by threatening a libel suit, the student obtained a complete retraction of the letter's false and libelous accusations. Had she failed to take immediate steps, the letter would have served to discredit the results of her poll and to cast aspersions upon her personal integrity. Nevertheless, the maneuver accomplished its aim. The student, a physician's wife, has thus far refrained from publishing her data.

On several occasions new research projects have been designed and given wide publicity for the sole purpose of countering research unfavorable to fluoridation:

When Dr. J. R. Herman, a New York City urologist found 1795 ppm of fluoride in a kidney stone<sup>205</sup> he was promptly provided with a P.H.S. grant and P.H.S. scientists as collaborators. His second study purported to prove that fluoride has no bearing on the formation of kidney stones (see page 290).

Drs. W. F. Ramseyer, C.A.H. Smith and C.M. McCay, Cornell University, had demonstrated in long-term experiments<sup>206</sup> that rats, fed throughout their life water containing 1 ppm of fluoride, eventually developed periodontoclasia (gum disease) and kidney disturbances. Before the article was published, Dr. John W. Knutson, Asst. Surgeon Gener-

al, U.S.P.H.S. Dental Division, alleged that the results must have been associated with twenty to thirty times the fluoride concentration recommended for fluoridation.\* A new team, established with P.H.S. assistance,<sup>207</sup> reproduced the same abnormal changes but the authors attributed them to "old age." No fluoride determinations of tissues were made to rule out the possibility that the changes were due to fluoride rather than to "old age."

Dr. Reuben Feltman of Passaic, N. J.,<sup>208</sup> had administered fluoride tablets to children and to pregnant women. When he reported that about 1 per cent of his subjects could not tolerate the drug, the P.H.S. discontinued support for his research.\*\*

The experience of Dr. Ionel Rapaport, a perceptive scientist, formerly of the Psychiatric Institute, University of Wisconsin, further elucidates how important research is being eliminated. On the basis of official P.H.S. statistics from Wisconsin, Illinois, North and South Dakota, Dr. Rapaport in collaboration with local health officials showed that mongolism, a birth defect characterized by mental and physical retardation, occurs in significantly larger numbers in natural fluoride areas than where there is little or no fluoride in water.<sup>209</sup> Dr. Chas. Curry, senior dental surgeon at Middlefield Hospital, Knowle, England, and part time dental officer in Liverpool, Surrey, Hampshire, Warwickshire and Worchestershire, has supplemented this evidence by demonstrating an unusually high incidence of mottled teeth affecting 25 to 50 per cent of the tooth's surface<sup>210</sup> among mongoloid babies. Dr. Rapaport's basic discovery was bound to seriously threaten the promotion of fluoridation.

Shortly after Dr. Rapaport's first article appeared in 1956 in the *Bulletin* of France's National Academy of Med-

\* Knutson, J. W., D.D.S., to Rorty, James, Flatbrookville, N. J. 8/9/56.

\*\* According to F. F. Heyroth's testimony at Santa Fe, N. M., Hearing 11/16/55.

icine, Dr. W.T.C. Berry, a British health official and leading British fluoridation promoter, carried out a survey of mongolism in England.<sup>211</sup> Like Dr. Rapaport, he compared the number of mongoloid births in British cities where fluoride occurs naturally in water with the number in cities where water contains little or none. In tea drinking Great Britain, such a comparison is fallacious, since most British mothers consume as much or more fluoride through tea alone than the average daily dose imbibed with drinking water. For adequate controls Dr. Berry should have selected births from mothers who drink little or no tea. Moreover, thirteen of Dr. Berry's sixty-four cases of mongolism were encountered in cities where the water's natural fluoride content was neither high nor low; thus they did not fall into either category.

In spite of this faulty design which fails to meet scientific criteria, the Berry data have been widely publicized for the purpose of discrediting Dr. Rapaport's research.

Like Dr. Taylor, Dr. Rapaport repeated his studies on a much larger scale and eliminated the basis for criticism. For his statistics he used the mothers' permanent residence rather than the place of their confinement.

In one of the letters critical of Rapaport's work addressed for promotional purposes to the late Dr. F. A. Bull, Wisconsin State Dental Director, dated November 25, 1957, A. L. Russell, D.D.S., Chief of Epidemiology and Biometry, National Institute of Dental Research, a P. H. S. troubleshooter, favored the state of Illinois for further studies. He explained that the state furnished a large sample with virtually complete fluoride histories, largely the work of his associate Dr. Elvove. Like Dr. Herman, Dr. Rapaport was provided with P.H.S. counsel during the progress of his second study, namely five Illinois state health officials under the leadership of Dr. Russell. However, unlike in Herman's case, Rapaport's conclusions remained unaltered.

The second (1959) study established incontrovertibly

that fluoride increases the incidence of mongoloid idiocy. There is less than 1 possibility in 1,000 that these statistical results of the 1959 study occurred by chance.

It covered five and a half million people, 335,000 births and 148 cases of mongolism. Presented in the *Bulletin* of France's National Academy of Medicine, May 12, 1959,<sup>212</sup> it confirmed the 1956 results.

The tabulation of Rapaport's findings (Table 13) shows a rate of 34.15 cases of mongolism per 100,000 births in cities where water contained 0.2 ppm or less. Twice as many cases (71.59) occurred in areas where water contains between 1.0 and 2.6 ppm fluoride.

Table 15

FREQUENCY OF MONGOLISM IN ILLINOIS TOWNS OF 10,000 TO 100,000  
(JANUARY 1, 1950 TO DECEMBER 31, 1956)

Total Number of Births	Fluorine in Water PPM	Number per 100,000	Cases of Mongolism
196,186	0.0 - 0.2	34.15	67
70,111	0.3 - 0.7	47.07	33
67,053	1.0 - 2.6	71.59	48

The validity of Dr. Rapaport's 1959 survey like that of Dr. Taylor's second (1954) experiments is beyond question. As in Dr. Taylor's case, the preliminary research is constantly being quoted by promoters of fluoridation whereas the confirmatory data are disregarded as though they did not exist.

Recent correspondence with Dr. A. L. Russell of the National Institute of Dental Research has provided new evidence on the method used to withhold from the medical profession valid research unfavorable to fluoridation.

There is a twofold approach: 1. A special investigating committee is formed to create a sounding board for public repudiation of the scientist and his research. 2. A letter written by a top P.H.S. official, usually A. L. Russell, D.D.S., downgrading the research, is placed before the committee.

The "Rapaport Committee" headed by W. D. Stovall,

M.D., consisted of scientists with no research experience on the relation of mongolism to fluoride. Dr. Stovall wrote on May 10, 1960 to Dr. J. Z. Bowers, Dean of the University of Wisconsin Medical School, and to four other dignitaries that his committee relied largely "on the correspondence of Dr. A. L. Russell and others who have offered criticism and suggestions of re-study or corrections."

Dr. Russell, in turn, establishes his case upon the opinion of the committee. In his letter to me dated March 9, 1965 he stated: "As you are probably aware, these data by Rapaport were examined by ourselves at the Institute and by a committee at the University of Wisconsin. Both groups agreed *independently* that the Rapaport data were so full of errors as to be worthless, and that his conclusions are not supported by evidence." When asked to outline specific errors, in another letter dated March 30, 1965, Dr. Russell merely repeated his accusations and cited several articles which had little or no bearing on Rapaport's research.

Thus, the inquirer, whether physician, dentist, scientist, medical editor, official of a medical society or member of congress, is bound to infer erroneously that there is general consensus among scientists that the research under discussion is invalid.

Dr. Russell's approach preempts presentation of the research through the conventional channels, namely before medical societies and in medical journals where an unbiased appraisal could be obtained. In this way the subject of fluoridation is rendered "non-controversial" and "undebatable" to physicians and dentists.

The main objection to Dr. Rapaport's research pertains to whether or not his survey covered every mongoloid birth in the population. Because his conclusions are based upon carefully controlled samples, not upon the total incidence of mongolism, his final results are valid regardless of whether or not *all* cases in a certain population were discovered.

Recent careful studies on the patterns of occurrence of mongolism by Dr. Alan Stoller et al.\* of Victoria, Australia, and by Dr. E. H. Heinrichs et al.\*\* of Watertown, S. D., have clearly confirmed that an "environmental factor (is) operative in a high proportion of these congenital anomalies."

Students of fluoridation are rarely aware that it is almost impossible to publish valid research unfavorable to fluoridation such as that by Taylor and Rapaport in most U. S. scientific journals.

When, in 1950, a P.H.S. survey of inhabitants of American Samoa revealed sound teeth where water contains little or no fluoride the findings were not published in any of the official P.H.S. journals.<sup>212a</sup>

At the University of Oregon, Dr. H. L. Richardson through a series of experiments determined the cause of abortions, stillbirths and infertility which had gradually wiped out a herd of chinchillas. He proved that the fluoride content of food pellets in the animals' daily ration was responsible. Some of this research is described in detail in a book by a lay person, Mr. W. R. Cox,<sup>218</sup> the owner of the chinchilla ranch. It was never presented to the scientific community. In reply to my inquiry for details regarding his work Dr. Richardson indicated that his fluoride research had been abandoned. He was apparently reluctant to become involved politically as stated in a letter dated 3/18/57.

In Evanston, Illinois, extensive P.H.S. studies on fluoridation have been carried out under the direction of Dr. J.R. Blayney, a well known exponent of fluoridation. At the meeting of the International Association for Dental Research, in 1954, he reported experiments which showed that persons with kidney disease eliminate only 60% as much fluoride as normal persons when both are drinking

\* Med. Journ. of Australia 1:1-4, (Jan. 2, 1965).

\*\* The Lancet 2:468, (Aug. 31, 1963).

water fluoridated at 1 ppm. When both groups consumed water with only a trace of fluoride (0.1 ppm) no difference in fluoride elimination was noted. This important research, although abstracted in the *Journal of Dental Research*,<sup>214</sup> was never published in full, according to Dr. Blayney's letter\* of February 15, 1963. Had this observation been widely disseminated it would have drawn attention of scientists to the constantly accumulating evidence that fluoridated water is particularly harmful to persons with kidney disease.

Another equally important study by a team of P.H.S. scientists which deals with the fluoride content of organs from an air contaminated area of Utah was not presented in any medical journal (see page 251).

It would serve no useful purpose to present additional documents from my files which explain why scientific data unfavorable to fluoridation rarely, if ever, reach the practicing physician in the U. S. A. Only one more example will be cited here. It involves the country's foremost medical journal, the *Journal of the American Medical Association*. In its letter box, a physician inquired whether fluoridated water could cause dermatitis and allergic reactions.<sup>216</sup> Two dentists, Drs. J. L. Bernier and D. J. Galagan, served as consultants to the editor on this purely medical question. Dr. Bernier stated that there was no documented evidence that fluoridated water will produce an allergic response.

In subsequent correspondence I learned that Dr. Bernier, the editor's consultant, was neither familiar with the pertinent literature on dermatitis nor on allergy; that he relied solely upon information received from the P.H.S.; that he, himself, had carried out no research on fluoride, on allergy or on dermatitis.\*\* His 82 publications were solely concerned with dental surgery, none with any of the three subjects on which he had submitted his reply to this im-

\* Blayney, J. R., D.D.S., to Lampman, H.H., M.D. 2/15/63.

\*\* Bernier, J. L., D.D.S., to G.L.W. 10/25/61.

portant medical question. Nevertheless, he was selected by the editor as consultant on allergy to fluoride.

I asked the editor for his opinion as to how my cases of allergy<sup>217</sup> and dermatitis<sup>218</sup> due to fluoride, published in two leading specialty journals, could be further documented. In his reply on Oct. 12, 1961, Dr. W.G.B., Asst. Editor, acknowledged that he knew of no other methods for determining the cause of a dermatitis than those routinely utilized by me and listed in my letter to him, namely, the taking of a case history, the evaluation of the pattern of the skin eruption, the patch test, and the double blind procedure.

Another dentist's opinion had previously been published in answer to the question as to what effect fluoride tablets administered to a mother would have on her unborn child. B. G. Bibby, D.M.D., not a physician, assured physicians on June 3, 1961, that the unborn child is protected from adverse effects by fluoride. I cited research to the editor with which Dr. Bibby was apparently unfamiliar and suggested that it be made available to the profession in view of its major importance to the nation's health.

The editor, J.H.T., replied on August 8, 1961:

"I do not propose to publish another view in opposition to that taken by the House of Delegates and the Council on Foods and Nutrition of the A.M.A."

The House of Delegates is the A.M.A.'s political body. The two Councils had arrived at their position under the guidance of three exponents of fluoridation whose approach has been presented in detail on page 261. One of the three, a retired P.H.S. officer, wrote the report on which the House depended.

When, on a third occasion, I commented, October 10, 1963, upon an editorial of October 5, 1963, which categorically denied all proven harm from fluoridated water, the editor frankly replied:\*

\* J.H.T. to G.L.W. 10/21/63.

"I am not a toxicologist and do not profess competence in either formulating a program in the field (fluoride research) or evaluating results of others.

"On the acceptance of manuscripts for publication, on the other hand, I am ready to stand firm on my decisions. They are based in part upon the advice and opinion of those whose judgments I value and the deliberation of councils and committees duly authorized by the A.M.A."

He candidly added, "Furthermore, I was on the fluoridation committee for Buffalo when I was teaching in the medical school and did everything I could in support of this vital program."

This sentence explains his unalterable position. As a member of one of the many fluoridation committees set up by the A.D.A. for the sponsorship of fluoridation on the local level, he had received one-sided promotional data, much of which was designed to arouse his emotions. Scientific data unfavorable to the project which such committees receive are always accompanied by the usual proponent critiques. Hence, he was bound to be reluctant to lend his ear to an objective appraisal of valid research indicting his position, much less to permit its publication.

Interference with free exchange of scientific data on fluoridation in medical journals has its counterpart in the prohibition of its free discussion in medical societies.

On three occasions members of medical societies had notified me that an invitation to address their society on how fluoride affects the human organism was in the offing. In all three cases action was taken to prevent my appearance.\* The third and most recent instance brought forth a full explanation:

On July 24, 1963, R.W.P., M.D., the secretary of a district medical society of a northwestern state, officially in-

\* McC. D., M.D., Memphis, Tenn., to G.L.W. 2/10/59—Miller, R. J., M.D., formerly of Evansville, Ind., to G.L.W. 5/6/58.

vited me to report about my research on fluoride on which I had just published a monograph.<sup>84</sup> The date had been set and all arrangements were completed. I intended to limit myself solely to scientific data without touching on the subject of fluoridation.

On Oct. 18, 1963, the secretary of the society wrote again as follows:

"The Executive Committee which comprises Dr. M.A.K.L., Dr. O.V.L. and myself (Dr. R.W.P.) have been vetoed by the . . . District Medical Society comprising all the doctors in this area. Because of the controversial subject on fluoride, the . . . District Medical Society has asked me to tell you that we have cancelled and recalled your invitation to speak to us."

"I am sorry for this as I felt that this would be an interesting subject. Because of the suggestion of another member of our Society, and with the approval of the Executive Committee, I went ahead and invited you."

A subsequent letter from a leading physician from that area casts additional light on the subject. The town had been fluoridated through the efforts of the local health officer, Dr. P. O. Many members of the District Medical Society are practicing in small nearby towns where the water contains fluoride naturally. When Dr. P. O. heard that I was to speak he approached the members, present at one of the Society's meetings, and persuaded them that I intended to stir up sentiment against fluoridation. Physicians have little or no knowledge on what damage fluoride may cause to human health. Undoubtedly my talk would have alerted them, making it possible for them to recognize chronic fluoride poisoning with which they are bound to be frequently confronted. It would also have reflected on the health officer for promoting fluoridation and for being responsible for the illness of citizens whose health it is his duty to guard. Hence, he had ample reason to campaign

against my appearance before the Society.

On January 29, 1957, I received an invitation of a different sort. The Academy of Medicine of New Jersey through its Public Health Committee Chairman, Dr. E. C. Hillman, asked me to participate in a panel discussion on fluoridation. I was to be the sole speaker opposed to fluoridation. This time, I was confronted with three proponents, not two as previously.

My experience with the Eastern Dental Club at the Whittier Hotel, Detroit, impelled me to take the precaution of requesting equal time and an equal number of participants on both sides. Moreover, since this was to be a meeting of physicians, I asked that all discussion be confined to the scientific aspect. I submitted a choice of several titles for my talk. Upon receipt of my letter the invitation was promptly rescinded. The purpose of the meeting turned out to be promotion of fluoridation.

I rejected a similar invitation to appear before the British Nutrition Society October 6, 1962, in London.\* This meeting was to be the opening gun for initiation of an all-out campaign for fluoridation in Great Britain. Only two of seven participants were to present data unfavorable to fluoridation. One of the so-called "scientific" papers by Dr. Dalziel-Ward, Central Council for Health Education, was entitled "The Social Aspects of a Policy of Fluoridation of Water Supplies." It was designed to downgrade opponent scientists.

Several other experiences are indicative of efforts by proponents of fluoridation to impede circulation of important data proving fluoridation hazardous.

Dr. H. Velu of Paris, France, one of the pioneers in fluoride research, had written an excellent review article on

\* Hollingsworth, D. F., Secy., The Nutrition Society, London, to G.L.W. 1/12/62.

fluoride in *Revue Pathologie Générale*, February, 1956,<sup>219</sup> When I requested a reprint of his article he referred me to the late Dr. H. Trendley Dean, one of the originators of fluoridation, at the time a member of the A.D.A. executive staff. Dr. Dean informed me on January 2, 1957, that he had no reprints of this article. I never learned to my satisfaction how it came to pass that Dr. Velu had sent all his reprints to Dr. Dean.

Similarly, reprints of another important article indicting fluoridation were not obtainable at its source. Dr. Paul Pincus, Professor of Dentistry, University of Melbourne, Australia, was puzzled when shortly after his article appeared in the *Australian Journal of Dentistry*, 1952, numerous U. S. dentists requested reprints at the rate of six at a time.\* This, he stated, quickly exhausted his supply.

Dr. Hans Borei of Copenhagen, Denmark, had published a classic book entitled *Inhibition of Cellular Oxidation by Fluoride*.<sup>220</sup> It demonstrates how fluoride interferes with the oxidation (breathing) of body cells. Dr. Borei, the world's expert on this subject, was offered a position at the U. of Pennsylvania where he is now occupied with work along entirely different lines. He has abandoned his valuable fluoride research. When asked by an interested citizen, Mrs. G. C. Dreyer, of Mountainside, N. Y., for a list of his publications, he failed to include his important monograph. In this same connection it is interesting that the official London distributor listed on the book cover, H. K. Lewis Co., Ltd., no longer has any record of ever having handled this monograph, according to a letter dated Aug. 3, 1956, addressed to Mrs. W. M. S., Huddersfield, England.

Heretofore, odd experiences such as these were rarely, if ever, encountered in science. They suggest that efforts are being made to interfere with the free flow of scientific

\* Pincus, P., D.D.S. to G.L.W. 10/10/63.

data, to neutralize research unfavorable to fluoridation and to prevent physicians and dentists from learning all the facts about this dubious health measure.

There is another explanation for the sparsity, in U. S. scientific journals, of research disclosing harm from fluoride. Ever since fluoride in water naturally was first proven damaging to health in the thirties and early forties, numerous grants have been made by corporations and the P.H.S. for research designed to prove fluoridation safe. Little or no money has been available to those in a position to produce data revealing fluoride's hazard. Indeed, like Dr. Borei, other pioneers, the true U.S. experts in fluoride research, among them Dr. F. DeEds of San Francisco, California, and Drs. M. C. and H. V. Smith of the University of Arizona abandoned further studies on fluoride.

The question arises whether they voluntarily relinquished their fluoride research or whether the P.H.S. denied them continued support of their work. Or is it due to intimidation that a scientist abandons his fluoride research?

In October, 1963, two Oxford, England, scientists, Drs. R. J. Berry and Wilfred Trillwood, reported in the *British Medical Journal*,<sup>220a</sup> page 1064, that the rate of growth of cancer cells, grown outside of the body, is significantly retarded by sodium fluoride in a concentration as low as 1/10 part in 1 million parts of water (0.1 ppm).

Like Dr. Rapaport and myself, Dr. Berry has been subjected to much unfounded criticism and—as I learned on a recent visit to Oxford from his close associates—to veiled threats. He decided to abandon all future work on fluoride. As a means of downgrading his important research, the British Ministry of Health propagated a letter, November 22, 1963, written by Prof. Neil Jenkins of Newcastle, who has had no research experience on fluoride's effect on cell metabolism. However, like the widely circulated letters critical of other opponent scientists, Dr. Jenkins' views carry

weight because of his position of prestige as dean of a dental school.\*

The A.D.A. now advises its members to call early research "outdated." Actually the classic descriptions of harm from fluoride by the pioneers, Roholm, the Smiths, DeEds, Velu and Borei are now of greater value than when they were written. They constitute unbiased research, the results of which have not been influenced by support from vested interests.

The guns set up by the promotional forces to counter-attack have been hitting their marks on the scientific front as they already had on the political level. Even the most discriminating scientists have become prejudiced by such ingeniously conceived and widely disseminated promotional material as W.T.C. Berry's paper on mongolism, the critiques of Taylor's research and the Hornung letter. Concerning myself, the farfetched rumors have been spread from coast to coast and from country to country:

When I was a witness at a court hearing on fluoridation in St. Louis on March 17, 1960, I was obliged to produce my Michigan State Board Registration Certificate. Rumor had it that I was not licensed to practice medicine in Michigan.

A British health official, Dr. C. L. Sharp, Medical Officer of Health for Bedford, and the Royal Society for the Promotion of Health were forced in open court<sup>221</sup> to retract a statement about me made at a meeting of the Society June 16, 1960, and previously published and circulated.

\*Dr. W. D. Armstrong and associates published experiments in the British Medical Journal, February 20, 1965, p. 486, which indicated that up to 10 ppm fluoride added to the cell culture had no effect on their growth. This, Dr. Armstrong implied, invalidated the Berry-Trillwood experiments.

In the March 20th issue of the same journal on page 793, Dr. Berry pointed out that Dr. Armstrong's cells failed to show significant growth without which *inhibition* of cell growth would be impossible to demonstrate.

They had claimed that I was opposing fluoridation for financial gain.

A U.S. journal on dietetics which had libelled me was obliged to publish a retraction in its April 1962 issue.

Fortunately, I have remained unperturbed by personal slights of this kind. The conviction that I have already made important contributions to a most confused subject has enabled me to face these onslaughts calmly.

Yet, one cannot help but ask why those promoting fluoridation so eagerly shield the medical profession from valid adverse information. Every new approach in medicine has been subjected to critical examination of its merits and demerits alike. Why do exponents of fluoridation prevent free discussion of this important subject? True scientists invite criticism.

In one of its pamphlets the American Dental Association advises its members: "At no time should the dentist be placed in a position to defend himself."<sup>70</sup> This alone should make people realize that there is much about fluoridation which does not meet the eye.

Addendum: Call and associates published their data in Public Health Reports, Vol. 80, pages 529-538, June 1965, five years after completion of the study. Their grants were not renewed, according to Dr. Call's letter to the author, June 22, 1964. Therefore, the study of ill-effect of airborne fluoride on kidney disease which their research had disclosed was abandoned.

## CHAPTER THIRTEEN

### UNDER FIRE

By 1957, I had enough data accumulated to be certain that fluoridation was harmful.

Little by little the thought crystallized in my mind that, as a physician, my only chance to combat fluoridation was to procure additional valid scientific data and to present them to the American Medical Association "sine ira et studio"—without anger and partiality. To try to reach the top echelon of the A.D.A. and the P.H.S. was a useless undertaking. Their efforts at downgrading my work had already begun to bear fruit. In Detroit, a whispering campaign had been started among dentists to discredit my scientific competence and my intellectual honesty.

When the A.M.A. endorsed fluoridation in 1951, they did so for only one reason: They felt it would benefit children's teeth. They stand for progress in anything pertaining to medicine. If fluoridation prevented tooth decay and if it was—as they believed—absolutely safe, they were duty-bound to advocate it.

If, on the other hand, they could be convinced that fluoridation is hazardous, this, I was sure, would spell the end of their approval.

Very few of the leaders in the Association were aware that the 1951 endorsement had been accomplished against the backdrop of "No Knowledge" on the medical aspect of fluoridation. It could never have been obtained had there not been a complete lack of data on how fluoride affects humans.

Four of the six Michigan members of the A.M.A.'s House of Delegates had either written or told me that they were opposed to fluoridation. They were obliged to be discreet about this hot political issue. As one of them so aptly expressed it December 11, 1957: To openly oppose fluoridation "is political suicide."

The existing paucity of available information was brought out in a letter which I received from Dr. Charles Farrell of Providence, R. I., a member of the A.M.A. House of Delegates dated Oct. 16, 1954.

Dr. Farrell was chairman of the A.M.A.'s Public Health Committee. In his letter he described in detail how, at the A.M.A. convention in Los Angeles, two state health commissioners, one from Connecticut, the other from Wisconsin, submitted resolutions to the committee. These resolutions "would have made the A.M.A. strongly support, completely endorse and go on record as extolling the virtues and benefits of fluoridation," Dr. Farrell explained.

"I fully recognized," he stated, "that in the House of Delegates there would be no opposition—at least no organized opposition—and no one well-informed or thoroughly enough informed to stand up on the floor and lead the fight against the adoption of fluoridation proposals."

As the lesser of two evils, Dr. Farrell proposed a mildly worded substitute to endorse fluoridation "in principle." "It did not commit the A.M.A. to full endorsement," Dr. Farrell wrote.

Because fluoride research was a virgin field in medicine at that time, the A.M.A.'s Council on Foods and Nutrition could find no physician to present clinical evidence on the subject. Instead, a biochemist, Dr. F. J. McClure of the National Institute of Health and an exponent of fluoridation, appeared to advise them when they were studying fluoridation.

As early as 1933, Dr. McClure had carried out studies at the National Institute of Dental Research which showed

that fluoride interferes with the action of certain body enzymes.<sup>222</sup> Late in 1946, he wrote that "anti-enzymatic effects of trace quantities of fluoride cannot be disregarded."<sup>223</sup> Yet in 1951, Dr. McClure assured the A.M.A. Councils on Pharmacy and Chemistry and on Foods and Nutrition that fluoridation was safe.

The Councils in their report stated that they were "unaware of any evidence" that fluoridation was hazardous. Yet they warned that "use of products which are naturally high in fluoride content, such as bone meal tablets, or of lozenges, dentrifices, or chewing gum to which fluoride has been added, should be avoided where the drinking water has been fluoridated."<sup>224</sup>

Once fluoridation was endorsed "in principle," staff officials, particularly Dr. George F. Lull, the A.M.A.'s executive secretary, and Dr. W. W. Bauer, editor of *Today's Health*, felt obligated to actively support the project.

My correspondence with these two A.M.A. officials showed me that they were uninformed on the subject. They habitually referred medical inquiries about fluoridation to the American Dental Association for an answer as indicated by A.M.A. president Dr. Elmer Hess' letter quoted on page 35.

Another president, Dr. Walter B. Martin, had taken a strong stand, evidently on the basis of incomplete evidence.

When I asked for an opportunity to present my data on poisoning to the general A.M.A. membership, he stated on June 27, 1955:

"I am entirely out of sympathy with the campaign that is being carried on to discredit the use of fluorine in proper concentration in drinking water as a preventive of dental decay."

On April 23, 1954, Dr. Lull had assured me that the American Medical Association, in spite of their endorsement, did not "press any particular action on the part of the state and county medical societies."

The following year, in June, 1955,<sup>28</sup> however, he published a scathing editorial in *Today's Health*, which was reprinted and disseminated throughout the world as a part of the A.D.A.'s kit of promotional material. Curiously enough the Lull editorial, which was based upon the information obtained from the A.D.A., was now in turn utilized by the A.D.A. to support their own position.

From Dr. Lull's letter to me, April, 1954, it is apparent that he was not properly informed concerning the available literature. For instance, he stated unequivocally that "no untoward effects are shown in individuals taking as high as 10 parts per million (fluoride) in the water supply" and that 1 part per million will not cause significant mottling.

Ample evidence in scientific journals testifies to the contrary.

Dr. W. W. Bauer, the editor of *Today's Health*, supported Dr. Lull's editorial in a 10-page letter August 23, 1955, to a Detroit physician.\* The physician had requested documentation for Dr. Lull's assertions. Dr. Bauer failed to provide such data, but quoted instead views and opinions of individual scientists, health officials, editors, most of whom had never carried out research on fluoride. Indeed these scientists had relied on the same source for their information as Dr. Bauer himself, namely the A.D.A. Dr. Bauer dwelled at length on the opinions of the members of the special committee of the National Research Council who were asked to study the subject.

Two of the six members of this committee had been actively engaged in promoting fluoridation, namely Drs. H. T. Dean and F. F. Heyroth. At least two of them, Dr. B. G. Bibby and Dr. Heyroth, had received research grants from industry with a stake in fluoridation promotion.

Curiously enough, at that time, the stationery of *Today's Health* carried at its left-hand border a statement designed as a motto for the U.S. physician:

\* Bauer, W. W., M.D., to Lampman, H.H., M.D., Detroit.

"No two living things are alike—physicians do not treat symptoms or disease—they treat patients... There is no standard dosage for drugs applicable to all patients under all circumstances."

A.M.A. officials must have realized that fluoridation seriously infringed upon the most basic principle in therapeutics, namely that "no standard dosage" is applicable "to all patients under all circumstances": Fluoride was to be administered to persons beyond age eight who admittedly have less benefit from it, some of whom might be harmed. Administering fluoride through the water supply was even worse than furnishing a "standard dosage." One part in one million parts of water represents a concentration of fluoride. The actual amount of fluoride consumed from drinking fluoridated water was bound to be much less exact than a standard dosage, depending, as it does, on the amount of water consumed. Individual tolerance or susceptibility to fluoride poisoning was disregarded.

Within a year or two, subsequent to the initiation of our correspondence, the statement vanished from the stationery of *Today's Health*. With its disappearance the principle which this motto expressed seemed to have vanished from the realm of U. S. medicine as well.

I had made repeated requests to program committees of A.M.A., state and local medical societies for an opportunity to present some of my data on fluoride poisoning before their general membership. Many times in the past I had addressed meetings on the subject of allergy on local, state and national levels.

Now, all answers to my requests were uniform. The society had already taken a stand. The subject of fluoridation was "too controversial." On one occasion my application to present a paper at the A.M.A. was mislaid and did not come to light until after the yearly meeting.

I now reluctantly decided to follow Dr. Lull's advice

and approach the matter on the political level. I asked some of the A.M.A. delegates to request examination of my data.

In mid-July of 1957, I received a phone call from American Medical Association headquarters. A hearing of their Councils on Pharmacy and Chemistry and, on Foods and Nutrition was scheduled for August 7th. The scientists on these Councils, I was told would like to hear my evidence on harm from fluoridated water.

It was in the midst of the hay fever season when I am always unusually busy in my clinic. In the evenings, I was exhausted and had to retire early. I had only a few weeks to prepare for presentation of the research data which I had acquired in recent months and which had not yet been processed. Nevertheless, I was delighted with this opportunity to have my data critically examined.

My enthusiasm, however, soon received a jolt. Upon entering into correspondence with Dr. R. T. Stormont, the Council's secretary, I learned about the proposed setup of the hearing. I asked myself why I had not been permitted to present my data to the A.M.A. membership at one of their sectional meetings as is customary with original research of this kind. This would have given me a chance to profit by a free discussion among physicians who, like myself, were in daily contact with patients. Most Council members were solely engaged in experimental work, not in clinical medicine.

I inquired whether or not the proponent evidence was to be likewise critically examined. No clear-cut answer was forthcoming. I was merely told that there were to be two opponent speakers, Dr. Frederick B. Exner of Seattle and myself, and two proponent speakers, Dr. H. Trendley Dean, the "father of fluoridation," and Dr. W. D. Armstrong, the biochemist of the University of Minnesota in Minneapolis.

The correspondence led me to believe that there was another purpose for this meeting than an objective examination of my data.

The previous year I had submitted some of my material to a Special Committee on fluoridation of the Wayne County Medical Society. This hearing, I later found out, had been initiated at the behest of the Detroit District Dental Society, a branch of the A.D.A. It had been designed to emasculate my evidence; as one dentist (Dr. F. S.) expressed it, "to put Dr. Waldbott on the carpet."

Fortunately, the majority of the Wayne County Committee members had been open-minded. The investigation had turned out to be objective. According to the *Detroit Medical News* July 16, 1956, the Committee had recommended that the Society's governing board adopt a neutral stand. However, subsequently the Society was persuaded by local dentists to abide by their former position as indicated by *The Detroit Medical News* Sept. 17, 1956. The Society continued its 1951 endorsement.

I began to wonder whether this A.M.A. investigation was likewise sponsored by the A.D.A. for the same purpose, namely to neutralize my evidence and that of Dr. Exner. I was told in confidence by a high official of the Michigan State Medical Society that he had already received word that the endorsement would be confirmed regardless of the outcome of the Hearing.

I had sent some of my reprints to the members of the two A.M.A. Councils with a request for critiques; I particularly wanted their evaluation of the detailed case reports prior to my appearance. This would have been most constructive since it would have assisted me in elucidating my cases at the Hearing. Any points not clearly established in my published articles could have been clarified.

The chairman of the Hearing, Dr. Torvald Sollmann, the well known pharmacologist at Cleveland's Western Reserve University, had replied to my request for a critique

of my case reports February 18, 1956, as follows:\*

"I must concentrate on revision of my manual (his textbook) and on other commitments which I have already made, so that I could not now go thoroughly into the subject. Better none than half-cooked!"

He was in the process of revising his widely read textbook on pharmacology, a chapter of which was devoted to fluoride. Had he taken the time to review my data at this time, he would undoubtedly have treated this subject differently in his book.

When it appeared that the Hearing would be an investigation of both sides, I requested that additional opponent scientists be invited to present data unfavorable to fluoridation. I particularly had in mind George Calingaert, Ph.D., professor of physical chemistry at Hobart College, one of the nation's prominent chemists, and Mr. K. K. Paluev, an outstanding statistician who had carried out a painstaking analysis of the official statistics from the Newburgh, N. Y., and Grand Rapids, Mich., fluoridation experiments. I knew that I was not as well qualified as a statistician to present this important phase to the Councils. My request was denied.

Another matter was troubling me: Who were the members of the two committees who were to evaluate my research? I was sufficiently conversant with the literature on fluoride to realize that only two of the members, a biochemist, Dr. C. A. Elvehjem, and a pharmacologist, Dr. M. H. Seevers, had carried out research on fluoride. Neither had had the clinical experience needed to properly assess a purely clinical presentation. All other members had to rely on the literature available to them. Had they had access, I wondered, to some of the reports of harm from fluoride in water naturally? These reports were difficult to procure. Some were written in foreign languages.

\* Sollmann, Torvald, Chr. Council on Pharmacy and Chemistry, A.M.A. to G.L.W. 2/18/56.

Some of the Council members were leading scientists in their own fields. They included one of the best known dermatologists whose strong letter promoting fluoridation had previously appeared in a Grosse Pointe, Mich., newspaper. Several other members were officers in the P.H.S., the agency promoting fluoridation.

Even those not connected with the P.H.S. or with a fluoride promoting industry had to be more or less cautious about their position since all scientists connected with universities are dependent upon the P.H.S. for their salaries and research grants.

My attorney, with whom I reviewed my correspondence with the A.M.A., was convinced that this would not be a bona fide unbiased hearing. He assured me that its purpose was to discredit Dr. Exner and me. He advised me not to go to Chicago.

I considered several alternatives: Should I ask the American Medical Association to establish a really neutral committee? Should I register, in advance, my doubts as to the objectivity of this hearing? Could I now refrain from attending after I had already signified that I would come? Whichever way I decided I knew I would be in trouble.

On August 7, 1957, at 9:00, I appeared at A.M.A. headquarters in Chicago with mixed feelings. The meeting lasted practically the whole day.

I was impressed at first by the cordiality of the members and the Chairman's effort to conduct the meeting impartially.

During lunch I sat next to Dr. Lull. I was in pain due to an injury to my sacroiliac joint. Ironically, Dr. Lull recommended a drug to me which had given him considerable relief from the same ailment. As it happened, a year or so later, the drug had to be withdrawn from the market because of serious side effects which were not known at the time. Neither he nor any one of the learned members of the Council on Drugs were aware at the time that the drug was

dangerous. They had approved it for general use. Can one blame them for not recognizing side effects caused by fluoride in water, which is consumed day in and day out without interruption?

At the outset, Dr. Exner and I enjoyed the freedom of the floor with relatively little interruption. Since Mr. K. K. Paluev, who had made a fastidious study of the dental statistics was not present, I pointed out that there was serious disagreement among competent statisticians concerning the interpretation of the Newburgh and Grand Rapids statistics. I was unable to present this data as clearly as Mr. Paluev, for whom I spoke, could have done it. I did not review data on poisoning from fluoridated water because my published articles had already been made available to members.

Instead, I concentrated on more recent research which I was carrying out on the effect of fluoride on the calcium and phosphorus metabolism.

I later realized that it was unwise to discuss research which had not as yet been carefully processed. Indeed, subsequent analysis disclosed that these and other data which I had accumulated could not be used for the purpose intended, namely to pinpoint illness due to fluoride.

I showed Kodachromes of mottled teeth of patients who had always resided in Detroit. This mottling occurred in spite of the fact that Detroit water is practically free of fluoride (0.1 part per million). I now know that not only dental fluorosis but also systemic chronic fluoride poisoning can occur from sources other than water in areas where water contains little or no fluoride. Dr. Dean, "the father of fluoridation," who was sitting at my left, and who was to testify later, confirmed that my Kodachromes portrayed true mottling due to fluoride. He indicated that fluoride present in such drugs as calcium preparations which the patient may have taken early in life or in baby food, formerly made with bone meal, could be responsible. If such

mottling occurs at 0.1 ppm, I pointed out, how can anyone maintain that 1.0 ppm causes no mottling?

Dr. Frederick Exner, a Seattle radiologist, who had been studying fluoride's effect for years, gave a scholarly discussion in which he analyzed some of the P.H.S. studies and pinpointed their fallacies.

One of the two proponent scientists, Dr. Armstrong, candidly admitted that he did not anticipate speaking at this meeting. Thus he inadvertently disclosed that the purpose of the hearing was not to examine both sides. He gave an impromptu description of his new analytical method which he had developed to determine fluoride levels in blood. Whereas this was a valuable contribution to biochemistry it had no bearing on clinical medicine.

Dr. H. T. Dean, who had retired from the P.H.S. and held a position with the A.D.A., outlined his experiences in U. S. cities with mottling which he was one of the first to describe.

I questioned Dr. Dean's conclusions that fluoride in water naturally was solely responsible for decay prevention. He had failed to demonstrate to what extent such important tooth builders as calcium, phosphorus and magnesium, which almost invariably accompany fluoride in natural fluoride areas, had affected his statistics. He answered briefly: The figures are available. Anyone who wants to do so can plot them. He gave no reason why he himself had not done so.

Before long I could detect a hostile atmosphere. There were constant interruptions by three scientists. One of them, before the meeting, had been pointing out to his colleagues a minor inadequacy in one of my publications. I overheard him repeatedly remark that this proved my data "unscientific."

The three dominated the questioning. At one time one of them, Dr. Perrin Long, became so emotional in his interrogation that I had to protest to the chairman.

One implied by his questions that I had omitted certain tests which had, in fact, been carried out as a routine matter but had not been mentioned in my published case reports because they seemed to be irrelevant. In this way, he suggested to the other members that my work was not thorough.

Much was made of the fact that Dr. Exner and I believed that the pivotal Linsman and McMurray case<sup>44</sup> had died of poisoning from fluoride in water naturally. The diagnosis on record No. 86050 of the Wm. Beaumont General Hospital, El Paso, Texas, was "Chronic Fluoride Poisoning." The authors entitled their report *Fluoride Osteosclerosis (bone hardening) from Drinking Water*. It did not appear likely to me that a minor injury to one of the patient's kidneys sustained many years earlier could have caused the destruction of *both* kidneys.

This honest difference of opinion on a point on which no one has the final answer was utilized by one of the three scientists to imply that Dr. Exner and I were "misrepresenting" the case.

Another curious attempt was made to downgrade my research.

In my studies I had distinguished between allergy and intolerance to fluoride. No one with experience in allergic diseases would question that these are two distinct phenomena. A person intolerant to whisky can become intoxicated by a small amount. Others can drink many times that amount without becoming intoxicated or temporarily poisoned. On the other hand, a person who is allergic to whisky will start sneezing, coughing, wheezing or break out in hives even after the first swallow. This is not intoxication. It is allergy.

Clinicians dealing with allergic patients are thoroughly familiar with this phenomenon of lowered tolerance to drugs in distinction to drug allergy. When a few years later the editor of the *Journal of Allergy* reviewed one of my ar-

ticles in which I emphasized this distinction he advised me to omit this passage. Every physician treating allergic patients, he explained, is conversant with this phenomenon.

One of the three scientists asked a fellow Council member, a pharmacologist, whether or not a distinction between allergy and intolerance to fluoride was justified. As though he had been anticipating this question, he promptly termed my explanation a "matter of semantics." This gave the other Council members, none of whom had specialized in allergy, the impression that I was trying to mislead the Council members.

The foregoing are but a few highlights of this meeting. My main evidence, namely my cases of poisoning on which I had expected to arouse a lively discussion, was hardly considered.

Significantly, in the Report of the Councils<sup>225</sup> to the House of Delegates, page 14, only one sentence dealt with my testimony: "Dr. Waldbott's reports (of chronic fluoride poisoning) fail to demonstrate enough consistency to justify impartial acceptance as showing a symptom complex due to fluoridated water." Since inconsistency is the most characteristic feature of chronic fluoride poisoning, this comment actually tends to confirm my observations. Subsequently I reproduced the disease at will by administering minute doses of fluoride on a double blind basis. Thus the Council's only objection has been eliminated.

The Report was submitted to the House of Delegates. At the meeting of their Reference Committee a formidable array of top health officials appeared personally to testify in favor of fluoridation. I considered it useless to take part in this political battle. A stormy debate took place in the House of Delegates. About one-third of the delegates registered their disapproval by voice vote.\* As far as the general public was concerned, the A.M.A. had confirmed

\* Alesen, L.A., M.D., California Delegate to A.M.A. to G.L.W. 1/1/58.

its position advocating fluoridation. However, anyone who takes the time to examine the 20-page Report carefully will discover that it contains as much or more evidence indicting fluoridation than in favor of it. Yet, on the basis of a one page news release of the A.M.A.'s action, an increasingly vigorous promotional campaign was now being initiated.

Numerous investigations have since been made, some before city councils, some at state levels.

The pattern is always identical. A so-called "Investigating Committee" is established at the behest of the A.D.A. Its members are uninformed concerning fluoridation and must therefore be guided by one or more staunch exponents. Carefully briefed how to proceed, the proponents put fluoridation across by downgrading opposing views and by constantly quoting endorsements which have been secured on the political level.

Since few research grants are available to scientists from sources other than the P.H.S. and fluoride promoting industry, expert witnesses in opposition to fluoridation are not readily available.

Physicians are reluctant to publicly oppose anything which the officials of their medical society favor. Should they counter a project which has been widely lauded as a great boon for children, their fellow citizens might conclude that they lack public spirit. They don't have the time to carefully scrutinize the involved and confusing scientific literature.

One of the most important hearings in recent years took place in Toronto, May, 1960.

An investigation had been authorized by Ontario's Prime Minister Leslie Frost and the Ontario Parliament. Previously, fluoridation of Ontario cities not already fluoridated had been outlawed. Minister of Health, Dr. M. B. Dymond, and Mr. Allan Grossman, Minister without Portfolio, had opposed fluoridation. The special commission

was appointed March 17, 1959, with full investigating power and unlimited funds.

W. G. Brown, M.D., D.P.H., of the Ontario Department of Health, an ardent proponent, was in charge of initial arrangements for this investigation.\*

In the spring of 1959, at a meeting of the Health League of Canada, at the Windsor Hotel, Montreal, Dr. Gordon Bates, the League's director and Canada's major fluoridation promoter, boasted that he was instrumental in having the fluoridation question submitted to another study. This was his means to counter Prime Minister Frost's policy which had blocked general fluoridation in the Province.

The three member commission consisted of two lay persons, Mr. Justice Kenneth Gibson Morden, Chairman, and Mrs. Cameron McKenzie and was guided by Dr. G. E. Hall, President of University of Western Ontario. Dr. Hall, the only scientist and a physician, was looked upon by the others as the expert.

A public hearing was announced for Monday, May 2, 1960. Prior to this date, however, the committee had already propagated to the press and throughout Ontario the findings of six leading Toronto scientists, all of whom were known proponents of fluoridation. Some of them were recipients of U.S.P.H.S. research grants. My offer to balance this unfairly weighted procedure by obtaining competent opponent scientists as advisers to the Committee was rejected.

In a letter to Justice Morden dated August 3, 1960, I requested that Dr. Hall disqualify himself as biased: According to *Health*, March, 1956, page 34, he had been serving as Honorary Advisory Director to the Health League, Canada's major fluoridation promoting agency. He was president of a university which had received research grants from the Public Health Service,<sup>228</sup> the major U.S.A. promot-

\* Brown, Dr. W. G., Deputy Minister of Health, Ont. Dept. of Health, Toronto, to Dr. G.L.W. 3/18/59.

ing agency; his daughter was employed by Alcan Africa, Ltd., Montreal, a subsidiary of Alcoa, the major industry promoting fluoridation as was publicized in *Alumni Gazette* Nov., 1961, page 3, of his university. Justice Morden ignored my request.

It was obvious that the so-called experts selected by the Committee to act in an advisory capacity had merely read promotional material. They incorporated in their report incorrect data gleaned from proponent literature and thus showed that they had failed to examine original sources.

There were other conditions which prevented this hearing from being objective: As set up originally, the schedule provided no opportunity for presentation of scientific data unfavorable to fluoridation. Proponent evidence was not subjected to thorough critical examination. The Commission's final Report was based principally upon "Classification and Appraisal of Objections to Fluoridation" assembled by Drs. K. R. Elwell and K. A. Easlick, University of Michigan health officials.<sup>129</sup>

Hearings had been open to the public and the press. However, when I presented the most powerful evidence against fluoridation, namely poisoning from drinking fluoridated water, Dr. Hall's Committee decided that it should be heard behind closed doors.

The questions asked of me at this hearing, reminiscent of those asked at A.M.A. headquarters, were designed to embarrass me. I was asked, for instance: "Don't you respect the leaders of scientific organizations?" "Aren't health officials competent and honest?" Whatever my answer to such a question, it was bound to be held against me. To my amazement, Dr. Hall, an M.D., asked: "Isn't water a poison, too, when taken in large amounts?" Dr. Hall's implication that fluoride is no more poisonous than water disregards the fact that the poisonous action of a biological agent is determined by the latitude between its harmless and its toxic dose. For instance, the margin of safety for salt is wide;

for fluoride, it is extremely narrow or, for some people, almost nonexistent.

Other investigations, such as that of the New Zealand Commission and of the World Health Organization, were conducted in a similar fashion. At least five of W.H.O.'s seven-member special Committee were known to be ardent promoters of fluoridation in their respective countries.<sup>227</sup>

These are the investigations upon which the case for fluoridation hinges.

Regardless of the incontrovertible facts presented while under fire, I realized that, on this explosive subject, it was almost always futile to try to change the attitude of anyone who had already committed himself in favor of fluoridation.

## CHAPTER FOURTEEN

### A SLOW CLIMB

Early in my medical career a well known clinician told me: "To be successful, it is not enough to acquire knowledge. You must make others realize that you possess this knowledge."

In medicine there are two means of communication, the medical journal and the medical meeting. By the time I was ready to present some of my research on fluoride to the medical profession, the subject had already become so controversial that medical editors and leaders in medical societies shied away from anyone who even mentioned the word fluoride without plugging for fluoridation.

Nevertheless, as I accumulated new data, interest in my work began to develop. My articles on the subject appeared in several European scientific publications including the important Scandinavian *Acta Medica*.

An item in the weekly *Deutsche Medizinische Wochenschrift*, by Dr. L. H. Tholuck of Frankfurt/M.-Praunheim, proclaimed the absolute safety of fluoridation. When the editor learned of my research, he invited me to submit an article on poisoning from fluoridated water. This article<sup>228</sup> alerted many European physicians to the potential hazard of fluoridation.

A fortunate circumstance resulted in the publication of my first article in the U.S.A. The February, 1961, issue of the *Archives of Environmental Health*, an American Medical Association publication, contained a sympo-

sum by leading fluoridation exponents in this country entitled "The Physiologic and Hygienic Aspects of the Absorption of Inorganic Fluorides."<sup>229</sup> The names of the contributing scientists read like a Who's Who in fluoridation promotion. Dr. Robert Kehoe, Director of the Kettering Laboratory, Cincinnati, presented the opening discussion. There was a glowing account of the success of fluoridation in Grand Rapids. The so-called overwhelming evidence of fluoridation's safety was based principally upon the controversial P.H.S. survey of Bartlett, Texas.

Previous correspondence with the *Journal of the American Medical Association* led me to believe that not even a letter critical of proponent research would be published.

I therefore proceeded cautiously. I asked the *Archives'* editor whether or not a letter commenting upon some of the statements made in the Symposium would be acceptable. His response was encouraging. To condense into a letter the vast amount of original data which I had accumulated constituted a formidable problem. After some correspondence, the editor agreed to publish my article, "Physiologic and Hygienic Aspects of the Absorption of Inorganic Fluorides, Comments on the Symposium."<sup>62</sup>

In this article I established three basic reasons for the many discrepancies in fluoride research:

(1) The amount of fluoride taken into the system, its storage in vital organs and elimination from the body varies widely from person to person.

(2) The biochemical and statistical data presented in The Symposium were not correlated with clinical findings. Even the most thorough analyses of fluoride in the blood or in body tissues are worthless unless we know how the patient reacted to fluoride.

(3) At the present stage of our knowledge it is impossible to evaluate to what extent fluoride, accumulating in vital organs other than bones and teeth, interferes with the function of these organs. Hence, statistical data presented

at the Symposium do not apply to every person. There are wide differences in an individual's response to fluoride depending upon his state of health.

On the basis of tables and charts, I demonstrated erratic variations in fluoride content of food. Dietary habits, especially excessive consumption of tea and seafood affect the amount of fluoride taken into the system. In air-contaminated areas, vegetables, especially leafy ones, and fruit contain many times more fluoride than average. Some drugs and vitamins contain fluoride. In view of so many sources of fluoride intake, not epidemiological statistics but careful review of histories of individual cases, especially their food and drug habits and the individual drinking patterns, is of paramount importance.

I demonstrated the fallacy of the claim that only 10 per cent of ingested fluoride is stored in the system and pointed to wide fluctuations in urinary fluoride elimination from day to day. Statistics based on one or a few urinary fluoride determinations, therefore, do not reflect how much fluoride a person has taken into and stored in his system.

I discussed the many reports of poisoning from fluoride naturally present in water. I pointed to the wide variety of symptoms in fluoride poisoning which was first demonstrated experimentally in 1940 by two Kettering Laboratory Scientists, Machle and Evans.<sup>230</sup> They attributed the wide spectrum of its manifestations to the peculiarity of the fluoride compound involved, to the dose administered, the method by which fluoride enters the system, the diet and many other variables.

I emphasized that scientists had given little attention in the past to fluoride storage in organs other than bones and teeth. Accumulation of sizeable amounts of fluoride in vital organs (Table 14) in persons with kidney stones was reported from nonfluoridated (0.1 ppm) New York City.<sup>53</sup> This is proof that the bulk of fluoride stored in the system is not necessarily derived from water.

Like Dr. Herman, the Utah scientists Call and Greenwood,<sup>215</sup> who had confirmed excessive fluoride storage in soft tissue organs, disregarded this most significant observation.

From Drs. Nalbone and Parlato of Palermo,<sup>231</sup> I received the X-ray of calcified blood vessels in a forty-nine year old man with advanced skeletal fluorosis (Fig. 27). That fluoride does accumulate in the walls of blood vessels has recently been confirmed by other students of the disease. Why would it not harden blood vessels just as it hardens teeth and bones in which it is stored?

I received many communications from scientists commending me on this research. Only one unfavorable critique has come to my attention. It was published by the key promoter of fluoridation, Dr. Frederick J. Stare, in his Sept., 1961, *Nutrition Reviews*, Vol. 19, page 259. Dr. Stare is one of the most vociferous defenders of the food industry against those who warn about hazards of chemical additives to food. Dr. Stare's *Nutrition Reviews*, the publication of the *Nutrition Foundation, Inc.*, names forty-nine companies as its sponsors. Several of its supporting industries including Procter and Gamble, Reynolds Metals and Swift & Company have a stake in fluoride promotion. Swift sells fluoride to the city of Chicago for water fluoridation.\*

Dr. Stare criticized several minor shortcomings in my article. My method of fluoride analysis should have been outlined in detail, a point well taken. I failed to state in my article that Mr. George Kosel of Passaic General Hospital, Passaic, New Jersey, uses the standard method of analysis recommended by the Official Methods of Analysis of the Association of Official Agricultural Chemists, Eighth Edition, 1955, and Standard Methods for the Examination of Water, Sewage and Industrial Wastes, Tenth Edition, 1955, published by the American Public Health Association. By

\* Chicago *Daily Tribune* 11/22/57.

resurrecting the Hornung hearsay, Dr. Stare subtly cast aspersions on my scientific competence, in order to discredit my work.

*Dental Abstracts* of June, 1962, page 362, an A.D.A. publication, quoted the Stare critique. Ingeniously they failed to mention the name of the journal in which my article had appeared. Thus, a dentist, reading the Stare account, would have been obliged to devote much time and energy searching for my original article. Evidently the A.D.A. was aware that a dentist who personally examined this article would have gained considerable knowledge about the weakness of the case for fluoridation.

My article in the *Archives of Environmental Health* represented a critique of data reported by others. It was therefore a negative approach. There was need for a positive presentation of my own findings.

The material which I had presented to the Ontario Fluoridation Investigating Committee contained a wealth of information. To be suitable for the medical profession, however, it had to be put together into a concise article. A monograph of 60 pages with 227 references entitled, *Fluoride in Clinical Medicine* was published in 1962 in *International Archives of Allergy and Applied Immunology*.<sup>84</sup> In it I presented documented data on fluoride metabolism, on acute poisoning as well as seven detailed case reports of chronic fluoride poisoning from artificially fluoridated water. Brief mention was made of a woman in the habit of drinking 15 to 20 cups of tea daily for many years. She showed characteristic features of fluorosis, including calcification of ligaments in the spine. Her urinary excretion of fluoride ranged from 1.7 to 6.3 mg (6 determinations).

With this article I was about to break into the United States medical literature for the second time. This time I did not succeed.

The editor of a major American medical journal had dis-

played much interest in the monograph and desired to publish it. As is customary, he sent it to his editorial advisors for an appraisal. They rejected it mainly because I had failed to recommend the "great health measure": fluoridation of public water supplies. Purposely I had confined my presentation strictly to scientific data. I had not mentioned fluoridation because of its political overtones.

The wording of the rejection had a familiar sound. It was nearly identical with the rejection which the editor of another journal had received from his advisors.\* P.H.S. officials serve on editorial committees of most U. S. medical journals. Editors not familiar with available literature on fluoride know of no one else to whom to turn for advice. They therefore consult dentists and health officials, whom they assume to be experts on fluoride. They are not aware that the P.H.S., regardless of its high scientific accomplishments in most areas of medicine, is the type of organization in which subordinates must adhere to the policy of top brass, i.e., promote fluoridation.

Other editorial advisors, outside the sphere of P.H.S. influence, who carefully scrutinized my article, considered it an important contribution to the subject.

There was another means of communication, the medical meeting. On my 1959 European trip, I noted that scientists who had worked on fluoride poisoning at the University of Palermo, Italy, were not familiar with the research done at the Eastman Dental Institute at Rome, a short distance away. Scientists in Paris had no knowledge of the work done by either of these institutions. There was no exchange of ideas and no co-ordination in fluoride research among those who had produced evidence unfavorable to

\*The same journal recently rejected a scholarly review on fluoridation by D. H. Fogel, M.D., of Stamford, Conn., using approximately the same wording:

"To publish this paper would add further fuel to the fire of heat and emotion . . ."

fluoridation. This was in striking contrast to the efficient organization of those propagating research favorable to the subject.

I proposed to Dean René Fabre of the Faculté de Pharmacie at the University of Paris, France, that he and some of the Italian scientists arrange a conference on fluoride research.

Dr. Fabre was responsible for banning fluoridation in France. A personal experience convinced him early in life that fluoride can cause serious trouble: as a young man he had developed arthritis. He reasoned that small doses of sodium fluoride should ameliorate the osteoporosis (bone softening) often associated with arthritis. Upon taking a few doses of sodium fluoride (up to 100 mgm) he learned otherwise. They produced neuromuscular pains and severe stomach and bowel upsets of the kind which I had observed in my patients. Moreover, the fluoride had aggravated the arthritis. The cure turned out to be worse than the disease.

Another outstanding scientist, Prof. Andrea Benagiano, the head of the University of Rome's Eastman Dental School, displayed interest in the conference. He had always been aware of the dangers of fluoride. Fluoride ejected from volcanoes in the region north of Rome contaminates water supplies. The concentration ranges between 2 and 6 parts per million. He, and several of his collaborators, especially Prof. Sergio Fiorentini, had made studies of fluoride's ill effect to the human system,<sup>232</sup> particularly to the gums. Like other research unfavorable to fluoridation, the findings of these noted scientists is rarely mentioned in the U.S.A.

Another scientist interested in the proposed meeting was Prof. G. Bredemann of Hamburg (Fig. 28). He had just completed his classic book with 1200 references.<sup>75</sup> I was fortunate to confer with this great scientist at his home in 1959 shortly before he suffered a fatal stroke. He was



**PROFESSOR GUSTAV  
BREDEMAN**

1879 – 1960

Former head of the State Institute for  
Applied Botany, Hamburg, Germany.

*Fig. 28*

nearly blind at that time. The strain of his extensive and constant studies might well have hastened his death.

His collaborator, Dr. K. Garber, was eager to assist in my project. Two professors of Hanover's Veterinary Institute where some of the early observations on fluorosis in cattle had been made, Drs. E. Hupka and G. Rosenberger, likewise showed a keen interest in the conference.

Rome was chosen for the meeting. The date was to be March 19 to 22, 1961. On May 2, 1960, Prof. Andrea Benagiano informed me that the Italian government had decided to underwrite its expense. I was charged with preparing the program.

Meantime, an uninvited scientist, a top official of the Canadian Government displayed much interest. He was anxious to serve on a committee and to assist in making arrangements. I welcomed his participation, but was some-

what at a loss to explain how he found out about the proposed conference. I had only one clue. His correspondence with me began shortly after I had referred to the proposed Rome conference before the Ontario Fluoridation Investigation Committee in Toronto, in June, 1960.

Three weeks before the conference was to take place, I received a cable from Rome in which I was told that financial support had been withdrawn. The conference had to be cancelled.

Correspondence with the Italian scientists indicated that they, themselves, were much dismayed by this sudden turn of events. They were anxious to have me proceed with plans to hold the meeting elsewhere.

The Eastman Dental Institute in Rome was founded by George Eastman of Rochester, New York. Italian scientists were recipients of \$73,845 in research grants from the U.S. Public Health Services in 1960; \$495,564 in 1961; \$500,335 in 1962. Whether Rochester, Washington, D. C., or Ottawa was instrumental in achieving the about-face of the Italian Ministry of Health, I shall never learn.

In retrospect, I cannot help but recall a letter written by the Chairman of the Fluoridation Committee of a dental society in a Pennsylvania town, dated October 6, 1961, to Mrs. W. S., Ketchikan, Alaska. It stated:

"We now have spies in most of the established national organizations opposed to fluoridation and can anticipate the moves they are making, and we can really hit hard now. Of course, this is not for publication."

In Paris, Prof. R. Truhaut, Dean Fabre's successor, was interested in holding the conference in Paris. I hesitated to go along with his plan, since he intended to have the World Health Organization sponsor it. W.H.O. had announced its position in favor of fluoridation and was responsible for its promotion in several countries under the leadership of U.S.P.H.S. officials.

While my correspondence with Prof. Truhaut was in

progress, an allergist from Holland visited me in Detroit. He is widely known in European medical circles and well acquainted with high Dutch officials. I told him about my woes. He generously volunteered to host the meeting in Holland.

The program had been set up. The scientists who had planned to convene in Rome had been invited. My friend was to make local arrangements.

However, a new hitch developed. During my correspondence with him I learned that he had invited some of the Dutch public health officials to collaborate in running the meeting. At the time, Dutch health authorities were about to introduce fluoridation in the key cities of Rotterdam and Amsterdam.

My aim was to confine the meeting to scientists who had carried out original research on fluoride. The most competent ones were to preside at the scientific sessions. My friend, on the other hand, wanted to honor his Dutch friends, our hosts, by appointing them chairmen. This is a customary procedure and ordinarily would have been a reasonable request. I knew that a single promoting scientist, by chairing a session of the meeting, could permit the discussion to diverge from the scientific to the political level. This I was determined to avoid by all means at my disposal.

The final blow came when my friend suggested, undoubtedly at the request of his Dutch advisors, that one evening of the meeting be set aside for a visit to Tiel, the Dutch town fluoridated on an experimental basis, the Grand Rapids of Holland.

When proponents wish to convince scientists and lay persons of the efficacy of fluoridation, or when an industrial concern wants to prove that poisonous air contaminants emanating from their factory smokestacks are harmless to vegetation, livestock and humans, they invite their prospects to the fluoridated town or to the respective factory to witness at first-hand the so-called scientific evidence in

support of their stand. Free transportation and hospitality are provided by the corporation.

In the early 1950's such an excursion to an air-contaminating factory in Scotland took place. A scientist in Swiss government employ told me that he was offered free transportation from Switzerland to Scotland. His superiors, no doubt aware of the purpose of the visit, refused to give him a leave of absence.

In the U.S.A., scientists opposed to or lukewarm on fluoridation have been invited to Newburgh where they were shown a selected group of children,\* i.e., only those likely to impress them favorably. Similarly, a Detroit city councilman\*\* given the official tour of Grand Rapids returned with glowing reports of fluoridation's great accomplishments.

My Dutch allergist friend had already mailed the printed invitations to participating scientists and had made arrangements to house them in a delightful Dutch hotel when—because of the ominous changes in the set-up—I was obliged to cancel the conference.

I was faced with a difficult decision. By revoking arrangements for the conference a second time I could have become the laughing stock of all those who had thus far co-operated with me. Fortunately this did not happen. My abrupt turnabout, however, marred a long friendship with my Dutch friend and his charming family, a friendship which I had highly valued. He had every reason to take offense at what seemed to be my lack of courtesy. Neither he nor anyone else could be expected to understand the true motives for my decision without having personally experienced some of the many adversities to which I had been subjected over the years. He may never know how much

\* Smith, H.V., U. of Arizona, to Munch, R.J., Greenwich, Conn. 9/17/54.

\*\* Lincoln, J.H., Detroit Councilman. "Fluoridation of Water," Dec., 1956.

I had really appreciated his efforts in my behalf.

I immediately contacted other scientists in Germany and Switzerland to make a third try for a satisfactory meeting place. Only two weeks remained for me to set up the new plan. One of the three scientists Prof. T. Gordonoff, Chairman of the Department of Pharmacology, University of Bern, made arrangements at the Gurten-Kulm Hotel, located on a mountain overlooking this beautiful university town, the capital of Switzerland.

With fear and trepidation he and I held a preliminary meeting in a Basel hotel. The previous program which had been so carefully planned for Rome and Holland had to be scrapped. Now, two days before the meeting, we didn't know who would attend. I was prepared to spend three days at the hotel as the sole participant of the conference. I planned to utilize the time mountain climbing.

On Sunday, October 14, 1962, I sat in the lobby of the Gurten-Kulm Hotel opposite the clerk wondering if any of the scientists would show up. I rejoiced when one after another trickled in. In fact, every one scheduled to be in Holland was present Monday morning at roll call. When a beturbaned, bearded Indian patriarch passed through the hotel entrance I was delighted. It was Prof. Amarjit Singh, University of Patiala, India, a man of profound wisdom and his country's foremost student of fluorosis. He turned out to be the soul of the conference and became one of my intimate friends.

Several scientists had requested an invitation to the conference through Bern University officials. They represented aluminum companies in Switzerland and France.

One of the Swiss scientists, Dr. E. W. Alther, the high caliber of whose work is recognized, had carried out extensive research on cattle;<sup>288</sup> another is internationally known for his research in plant physiology. I considered it fortunate to have these men in our midst. Through their experience and background in fluoride research, I anticipated

stimulation of our discussions.

However, this did not materialize. One of the aluminum company representatives was constantly making notes. He must have taken down every spoken sentence from the beginning to the end of the conference. At no time did he make a single remark.

Near the close of the conference I confronted him: Why, with his extensive knowledge of the subject, I asked, had he failed to participate in the discussion. He was obviously embarrassed. He assured me that under no circumstances could he have taken part.

"Did your company give you orders to remain silent?" I bluntly inquired.

For want of a reply he became increasingly uncomfortable. Finally he seemed to have found the right answer for me. He insisted that he could not have carried his point among the scientists assembled there. He must have been aware that the industry's position would not withstand critical examination by scientists who were conversant with the genuine facts.

The spokesman for the French company acted differently. He repeatedly challenged the essayists. His reasoning was reminiscent of statements encountered in U.S.A. political fluoridation campaigns.

For instance, I showed a picture of an enlarged rabbit's heart experimentally poisoned by fluoride, side by side with a nonpoisoned control specimen. It was sent to me for presentation to the conference by the Japanese scientist, T. Takamori, of the University of Gifu.<sup>284</sup> The representative of an aluminum corporation reasoned as follows:

"These changes in the rabbit's heart can't be due to fluoride. Our people in Vichy have been drinking water with a fluoride concentration as high as 8 parts per million for years. At no time have we seen enlarged hearts."

Although the heart of an experimental animal is bound to behave differently from that of a Vichy citizen, no studies

have been made to determine whether or not continuous consumption of high fluoride Vichy water has caused an increased trend to heart disease. Furthermore, for drinking, inhabitants of the town of Vichy have access to water other than that from the high fluoride Vichy Springs.

Another group of participants had received invitations through the University of Bern at their request. They represented Swiss citizens who had suffered damage from fluoride fumes. They symbolized the powerful struggle of the common people in Switzerland against their Titans of industry.

Parts of northern Switzerland along the Rhine and the Frick valley, near the towns of Rhinefelden and Mohlin, are contaminated by fluoride. The vegetation has been partially destroyed by fluoride fumes emanating from a nearby German aluminum factory on the opposite side of the Rhine River (Fig. 29a, b). For years constant litigation by local citizens against the company has been underway.

Many improvements have been introduced in the factory to reduce the hazard. However, the population is still confronted with the fluoride threat. Citizens have been antagonized by the company's scientists who attempt to minimize fluoride's harm. I was told that most veterinary physicians and scientists in the area have been engaged to carry out research and examinations for the company. Few scientists dare to speak against the powerful corporation for fear of being subjected to disparagement and economic pressure. It all had a familiar ring. Correspondence in my files shows that American farmers whose cattle have suffered fluoride damage are also hard put to find veterinary physicians to take care of their animals.\*

The Gurten conference was most instructive and proceeded according to plan. It was confined to scientific evi-

\* Cox, W. R., Portland, Ore., to Mrs. G.L.W. 3/7/57.—Mrs. E.J.P., Golden, Colorado, to G.L.W. 12/9/63.

dence on fluoride's effect. All references to fluoridation were avoided.

The program opened with a review of the pharmacological action of various fluoride compounds by one of the most brilliant scientists in this area of research, Prof. N. P. Buu-Hoi<sup>235</sup> of the National Research Center in Paris. Prof. Buu-Hoi received the Cross of the Legion of Honor, France's highest award, in 1962, for outstanding research. He explained that there are two kinds of poisonous action in fluoride compounds: One is determined by the fluoride ion and the other by the remaining portion of the molecule. Accordingly, fluoride poisoning can exhibit a wide variety of manifestations depending upon the ions of the other minerals present in the fluoride compound.

The balance of the first morning was devoted to methods of fluoride analysis. Two outstanding German scientists with extensive experience, Profs. W. Wohlbier and W. Oelschlager of Stuttgart-Hohenheim pinpointed the many pitfalls involved in carrying out accurate fluoride analyses.

In the afternoon, Profs. E. Hupka and G. Rosenberger of the Hanover Veterinary School related their experience with fluorosis in domestic animals. They showed a film of fluorosed cattle from a fluoride contaminated area in Germany. The pitiful appearance of these animals, their extreme emaciation, painful stance and movements due to joint swelling and palsy of their hind legs were clearly evident.

A scientist from Holland, Dr. F. Spierings, Institute voor Plantenziektenkundig Onderzoek, Wageningen, showed that one of Holland's major industries, cultivation of tulips and gladiolas, has been adversely affected by fluoride in the air. Dr. L. Gisiger of the Swiss Government Agricultural Station at Liebefeld near Bern, and Prof. K. Garber, Staatsinstitut für Angewandte Botanik, Hamburg, Germany, likewise presented data on fluoride damage to plants.

The following day a symposium on how fluoride affects the calcium-phosphorus metabolism featured Prof. E. Uehlinger, the head of the Department of Pathology, University of Zurich, one of the world's outstanding experts in this area of research. He outlined the mechanism of fluoride's effect on the calcium-phosphorus balance and its action on bones and teeth.

Another symposium was concerned with mottled teeth. It was led by Dr. Ch. Leimgruber of Bern, a dental research scientist. My own contribution to this symposium was a review of the many abnormal conditions of the teeth with which mottling might be confused. Through the courtesy of B. G. Anderson, D.D.S., of New Haven, Conn., a pioneer in diagnosis of mottling,<sup>236</sup> I showed photographs of teeth which had been published in the A.M.A.'s *American Journal of Diseases of Children* in 1942. They demonstrated how to differentiate true mottling from other enamel defects. Prof. T. Takamori of Gifu University, Japan, who was unable to appear personally, had sent an account with pertinent illustrations of his ingenious classification of mottling. By taking into consideration the extent of the mottling, the appearance of the tooth's surface and its degree of discoloration, Takamori's classification provides an immediate clear appraisal of fluoride damage to a tooth.

Profs. T. Gordonoff and W. Minder presented their basic research on fluoride's interference with the function of the thyroid gland. Other detailed clinical reports of poisoning from water naturally containing fluoride were presented by Dr. G. Nalbene, of the U. of Palermo, Italy, and by Dr. W.P.U. Jackson, Pretoria, S. Africa. The highlight of the meeting was the lecture by Prof. Amarjit Singh, head of the Department of Medicine, University of Patiala, India. He illustrated his remarks with a motion picture on fluorosis in humans from natural fluoride areas. He presented a wealth of information, some of which was subsequently published in the May 1963 issue of *Medicine*.<sup>167</sup>

The Transactions of the Gurten Conference were about to be published in July, 1963, by a Swiss medical publisher under the editorship of Prof. Gordonoff of Bern. I had already seen the proof sheets. In September, Prof. Gordonoff notified me that the publishers had been obliged to abandon their work on the nearly completed book. Expenditures had already amounted to several thousand dollars.

Who defrayed this substantial cost already incurred by the publisher for printing the material, is not known. According to a Swiss spokesman, the company had been threatened with boycott. Swiss cities were in the midst of a fluoridation struggle reminiscent of U. S. battles. The *Transactions* gathered together a wealth of scientific data which are otherwise difficult of access and would take years for an individual to acquire. The data presented would have interfered with promotional efforts in Switzerland. The book was subsequently published by the German medical publisher Benno Schwabe of Stuttgart.<sup>236a</sup>

My interest in this Conference had been inspired by my awareness of lack of communication between scientists regarding fluoride research and by my eagerness to explore new areas of this complicated and confused subject.

I learned at the Conference that my research had already provided much stimulation to other scientists. Moreover, the research which proponents had set up for the express purpose of countering my findings had brought forth new and significant facts.

I realized that a tedious and laborious uphill climb lay ahead.

## CHAPTER FIFTEEN

### SCIENCE AND SCIENTISM

An editorial entitled "Scientism, A New Blight" appeared in the April 14, 1962, issue of the *Journal of the American Medical Association*.

The editor defined "scientism" as "A parody or defeat of true science" "Grant-Getting by wisdom of application—A combination of pseudo-scientific pecuniary pedantry and integrated cooperative research, based all too often on irrelevant or misinterpreted data, compounded by mass computer techniques."

"Huge sums of money are spent," the editor asserts, "on doubtful, artificially blown-up, occasionally ridiculous projects." This "pseudo-science," he suggests, should be replaced with research by "clinical staffs and personnel who represent that sometimes forgotten man, the patient."

Had the editor referred to fluoridation research he could not have found a more glaring illustration of this "new blight."

Numerous meticulously executed statistical studies and epidemiological surveys published in scientific journals present a multitude of impertinent data. A host of articles dwell on how to promote fluoridation. Psychiatrists, social workers and nutritionists have written "scholarly" treatises analyzing the psychology of fluoridation opponents<sup>182</sup> and how to neutralize their arguments: Yet, no studies are available dealing with individuals to prove fluoridation safe. He, the person suffering poisoning from fluoridated water, is indeed "The Forgotten Man."

It is easy to distinguish between objective publications on fluoridation and those written for promotional purposes. The latter exhibit certain earmarks readily spotted by the observer. They invariably begin, or end, with a plug for fluoridation. For instance, a learned article by Dr. A. L. Russell, head of the Statistical and Biometric Branch of the National Institute of Dental Research begins with the following sentence:

"It is now generally conceded that children, twelve to fourteen years of age, who have been exposed to fluoride-bearing communal waters during their entire lifetimes, have a more favorable dental caries experience than individuals of the same age who have always lived in areas where the community water is fluoride-free."<sup>237</sup> This was in 1949, only four years after the experiments in Grand Rapids, Mich. and Newburgh, N. Y. were initiated.

Promotional research disregards whatever findings do not support the fluoridation thesis. It labels all data unfavorable to fluoridation "unconvincing" or "unscientific."

This kind of "science" should not be confused with the so-called science which is based upon arbitrary statements made at public hearings or appearing in newspapers for lay consumption. The following are typical examples:

Fluoridation is safe because millions are drinking fluoridated water—

Physicians in Grand Rapids have not reported illness due to fluoride in water. (This is held up to the public as "proof" that fluoridation causes no ill effect.)

Vitamin A and table salt are poisonous too in large amounts\*—

"To produce even the mildest symptoms of fluoride poisoning would demand that the victim swallow two

\* The degree of toxicity of a substance depends upon the latitude between a harmless and a toxic dose. With fluoride the margin of safety is extremely narrow or nonexistent.

and a half bathtubsful of properly fluoridated water, during a single day."<sup>288\*</sup>

Such slogans originate with public relations counsellors, not with scientists. Nevertheless, through constant repetition, they have found their way into scientific journals where they have influenced a segment of the dental and medical profession.

"Scientism," as indicated in the A.M.A. editorial is different. It pertains specifically to elaborately and well executed research by scientists of the highest caliber, presented in leading scientific journals, supported by vast grants from the federal government and from industry. This research appears thoroughly convincing on the surface. Careful scrutiny and a solid research background on the subject are required to detect its shortcomings:

1. In some publications one or two sentences contain the key fallacies.
2. In others the design of the study is defective.
3. In some, data on individuals are either lacking or disregarded.
4. In others the author's conclusions ignore important data contained in the text.
5. Scientists make statements which contradict their own research findings.

#### 1. The Crucial Sentence

In the *American Journal of Roentgenology* of 1951, three fluoridation proponents, Drs. E. J. Largent, P. S. Bovard and F. F. Heyroth,<sup>289</sup> reported X-ray evidence of fluoride poisoning in five out of sixteen factory workers

\* This refers to immediate acute poisoning from a single dose which is not pertinent to fluoridation. The hazard of repeated persistent intake of minute amounts of fluoride for months and years is at issue.

exposed to fluoride. Except for the changes in bones, they asserted that these people had not been harmed. This research is often quoted as evidence that bone changes, of the kind encountered in high fluoride areas and in industry, are never associated with harm elsewhere in the human organism and therefore have no significance.

Careful examination of this article reveals a single sentence which tells the story:

"Detailed clinical examination of the workmen in these plants could not be carried out and therefore no other data are available for consideration."

Actually, without thorough clinical investigation these scientists had no basis for their arbitrary statement that the 5 workers suffered no ill effect other than that noted in X-rays.

In another study, one sentence made the difference between a valid and a misleading piece of research. It was carried out by a P.H.S. team led by Dr. E.F. Geever, now of Philadelphia, published in *Public Health Reports*,<sup>240</sup> 1958.

These scientists investigated the microscopic appearance of bones from thirty-seven persons who had lived in areas where the water naturally contains 1 to 4 ppm of fluoride. They compared these bones with bones of persons from communities with less than 0.5 ppm of fluoride in water and found "no significant differences" in the two groups. They concluded that fluoride naturally occurring in drinking water does not damage bones.

On page 722 one finds the following pivotal sentence:

"Those (persons) with chronic illness and diseases known to affect bone structures were excluded." Among the diseases excluded, the authors specifically named two which are frequently associated with chronic fluoride poisoning, namely parathyroid and kidney diseases.

Thus the cases which warranted special attention and which were most likely to have suffered ill effect from fluoride

were omitted from the study. Had they been included the authors would not have arrived at the conclusion that fluoride naturally in water causes no harm.

Another widely propagated promotional study which omitted the very cases which were most likely to have suffered ill effect from drinking fluoridated water is a survey in the pilot city of Newburgh, N. Y. (fluoridated in 1945), published in the *Journal of the A.M.A.* in 1956. It was designed to "prove" that fluoridation is not harmful to kidneys. A team of public health officials led by Dr. E. R. Schlesinger<sup>241</sup> of the New York State Dept. of Health examined urine specimens of 900 children for blood cells, albumin and casts, which are evidence of kidney disease.

The key sentence in this study on page 21 is as follows:

"No specimens were taken if there was any history of clinical illness, no matter how mild, during the previous two weeks."

Acute episodes of bowel disorders, bladder and lower kidney tract disease (pyelitis) are not uncommon in the beginning stage of chronic fluoride poisoning. Otherwise it is a nonspectacular progressive illness. Many reasons account for such sudden acute flare-ups.

For instance, on a hot day, a person may consume fluoride in excess because he drinks many times his usual daily amount of water. On such a day an acute episode of illness is liable to occur whereas damage to kidneys may not be detectable on other days. By eliminating all children who had suffered an acute illness within two weeks prior to the examination, the authors defeated the purpose of their study, namely to detect early kidney damage from fluoridated water in children.

Another deficiency often encountered in promotional research is illustrated by the P.H.S. study of Drs. J. R. Herman, Brian Mason and Igo Light in the *Journal of Urology*,<sup>53</sup> Oct., 1958. It categorically concluded that the "fluorine content of the (kidney) stones is not related to sys-

temic fluorosis as determined by the fluorine content of the tissues." This implies that the general health of persons whose kidney stones contained an unusually high concentration of fluoride—as much as 1800 ppm—was not adversely affected by fluoride. Page 266 in the article contains the key to the fallacy of the authors' conclusion:

"None of the tissues (of vital organs) revealed fluorine contents elevated significantly above the normal established in the literature."

For "normal fluoride levels established in the literature" Dr. Herman and associates refer the reader to three publications, one by Drs. A. Gautier and P. Clausmann of Paris,<sup>242</sup> France (1913), one by Drs. A. P. Gettler and L. Ellerbrook of Philadelphia<sup>194</sup> (1939) and the book by Roholm<sup>82</sup> (1937).

Upon checking the fluoride content of the organs covered in these three studies, one finds exactly the reverse of what Dr. Herman and co-workers reported. As shown in Table 16 normal fluoride levels in kidney tissue proved to be far lower than those encountered by the Herman group.

Table 16  
NORMAL FLUORIDE LEVELS IN KIDNEY TISSUE WITH WHICH  
DR. HERMAN COMPARED HIS DATA

		PPM
Gautier and Clausmann <sup>242</sup>	(1913)	2.6 (dry)
Gettler and Ellerbrook <sup>194</sup>	(1939)	0.56 - 0.78 (wet)
Roholm <sup>82</sup>	(1937)	11.0 (dry)
Herman <sup>53</sup>	(1958)	181.0

Herman's 181.0 ppm fluoride value in kidney tissue is extraordinarily high and in marked contrast with those found by the three authors whom he quoted. In his article in 1956,<sup>205</sup> on page 190 in the *Journal of Experimental Medicine*, 0.78 ppm had been given as the "normal" fluoride level for kidneys, 11.6 ppm for kidneys acutely poisoned. The high value of 181 ppm should have stimulated a follow-up investigation by himself and his P.H.S. collaborators to

determine whether the high fluoride storage had adversely affected the function of the kidneys and the patients' general health.

These examples point up the need for painstaking examination of all details contained in reports by exponents of fluoridation before accepting their conclusions on this confused subject.

## 2. Faulty Design of the Study

The most striking deficiency in proponent studies is the inadequacy of controls. "Controls" are normal individuals furnishing data under normal conditions used as a standard of comparison for the new findings.

It has already been shown that the erratic action of fluoride itself renders it extremely difficult to obtain controls in the true sense of the term: It is virtually impossible to determine how much fluoride has entered a person's system on a long term basis either through drinking water or through other sources; how much is being stored; in which organs it is being deposited and through which channels it is being eliminated. Even in animal experiments for which controls are easier to obtain than for humans, scientists have struggled in vain to secure reliable controlled data.

In the proponent research it is customary to compare data from a high fluoride with those from a low fluoride area. The latter are considered "controls." Again it is necessary to refer to Dr. Herman's data from nonfluoridated New York City (0.1 ppm).

Table 17  
FLUORIDE IN TISSUES AND ORGANS ACCORDING TO  
DR. HERMAN AND ASSOCIATES

	PPM
Skin	10 - 290
Prostate	0 - 86
Bladder	0 - 185
Kidney	0 - 181
Nails	10 - 186
Fat	0 - 145
Hair	13 - 171
Kidney Stone	5 - 1575

Table 17 demonstrates that in some persons organs are free or practically free of fluoride, whereas in others there is substantial accumulation. This is true whether one resides in a nonfluoridated city like New York or in a fluoridated one. Fluoride determinations of tissue from autopsies in nonfluoridated Detroit (0.1 ppm) confirm Herman's observations. Therefore data from a community where water is practically "fluoride-free" does not constitute a genuine "control" for data from fluoridated communities. At the present state of our knowledge, scientists are not yet aware why and under what circumstances high accumulations of fluoride occur in organs other than bones and teeth.

With this in mind, the widely publicized statistical study by the P.H.S. team, T. L. Hagan, M. Pasternack and O. C. Scholz, in *Public Health Reports*, Vol. 69,<sup>243</sup> is of relatively little value.

These P.H.S. scientists compared mortality rates for cancer, kidney, liver, intracranial lesions and heart disease in natural fluoride towns with those obtained from thirty-two "nonfluoride control" cities. They found "no statistically significant differences" for the five diseases in the two groups of cities. They disregarded intake of fluoride through food, drugs and air contamination.

The design of this survey is further confused because some of the so-called nonfluoride "control" cities had considerable fluoride in their water supplies, even more than the "natural fluoride" cities with which they were compared. Therefore, the authors' conclusion that fluoridation is safe because there were "no significant differences" in mortality rates in the two groups of cities is fallacious. Nevertheless this study constitutes a bulwark of fluoridation promotion.

The matter of faulty controls is even more vividly illustrated by a study by one of the country's most outstanding pharmacologists, Dr. H. C. Hodge of the University of Rochester, N.Y., and co-workers.<sup>244</sup> Its purpose was to com-

pare urinary fluoride elimination in persons with normal kidneys with that from persons known to be afflicted with kidney disease, before and after fluoridation was initiated in Rochester, N. Y. Data in kidney patients were compared with data from so-called "normal" individuals who served as "controls." In this report published in *Archives of Industrial Health*, Vol. 11, page 9, 1955, the individuals designated as "normal" ranged in age from seventy-four to ninety-seven years. There is a consensus among physicians that at this advanced age kidneys are rarely, if ever, normal because of the arteriosclerotic and other senile changes. It is, therefore, not surprising that Dr. Hodge found no significant differences in the two groups.

Yet, promoters of fluoridation utilize this particular study to support their claim that fluoride does not interfere with kidney function. Had Dr. Hodge and associates selected young persons with normal kidneys, they would have found significant differences in elimination of fluoride by normal and diseased kidneys.<sup>214</sup>

A study by Dr. O. M. Derryberry, health director of the Tennessee Valley Authority project, and co-workers<sup>246</sup> furnishes another demonstration of the difficulties encountered in setting up adequate controls in fluoride research. It was published in *Archives of Environmental Health* April, 1963.

Workers in the TVA phosphate areas are constantly exposed to inhalation of fluoride fumes and dusts, a constituent of phosphate rock. Dr. Derryberry's group compared the health of seventy-four workers "exposed" to fluoride with that of sixty-seven individuals who presumably were "unexposed." The latter served as so-called "normal" controls. The principal criterion for the exposed group was a "consistently high urinary fluoride excretion (elimination)" during their employment. This study was carried out most meticulously with the best tools of modern science: Each worker had a complete physical examination,

numerous laboratory tests and X-rays.

In the seventy-four "exposed" workers the *average* daily fluoride elimination through the urine was 4.6 ppm; in the sixty-seven "control" supposedly "nonexposed" workers elimination averaged 1.15 ppm. From the latter figure one must conclude that those presumed to be unexposed were also exposed to fluoride, although to slightly less than those under study.

On examining the detailed data we find that each worker had numerous urinary fluoride determinations, one of them as many as seventy-four. A worker in the "exposed" group, for instance, as indicated on page 514 of the article, eliminated on one day as little as 0.2 ppm, on another as much as 7.9 ppm. For the group of "unexposed" workers the authors presented no breakdown for each individual. Only the averages of all determinations of fluoride in urine of all sixty-seven so-called "unexposed" workers were reported.\* It was therefore impossible to compare elimination of fluoride in "exposed" and "unexposed" individuals.

These and other details in this research demonstrate that there was considerable overlapping in the composition of the two groups. Here again a thoroughly executed and elaborate study is of little significance because of an overall faulty design.

The same basic fallacy underlies the mainstay of the research designed to prove fluoridation safe, the survey of Bartlett and Cameron, Texas,<sup>247</sup> where water contained fluoride naturally at 8 ppm and 0.4 ppm, respectively.

The health of one hundred sixteen persons who had resided in Bartlett for more than ten years was compared with that of 113 in Cameron. All individuals underwent elaborate examinations similar to those in the Derryberry studies.

\* Averaging of averages constitutes another fault frequently encountered in fluoride research. This criticism applies especially to statistics which constitute the basis for the claim that the incidence of tooth decay in fluoridated cities has been reduced by 65 per cent.

Cameron is close to Bartlett. No information is available regarding the extent to which persons in Cameron, the control city, were exposed to fluoride from sources other than water, such as food grown in the area and contaminated air. Western Texas, where both cities are located, is known as a high fluoride area.

The survey reported no significant differences in the examination and laboratory findings in the two groups. Nevertheless, in both cities there was an unusually high incidence of cataracts, bone changes, arthritis and hearing disturbances. However, no comparison of these diseases was made with their overall incidence in the U.S.A.

Crippling arthritis and partial deafness have been linked with chronic fluoride poisoning in a survey by the Indian scientist, A. H. Siddiqui, in the *British Medical Journal*,<sup>166</sup> Dec. 10, 1955, page 1408.

Examination of the data presented in the Bartlett-Cameron report shows that the mortality in Bartlett was 265 per cent higher than in Cameron. This important fact was given no attention in the authors' conclusion.

The Bartlett survey demonstrates yet another fallacy in fluoride research: Data on only one hundred sixteen persons are used as the basis for the assertion that fifty million people in the U.S.A. drinking fluoridated water need not anticipate harm.

If 1 in 117 were to suffer ill effect from fluoride in water, the number of those so afflicted among the fifty million U.S. citizens would be 427,350 — a sizable incidence. Thus the sampling in the Bartlett survey was far too small to assure the safety of millions of persons drinking fluoridated water.

### 3. No Studies on Individuals

Referring again to the A.M.A. editorial on "Scientism" and the absence of studies on individuals whom the editor so aptly characterizes as "the forgotten man," a case in

point is worker #54 mentioned in the Derryberry study previously discussed. This worker with skeletal fluorosis eliminated during one day as much as 44.0 ppm of fluoride in the urinary specimen, on another only 4.0 ppm. In this case the available data clearly point to serious damage from fluoride. Examination and laboratory findings carried out on the day of his high fluoride elimination would, undoubtedly, have been revealing.

There are many "forgotten men" in fluoridation research:

P.H.S. scientists I. Zipkin<sup>173</sup> and associates reported in *Public Health Reports* of Aug. 1958, page 732, the chemical composition of bones of sixty-nine persons from communities with fluoride in water ranging from 0.1 to 4 ppm. They observed an increase of fluoride in bones proportional to that in drinking water.

Yet, in one of their cases from a low fluoride town (0.4 ppm) they detected in the breast bone (sternum) an unusually high fluoride content, namely 2290 ppm. Fluoride in breast bones of the other cases in that town ranged from 400 to 1010 ppm.

Such an exceptional case in a low fluoride area should have been subjected to a special investigation which might have provided significant data. Instead, this case was eliminated from the study.

### 4. Unwarranted Conclusions

Two studies have come to my attention which were carried out on individual patients at the National Institute of Dental Research in Bethesda, Md. They demonstrated how partial information can be misinterpreted and lead to faulty conclusions.

In *Public Health Reports*,<sup>248</sup> Vol. 73, page 741, 1958, Drs. F. J. McClure, H. G. McCann and N. C. Leone compared the skeletal fluoride content of two women who died under similar circumstances. One, seventy-four years old, had resided in Washington, D. C. (0.2 ppm fluoride in wa-

ter); the other, aged seventy-eight, in Bartlett, Texas, (8 ppm).

The Washington, D. C., person died of a heart attack, the one from Bartlett of a cerebro-vascular accident (stroke). The bones of the Bartlett woman contained about 6000 parts per million of fluoride; those of the Washington, D. C., woman about 1/8 of that figure or around 750 ppm. The former showed more calcium and other minerals in bones than the latter.

The study concluded that "no unusual findings of impairment of health or well being or malformation of skeletal tissue or malfunction generally" were noted in the Bartlett case although her bones contained eight times more fluoride than those of the one from Washington, D. C.

Here, too, a conclusion was drawn without adequate laboratory tests or clinical investigation during the lifetime of the patient to determine whether and to what extent fluoride had interfered with her general health. There is no record of repeated blood and urinary tests for fluoride nor of double blind studies with fluoride-containing and fluoride-free water prior to her death. Without such data it is impossible to ascertain whether or not this patient suffered ill effect from fluoride in Bartlett while she was alive.

To rely upon the fluoride content of the person's bones as a criterion of a person's physical health and well being is misleading. Prof. A. Singh<sup>249</sup> reported in ten cases of *advanced crippling fluorosis* an average of 2720 ppm fluoride content of bones, which is far below the 6000 ppm which the P.H.S. team found in the Bartlett woman.

The other case at N.I.H., Bethesda, Md., of which I learned was not "forgotten." A fifty-six year old housewife was thoroughly studied by the National Institute of Dental Health. I obtained her record through the courtesy of the patient's family physician who wishes to remain anonymous.

She developed severe abdominal cramps and diarrhea, an early sign of fluoride poisoning, within two days after fluo-

ridation was initiated in Washington, D.C., in 1952. This condition persisted with periodic aggravation and temporary improvement up to April, 1959, when the woman was admitted as an out-patient to the Institute. In addition to the abdominal pain she experienced increasing eye disturbances and occasional blurring of vision during the course of her illness.

Four eye specialists had been unable to give her an adequate explanation of her symptoms nor were they able to relieve her condition. One of her eye physicians suggested that she might be allergic to chemicals. As the disease progressed, she developed arthritis which started in the finger joints.

Her symptoms became distinctly aggravated when she drank water unaccompanied by food. Thus, for the first time her attention was drawn to fluoridated water. She and her husband, a physician, soon related aggravation of her disease to drinking fluoridated water and eating vegetables cooked with Washington, D. C., fluoridated water.

Objectively the patient had shown evidence of a progressive loss of vision and of beginning arthritis. These are some of the early symptoms which I described as characteristic of the beginning stage of fluoride poisoning.

Blind studies at the Institute were initiated by providing the patient during the first week, without her knowledge, with fluoride-free water. At this time her daily urinary fluoride level ranged from 0.4 to 0.7 mg with a mean of 0.54. During the second week, again unbeknown to her, fluoride was added to her drinking water in a quantity sufficient to make the urinary fluoride rise as high as 6.7 mg (with a mean of 3.82). She noted no difference in the severity of her symptoms.

On the basis of these procedures, the patient was informed by the Institute that her symptoms were not related to fluoride.

This case again illustrates how difficult it is to establish

proper controls in studies of this kind and how the sole dependence on a laboratory procedure, the urinary elimination of fluoride, can lead to a faulty conclusion:

During the first week, while the patient was eliminating relatively little fluoride,\* she continued to be ill from the previous intake of fluoride. During the second week, while unbeknown to herself she was drinking fluoridated water, she eliminated larger amounts of fluoride in the urine but the change in her symptoms was not impressive.

In my experience, weeks and months are ordinarily required for stored fluoride to be sufficiently eliminated from the system to enable patients to regain their health. Had the test been initiated after she had completely recovered from her illness and after her system had adequately disposed of excess accumulated fluoride, the result of the test would undoubtedly have been different. In other words, a proper baseline had not been established in this patient, a prerequisite for controlled studies on individuals.

The same fallacy characterizes a study by a Stanford University dermatologist, Dr. Ervin Epstein, which is being widely publicized by the P.H.S.<sup>129</sup>

Fluoride, like the other halogens bromide and iodide, has been identified with the causation of acne by a German clinician.<sup>250</sup> Presumably in order to disprove this, Dr. Epstein gave twenty patients with acne 1 mg of fluoride per day for one to eleven weeks, as reported in the *Stanford Medical Bulletin*,<sup>251</sup> Vol. 9, p. 243, 1951.

Dr. Epstein did not wait until the acne had subsided in his patients before starting his experimental administration of fluoride tablets. In other words, he failed to establish a baseline. Because the drug did not aggravate the existing acne eruptions, he incorrectly concluded that fluoride does not cause acne. Moreover, while administering

\* During the last three days of the first week, at which time she was not using fluoridated water, the daily urinary fluoride values were higher than during the first four days, namely, 0.53, 0.67 and 0.7.

fluoride, he simultaneously treated the acne with a special diet, "local treatment," acne toxoid (vaccine) and ultraviolet light. Had fluoride aggravated the condition, the other measures would have acted as antidotes.

Interestingly, one of Dr. Epstein's twenty patients developed a severe generalized allergic eruption on face, hands and neck, which necessitated discontinuance of the tablets. This is the kind of allergic reaction which Dr. Reuben Feltman of Passaic, N.J., described in the *Journal of Dental Medicine*,<sup>252</sup> Vol. 16, 1961, in 1 per cent of pregnant women and young children to whom he administered fluoride tablets and which I recorded, in 1958,<sup>218</sup> in my own patients who had been drinking fluoridated water.

Another shortcoming in the promotional research on fluoridation is the downgrading of some of the most significant contributions to the fluoride literature:

In a comprehensive article in the *Journal of Occupational Medicine*,<sup>253</sup> February, 1960, page 92, the late Kettering Laboratory scientist, Frank Princi referred to the research by Prof. Tokio Takamori and his co-workers at the University of Gifu, carried out in a high fluoride area of Japan. Dr. Princi casually dismissed this work (page 95) on the basis that "none of these observations has ever been confirmed by any other investigator." He must have been aware that often years pass before new data in medicine are confirmed.

Dr. Princi disregarded another valuable clinical report by Dr. A. H. Siddiqui in the *British Medical Journal*<sup>166</sup> of 1955 on thirty-nine cases with advanced crippling fluorosis from drinking water in India by stating:

"In the study of these cases no attempt was made to exclude other diseases and the author admits that all those under study were in the poorest state of nutrition and probably suffered from severe avitaminosis (vitamin deficiency)."

Dr. Princi's reflection on Dr. Siddiqui's competence as a

diagnostician sharply contrasts with his high praise for the work of his own colleagues at the Kettering Laboratory. Without questioning, he accepted Dr. Largent's assurance that the five factory workers with skeletal fluorosis, previously mentioned,<sup>239</sup> suffered no systemic damage by fluoride, although Dr. Largent himself frankly acknowledged that the workers had not undergone a detailed examination.

In order to support his case for fluoridation, Dr. Princi resurrected a highly dubious piece of work by Drs. M. H. Black and I. S. Kleiner which appeared in the *New York State Journal of Medicine*<sup>254</sup> in 1949. These clinicians administered sodium fluoride to seventy patients suffering from malignancies in order to determine whether fluoride would retard the development of these diseases. This study convinced Dr. Princi that doses of fluoride up to 320 mg daily are safe for adults.

However, an examination of the Black-Kleiner report discloses that some of their patients—the number is not stated—suffered stomach and bowel disturbances which are early signs of acute fluoride poisoning. It was necessary to administer an aluminum salt as an antidote simultaneously with fluoride to buffer fluoride's poisonous action. This precluded the recognition of other ill effects from fluoride.

Dr. Princi's promotion of fluoridation likewise relied upon a survey by Drs. C. A. Stevenson and A. R. Watson in the *American Journal of Roentgenology*,<sup>255</sup> Vol. 78, page 13, 1957. Their review of 170,000 X-ray films, principally from high fluoride southwestern states, revealed only twenty-three cases with skeletal fluorosis. Because of this low incidence, the authors reasoned that fluoridation must be safe.

As already pointed out, of 237 individuals in the Bartlett-Cameron, Texas, survey with 8 ppm and 0.4 ppm fluoride in water, respectively, twenty-one cases of bone changes (fluorosis) were identified. In other words, approximately

the same number of cases were recognized among the 237 persons of the Bartlett-Cameron survey as Dr. Stevenson reported upon examining 170,000 from the same and nearby areas.

This extraordinary discrepancy may be due to the fact that minor abnormalities were tabulated in the Stevenson study as "normal." Scientists, who encounter inconspicuous abnormalities frequently, are inclined to minimize their importance. They fail to realize that frequency of occurrence does not render an abnormal condition normal.

Neglect of inconspicuous findings is characteristic of other phases of fluoride research. Fluoride is being stored in everybody's body. With advancing age, greater amounts accumulate not only in bones, but also in connective tissue, in ligaments, joints and in blood vessels.<sup>266</sup> Such hardening or calcification has become so widespread that many physicians fail to recognize it as a disease process.

Little is known today about the part which fluoride plays in what the medical profession and the public accept as the "normal" process of aging.

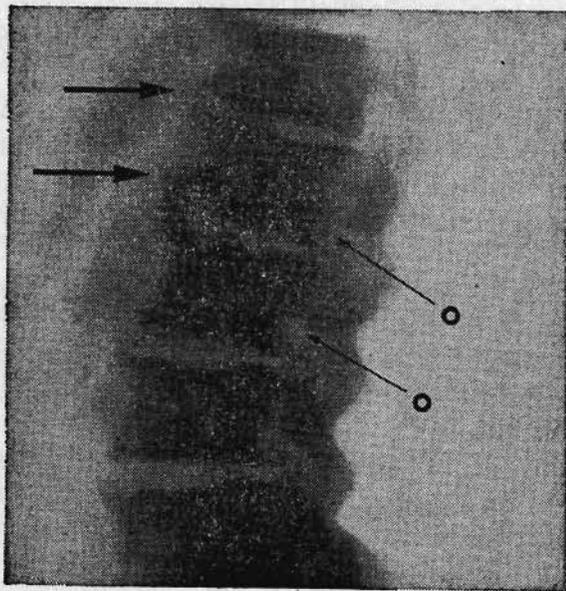
Drs. H. C. Hodge and F. A. Smith at the University of Rochester, N. Y., found unusually high fluoride levels in aortas, the main artery of the heart,<sup>266</sup> as reported in the A.M.A.'s *Archives of Industrial Health*, Vol. 31, 1960. The increase was roughly proportionate to the person's age.

Drs. G. K. Stookey and J. C. Muhler in the *Proceedings of the Society for Experimental Biology and Medicine*,<sup>150</sup> Vol. 113, 1963, showed that under certain conditions fluoride enhances the deposition of calcium in kidneys, livers and hearts. Calcium deposits are bound to damage these organs.

In my own series of analyses of twenty-two aortas for fluoride, I have observed high levels in calcified (hardened) arteries.

Fluoride hardens teeth and bones. Whether or not it con-

### "POKER SPINE"



X-ray in spinal fluorosis. In addition to excess calcification of the bones (darkened areas), the ligaments connecting the spinal bones are calcified (arrow), causing stiffening of the spine. In the areas marked O (openings between spinal bones) the passageways of nerves, new bone formation encroaches upon nerves causing pain and palsy in arms and legs.

Fig. 30

tributes to hardening of arteries rendering them more brittle and breakable is a question which requires further studies.

Similarly, calcifications in ligaments and in the vicinity of joints lead to arthritis as the result of persistent fluoride intake. This has been demonstrated frequently in natural fluoride areas. Like hardening of arteries, calcifications in

ligaments are often looked upon as diseases of old age. To what extent fluoride enters into this kind of aging process is an important question.

### 5. Contradict Own Findings

Noteworthy in the promotional scientific literature are statements made by scientists which contradict the results of their own research:

After Dr. Armstrong had published a reinvestigation of his original data which unequivocally proved that enamel of sound and carious teeth do not differ in their fluoride content, he stated according to the *Minneapolis Tribune* on Dec. 13, 1964, that "Sound teeth contain more fluoride than decayed teeth."

Drs. J. H. Shaw and R. F. Sognaes<sup>179</sup> of the Harvard School of Dental Medicine noted that, in rats during tooth development, 6 ppm of fluoride added to the diet did not prevent tooth decay; 25 ppm only partially prevented it. Yet, the authors dismissed these important findings by categorically declaring that their results do not apply to humans.

Drs. R. L. Maurer and H. G. Day, biochemists at the University of Indiana, established<sup>256a</sup> that fluoride is not a dietary essential and that "fluorine may not have any value in nutrition or even in the maintenance of dental health." Later in their article they reversed their stand with respect to fluoride's effect on teeth: "Its (fluorine's) value in the body," they maintained, "is *apparently* limited to the promotion of resistance to dental caries" (*italics mine*).

In a typewritten report February 23, 1959, to the Atomic Energy Commission Dr. F. W. Lengemann, Division of Chemistry, School of Biological Sciences, University of Tennessee, Memphis, stated: "Fluoride . . . increased the strontium to calcium ratio (in growing bones)." In other words, in the presence of fluoride more radioactive strontium — the potentially dangerous air pollutant — is stored

than without it. Yet, his published report which subsequently appeared in the *Journal of Biological Chemistry*<sup>265</sup> dealing with the same experimental data concluded: "Fluoride had no effect on the strontium to calcium ratio."

In 1963 Dr. Lengemann carried out new experiments from which he concluded that 1 ppm of fluoride in water had no effect upon retention of radioactive strontium and calcium in the skeleton of young rats, but acknowledged that these studies "are still not ideal for predicting the effect of fluoridated drinking water upon the retention of Strontium 90 in bones of young children."<sup>265a</sup>

One wonders how much the objectivity of researchers has been tarnished by unrelenting promotional efforts.

In the November, 1964, issue of the *Massachusetts Physician*,<sup>266b</sup> the official publication of the Norfolk District Medical Society, an editorial entitled "Civil Liberties" stated that fluoridation involves the individual's right to take or refuse medication. Yet, in January, 1965, an editor's note following a promotional letter by Dr. F. J. Stare said: "It (fluoridation) is *not* a civil liberties issue."

News releases are constantly being issued for the purpose of convincing the public and the professions of fluoridation's efficacy and safety. Although they create the impression that proof is available, the assertions are not supported by facts.

For instance, on Nov. 1, 1963, the *Hartford Courant* reported the statement by Dr. Paul Rosahn, New Britain pathologist, that fluoridation may be a "factor in prolonging life." When asked for substantiation, D. W. Coston, Deputy Assistant Secretary for Legislative Services, Dept. of HEW, stated on Jan. 16, 1964, that Dr. Rosahn's remarks were "based on subjective impressions, not on objective data."

In the *Des Moines, Iowa, Register* of January 2, 1962,

Dr. L. D. Samuels of the U. S. P.H.S. was quoted as saying that fluoride reduces the amount of radioactive strontium absorbed by teeth and bones. Therefore, fluoride provides protection against radioactive fallout, the release claimed. When asked where his research had been published, Dr. Samuels stated on January 8, 1963: "I don't expect to have any significant data until later this year. Newspaper stories of the study have not unexpectedly exaggerated the progress which has been made." On May 10, 1965, Dr. Samuels stated again that he has not, as yet, analyzed strontium uptake.

J. M. Dunning, D.D.S., in the respected *New England Journal of Medicine*, January 7, 1965, which reaches a large segment of the medical profession, referred to "studies" by A. L. Russell, D.D.S., which contradict Dr. Rapaport's observations that the incidence of mongolism is related to the fluoride content of drinking water. When Dr. Russell was asked for details about the research he had carried out on this question, he acknowledged February 3, 1965, that he was merely expressing his opinion and referred to views of other scientists who have done no research on the subject.

I have outlined here but a few of the many glaring inadequacies contained in scientific publications which are constantly cited as the "overwhelming mass of evidence" proving fluoridation absolutely safe:

Lack of proper controls; neglect of the individual; disregard of proven facts and/or omission of important data; acceptance as normal or inevitable that which actually constitutes ill effect from fluoride; lack of objectivity; failure to seek free and open critiques; premature publicity on flimsy, unconfirmed evidence; reliance on views and opinions—these are the fallacies which characterize the current state of fluoride research and constitute serious roadblocks to progress.

When the A.M.A. *Journal's* editor defined "Scientism"

he omitted one of its principal characteristics, namely, the fact that this kind of "Science" is undebatable and incontestible. Proponent scientists and the A.D.A. issue the statement that no controversy exists\* on this obviously controversial issue.

When exponents of fluoridation, university professors, statisticians, biochemists and clinicians consider "the mass of scientific evidence" so "overwhelming" that a subject is no longer debatable, Scientism takes over where Science should reign.

\* Patton, C.H., president of the Amer. Dent. Assoc. in his address at the 91st annual scientific meeting of the California Dental Association, San Francisco (*Examiner* April 17, 1961.) According to the Los Angeles Times of May 11, 1965, Dr. Harold Hillenbrand, Secy. of the American Dental Association, again called fluoridation no longer "scientifically debatable".

## CHAPTER SIXTEEN

### IN COURT

One of the most venerable buildings in Europe is the old courthouse in Dublin, Ireland, called "The Four Courts" (Fig. 32). It is a majestic stone structure built late in the 18th century in Renaissance style. From the far distance its massive central colonnaded dome attracts the visitor's eye. Wings enclose two courtyards which open to the river. Some of the columns show battle scars from the Irish liberation war of 1921 to 1922.

On my return from Bern, Switzerland, I had a conference in this building with four attorneys. They were representing Mrs. Gladys Ryan, Dublin housewife, in a law suit against the Irish Minister of Health and The Attorney General of the Irish Free State.

In 1960, the *Oireachtas*, the Irish national parliament, had passed an Act making the addition of fluoride to all public drinking water supplies mandatory. Mrs. Ryan was challenging the constitutionality of this Act. She retained Mr. Richard Ryan (no relation) as solicitor. Mr. Ryan is a member of the Dublin Corporation (city council) and of the Irish Dail (pronounced Doyle), the lower House of Parliament.

After Dublin Corporation voted against fluoridation, the Minister of Health threatened to abolish the Corporation unless its members complied with the Fluoridation Act. Not wishing to be thrust out of office they voted again, this time 25 to 15 in favor of fluoridation.

## THE FOUR COURTS, DUBLIN

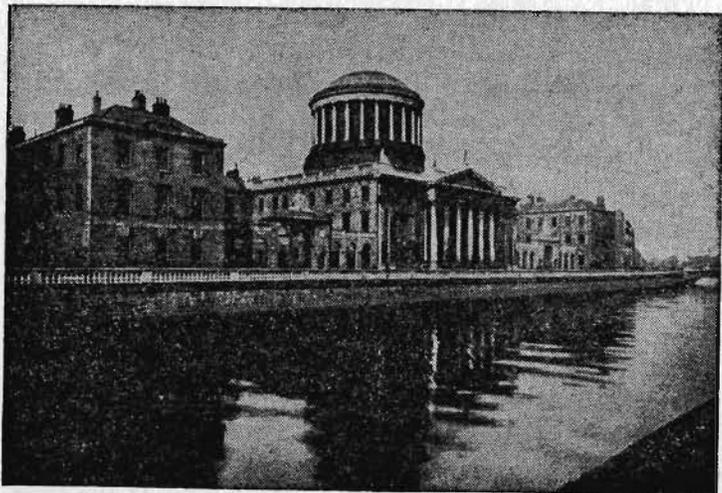


Fig. 32

In Ireland there are two classes of lawyers. The client employs a solicitor who works up the case and rounds up the evidence but does not take part in court proceedings. At the trial the case for plaintiff or defendant is conducted by barristers and senior counsellors. A barrister may, at his option, become a senior counsellor after years of practice and after an examination. In a trial, the barrister is instructed by the solicitors. Barristers and senior counsellors are employed as "free lance" individuals, not as partners or members of a firm.

Mr. Richard Ryan was able to secure the finest legal talent in Ireland to represent the plaintiff, Mrs. Ryan: Mr. Seán (pronounced Shawn) MacBride, S. C., Mr. Tom Connolly, S. C., Mr. McGilligan, S. C. and Mr. Ben O'Quigley, B. L. The defense attorneys were the Attorney General, Mr. O'Keeffe, S. C., assisted by Mr. McGonigal, S. C., Mr. W. D. Finlay, S. C., and Mr. Seán Butler, S. C. They were instructed by the Chief State Solicitor.

The trial was scheduled for March 14, 1963, before the high court with Mr. Justice Kenny, the sole judge. At the outset, it was clear that the decision would be appealed to the supreme court of fifteen members. In our Supreme Court a printed brief is submitted. Only a very short oral presentation and argument is permitted. In Ireland, the entire record of the testimony is read in court and the exhibits examined, after which the case is argued by counsel for each party. This process requires several weeks.

Our Conference took place in the library room of "The Four Courts" building. Senior attorney, Mr. MacBride, presided. At issue was a provision of the Irish constitution which maintains that parents are solely responsible for the health of their children. This is in contrast to the education of a child which is the state's obligation. The five attorneys discussed with me all details of the proposed suit. My function was to advise them whom to invite as expert witnesses and to furnish scientific references which would enable them to become informed on this vast and complicated subject.

I pointed out the difficulties of their undertaking. In U. S. court actions, in Chicago, in Evansville, and in St. Louis, the primary question was always the same: whether or not fluoridation is safe. The same difficulties would probably prevail in Dublin. In the U. S. suits, expert witnesses on the opponent side are hard to come by for the following reasons:

1. The vast preponderance of research on fluoride is sponsored by corporations and the P.H.S. In fact, few American scientists have like myself carried out research independent of such sponsors.

2. Those who have produced research with results unfavorable to fluoridation, hesitate to appear as witnesses because of threat of reprisals, especially if they are connected with a university. It would have been impossible to get such American scientists with research experience as

H. V. and M. C. Smith, F. deEds, V. O. Hurme and Alfred Taylor on the witness stand. Some of them had already been subjected to disparagement. They could scarcely be expected to further jeopardize their position which in the last analysis depended upon grants from the Department of Health, Education, and Welfare. This dearth of opponent scientific testimony was the major reason for the unfavorable decisions in U. S. courts.

3. In our own country very little money was available to opponents for a court action. I myself had defrayed my personal traveling expenses whenever I appeared in court since no funds were forthcoming for this purpose. At no time did I ever receive any remuneration for my testimony. Conversely the proponents could muster numerous scientists to give expert testimony. Almost unlimited corporation money and federal funds were available to them.

4. Moreover P.H.S. officials have means of showing their appreciation other than through financial remuneration. The P.H.S. is the most powerful medical agency in the world in terms of scientific talent and political know-how. Its officials can make or break a scientist. After all, any law suit on fluoridation, whether in the United States or elsewhere in the world, is directed against the U.S.P.H.S., which sponsored fluoridation prematurely before research had been carried out to prove its safety.

5. In all U. S. trials, proponent witnesses could remain on hand as long as they were needed, continuously advising their attorneys on scientific questions pertaining to the suit. This is a part of their P.H.S. duty, a function of their employment. Opponents, on the other hand, must earn their livelihood otherwise. They can ill afford to remain at a trial longer than a few days at the most.

In my own case, as a practicing physician, whenever I gave testimony, my obligations to my patients required my prompt return to work. In Evansville, Chicago and St. Louis, after my departure proponents brought in witnesses to

counter my testimony. Scientists representing opponents were not available to assist attorneys in refuting proponent claims and in cross-examinations.

6. In some of the U. S. suits, proponent newspapers may have exerted an influence on the judge. For instance, after the St. Louis county case had been decided against fluoridation by the lower court, the local newspapers\* clamored for a reversal of the Circuit Court decision.

All these drawbacks respecting the plaintiff's case were discussed with the attorneys at the Four Courts meeting. I also alerted them to two publications expressly designed to counter valid criticism of fluoridation namely, the comprehensive Kettering Laboratory catalog of the world's medical literature on fluoride<sup>116</sup> with annotations and comments to assist proponents in law suits and the University of Michigan's *Classification and Appraisal of Objections to Fluoridation*, designed to counter any and all objections to fluoridation.

Court procedures in Ireland differ from those in the U.S.A. There is no rebuttal testimony. Evidence to discredit a witness or his testimony must be admitted during cross-examination. Arguing with a witness is encouraged rather than forbidden.

Having just attended the Bern conference, I was acquainted with a number of outstanding scientists opposed to fluoridation. The attorneys reviewed with me the qualifications of those who might be asked to appear as witnesses. Unfortunately, several professors whom I suggested could not leave their university at the appointed time even for a few days. To others, funds for traveling expenses were not available.

Eventually, the following testified concerning their research: Dr. T. Anton Gordonoff, Professor of Toxicology and Pharmacology, Bern University; Prof. Andrea Benagi-

\* St. Louis Post Dispatch 7/7/60 and St. Louis Globe-Democrat 7/7/60.

ano, one of Italy's most outstanding dentists, Director of the Eastman Dental Research Institute, University of Rome; Prof. Sergio Fiorentini, a leader of dental research at the same institute; Dr. Fauzi Rozeik, Assistant Professor, at the dental school of the University of Mainz, Germany; Prof. Douw Steyn, head of the Dept. of Pharmacology and Toxicology, University of Pretoria, South Africa; Dr. H. McDonald Sinclair, an outstanding nutritionist and Fellow of Magdalen College, Oxford University; Charles Curry, Senior Dental Surgeon, Middlefield Hospital, Knowle; Chas. Dillon, D.D.S., Inverness-Shire, Scotland, a dentist who had resided in Fort William, a fluoride-contaminated area. For years he had been studying fluoride's effect on teeth.

The calibre of these scientists differed appreciably from that of the witnesses in most U.S.A. court hearings on fluoridation who are usually lay persons.

On May 5, 1963, I returned to Dublin to testify. I was met by my host, Mr. Richard Ryan, accompanied by Prof. Douw Steyn of South Africa, who had just completed his testimony. Mr. Ryan, a hard working, level-headed, clear-thinking gentleman in his early thirties, impressed me as being destined to go far in his career.

The traffic in Dublin like in other European cities was bound to frighten an American. There were numerous bicycles, horse-drawn vehicles and trucks. Cars were double parked on the narrow streets. No one seemed to be inhibited by speed limits — and all this happened on the "wrong side" of the street.

Nevertheless, during my entire visit, I didn't see a single wrecked car in Dublin. The heavy traffic is taking much less of a toll there than in Detroit.

The city itself is clean. Most of its streets are wide and attractive. Some of the buildings are a thousand or more years old, others are modern structures of recent vintage. There are no skyscrapers.

Only a few dwellings in the city have thatched roofs.

Old time thatchers are dying off like the skilled stone masons in our country. All other roofs are made of tile; none of wooden shingles. Most of the buildings are constructed of brick or stone. Many houses are built wall-to-wall covering entire blocks. In the outlying districts there are many villas with beautifully kept gardens. Fruit trees and ornamental shrubs were at the height of their bloom.

The city was in the midst of a bus strike. At the close of school hours, hundreds of children were begging for rides home. The Irish Army had come to the rescue with a fleet of trucks in which people were packed like sardines.

In the evening, Mr. Ryan, Prof. Steyn and two other attorneys visited Mr. Séan MacBride at his Roebuck Place home. From this venerable old landmark, Mr. MacBride's father had directed revolutionary activities against the British, which finally led to Irish independence and to his death. The elder MacBride was apprehended by the British and executed by a firing squad. His wife, Maude, carried on in her husband's stead, playing a major part in Ireland's liberation.

Mr. Sean MacBride is a brilliant attorney, one of Ireland's best. Astute and clearheaded, he has his feet on the ground. Like his parents, he is a lover of freedom and a friend of the people. By working late into night he had already acquired a remarkable knowledge of the subject. Later I learned that until a few years ago he had been Ireland's foreign minister. With a man of his caliber holding this position I felt that the affairs of the Irish Republic could not have been better served.

We discussed some of the questions liable to come up during tomorrow's testimony. Just previously in Detroit I had made a deposition regarding my experience with fluoridation in the suit of the New Haven Water Company versus the city of New Haven. The plaintiff's attorney had offered me some sound advice on how to conduct myself in court: Don't say any more than is asked of you; reply briefly, a

very difficult assignment at times.

I was prepared to confine my testimony largely to the numerous cases of poisoning from drinking fluoridated water, which I had personally encountered, one following another. Mr. MacBride considered this inadvisable. It would have invoked a lengthy and unpleasant cross-examination on each case. The defense would have tried to find loopholes in my presentation to fatigue and embarrass me whenever possible.

Mr. MacBride had warned me not to speak of my "office." "In Ireland offices are commercial institutions," he said. Physicians in Ireland practice medicine in clinics. I was reminded of the days shortly after I had immigrated into the United States in 1923. Some members of my noble profession shocked me by their greeting in the hospital cloak rooms: "How is business today?"

I anticipated that the same U.S.P.H.S. representatives from Washington, D. C., who had appeared in St. Louis, Chicago and Evansville, would cross-examine me in Dublin through the intermediary of different attorneys. I, therefore, presented to Mr. MacBride all questions which had been asked of me during former trials in cross-examination, as well as my proposed answers. As it turned out, my suspicions were justified. Indeed, several U.S.P.H.S. scientists, including Dr. N. C. Leone of Bethesda, Md., supported by British dental health officials, and Prof. Ingve Ericsson of Stockholm, had already been at hand. They had been sitting behind the defense attorneys advising them constantly, handing them written suggestions on slips of paper regarding examination of plaintiff witnesses. This, I feared, was an ominous sign. No matter how thoroughly informed the plaintiff's attorneys were on the subject, they could not acquire enough knowledge to match the constant onslaught of statements, most of which originated with the P.H.S. in Washington, D. C., and the A.D.A. in Chicago. The plaintiff, on the other hand, had no funds avail-

able to hire a battery of scientists to be present throughout the hearing.

I later learned that the plaintiff's witnesses had done well.

Prof. T. Gordonoff had presented his research showing that fluoride interferes with the proper functioning of the thyroid gland, a subject on which he had carried out animal experiments and other careful studies. Prof. A. Benagiano had reported his extensive studies on fluoride's effect on the thyroid as well as on teeth, both on animals and on humans residing in a volcanic area north of Rome. The defense attorney attempted to eliminate his testimony by arguing that not he but his collaborators at his clinic had carried out the research. This impelled him to send for Prof. Sergio Fiorentini. The latter appeared a few days later and demonstrated that animals developed periodontal (gum) disease from fluoride at concentrations in drinking water slightly higher than 1 part per million.

In 1947, Prof. Fiorentini, a physician as well as a dentist, had examined 687 persons representing all ages in Campagnano, north of Rome, where water contains about 2.1 ppm fluoride. In age groups six to ten years, 44 per cent had normal gums; in the group between eleven to fifteen years, only 6.9 per cent; between ages sixteen to twenty, 4.9 per cent; after age forty-one, none of the persons examined had normal gums.

Another witness, Prof. Douw G. Steyn of the University of Pretoria, Union of South Africa, at his government's request had investigated in 1938 an unusual bone disease widely prevalent in the northwestern Cape Province. He demonstrated that it was due to fluoride in drinking water. He followed up his research with experimental work on sheep, cattle and rats.

At first he added a large dose, namely 0.7 gm of fluoride as calcium fluoride, to the daily basal ration of a group of heifers. The teeth of those which had received fluoride for

fifteen to eighteen months were soft, stained, almost worn down to the gums.

In 1942 he observed diarrhea, kidney and bladder stones in a group of 30 young sheep kept on artificially fluoridated water. Water which naturally contained fluoride proved to be less harmful.

From 1949 to 1950, he studied individuals in an endemic goitre area. The water was not deficient in iodine, the usual cause of goitre.<sup>2560</sup>

To determine whether or not fluoride was responsible for goitre, Prof. Steyn administered fluoride and iodide to nine groups of twenty rats each. Groups A, B and C were given only fluoride, 0.3, 5 and 15 ppm, respectively, in water; groups D and E only iodide, 0.25 and 1 ppm. Groups F to I received water containing both iodide and fluoride, as indicated in Table 18. When the rats were sacrificed after twelve months, the thyroid gland had increased in size by one-third in 20 per cent of groups B, F and H which had received 5 ppm of fluoride. Rats in groups C, G and I which had received 15 ppm, the largest fluoride supplement, had thyroid glands two to three times their normal size.

Thus, Professor Steyn clearly confirmed what others, es-

Table 18

PROF. DOUW STEYN'S EXPERIMENTS IN NINE GROUPS OF RATS  
Receiving iodide and fluoride supplements  
in their daily ration.

Group	Iodide PPM	Fluoride PPM
A	—	0.3
B	—	5.
C	—	15.
D	0.25	—
E	1.	—
F	0.25	5.
G	0.25	15.
H	1.	5.
I	1.	15.

After 12 months: 20% in groups B, F and H showed an increase of the thyroid gland by 1/3. In Groups C, G and I the glands were 2 to 3 times normal size.

pecially Dr. Goldemberg of Argentina, had observed many years previously: fluoride interferes with the normal metabolism of iodide and the function of the thyroid gland.

Charles Curry, L.D.S., R.C.S., senior dental surgeon of Middlefield Hospital, Knowle, another witness for the plaintiff, had become interested in the fluoride problem when he was studying teeth of mongoloid babies. They were relatively free of tooth decay, yet from twenty-five to fifty per cent of their tooth's surfaces were mottled. Dr. Curry apparently had no knowledge of Dr. Rapaport's research that showed a higher incidence of mongoloid births in natural fluoride areas compared to areas with little or no fluoride in water.

The witness who had testified just before my arrival was Professor H. M. Sinclair, of Magdalen College, Oxford, England, an outstanding student of nutrition, especially in its relation to heart disease. His surveys on decay-free teeth of Eskimos and Canadian Indians showed that the presence or absence of fluoride in food or water had very little bearing on tooth decay. Sugars and sugar products, he assured the court, were mainly responsible for tooth decay. This phase of the caries problem, he urged, should be given foremost attention.

The next morning court started at 11:00 o'clock. In a large center hall of the beautiful "Four Courts" building adorned with heavy columns, small groups of bewigged and begowned attorneys were conferring with their clients, a picturesque sight. Even the clerks wore wigs and gowns.

Court procedure was most impressive. Instead of calling the judge "your honor," one addressed him as "your lordship" or "my lord." Anyone entering the courtroom or approaching the judge must bow his head like a vassal in the Middle Ages.

The defense had apparently not been told of my appearance. It seemed to come to them as a surprise.

Two extra stenographers, employees of the Ministry of

Health, were taking notes. This made it possible for the Irish Health Ministry to obtain a transcript of the day's hearing the same evening and prepare for cross-examination the following day while the witness was still on the stand. It also facilitated daily consultation by trans-Atlantic phone with the U. S. Public Health Service, which had a major stake in this hearing.

The defense attorney had successfully persuaded the court that scientific data from the literature could be quoted only if the witness could qualify as an expert on the particular phase of the subject on which he wanted to quote the literature. Thus I was permitted to quote data of others only if they pertained to fluoride poisoning.

The defense objected to admission of laboratory data on my patients on the grounds that I did not personally carry out the laboratory tests. This would have caused my whole testimony to collapse. However, Judge Kenny ruled in favor of admitting my laboratory findings.

Curiously enough, the same objection was made in Chicago where I testified in the court case of Schuringa et al. versus The City of Chicago. There, the Master in Chancery, Mr. Mayer Goldberg, allowed the objection to stand. Physicians rarely do their own laboratory work. Nevertheless, it is customarily admitted as evidence in court. Had I carried out my own fluoride determinations, the defense undoubtedly would have objected to their admission as evidence on the grounds—and rightly so—that I was not qualified by training to carry out such complicated laboratory procedures.

My testimony dealt largely with the poisoning which I had observed from drinking fluoridated water. At first I briefly reviewed some of the data on fluoride and its toxicity. Fortunately I had just completed my second monograph on "Acute Fluoride Intoxication" which subsequently appeared in *Acta Medica Scandinavica*, June, 1963, as a supplement.

I demonstrated that consumption of fluoride is impossible to control because unpredictable quantities are present in food, air and drugs. I showed that a person may become seriously poisoned by fluoride from minute amounts present in toothpaste and in tea even when drinking water is not fluoridated.

The fluoride analyses of soft tissues which I had carried out demonstrated that fluoride is stored not solely in bones and teeth but, under certain thus far unknown conditions, in soft tissues as well, especially in the aorta. I concluded with a detailed description of one of my cases of poisoning from fluoridated water. I explained why a single drug such as fluoride can produce a wide variety of symptoms: since fluoride is carried by the blood to all organs of the body, its action is not unlike that of other poisons taken into the system in minute amounts over long periods of time.

The cross-examination was remarkably similar to that which had taken place at previous court hearings in the U.S.A. Indeed, all questions which I had anticipated in advance were asked by the defense.

Everything went smoothly at the outset. In order to upset my equanimity, Mr. Butler, the defense attorney, inquired why as a respected physician I had taken no legal steps to counter the disparaging statements disseminated by Mr. Robert McNeil in his book on fluoridation.<sup>128</sup>

I had not even read the item in question. However, had I read Mr. McNeil's book, it would not have disturbed me. I believed that my reputation in the community among my colleagues and my patients was so firmly established that unwarranted abuse would be of no consequence.

However, I told the court that I decided to take action when efforts to disparage and discredit me persisted. For Mr. Butler's information I produced a photocopy of the retraction which had appeared in the London *Times*, November 24, 1961, after I had successfully sued a British health official and the Royal Society for the Promotion of

Health for asserting that I opposed fluoridation for monetary gain. In this suit I merely asked for and obtained a public apology and retraction.

The defense attorney then quoted passages from the Report of the New Zealand Commission, the Ontario Fluoridation Investigating Committee and the AMA Report claiming that these fine bodies of scientists did not accept my data as valid.

"The New Zealand Committee," I explained, "consisted of three lay persons, a judge, a merchant and a biochemist. Not one of them was a scientist in a position to evaluate medical data on his own. They had to be briefed by advisers, the so-called "authorities" who were known promoters of fluoridation."

I presented the details of how the A.M.A. came to endorse fluoridation as described in Chapter XIII.

The heckling continued. The defense attorneys attempted to upset my testimony by reproaching me for permitting my wife to publish a newspaper as though the work of editing this informative paper had been a mortal crime. They then attempted to counter my reports of poisoning.

"Weren't Mrs. J's symptoms psychosomatic?" Mr. Butler queried. I pointed to the double blind test which incontrovertibly rules out the possibility that the disease is imaginary. Besides, I responded, doesn't clinical experience with more than 24,000 patients qualify me to recognize what is and what is not psychosomatic? Could such clear-cut organic findings as retinitis and objective neurological manifestations be due to psychosomatic causes? I asked.

"Did you inquire into her full history? What happened to her relatives, her father and mother, aunts and cousins?" Mr. Butler asked. This question previously posed at the A.M.A. Hearing in August, 1957, was an obvious attempt to prove to the court that I had neglected to thoroughly study all ramifications of this case and that my examination was superficial.

I had carefully delved into every phase of this patient's case, I replied, but had not considered it necessary to record irrelevant details.

"How could such a chronic disease as you described clear up within a few days?"

Of course it does not clear up altogether within such a brief time. The gastrointestinal symptoms and headaches disappear first, the arthritic changes in the spine and pelvic bones usually persist for several weeks. There is no definite pattern with respect to onset and improvement. No two persons react alike. In some, the disease clears up more promptly than in others.

"How did it happen that the *Journal of the American Medical Association*, the *Annals of Internal Medicine*, the *Journal of Gerontology*, and *Annals of Allergy* turned down your articles on fluoride poisoning?" Mr. Butler asked.

The enumeration of every single journal that had ever rejected an article of mine could have become the basis of exposing a genuine scandal had I been aware of it at the time: Mr. Butler's question betrayed the fact that P.H.S. officials, in their capacity as editorial consultants to the above-mentioned journals, must have advised the editors of each of these journals to turn down my articles, a fact which I had suspected but had, heretofore, been unable to prove. In no other way could Mr. Butler have learned that these four particular journals and no others had rejected my articles. It is not customary for editors to discuss with anyone on the outside which articles they have turned down and which they have accepted for publication.

As though he himself had grasped the significance of his own question and was desirous to divert my attention, Mr. Butler suddenly burst forth:

"So you believe that there is a conspiracy behind the fluoridation movement?"

I had been asked this loaded question in a previous

court session. Had I said "Yes," the next day the Irish newspapers would have headlined: "U. S. Expert Believes That Fluoridation Is a Conspiracy But Fails To Prove It!"

This time, however, the question had real significance coming, as it did, immediately after the previous one. Actually, somehow, there must have been collective action to keep my articles out of American medical journals. How would the Attorney General of Ireland, otherwise, have learned the name of every medical journal which had rejected an article of mine?

I was reminded of the law suit, *Martin vs. Reynolds Metals Company*, wherein the attorneys of seven corporations which were not involved in the suit joined Fred Yerke of Portland, Reynolds' attorney, in his unsuccessful attempt to obtain a reversal of the judgment against Reynolds.\*

It also recalled reports in metropolitan newspapers indicating price fixing by corporations which supply fluoride to communities for fluoridation (Table 19, page 336).

As though embarrassed by his own question and anxious to change the subject in a hurry Mr. Butler, the defense attorney, suddenly asked:

"Do you feel that you are being persecuted?"

I was about to break out in laughter when I quickly recalled the dignity of the court, the attorneys' wigs and gowns, the bowing before His Lordship. I caught myself in time and dismissed the question as ridiculous.

After my departure, Dr. Charles Dillon of Fort William, Scotland, presented his observations on mottled teeth from the fluoride contaminated area where he had practiced dentistry for many years and where he has carried out research on the adverse effect of airborne fluoride from Scottish factories upon tooth structures in both children and adults.

Subsequently the Government called an even longer list

\* The *Oregonian* Portland, Ore. 10/15/57.

of expert witnesses, mainly from the U. S. A., including an Assistant Surgeon General and four other members of the P.H.S. They related at length the technical details of various experiments on rats or human beings, from which they drew the conclusion that fluoridation was effective against caries and completely harmless for everyone. Most defense witnesses admitted to active personal involvement in promoting fluoridation. They also made full use of the opportunity afforded to the defense to attack the evidence of the plaintiff's witnesses, and to belittle them as scientists. Only one (Prof. Fiorentini) was allowed to return to Court to rebut the charges made against him, which he did in spirited fashion. Not being conversant with the English language, he had the disadvantage of having to speak through an interpreter.

An important Government witness was Dr. John Fremelin, lecturer in physics at Birmingham University. He claimed that from 80 to 98 per cent of the fluoride in fluoridated water could be removed by running it through carbonized crushed bones. His conclusions were based upon experience with only 60 liters of water. This rather flimsy evidence was greatly overrated by the defense to support their contention that there would be no compulsion upon the plaintiff or her family to consume the added fluoride. They could buy crushed bones and a kettle.

In his concluding address Mr. MacBride, the leading counsel for the plaintiff, argued that rights guaranteed by the Constitution could not be less than private rights. A man who pollutes his neighbor's water or air is liable to be restrained from doing so. It is no answer for the wrongdoer to say "no wrong will be done to you if you fit and use a gadget at your own expense which will purify the water or air."

Neither the judge nor Counsel on either side had any training in medicine, dentistry, biology, chemistry, statistics or any of the technicalities with which the evidence was

concerned. Even the simplest scientific terms had to be spelled out and explained in simple language to the Court.

After about sixty days of near-interminable lecturing by the witnesses, amounting to some two million words of transcripts, with the Court literally surrounded by heaps of scientific and medical literature, the case came to an end. Mr. Justice Kenny rejected the plea that either the bodily integrity or the parental or personal rights of the plaintiff or her family had been in any way violated by the Act. He held that fluoridation involved no risk. In any case, he claimed, the plaintiff was not obliged to drink the water and could "by the expenditure of a few pounds, remove almost all the fluoride from the water."

The court left open the question, whether or not it is right to oblige a citizen, who is already paying taxes for drinking water, to go to the extra expense and trouble of buying bones to filter his water. Nor did the court anticipate that particles of the fluoride-containing bone precipitate could accidentally reach the drinking water and, when swallowed, cause sudden poisoning.

This important decision concerning the constitutional rights of the Irish citizen in the matter of his children's health depended entirely upon the expert evidence, and upon the ruling of one man, learned in the law but not in science. Yet, the decision hinged upon scientific, not legal, evidence. The judge decided that one set of experts was totally right, even to the point of proving a negative, i.e., that fluoridation carries no possibility of harm to any member of a large population and that the other set of experts, equally eminent and well-qualified, was totally mistaken and incorrect to the point of failing to establish even a possibility of harm. He failed to take into account that medicine is not an absolute science like mathematics or physics.

Indeed, Justice Kenny's decision contrasts with that of Sweden's Supreme Administrative Court. In December, 1961, it unanimously agreed that "the possibility cannot

be precluded that fluoridation will involve certain risks or disadvantages to the health of those who are constrained to make use of this water."

Decisions based upon the Court's understanding of the evidence and the Court's impression of the expert witnesses are in accord with the operation of the Law; they are not in accord with the operation of Science. Yet health officials and dentists quote this part of the Irish judgment, as they have quoted the "findings" of various Commissions and endorsing agencies, as though they constituted scientific authority. In science, however, facts are established by observation and experiment, not by advocacy or by voting.<sup>177a</sup>

In contrast to court sessions on fluoridation in the United States, the plaintiff's case in Dublin was prepared by some of Ireland's most outstanding attorneys. Expert testimony for the plaintiff was presented by competent scientists, in contrast to what had happened in some of the U.S.A. law suits. Why then did Dublin's Mr. Justice Kenny rule against the plaintiff?

His decision can be explained on the following basis: The defendant's attorneys were continuously guided by two or three seasoned proponent scientists, who were familiar with every phase of the fluoridation campaign. Throughout the trial they were advising their attorneys how to rebut evidence submitted by the plaintiff. No such assistance was available to Mrs. Ryan's attorneys.

Furthermore, the Attorney General's legal staff with two stenographers constantly at work had access to the full daily transcript of the hearing. Thus, they could confer day by day with Washington, D. C., public health officials and their public relations advisers about whatever difficulties had arisen on this involved subject. U.S.P.H.S. public relations counsellors could make allegations based on the highly controversial literature at their disposal, weaknesses of which are difficult to pinpoint without extensive and painstaking studies. To obtain the documents necessary

for refuting such claims immediately was impossible for Mrs. Ryan's attorneys.

There was, however, a more significant reason for the collapse of the plaintiff's case. No matter how well qualified her witnesses and how learned their testimony, no matter how impressive their animal experiments, I was the only witness who could report about actual observations of humans poisoned from drinking artificially fluoridated water. On this pivotal point that water fluoridated at 1 ppm can and has poisoned people, the one and only fact which would unequivocally defeat fluoridation, I stood alone against the numerous voices assuring the court that fluoridated water was absolutely safe for humans and that my data were unreliable. Other physicians who have observed ill-effect from fluoridated water (see pp. 105, 207) were not available to testify.

During the course of the trial, damage was reported from fluoride naturally in water at concentrations only slightly higher than 1 ppm. That the same damage is bound to occur at 1 ppm in susceptible individuals is a foregone conclusion to every physician with clinical experience but is not readily understood by a lay person, not even by a learned judge.

It was impossible to bring to the surface during the trial the inner workings of this *Struggle With Titans*, namely, how valid research is being prevented from reaching the medical profession; how proponents create an unfavorable image of opponent scientists; how industry, using vast research grants, originated the fluoridation idea and influenced the thinking of the scientific community. Since not any of these facts were presented to Justice Kenny's court, his decision is understandable.

## CHAPTER SEVENTEEN

### NEW HORIZONS

In June, 1931, at Philadelphia, I presented research to the Association for the Study of Allergy, the forerunner of the present Academy of Allergy, in support of the current theory that fatal anaphylactic shock can occur in humans. At the time anaphylaxis was generally looked upon as an experimental curiosity confined to animals. A person can be so sensitive to an otherwise harmless agent, that he can die suddenly from it. Cases of anaphylactic shock and death, gathered from hospitals and from other physicians, were reported by me in several issues of the *A.M.A. Journal*, from 1933 to 1935. This disease occurred following injections of pollen,<sup>257</sup> serums and from eating certain food substances.<sup>258</sup> I pinpointed for the first time cases of human anaphylactic shock from ether and from a novocain (local anesthetic) injection.<sup>258</sup>

When I linked this condition, now called "crib deaths," with—of all things—the thymus gland, a fierce debate developed among my allergist friends.

This gland in the neck behind the breast bone had been subject to so much controversy that no one dared mention the gland lest he be ridiculed. In studying autopsies of children who died suddenly without apparent cause at various hospitals, I observed an enlarged thymus gland. There was a simultaneous enlargement of other lymphoid glands which belong to the same system as the thymus. In nearly all patients the adrenal glands were unusually small, in some they were paper thin.

On the basis of the facts gleaned from my clinical studies, I propounded a theory: Human anaphylaxis is linked with a lack of adrenal substance which in turn leads to enlargement of the thymus gland and of other lymphoid tissue. The autopsy findings of anaphylaxis differ greatly from asthma. Nevertheless, the anaphylactic state represents the earliest indication of an asthmatic condition, during which the child has not yet acquired the necessary protective antibodies to enable him to cope with, and eliminate, the harmful agents to which he so violently reacts.

Now, more than thirty years later, this theory is being resurrected. We now know that insufficient production of cortisone by the crippled adrenal gland leads to enlargement of the thymus and of other lymphoid glands. It is also associated with a heightened susceptibility to severe reactions.

The reticence of my colleagues at that meeting to accept and follow up the data which I then presented, based on careful autopsy studies and clinical observations, gave me an insight regarding the medical profession's reluctance to accept new ideas.

However, the opposition then encountered cannot be compared with the abuse and disparagement to which I have been subjected because of my research on fluoride, not only from lay persons with no knowledge of medicine, but from members of the dental and medical profession as well.

In the early days of allergy, only a few would believe that an otherwise harmless, non-protein substance such as an aspirin tablet, could be responsible for death. Similarly, today some of the country's most outstanding scientists are reluctant to believe that fluoride can be harmful in small amounts. They cannot conceive that "The Experts" upon whom they rely might be in error.

Had the officials of the American Dental Association and the P.H.S. known the full story about fluoride and its ef-

fect on humans at the time that Dr. Cox originated the fluoridation idea, they would not have initiated this unending campaign. Now that they have committed themselves, it is difficult for them to retreat.

Who is winning the "Struggle with Titans?" How will it end? Will it be decided next year, in ten years, or in 100 years?

Today many still accept the unproven promotional dictum widely disseminated by Dr. F. J. Stare that fluoride is a nutrient essential for health. Parents of young children are grasping for what they assume to be an easy panacea: 65 per cent reduction of tooth decay from drinking fluoridated water. The P.H.S. has assured the public that there cannot be any harm unless one daily drinks bathtubsful of fluoridated water.

Constant repetition of the standard phrase "there has not been a single proven case of harm since controlled fluoridation started in 1945"\* has had a profound impact upon the American public.

In Detroit, Judge George Bowles failed to examine the evidence on both sides on the premise that the safety of fluoridation has been established.\*\* Before the case was assigned to his court he had publicly advocated\*\*\* fluoridation on the basis of one-sided information obtained from the University of Michigan.

A Kalamazoo physician who has promoted fluoridation in Michigan and in the U.S.A. has received the Wayne State University's "Distinguished Service Award" for his "concern about fluoridation." Curiously his sole research on the subject sponsored by a drug company actually indicated that young children drink very little water. Therefore, they

\* *Post and Times Star*, Cincinnati, Ohio, 12/25/64.

\*\* *Detroit News* 7/24/63.

\*\*\* Governor's Study Comm. on Prepaid Hospital and Medical Care Plans, July, 1962, Wayne County Circuit Judge George E. Bowles, Chairman.

do not receive enough fluoride through drinking water to warrant fluoridation.

Mr. Justice Kenny, in Ireland, decided that fluoridation does not interfere with the parents' constitutional right to make decisions on such personal, individual matters as their own children's health.

In the U.S.A., fluoridation has been instituted in many large cities. In little Ireland, fluoridation is now compulsory throughout the country. In several of Holland's largest cities, fluoride is being added to water supplies. The outcome of the battles in Great Britain, New Zealand, Switzerland and Australia hangs in the balance. Italy, France, West Germany,\* Denmark, Norway and Sweden are thus far holding the fort.

On the *political* front, in the *Struggle with Titans*, the battle lines are yielding to the unremitting waves of promotional releases. Not so on the *scientific* front:

Dr. Armstrong has reversed his early claim that sound teeth contain more fluoride than decayed teeth.<sup>114b</sup>

Endemic dental fluorosis has been recorded in Israel from drinking water naturally containing as little as 0.35 to 0.95 ppm fluoride. The authors of this survey, K. A. Rosenzweig, D.M.D., and I. Abkewitz, D.M.D.,<sup>250</sup> concluded that the widespread mottling caused by the fluoride was too high a price to pay for the slight reduction in tooth decay in that area. In Bindapur, India, where fluoride in water naturally ranges from 0.5 to 2.18 ppm, Dr. D. Anand and co-workers<sup>245</sup> reported a substantial incidence of dental decay associated with mottled teeth. This contradicts the widespread belief that mottled teeth do not decay.

Prof. Singh's research is now appearing in U. S. medical journals. My monograph, *Fluoride in Clinical Medicine*,<sup>34</sup> has received a favorable reception in Europe. Prof. Fradá is exploring fluoride's relationship to hardening of arteries.

\* In West Germany only half of one city (Kassel) is fluoridated.

In the *British Journal of Radiology*<sup>171</sup> of July, 1963, page 497, Drs. Kumar and Kemp Harper reported new evidence of calcified arteries in young persons with skeletal fluorosis from relatively low concentrations — less than 6ppm of sodium fluoride or 2.7 ppm of fluoride — in water naturally.

Through the courtesy of two Iowa physicians I have had an opportunity to study the organs of a newborn baby who expired a few hours after birth with extensive calcium deposits in the aorta, heart and other organs.<sup>260</sup> Fluoride levels in the aorta were as high as 59.32 ppm. This finding casts doubt upon the theory propagated eagerly by some, that nature protects the unborn child from fluoride damage by preventing excess fluoride from entering its system.

In a Czechoslovakian medical journal, Dr. G. Kauzal<sup>261</sup> has observed hemorrhages in the duodenum (upper bowel) of five newborn infants whose mothers had been working in an industry where they were exposed to air contaminated by fluoride. The ulcers were of the kind experimentally produced by large doses of fluoride.

Dr. F. J. Stare's persistent recommendation of fluoride for osteoporosis is backfiring. At least one case of permanent blindness (macular retinitis) of one eye has been attributed to this treatment by Drs. Geall and Beilin<sup>262</sup> of London, England. I have encountered the early stage of this eye disease in three patients poisoned by fluoridated water. Others<sup>263</sup> have noted spinal arthritis and stomach disorders due to this treatment as well as increased joint pains.<sup>190</sup>

J. R. Marier and associates, scientists of the Canadian National Research Council, in the AMA's *Archives of Environmental Health*<sup>264</sup> and Dyson Rose and Marier in *Chemistry in Canada*<sup>264a</sup> have further pinpointed factors which are inconsonant with fluoridation. A U. S. medical journal, *Annals of Internal Medicine*, has reported cases of

skeletal fluorosis in Arabia from fluoride which naturally occurs in drinking water at the unusually low range of 0.8 to 3.45 ppm.<sup>98</sup>

Most significantly, Dr. Muhler himself, a staunch promoter of fluoridation, has shown that fluoride accumulates in soft tissues where it can produce calcium deposits under certain conditions.<sup>150</sup>

More telling than the most elaborate statistics and animal experiments is a statement by Dr. A. L. Russell of the U. S. National Institute of Dental Research, Bethesda, Md., made at the meeting of the American Association for the Advancement of Science, Montreal, December 26, 1964. He referred to the deplorable condition of teeth in Baltimore which he considers "reasonably representative of the U.S.A. as a whole." The decay rate among white people in Baltimore is about 60 per cent worse than that of Ethiopians who, he stated, have "the fewest decayed molars and other teeth (of any group reported)." After twelve years of fluoridation in Baltimore, one would expect that the proverbial 60 to 65 per cent improvement in the decay rate should somehow be perceptible.\*

During the past two years I have encountered additional cases of chronic poisoning from fluoridated water. Some patients have been hospitalized for thorough investigation whereas in others I had no opportunity to carry out extensive studies. In all cases the disease has been cured without treatment other than the elimination of fluoridated water. Since I am not practicing in a fluoridated city it is difficult for me to assess the incidence of the disease. It is likely to vary from one city to another because water supplies vary in their content of calcium, phosphorus and other protective minerals. The appalling lack of knowledge concerning the manifestations of this disease among physicians and the unrelenting propaganda claiming fluoridation is absolutely safe account for the fact that fluoride poisoning continues

\* Tampa Times Dec. 26, 1964.

to be generally unrecognized throughout the country.

From the foregoing it appears that the pieces of the fluoridation puzzle are falling into place. They reveal a gigantic picture of the fluoridation struggle. The following are some of the pieces:

Scientists at U. S. universities whose research has established evidence unfavorable to fluoridation issue statements that their work is being misinterpreted or that they, themselves, are of an opinion diametrically opposite to the facts which their research disclosed (pp. 122, 304).

A scientist at a New York state institution, Dr. J. A. Forst, was obliged through intervention of a P.H.S. official, Dr. D. B. A., to declare his own research invalid, as disclosed at a New York State Legislative Hearing in Albany on February 29, 1956.

Several important P.H.S. studies which turned out to be unfavorable to fluoridation were not published in official health journals (pp. 242, 243).

The P.H.S. has initiated many scientific studies on air contamination, yet fluoride, one of the most poisonous air contaminants, is rarely if ever mentioned.

Whereas millions are drinking fluoridated water, there is scarcely a hospital in the U. S. A. whose laboratories are equipped to perform fluoride analyses.

On several occasions, scientists who proved fluoridation harmful<sup>205,206</sup> were provided with research grants and P.H.S. advisers for the purpose of setting up new research designed expressly to arrive at conclusions opposite to their original findings (p. 237).

P.H.S. officials, acting as consultants, have advised editors of leading U. S. medical journals to refrain from publishing scientific findings of unquestionable validity and of utmost importance to the nation's health merely because they did not conform to fluoridation promotion (pp. 163, 322).

Free discussions, which are customary in medical socie-

ties regarding other new measures, have been repeatedly barred on the subject of fluoridation (pp. 24, 255).

Scientists who have carried out valid research unfavorable to fluoridation have been harassed to such an extent that they have decided to discontinue their research on fluoride (pp. 235, 242, 249).

An international conference on fluoride of outstanding scientists, underwritten by the Italian government to convene at the Dental School of the University of Rome, September, 1961, was abruptly cancelled within a few weeks before it was to take place (page 276).

After the same group of scientists had conferred in Bern, Switzerland, Oct. 21 to 23, 1962, publication of the transactions already in print containing research on fluoride otherwise difficult of access was suddenly abandoned by the original publisher (page 284).

When the Science Editor of a nationally circulated magazine was attempting to explore all aspects of the fluoridation question he was designated "an anachronism who should be removed from his editorial chair."\*

According to the *Journal of the North Carolina Dental Society* of August, 1955, Vol. 38, page 144, dentists R. P. and D.H.E. of Greensboro, N. C., were temporarily suspended from membership in the society because they openly opposed fluoridation. According to the *Boston Daily Record* Sept. 28, 1961, Dr. Max Ginns was "dropped" from the Massachusetts Dental Society for the same reason.

Seven large corporations, through their attorneys, joined Reynolds Metals Company to obtain a reversal of a court decision against Reynolds. Fluoride from its smokestacks had contaminated the air and poisoned three humans (p. 119).

Vested commercial interests are sponsoring the British Dental Association's drive in favor of fluoridation. A publicity campaign to obtain fluoridation was announced in the Supplement to the *British Dental Journal* of September,

\* John Lear, *Saturday Review* Jan. 2, 1965, page 91.

1963. Made possible "through the generosity of three firms of toothpaste manufacturers *who will remain anonymous*," "advertisements in the press and in magazines, circularization of letters and pamphlets to all local councillors and distribution of posters for display in waiting rooms, clinics, out-patient departments, factory notice boards, canteens and interviewing rooms in factories," will be utilized, according to the announcement.

Newspapers in five cities reported identical bids by two and more corporations in the sale of fluoride for addition to municipal water supplies (Table 19), thus raising the question of price fixing, a federal offense.

Table 19  
NEWSPAPER REPORTS OF IDENTICAL BIDS

Town	Source of Information	Remarks
Wilmington, Delaware	Journal Every Evening 11/25/59	Of four bids, 2 identical: \$6.60 per 100 pounds of sodium silicofluoride
Chicago, Illinois	Daily Tribune 6/8/60	International Minerals and Chemical Corp. Skokie; —Davison Chemical Co., Baltimore; —Swift and Co., Chicago: \$54 per ton.
Cleveland, Ohio	Plain Dealer 7/18/60	Identical bids from Harshaw Chem Co.; Henry Sundheimer Co., New York; Amer. Agric. Chem. Co., New York: \$.0687 per pound on 900 tons of sodium silicofluoride.
Niagara Falls, New York	Niagara Falls Gazette 12/22/59	Equal bids \$53.80 per ton to supply 800,000 lbs. of hydrofluosilicic acid by Commercial Chemicals and Davison Chemical Co.
Milwaukee, Wisconsin	Chemical Week 3/23/57	3 identical bids: \$46,800 for 600,000 lbs. of sodium silicofluoride by Blockson Chemical Co., Joliet, Ill.; Hydrite Chemical Co., Milwaukee, Wis.; and McKesson Robbins, New York.

One of the country's highly reputed scientific institutions, the Kettering Laboratory, Cincinnati, published a "Selected Bibliography" on fluoridation for distribution to scien-

tists. Sponsored by nine corporations and supported by P.H.S. grants, all research unfavorable to fluoridation is omitted, including some of the most valuable scientific material on the subject.<sup>266</sup> Thus a scientific institution of high repute has allowed itself to become something akin to a propaganda agency.

The following event illustrates the difficulties encountered by physicians in becoming aware of data unfavorable to fluoridation:

In the February, 1965, A.M.A. *Archives of Internal Medicine*, Dr. D. R. Taves, and collaborators, of Rochester, N. Y., reported substantial accumulation of fluoride in the blood of a 41 year old nurse from the use of fluoridated water in hemodialysis, a treatment for kidney disease.<sup>267</sup> Hemodialysis is the process of clearing the blood of damaging metabolic waste products by withdrawing blood from the body and then returning it after its passage through an "artificial kidney." In this procedure, circulating blood passes through flowing water, separated from it by a semipermeable membrane.

In repeated treatments extending over eight months, the authors observed that fluoride entered from the water into the blood stream and settled in the bones instead of the toxic waste products leaving the blood. After the patient's death destructive changes in bones which were associated with an unusually high (5500 ppm) accumulation of fluoride were revealed at autopsy. The authors failed to realize that others, especially Dr. Amarjit Singh<sup>167</sup> of Patiala, India, had observed advanced crippling fluorosis in patients whose bones contained only 1500 ppm of fluoride. They determined that most of the fluoride stored in this woman's bones had accumulated prior to the treatment.

I wondered why the authors had failed to report significant clinical details in their presentation of this case, especially the patient's symptoms and autopsy data. Data on the extent to which fluoride had accumulated in organs other

than bones, especially in the diseased kidneys, would permit an evaluation of its possible damage to these organs. It also would indicate whether or not fluoride had contributed to, or caused, the woman's death.

When I asked one of the authors for further clinical details, to my surprise he referred me to another article dealing with the same case. Written by an entirely different team, Drs. L. H. Kretchmar, W. M. Greene, C. W. Waterhouse and W. L. Parry, it was published in 1963 in the *J.A.M.A.* Vol. 184, page 1030.<sup>268</sup> My correspondent stated that he had forgotten to mention this article in his paper. He also enclosed another forgotten reference about which I had inquired, namely that of an article by Drs. J. R. Blayney, R. C. Bowers and M. Zimmerman.<sup>269</sup> A number for this reference was shown in the text, but the reference was missing in the bibliography. This article showed that, in patients with kidney disease, excess accumulation of fluoride takes place in the iliac bone.

According to the *J.A.M.A.* article the patient had fourteen treatments with the artificial kidney. At first all went well and she improved. Later when each treatment was prolonged from 4 to 6 hours she developed headaches, confusion, nausea and, on one occasion, a convulsion. Not aware at the time of the effect of fluoridated water, the authors attributed these symptoms to the kidney disease. Intravenous medication brought relief for only 15 minute periods but the symptoms persisted for 24 hours after each treatment. Paradoxically, the patient's output of urine was diminished for two days after each treatment, a sign of further impairment of her kidney function.

The A.M.A.'s authors described "a bizarre neuromuscular irritability" with twitching of the right arm and occasional convulsions. During one of the convulsions, one hour after treatment, the patient expired. The authors had no explanation for this unusual phenomenon. I could not help but recall my cases of fluoride poisoning in which I

have frequently observed muscular fibrillation (twitching), especially in the case with tetaniform convulsions described on page 106. The authors warned that the otherwise well established method of hemodialysis should not be employed too vigorously as it might induce further deterioration of the disease which it was to alleviate.

Whereas convulsions occur occasionally in advanced kidney disease, a member of the team must have suspected that some other factor, perhaps a contaminant in the Rochester tap water, had poisoned the patient. An investigation followed in which top P.H.S. scientists were consulted, including Prof. Armstrong, of the University of Minnesota, whose services the P.H.S. had employed previously to counter the research of Dr. Alfred Taylor and that by Drs. Berry and Trillwood. Another consultant was Prof. H. C. Hodge of Rochester, a well-known exponent of fluoridation, some of whose research was discussed on page 293.

The P.H.S. must have found itself in another dilemma. If hemodialysis with fluoridated water as practiced on a large scale in the U.S.A. were to continue, this otherwise useful procedure would in all likelihood turn out to be disastrous to many people. On the other hand, if the case were to be properly presented to the medical profession, it might kill fluoridation. The P.H.S. scientists could not risk keeping the data gleaned from this case to themselves. They had to warn the medical profession against the use of fluoridated water in an artificial kidney. This was accomplished in a most inconspicuous way by the publication of a second article which did not refer to the original case report.

From the evidence presented here and in previous chapters there cannot be any question but what this case constitutes the second fatality from fluoride in water reported in the U. S. medical literature, the first one from *artificially* fluoridated water. How many others have already shared the nurse's fate no one will ever learn. Nor is it possible to foretell how many additional unforeseen dangers to human life

due to fluoride will eventually come to light.

More significantly, this case demonstrates how the medical profession is being deprived of straightforward information about poisoning from fluoridated water.

It should be stated emphatically that the authors of the two articles cannot be held responsible for concealing the truth. Nor should anyone blame the editor of the *A.M.A. Archives of Internal Medicine* who inadvertently failed to ask for complete clinical details before he accepted the article for publication. The finger of guilt points to those who insist, categorically, that there has never been the slightest harm from fluoridation; that cases of poisoning have not been "documented" or have not been "brought to our attention" and who, in scientific journals, portray those not in accord with their views in the following manner: "The capacity of the human mind to deceive itself knows no limits."

Again, the question arises, why have no other physicians in the U.S.A. reported damage to health from fluoridated water.

Two recent experiences provide the answer. They disclose an approach quite similar to that described previously in "eliminating" experimental research unfavorable to fluoridation:

At first the patient is visited by a representative of the U.S.P.H.S. or of the local dental society. The latter seeks to learn whatever he can that might be embarrassing to the patient or to his physician. The physician is then persuaded to make his record available to a special committee which, unbeknown to the patient or physician, is established for the purpose of "proving" that the diagnosis of fluoride poisoning is fallacious. The physician is subsequently obliged to declare his diagnosis unwarranted. Should he insist upon maintaining his position or communicate his experience to his colleagues, he will be subjected promptly to public abuse and embarrassment.

On March 24, 1965, two prominent fluoridation prome

ters representing themselves as a newspaper editor and a member of "The Antigo Freedom from Fluoridation Committee" gained the confidence of Mrs. J. W. P. of W., Wisconsin, whose physician had recognized that she was poisoned by fluoridated water and advised her to eliminate it for cooking and drinking. Having convinced her that they were genuinely interested in assisting her in proving her case valid, she divulged her physician's name and granted them permission to contact him for the details. Subsequently the physician, Dr. . . . S, was visited by five fluoridation promoters. After their visit he had no choice but to remain silent. The following day, the profluoridation committee, "Antigo Citizens for Better Health," declared in the local Antigo *Daily Journal* while this so-called "legal and medical investigation" was "in the process" (sic) that the case of Mrs. P. was "a flagrant abuse of truth, in fact a hoax."

On March 31, 1965, Dr. T., a health department official, visited the home of E. F., age 51, another victim of the same disease, in Hamden, Conn. This patient had undergone extensive tests under my supervision in a Detroit hospital by means of which diseases other than fluoride poisoning were eliminated.

At a hearing before a Conn. Committee on Public Health and Safety, following the examination of the patient by a special committee in a New Haven hospital, the Connecticut State Health Commissioner, Dr. F. Foote, publicly attempted to downgrade my competence, that of the chemist in Passaic, N. J., who had made the fluoride determinations on this patient, and that of the dentist in charge of the research unit who had upheld the chemist's reputation. The New Jersey State Health Department had requested the chemist's dismissal from his position at his hospital at the behest of the Connecticut State Health Department.

A New Haven physician who had concurred with my diagnosis was invited to appear before the local medical so-

ciety where a program was set up for April 7th to feature the State Health Commissioner, Dr. Franklin Foote, and his special committee. In a letter to the program chairman, dated March 23, 1965, I requested equal time in order to present my evidence on this case at this meeting. This request was denied.

In January, 1965, several Detroit dentists told a newspaper editor, in whose paper facts unfavorable to fluoridation had been revealed, that \$27,000 was available for advertising to win the vote for fluoridation in Detroit the following November, and that some of this money could be used to buy space in his newspaper should he wish to cooperate.

May 13, 1965, every member of the Detroit District Dental Society was notified of a \$20.00 assessment for the campaign to win the local vote for fluoridation in Nov., 1965. Members failing to comply within 4 months were threatened with loss of membership in the local and national dental societies as stipulated in the portion of the by-laws which was attached.

To what does all this add up? On the basis of available information the question whether fluoridation is safe and effective is no longer at issue. It is evident that

- fluoridation was originally promoted by industry;
- a handful of outstanding scientists were given grants to carry out research in order to prove a predetermined thesis;
- these scientists, utilizing this research and their high standing in scientific groups, were able to attract officials in medical and dental organizations;
- the dental branch of the U. S. Public Health Service embraced the new "health measure" at a time when relatively little progress in preventive dentistry was on record compared with its sister branches in the medical field;

- new industries including some of the toothpaste and drug industries fell into line;
- the same scientists, now aided by the U.S.P.H.S., began a vigorous campaign among lay organizations with the backing of some of their colleagues whom they had, by now, convinced that fluoridation is safe;
- these men won the news media, especially medical news writers, for their cause and thus prevented data unfavorable to the project from reaching the profession and the public;
- supported by the P.H.S., by industry, by professional organizations, lay groups and trusting individual civic leaders, they created an unfavorable public image of all who disagreed, lay persons and scientists alike.

It may well be that the P.H.S. was not in on the ground floor when the fluoridation idea was initiated. However, having committed themselves prematurely to promotion of fluoridation, now that serious damage to health of citizens in many fluoridated cities has been established, they cannot retreat without jeopardizing their position and laying themselves open to prosecution.

As one of the participants at the Fourth Annual Conference<sup>69</sup> of State Dental Directors with the Public Health Service and the Children's Bureau, June 6-8, 1951, stated: "We have told the public it (fluoridation) works, so we can't go back on that."<sup>\*</sup>

The struggle against the modern day Titans will eventually end. With its termination will emerge a vast expansion of scientific knowledge. The suffering of a Merrilies, a Jones, a Dunn, and an Ayres<sup>\*\*</sup> will not have been in vain.

The mighty gods called Titans, who once ruled the world, have faded away. They exist only in memory. Yet their impact upon civilization—good and bad—is undeniable. The same fate awaits the Titans of today. Their con-

<sup>\*</sup> Page 35 of the *Minutes of the Fourth Annual Conference*.<sup>69</sup>

<sup>\*\*</sup> Names of patients poisoned by fluoridated water.

tributions to our modern way of life will remain.

Evidence is already available that fluoride, one of the most reactive chemical agents, liable to be present in every human organism and in many body organs, provides the key to the explanation of several illnesses. Among them some forms of migraine, arthritis, colitis and gastric disorders rank prominently. These diseases are due to many different causes. Fluoride will be recognized as one of them.

Fluoride's effect on calcification of arteries and ligaments, conditions which we now attribute to "normal" aging will eventually be clarified. Research respecting fluoride's bearing on the thyroid gland, on the glucose (sugar) and on the calcium-phosphorus metabolism is bound to open up new frontiers in medicine.

I am completing the last lines of *A Struggle With Titans* at my farm retreat, about thirty miles north of Detroit. In this dream house of mine, nestled in the hills, I have personally set rock upon rock to build its solid walls. Through the huge glass partitions I glance at the waves of ripening wheat. I can see cows grazing on the hills suckling their calves. A flock of starlings pursue a hawk in its graceful flight. I hear the rustling of corn. The atmosphere, calm and serene, contrasts with the turmoil of a stormy council meeting, a radio debate, the penetrating barbs of a Stockholm professor of dentistry or of a former Kettering scientist now employed by an aluminum corporation.

I turn on the radio and hear the voice of WJR's Director of Fine Arts, Karl Haas. Listening to this brilliant music commentator and pianist affords me genuine satisfaction especially since, some thirty years ago, I rescued him from the Nazi gas chambers by bringing him to Detroit.

Today, his program featured the German poet Goethe. One of his poems, "Wanderer's Night Song," set to music by Franz Schubert, struck a familiar chord. It put into words the peaceful atmosphere surrounding me:

<p>             "Über allen Wipfeln is Ruh              In allen Gipfeln spürest Du              Kaum einen Hauch              Die Vögel Schlafen im Walde              Warte nur balde              Ruhest du auch.           </p>	<p>             Above all summits there              is peace,              Above all tree tops one              Senses scarcely a breath.              The birds are silent in              the woods;              Wait, oh wait—you, too,              will soon be at rest.           </p>
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## GLOSSARY

- AAAS** American Association for the Advancement of Science.
- Acne** An affection of the skin with eruption of papules or pustules.
- Acute Illness** Illness of short duration as contrasted to chronic illness.
- A.D.A.** American Dental Association.
- Adrenal gland** Gland of internal secretion located above the kidney.
- A.M.A.** American Medical Association.
- Amyloidosis** Replacement of tissue by a substance resembling starch.
- Anaphylaxis** A severe state of sensitivity leading to shock and death.
- Aorta** Great artery through which fresh blood is pumped from left ventricle of heart throughout the organism.
- Arteriosclerosis** Hardening of the arterial walls.
- Biopsy** Microscopic examination of tissue removed from the living organism.
- Calcification** Deposition of calcium salts.
- Calcium Fluoride** ( $\text{CaF}_2$ ) a mineral containing 51.33% calcium and 48.67% fluorine.—Molecular weight 78.08 (calcium ion = 40.08, 2 fluoride ions = 38.00).
- Cataract** Opacity of the lens of the eye.
- Chalazion** Inflammatory distention of one of the Meibomian glands which are located at the margin of the eyelids.
- Cortisone** A steroid component of the adrenal cortex.
- D.D.S.** Doctor of Dental Surgery.
- D.M.D.** Doctor of Dental Medicine.
- Ectopic** Displaced outside abdominal wall.
- Emphysema** Overdistention of lungs.
- Enzyme** An organic compound, frequently a protein, which accelerates or produces a biochemical process by catalytic action.

- Erythema Multiforme** Skin eruption characterized by round, centrally indented lesions mainly on arms and legs.
- F.D.A.** Food and Drug Administration (Dept. of HEW).
- Fluorine** an element of the halogen group, atomic weight of 19. Exists as  $\text{F}_2$  molecules.
- Fluorosis** Chronic fluoride poisoning.
- Gingival** Pertaining to the gums.
- Halogens** A nonmetallic element of the seventh group of the periodic system: chlorine, iodine, bromine or fluorine.
- Heifers** Young cows that have not had a calf.
- H.E.W.** U.S. Dept. of Health, Education, and Welfare.
- Hydrofluoric Acid** or **Hydrogen Fluoride** (HF) molecular weight, 20 (hydrogen ion = 1, fluoride ion = 19).
- Hydrofluorosis** Chronic fluoride poisoning from drinking water.
- Hyperparathyroidism** Disease due to excess activity of the parathyroid glands.
- Ingest** To take substance into the body by way of the alimentary canal.
- Intradermal injection** Injection between the two layers of the skin.
- Ion** An atom or group of atoms carrying an electric charge.
- J.A.M.A.** Journal of the American Medical Association.
- J.A.D.A.** Journal of the American Dental Association.
- Lymphoid glands** Structures about the size of a pea distributed throughout the body serving as a disposal plant for foreign substances.
- Metabolism** The sum of physical and chemical processes by which simpler compounds are converted into living, organized substances.
- Monograph** A treatise on a single subject.
- N.F.N.** National Fluoridation News.
- Neuromuscular** Pertaining to nerves and muscles.
- N.I.H.** National Institutes of Health, Bethesda, Md.
- Osteoporosis** Abnormal porosity or rarefaction of bone.
- Osteosclerosis** Excessive hardening or abnormal denseness of bone.
- Parathyroid gland** One of the four small glands on the lateral lobes of the thyroid which regulate the calcium-phosphorus metabolism.
- Parotid gland** A saliva producing gland located in both cheeks in front of the ears.

*Periodontal disease* Disease around a tooth.

*Pharynx* Area situated in back of palate and mouth, above the voice box.

*P.H.S.* Public Health Service.

*Polydipsia* Excessive thirst.

*PPM (fluoride in water)* Parts per million, i.e., 1 milligram (mg) per liter or 1 milligram (mg) in 1000 g of solid material.

*Per cent (%)* 1% is equivalent to 10,000 ppm.

*Retinitis* Inflammation of the retina, often leading to degeneration of the inner eye and to blindness.

*S. C. Senior Counsellor*, a title earned by Irish attorneys after special training and experience.

*Sodium Fluoride (NaF)* contains 54.75% sodium and 45.25% fluorine. Molecular weight 42 (sodium ion = 23, fluoride ion = 19).

*Sodium Fluosilicate (Na<sub>2</sub>SiF<sub>6</sub>)* contains 24.46% sodium, 14.92% silicon, and 60.62% fluorine; molecular weight, 188.05 (2 sodium ions = 46, silicon = 28.05, 6 fluoride ions = 114).

*Soft tissue organs* Organs other than bones, teeth, hair and nails.

*Syndrome* A group of concurrent symptoms characterizing a disease.

*Teleangiectasis* An area of tissue composed of dilated capillary blood vessels or minute arteries.

*Thymus* A ductless gland in the chest cavity, just above the heart.

*TVA* Tennessee Valley Authority.

*Vertebra* One of the bones which constitutes a segment of the spinal column.

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