

THE AUSTRALIAN FLUORIDATION NEWS



ARTIFICIAL FLUORIDATION IS WATER POLLUTION

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Fluoride Air Pollution and Water Fluoridation - The Link[©]

Fluoride air pollution, largely by emissions from industrial sources, became a problem in the mid 19th century with the advent of the industrial revolution. Although the cause of injury and death to cattle and man, as well as damage to plants, was not recognised as fluoride poisoning until the 1900's, injury to man from fluoride-emitting smelters was known half a century before. Although now partly controlled by air pollution laws, emission of fluoride pollutants into the atmosphere from a wide range of sources continues apace, although such information is rarely publicised by normal press and news media.

To understand how this major air pollutant is largely ignored, review of some history is necessary. The background to the fluoride air pollution problem was very well summarised in an article by Dr. F.B. Exner, M.D., of Seattle, Washington, U.S.A.. *"Economic Motives Behind Fluoridation"*, published in an early edition of this journal⁶⁷, extracts of which follow.

Historic Background

Around 1900, the very existence of the great smelting industry, both in Germany and Great Britain, was threatened by successful suits for fluoride damage and by burdensome laws and regulations³. Today that same threat hangs over the bulk of American big-industry; and fluoridation offers both camouflage and scapegoat. Hence the relentless and uncompromising drive for universal fluoridation.

There has been fluorine poisoning as long as there have been plants, animals and people - unrecognised as such, of course, and mostly associated with volcanic phenomena or fluorine-bearing waters. Came the industrial revolution, and things were different. There came a wholesale pollution of air and country-side with fluorine fumes and fall-out; and fluorine poisoning became an important industrial hazard.

There were many sources, including glass, brick, enamel and ceramic tile; but the worst offenders were the iron and copper smelters.

According to Ost³, the Freiburg smelters, in Germany, first paid damages to injured neighbours in 1855; and in 1893 had paid out 880,000 marks for current injuries and 644,000 for permanent relief. Around the turn of the century, as I said before, the situation became acute, and the very existence of

the smelter industry, both in Germany and Great Britain, was threatened.

Meanwhile the cattle around Anaconda, Montana, developed what were known as "copper teeth", remarkably similar to the human disease which became famous as "Texas teeth", "Colorado brown-stain", or "mottled enamel" and was later identified as fluorine poisoning¹⁴. I find no description of the other effects on the cattle; but we know that a cow with mottled teeth is a poisoned cow, just as a child with mottled teeth is a poisoned child. Neither will ever be as well as if it hadn't happened.

In any case, it wasn't to preserve the beauty of the teeth of cows that the enormous stacks were built at Anaconda, Great Falls, and Tacoma. It was to carry fluorine and arsenic high into the upper air.

Then, in 1907, a disease of cattle that had been endemic around Freiburg for some 20 years was identified as fluorine poisoning from the smelters³.

Superphosphate and Aluminium

Then came two new industries which were in immediate trouble. During the 90's there had been numerous complaints of damage to vegetation around superphosphate fertilizer plants. In 1912, Bartolucci reported fluorine poisoning of cattle near a superphosphate plant in Italy¹⁵.

Between 1911 and 1918, the cattle around a Swiss aluminium plant became poisoned. The disease was identified as fluorine poisoning by Christiani and Gautier; but the Court was not convinced and damages were awarded for injury to the land but not to the livestock¹⁶.

During the 20's, there was growing concern abroad, and in our own department of Agriculture and Bureau of Mines over fluorine as a public hazard - but not in the Public Health Service. PHS was under the Treasury Department; and Andrew Mellon was Secretary of the Treasury. During all those years I can find no mention of fluorine in Public Health Reports, the official publication of PHS.

Water-borne Fluorine

Meanwhile there had been a parallel development with respect to teeth. There had been fluorine-mottled teeth as long as there have been people but, again, the cases were scattered and rare except in volcanic regions. With our

westward migration, however, arid and volcanic regions were settled. Deep wells in the former, and even surface sources in the latter, often contained fluorine; and mottled enamel in such places was endemic.

Then Eastern communities, seeking sources of pure water, turned to deep wells, many of which contained fluorine. As a result mottled enamel which had been endemic chiefly in Colorado, Texas, and Arizona, became a problem in the East as well.

When it was discovered, in 1931, that mottled enamel was due to fluorine poisoning of the tooth-buds while the teeth were forming. PHS had to recognise that fluorine had public health importance. Dr. H. Trendley Dean was delegated to determine how much fluorine might safely be permitted in water supplies. But PHS showed no slightest interest in fluorine except in water.

Agriculture, 1933

In 1933, Dr. Lloyd DeEds, Senior Toxicologist with the Department of Agriculture and Lecturer on Pharmacology at Stanford, published a 60 page review on chronic fluorine poisoning. He wrote:¹⁷

“Only recently, that is within the last ten years, has the serious nature of fluorine toxicity been realised, particularly with regard to chronic intoxication. It is from the viewpoint of chronic intoxication that fluorine is of importance to the public health. A review of the literature shows that the public health aspect of fluorine is manifested in industrial hygiene, in agriculture, and in foods. The latter aspect of the problem is particularly important because of the recommendation and increasing utilization of fluorine compounds in agriculture”.

In this connection, we should note that, as of 1957, the FDA tolerance for insect-spray residues allowed 7 parts per million of fluorine in some 60 fruits and vegetables¹⁸.

DeEds also wrote:

“It is a well-established fact that chronic intoxication may manifest itself in man as recognised abnormalities only after constant, or at least frequent, exposure over many years.”

And he quoted a paper by Sollman, Schetter, and Wotzel¹⁹, saying:

“According to information obtained from the United States Bureau of Chemistry, “Phosphate rock” is used to some extent in the production of phosphates used in the manufacture of baking powders. Ordinarily, such rock contains from 0.5 to 15 per cent of fluorine. The finished baking powders are made from acid calcium phosphate containing in the neighbourhood of 0.04 per cent of fluorine; but if carelessly manufactured, i.e., if calcium acid phosphate is used they may contain as much as 0.5 per cent.”

Dr. E.W. Schwartz calculates . . . that the daily intake of fluorine through the use of baking powders would approximate 0.35 to 2.84 mg if the powders contain 0.04 per cent of fluorine; or 4.45 to 35.55 mg. if the powders contain 0.5 per cent of fluorine.

These amounts, 0.35 to 35 mg. per day, should be compared with the figure of 0.3 mg. per day that the fluoridators tell us in the average total diet, and with the 20 mg. per day that they tell us is needed to produce systemic poisoning.

Rock-phosphate is also the source of calcium or phosphorous used in many drugs and mineral supplements. In 1957, Feltman and Kosel²⁰ found from 1 to 286 micrograms of fluorine per tablet or capsule in 34 of 38 leading vitamin and mineral supplements. This accounted for the surprisingly high levels of blood-fluorine among patients on fluorine-free water.

DeEds also wrote:

“The possibility of fluorine hazard should . . . be recognised in industry where this element is dealt with or where it is discharged into the air as an apparently worthless by-product.”

He discussed poisoning of vegetation and livestock near aluminium plants; and pointed out that superphosphate plants were pouring 25,000 tons of fluorine into the air and adding 90,000 tons to the top-soil each year. He added:

“This sizeable quantity gives pause for thought of the potential toxicities connected herewith.”

Systemic Poisoning in Man

Such was concern over fluorine in 1933; and DeEds did not yet know that Moller and Gudjonsson had already found, and described, chronic fluorine poisoning among Danish cryolite workers. In 1937, Kaj Roholm published his monumental study of Chronic fluorine poisoning, which is still regarded as a classic^{21, 22}.

Also in 1937, Shortt and co-workers, in India, reported poisoning like that described by Roholm and by Moller and Gudjonsson but caused by water-borne fluorine²³.

Cox to the Rescue

Concern over fluorine as a public health hazard was definitely getting out of hand. For one thing, industry was dumping its fluorine wastes in rivers - rivers that were used downstream for water supply.

This was the situation when Dr. Gerald Cox, from Mellon Institute, suggested²⁴, in 1939, that (and I quote):

“. . . the present trend toward complete removal of fluoride from water and food may need some reversal . . .”

And suggested that fluoride be added to water supplies as a means of reducing tooth-decay.

The PHS “Tolerance”

The result was that, in 1942, instead of forbidding the dumping of fluoride in water supplies, PHS set 1.0 ppm of fluorine as the maximum tolerance in a public water supply. Then, in 1946, and with no new “evidence of safety” it was raised to 1.5 ppm.

Again, in 1961, it had been raised to 2.4 ppm, in spite of the fact one PHS investigator²⁵ had said that, at 1.5 ppm the factor of safety was zero; and another²⁶ had said that above 2.0 ppm the permanent disfigurement of many of the users far outweighs any hypothetical benefit.

However, the situation was desperate, because far higher levels of contamination were taking place. For example, the Peace River, from which Arcadia, Florida, takes its water, often has up to 17 ppm of fluorine caused by the triple-superphosphate plants in the river basin²⁷.

A lawyer for a leading copper company told a friend of mine that Salt Lake City would be fluoridated whether the people like it or not. “How else”, he said, “can we get rid of our fluorides?”

The Blackout

Since 1937, the foreign medical literature has contained hundreds of articles on the wide variety of troubles that can be caused by fluorine. The same is true of the veterinary literature in this country. But none of this appears in our medical literature.

The things that fluorine can do to people are seen every day everywhere. The trouble is to know which cases are actually caused by fluorine.

There has been constant danger that someone would analyse tissues in both high and low fluoride areas and find that fluorine poisoning is common. But if every community can be fluoridated there will be no fluorine-free areas for

comparison.

Meanwhile, such information (or rather misinformation) as has been disseminated in this country has come from the Kettering Laboratory, the Public Health Service, and sources they control.

All reports based on PHS research grants are subject to censorship before publication²⁸. Whatever is found is so reported as to conceal any possible hazards from fluorine. A good example is the report of the PHS sponsored study at Provo, Utah, where valuable data and findings were grossly misrepresented in reporting²⁹.

The result is that the physicians and dentists of America know almost nothing about fluorosis (chronic fluorine poisoning); and most of what they think they know isn't true. Most, in fact, don't even know there is such a thing; and because they don't, it never occurs to them to look for it, or even consider it.

World War II

In 1942, with the Second World War, there was an enormous increase in fluorine pollution. Steel production expanded; and aluminium which had been used for pots, pans and a few aeroplanes, was needed for an air-fleet. Moreover, these industries invaded parts of the country that were not used to fluorine-polluted air - for example the steel plants in California and Utah, and aluminium factories in Washington and Oregon. Crops and live-stock suffered, and people didn't like it. Even the deer in the hills around Provo, Utah, had mottled teeth.

At Provo, after the war, some \$30 million in damage suits were filed³⁰; and some \$4.5 million were awarded in settlements out of court³¹. Then, about 1950, the company spent \$9 million on air-cleaning equipment which requires, among other things, the use of 40 tons of lime dust a day. They say this removes 90 per cent of the pollution³¹; and a lawyer for U.S. Steel bragged to me that the Geneva plant is now the cleanest steel-mill plant in the world. (In Pittsburgh they don't have cattle. They only have people.)

The situation regarding aluminium was much worse. Aluminium is made by electrolysis of bauxite (aluminium oxide) in a bath of molten cryolite (sodium Aluminium fluoride), either artificial or the natural mineral.

In a typical plant, with four "pot lines" of 128 "pots" each, five tons of fluorine (as cryolite, aluminium fluoride, and calcium fluoride) were added each day to replenish losses. Of this, the company estimated that 7,000 pounds a day escaped into the atmosphere³².

This plant, at Troutdale, Oregon, was built and operated for the Government by Alcoa during the war. In 1946, it was rented from the Government by Reynolds Metals who demanded that air-cleaning equipment first be installed. This was done at a cost of more than \$270,000. This cut the emission to less than 4,000 pounds per day.

Additional controls were installed in 1950, at a cost of more than \$2 million, and cut the emission to less than half a ton per day.

Meanwhile, some millions in damage suits were filed; and many hundreds of thousands paid in settlements or judgements. One suit, for damage to the members of the Paul Martin family, is the only successful suit for damage to humans by fluorine pollution in the United States to date. Alcoa, Kaiser, Harvey Aluminium, Olin-Mathieson, Victor Chemical, and Food Machinery and Chemical, all joined in the suit as "friends of the Court"^{32, 33}.

Practically all the medical testimony for the Company came from four men from Kettering and one formerly from Kettering.

The story elsewhere is similar - at Sauvie Island, Longview,

Tacoma, Spokane - with extensive damage to crops, land and live-stock.

At the Dallas, Oregon, vegetation was analysed both before and after the plant was built. The plant was opened July 26, 1958. On June 30, the average fluorine content of seven crops grown within a mile of the factory was 3 ppm. After 73 days of factory operation it had jumped to 140 ppm. The following year, peaches contained up to 22 ppm of fluorine; and many suffered from the condition called "soft suture"³⁴.

At Longview, the people voted down fluoridation in 1952. A few years later, children started to show mottled teeth³⁵; whereupon the Council put in fluoridation without a vote. Now the mottling can be blamed on the water rather than the aluminium plant.

Petroleum Industry

World War II also brought new sources of fluorine pollution. The Kettering Laboratory has compiled and published abstracts of some 8,600 articles on inorganic fluorides up to 1958. It contains 639 articles on uses of fluorine compounds in industry. Of these, 76 were published before 1942, and 563 since. Most of the latter deal with new uses of fluorine compounds, and new sources of pollution.

One major change was the substitution of hydrogen fluoride for sulphuric acid as catalyst in the production of high-test gasoline. According to Callahan³⁶, one such plant required 500 to 750 tons of hydrogen fluoride yearly. How much of this goes directly into the atmosphere, and how much remains in the gasoline to appear in car-exhausts, has never been told.

In any case, the first such plant was put in operation in Los Angeles in 1942; and by a strange coincidence, that was the year of the first complaints of eye-irritating smog. Eye irritation is also the first noticeable effect of hydrogen fluoride for most people.

For several years the Los Angeles papers told about the hydrogen fluoride in the smog; but by the time the reports reached Seattle, fluorine wasn't mentioned. Now it isn't mentioned even in L.A., and we are told there is no fluoride in the L.A. smog. This is strange since there is fluoride in the air of every major city, with or without smog.

Now we are told that the eye-irritation is caused by hydrocarbons, ozone, or oxides of sulphur or nitrogen, all of which could be smelled strongly if in eye-irritating concentration.

Since 1942, numerous other uses of fluorides in petroleum refining have been added; and both hydrogen fluoride and the highly toxic boron trifluoride are used.

Elemental Fluorine

Fluorine itself, the chemical element, is the most reactive of substances; and does not occur in nature. It combines rapidly and violently with whatever it touches except its own compounds.

Prior to 1942, it was made with great difficulty, in gram quantities; and could not be bought at any price. The problem of containing it was solved by treating materials to form a tight surface coating of fluoride. This protects the underlying material from further attack³⁷.

It is now shipped in tank-trucks of 5,000 lb capacity. The consequences of a wreck are not pleasant to contemplate. There would be no explosion, but it would consume everything it touched, including water, steel, concrete and people. The heat would be terrific. The products of combustion would all be poisonous, and most of them corrosive; enough poison to kill a million people would result; and decontamination would be a major undertaking.

Fluorine is also being tried as a rocket-propellant. With

hydrogen or hydrazine as fuel, it makes the most effective chemical propellant that is possible. We are told³⁷ that it creates no toxic hazard, but this is hard to believe.

Atomic Energy

Enormous quantities of fluorides are also emitted in the refining of uranium. Uranium 238 is separated from its lighter isotopes as Uranium hexafluoride. To make this, pure uranium oxide is treated first with hydrogen, then dry hydrogen fluoride and finally with elemental fluorine.

Uranium hexafluoride is an extremely poisonous and corrosive gas and very hard to handle. On contact with moist air, it forms hydrogen fluoride and a dense cloud of uranium oxy-fluoride, both poisonous.

"UF₆ was almost constantly evolved, forming clouds of smoke which frequently were so severe as to obscure vision in the plant. The only fatalities occurred in the early days of production. The persons concerned exhibited symptoms of HF poisoning"³⁸.

Coal

Finally we must not forget coal as a source of atmospheric fluorine. According to Churchill³⁹, coal from Western Pennsylvania contained 85 ppm of fluorine, from Illinois 167 ppm, and from Utah up to 293 ppm.

The amounts may seem small as compared with rock phosphate; but if we assume a conservative average of 120 ppm, the coal mined in 1959⁴⁰ contained over 50,000 tons of fluorine. Nearly all of this was given off in burning⁴¹.

The Death-fogs; The Meuse Valley, 1930

During the first week of December, 1930, all of Belgium was blanketed by dense fog. In addition, there was a temperature inversion in the Meuse Valley, which served as a lid to prevent the upward escape of gases.

In a 15 mile stretch of the Valley, with hills of 250 to 350 feet on each side, some 6,000 people became violently ill and, on the third and fourth days, 60 died. Many cattle were also killed.

An official investigating committee declared⁴² that the symptoms were those of fluorine poisoning; but that only one plant was emitting fluorine and the amounts produced could not have caused the trouble. They said it must have been the sulphur dioxide and sulphuric acid.

However, van Leeuwen⁴³, Fenner⁴⁴, Flury⁴⁵, Teleky⁴⁶ and Schwartz⁴⁷ all disagreed. For one thing, windows and light bulbs showed etching by fluoride. Flury gave figures to show that toxic amounts of fluorine were present and Schwartz pointed out that soluble gases such as HF and SO₂ can become enriched in fog particles and produce acute poisoning even if the initial concentration is very small.

The evidence was carefully investigated by Roholm who was, at the time, the world's greatest authority on fluorine poisoning. He said⁴⁸ that he was convinced by the symptoms and the details of the disaster that the malady was acute fluorine intoxication. Of the 27 factories in the region, 15 either used raw products containing fluorine (superphosphate works, zinc works) or add fluorine compounds to the raw materials (steel works, iron works, glass works), involving the possibility of passing gaseous fluorine compounds (SiF₄, HF) into the chimney smoke.

Moreover, 20 years later the vegetation in the region contained enough fluorine to indicate that fluorine pollution was high, and had probably been high in 1930⁴⁹.

The Death-fogs, Denora, 1948

The next dramatic fog disaster was in Pennsylvania in 1948. The towns of Denora and Webster lie in a deep, narrow valley of the Monongahela River, shaped like a

reversed letter "C" and tightly enclosed on all sides by hills rising four to five hundred feet above the river.

Within these narrow confines were zinc works, a steel plant with blast and open hearth furnaces, a wire mill and two nail galvanizing mills. For years the neighbours had complained, chiefly of the most obvious pollutant which was sulphur fumes from the zinc plant. There were several successful damage suits for damage to health and property.

From October 27-31, a temperature inversion confined the pollution in an estimated 500 million cubic metres of trapped atmosphere. 6,000 of the 13,000 residents became ill, and on the fourth day 17 died. No one knows what would have happened if the fog hadn't cleared the next day. Two more died that day, and another 8 days later, making 20 in all.

Moreover, recent investigations show⁵⁰ that those made ill have since had poorer health and a higher death-rate than those who were unaffected.

The Investigations

The Steelworkers of America promptly donated \$10,000 for an investigation and it was suggested that Dr. Kehoe be employed. However, Kettering Laboratories had already been retained by U.S. Steel to investigate.

Phillip Stadler then investigated and reported both direct and circumstantial evidence of acute fluorine poisoning to people already suffering from chronic fluorine poisoning. The symptoms were those of fluorine poisoning; and blood-fluorine concentrations were 12 to 25 times normal⁵¹.

His investigation was followed by two others; one by Kettering Laboratory; and one by the Public Health Service.

The obvious ways to determine fluorine emission would be (a) by analysing surrounding vegetation; and (b) to analyse all materials going into the processes - ores, coal, coke, gas, limestone, fluorspar, etc., and all the products and recovered wastes. From the analyses the amounts could be calculated, and simple subtraction should be a fair measure of total fluorine emission.

This was done by Kehoe and his team⁵², but his findings have never been published; and cannot be without the consent of U.S. Steel. It is fair to assume, however, that they would have been if they exonerated fluorine, since the zinc plant was the chief source of the other likely causes. Moreover, Kehoe has testified⁵³ that the principal hazard from steel manufacture is fluorine.

The PHS Approach

The PHS approach was entirely different, and seems purposely designed to discover as little as possible. And that was the result. A 173 page report tells us⁵⁴ that there had been no unusual kind or amount of pollution, and that no pollutant present could have caused the trouble.

How the report can be taken seriously is past belief; but it is, and is generally accepted as the final word on the subject. It is an elaborate piece of hocus-pocus, wholly incompetent, irrelevant and immaterial to prove anything except how easily people - and I mean those who call themselves scientists - can be duped.

Sampling methods of doubtful reliability were applied at arbitrarily selected times and places, and the results "averaged" with no attempt at proper weighting. Calculations therefrom, replete with arithmetical errors and discrepancies, were combined with outright guesses to arrive at estimates of emission.

They guess that 210 tons of coal burned in homes emit 30 lb of fluorine but that 213 tons burned in the blooming-mill boilers emit only 4 lbs. No possible reason for the difference is offered.

On page 104, waste gas from the blast furnace contains 4.6 mg of fluorine per cubic meter. On page 108, it contains

one-tenth as much.

Calculations for open-hearth emissions show a discrepancy of several thousand-fold, with no way to know where the error lies.

The "biological studies" and general air-sampling are similarly inappropriate and meaningless. Air samples at 12 arbitrarily selected points between Feb. 16 and April 27, 1949, can tell us nothing about concentrations during the episode.

PHS tells us that 10 dogs, 3 cats, 7 fowls, 2 rabbits and 2 canaries died; but elsewhere we learn⁵⁵ that 14 of 22 sheep, 2 pigs, 740 chickens, 12 colts and 6 cows died in the surrounding area.

Mills tells us that⁵⁵

"There were few animal deaths near the smelter because farmers learned years ago the impossibility of healthful survival among destructive fumes."

He believes the deaths were from sulphuric acid and perhaps they were. The point here is that the sole purpose of the PHS "study" was to whitewash fluorine as the cause.

The Death-fogs; London, 1952

The next major fog episode was in England, 1952. From December 5 to 9, the Thames Valley, and particularly London, were blanketed with fog confined by a temperature inversion. **During the five days there were 2,000 excess deaths in London, and some 10,000 more in the surrounding area. This rates as the greatest fog disaster of all time,** although 2,000 deaths among 8 million people are not nearly as many, proportionally, as 20 among 13,000 at Donora.

Again, it has been assumed that sulphur compounds, easily smelled, and known to have been present, were responsible. And again, there is little supporting evidence, and fluorine as a cause, or contributing cause, must be considered.

In an area the size of Michigan, England burns half as much coal as the entire United States. Moreover, it is densely populated with industries that pour out fluorine.

Bellingham, Washington, noted like London for its fogs, with heavy sulphur pollution from the pulp mills but with almost no fluorine, has never experienced fog-induced illness that could be noted.

On the other hand, the 1952 episode in London does not stand alone. A fog in 1948 brought 600 excess deaths, in 1956 500, and in 1957 400⁵⁶. Since then there were two in rapid succession in 1959⁵⁷; although one of these was probably complicated by a "flu" epidemic.

Prior to 1948, there had been fog episodes with illness in England in 1873, 1880, 1882, 1891 and 1892. But six in less than 11 years since 1948 would indicate a much greater awareness or an actual increase in the number. We might well wonder whether fluorine in the new fluoride-catalyzed gasolines may not be a factor.

But I am not here to prove that any of the three major death-fogs were due to fluorine. My interest is in the efforts to prove that they were not.

The Air-Pollution Studies

After the London fog of 1952, there was much concern over air pollution in general and everyone got into the act. The Public Health Service saw a new field to exploit and started clamouring for appropriations. It still is.

Moreover, a rash of air-studies began by people who couldn't be trusted - people like air-pollution control-boards. So PHS and the Kettering Laboratory put on a fluorine study to end all fluorine studies.

In 1954 and early 1955, in co-operation with local or state health departments, it did fluorine sampling in 27 major

cities. They took 24-hour samples once a week at from one to five points in each city - two in New York. In Anchorage, Pasadena, Washington and Cincinnati they ran about a year. Some places they ran only a week. The average was 23 weeks^{58, 59}.

The collections were made on filter-paper which collects only particles and not the gases like HF or SiF₄. Philadelphia was sampled, but not Pittsburgh or Donora. Salt Lake City was studied, but not Provo; Tampa, but not Ft. Mead; Portland but not Troutdale. And there was no study at all in Tennessee.

A few mavericks have persisted, and there have been independent studies since in Florida, Texas, Oregon and the Bay area of California. But the worst offender has been Washington State University. It has conducted studies not just in Washington but also in Oregon and Utah. Something must be done^{58, 59}.

"There may be no connection but, when total N.I.H. research grants in 1961 were increased 38 per cent over 1960, Washington State University received 13 per cent less, and the University of Washington 94 per cent more, than their proportionate shares of the increase. The latter runs an 'Environmental Research Laboratory' but has made no study of fluorine since 1951."

The Conferences

There has also been a rash of conferences, national, international, and what have you, on both air and water-pollution. I shall concern myself with two: the one in 1950 and the one in 1958.

Just a year after the Donora episode, President Truman asked the Secretary of the Interior to organise an Inter-departmental Committee, which would sponsor a United States Technical Conference on air pollution. The conference was held in January, with Louis C. McCable of the Bureau of Mines as Chairman, and its Proceedings have been published⁶⁰. There were seven panels: on agriculture, analytical methods and properties, equipment, health, instrumentation, legislation and meteorology. J.G. Townsend, of PHS and Robert Kehoe were co-chairmen of the Health Panel.

William Ashe, from Kettering, talked on the Donora incident. He offered nothing concrete, concurred with the PHS Report that there had been nothing there to cause what happened, and he even questioned if anything had really happened. The rest of the papers were of similar calibre.

The agriculture panel, on the other hand, was much concerned about fluorine, and some very valuable information was presented.

No such mistake was to be made at the National Conference on Air Pollution, called by the Public Health Service in 1958. There Dr. McCable said: "The agriculture panel in 1950 was top-heavy with fluorine studies because fluorides were in the news."

And when Charles Butler, of the American Farm Bureau Federation, twice brought up the Farmers' interest in fluorine pollution, the subject was quickly changed⁶¹.

When the conference was reported in Public Health Reports, the only mention of fluorine was in connection with Polk County Florida. It tells briefly of damage suits against the fertilizer industry, and of millions spent to control pollution⁶². One man was then suing eight fertilizer and chemical companies for more than a million in damages⁶³.

Conclusion

Perhaps I can best conclude by quoting a statement by Dr. James P. Dixon, Health Commissioner of Philadelphia. At the 1958 Air Pollution Conference, he said⁶⁴: "If gas masks are not to become as common in a hundred years as shoes are today in the civilised world, we should do well to heed our somewhat submerged instincts of self-preservation and remember that - whatever other uses man may devise for it - air is essentially for breathing."

And I would add that water is essentially for drinking.

Fluoride Air Pollution from Industry

Air pollution with fluorides from nature is relatively rare⁶⁸, being confined to occasional volcanic eruptions of fluoride-containing gases in the known earth belts of volcanic activity. Particulate matter containing fluorides also falls to the ground downwind of eruptions, resulting in contamination of soil, crops and groundwater with fluorides.

The far more serious air pollution problem is widespread industrial fluoride pollution, compounded by extremely lax clean air standards. **The following is a brief summary of more recent details of some of the hundreds of cases of fluoride air pollution published since Exner's 1966 article:**

● Java Man Poisoned by Fluoride Pollution

Java Man, the 700,000 year old famous human fossil discovered in 1892, had an abnormal bone growth near the upper end of Java Man's thigh bone. The abnormality represents the oldest known disease of man.

"Thanks to a recent discovery in Spain, the disease can now be diagnosed as a form of fluoride poisoning.

Mr M. Soriano of the University of Barcelona in performing an autopsy on a patient, found a thigh bone growth like that on Java Man's femur. Mr Soriano's patient was an alcoholic who had died of cirrhosis of the liver. There were no clues as to why the growth had formed on the patient's thigh bone. But the Spanish scientist did notice similar growths were developing in other patients he was treating⁶⁹.

Fluoride

Scientific America said: "He was finally able to show that the abnormalities were caused by the ingestion of large amounts of sodium fluoride, which had been fraudulently added (to control fermentation) to the bulk wine the patients had been drinking."

In a search for other instances of fluoride-caused bone disease, the scientist found that sheep grazing in Iceland areas contaminated with fluorine from volcanoes "also developed abnormal bone growths".

This was the vital clue to Java Man's ancient malady.

Volcanic Ash

Java Man's remains, as *Scientific America* noted, were found in association with thick beds of volcanic ash. So the fruits and other plant materials eaten by Java Man might have contained enough volcanic fluoride to cause the bone disease which to-day's scientists believe he suffered.

● Iceland, Volcanic Gas Fluoride Poisoning

"Records of fluoride air pollution go all the way back to 1100 A.D., when a volcanic eruption in Iceland caused a crippling disease in sheep. The disease, which appeared every time the volcano erupted, was identified more than 200 years later as fluorosis, or fluoride poisoning, and traced to high levels of fluorides in volcanic gases^{70,71}."

● Kilauea and Mauna Loa, Hawaiian Volcanoes

Scientists at the observatory in the Hawaiian Volcano National Park believe they have found a link between fluorocarbons and volcanoes. "Studying the 1300m Kilauea, which erupted in September 1977, and the 4,500m Mauna Loa, which went off in July 1975, they found halocarbons - the chemical group which includes fluorocarbons⁷²."

● Dark Disease of Mount Vesuvius Spreads

The historic AD 79 volcanic eruption of Vesuvius overwhelmed the nearby cities of Pompeii and Herculaneum, destroying the cities and many of their populations. Serious eruptions also occurred in 1631 and

1906. Minor eruptions of the volcano, near Naples, occur intermittently. In 1968:

"More than 60 infants have died at the Naples' Santobono Paediatric Clinic.

"Naples always has the most fragile state of health of any of Italy's major cities (and Europe's highest infant mortality rate - 36 out of 100 births for the city at large, but as high as 127 out of 1000 births in some slum quarters). The disease has affected 50 per cent of the city's children under the age of one.

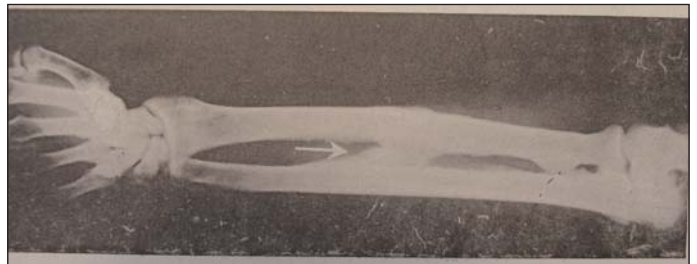
"About 300 children are being hospitalised each day suffering from an acute respiratory syndrome and about the same number are being released. Naples residents have named the disease the 'Dark Disease of Mount Vesuvius' because early victims all came from an area around the famous volcano. The head of the Institute of Public Health in Naples, Dr Donato Greco, said: 'We are now faced with an epidemic peak from which we can expect another 1000 patients and more deaths⁷³."

How Fluoride Causes Bony Outgrowths

In his 1983 book *Fluoride - The Aging Factor*⁷⁴, Dr John Yiamouyiannis reports in his chapter *Aging the Bone: the Degenerative Effects of Fluoride*:

"Bone also has the ability to rejuvenate itself. As older bone is removed by bone scavenger cells called osteoclasts, osteoblasts lay down collagen to produce a framework for new bone formation to renew the skeletal structure. Thus, damage to collagen production in bone can interfere with the normal processes of bone rejuvenation and repair throughout life.

"Fluoride has been shown to interfere with collagen formation in osteoblasts and chondroblasts. If, as pointed out, increased production of imperfect collagen or collagen-like protein results in mineralization of tissues which should not be mineralized, and vice versa, one would expect a calcification of ligaments, cartilage and tendons, as well as the formation of poorly and overly mineralized bone. This is exactly what happens after exposure to fluoride.



X-Ray showing fluoritic calcification (arrow) in forearm of a 65-year-old African male residing in Tolga (2.5 ppmF) in the Sahara⁷⁵.

"In discussing their examination of tissues from patients exposed to fluoride, Drs A. Sing and S.S. Jolly, world renowned experts on the clinical effects of fluoride in bone, point out that:

- The most noticeable changes are detected in the spine with calcification of various spinal ligaments, resulting in pronounced bony outgrowths. The other bones show numerous spiky outgrowths especially in tendons (collagen-rich fibrous tissue which attaches muscles to bone) and ligaments (collagen-rich fibrous tissue which holds bones together).

Even the bony outgrowths attributed to the increased synthesis of imperfect collagen or collagen-like proteins can give rise to deformities and discomfort."

● Cardiac Toxicity of Fluoride-based Aerosol Propellants

A Report by George J. Taylor IV, and Willard S. Harris, MD

in a 1970 article in *The Journal of The American Medical Association*⁷⁶ records the results of experiments to study the toxicity of fluoroalkane gas propellants used in pressurised aerosol dispensers.

They reported that the fluoroalkane gases used to propel aerosols were toxic to the hearts of 34 mice, sensitising them to asphyxia.

Commenting on their studies the authors reported:

"Pressurised nebulisers release fluoroalkane gases, many of which are called Freons, as propellants. Probably because ECGs were not obtained and asphyxia challenges not given, previous toxicity studies of these gases failed to uncover the cardiac effects revealed by our studies.

"In humans two syndromes have been described in which sudden death, likely cardiac in origin, followed exposure to gas propellants during asphyxia. First, there are published reports of over 50 unexpected deaths that followed the inhalation of gas propellant, often under asphyxia circumstances.

"The second syndrome of sudden unexpected death occurs with patients with asthma. Epidemiological and clinical observations have related it to the excessive use of pressurised bronchodilator aerosols.

"The present findings suggest that the cardiac toxicity of the gas propellants may be a cause of sudden asthma deaths."

● Hydrofluoric Acid Production

A 1979 report in *Chemical Engineering*⁷⁷ reports that:

"Producers are definitely not trigger happy about expanding right away. They remember the ban on fluorocarbon propellants, which by 1978 had shrunk this number-one HF market by 23%, from a 1974 consumption level of 305 million lb/year to 230 million lb last year. **And they still feel edgy about pollution-control regulations that virtually prohibit fluoride emissions from HF plants and closely monitor the disposal of waste materials (mainly gypsum).**

"The chemical goes into such uses as water fluoridation, and the manufacture of fluorosilicates and aluminium fluoride."

● Fluoride in Air-conditioning gases

The June 1968 issue of *Air-Conditioning, Heating and Refrigeration News*⁷⁸, printed in America, warned that the use of Freon 12 (F12 is a fluoride compound), had proved hazardous and the American Federal Trade Commission had proposed a ruling that refrigerant F12, when sold as a quick freeze aerosol spray, must be labelled concerning the hazards of the product, the label to read:

"Warning - do not inhale. Use only as directed. Death may result from inhaling this product".

● Death of 3 Sailors after Inhaling Freon Gas

At San Diego, the US Navy ordered a formal investigation into a gas leak in the air-conditioning plant that killed three sailors on the nuclear-powered guided missile cruiser Bainbridge and hospitalized seven more.

Three sailors were overcome by gas leaking from a valve in the ship's air-conditioning plant while making a routine check of compartments in the docking Bainbridge when they were overcome. All three men died about 45 minutes later at the Naval Regional Medical Centre of "cardiac arrest due to anoxia as a result of (refrigerant) gas inhalation", a Navy hospital spokesman said after an autopsy. The refrigerant gas (fluorocarbon 113) killed the men by replacing the oxygen in their blood⁷⁹.

● W.A. Brick company charged with failing to monitor and report on fluoride air pollution

Midland Brick, Western Australia's largest brick

manufacturer, was found to be in breach of Section 58(1) of the Environment Protection Act from 13 March 2005 to 18 July 2006, after an investigation by the Environment Protection Unit. The charge relates to Midland Brick's alleged failure to monitor - and report the results from - two of three ambient monitors around its Swan Hill brickworks, which measure ground-level concentrations of hydrogen fluoride. The charge carries a maximum penalty of \$125,000.

The department amended Midland Brick's licence after it was discovered that a 2004 amendment by then environment minister Judy Edwards had produced the unintended effect of allowing fluoride emissions to increase five-fold⁸⁰.

● 10 Fold Increase in Fluoride Pollution from Shell's Geelong Refinery

The Victorian Environment Protection Authority has lifted the previous standard allowing emission of 14 grams of fluoride per minute to 140 grams per minute under a new EPA licence⁸¹.

Comment: The new standard of 140 grams per minute is a total of 2,120 grams per day, or 74 tonnes per annum, of fluoride waste emitted into the atmosphere. Fluoride air pollutants are so toxic that they are measured in millionths of a gram, [micrograms (μg) per cubic metre ($\mu\text{g m}^3$)]. If this air pollution were to spread evenly over a 10 kilometre radius from the refinery to a height of 300 metres, 2.12 μg of fluoride would be added every day to every cubic metre of that air.

This compares to damage caused to some varieties of grapes leaves with a daily exposure of 0.22 $\mu\text{g m}^3$ of fluoride in air and is ten times the level which damages the leaves of sensitive grape cultivars⁸².

● Alarming link between respiratory complaints and power-station pollution

"It is common for children at Lake Munmora public school on the central (NSW) coast to take out their 'puffer' and inhale medication to clear their breathing when the pollution is bad.

"Forty per cent of children at the school - located between two large power stations - suffer from respiratory complaints, and most of them are asthmatics, according to statistics issued yesterday. The school has had to cancel its daily 15-minute educational runs because so many children were not allowed to take part because of asthma or other respiratory complaints. Three general practitioners who work in Lake Munmora and adjoining Gwandalan have issued a statement saying they estimate the incidence of asthma is 30 per cent amongst children under 12 - twice the national rate, and that recurring bronchitis in adults who do not smoke is greater than normal⁸³." Fluorine is a common element in coal⁸⁴.

● Asthma - the Fourth biggest Killer

Asthma was the most common medical reason for the admission of children to hospital in Australia, according to Professor Peter Phelan, of Royal Melbourne Children's Hospital⁸⁵. Figures provided by former consultant physician at the Royal Adelaide Hospital, Dr R. Monro-Ford, indicated that the death rate from asthma was climbing steadily. In 1975 it was responsible for 342 deaths in Australia. Ten years later, the figure had risen to 803, making it the fourth-biggest cause of death. He said Australia, New Zealand and Britain have experienced virtual epidemics of asthma deaths since the early to mid-1960's. (*This period coincides with increasing introduction of fluoride chemicals into water supplies; increasing air pollution with fluorides and other chemicals from fluoride-emitting industries, coal-fired power stations,*

benzine in air exhausts and aerosols, all of which contain fluoride chemicals. Asthma is a symptom of fluoride poisoning⁸⁶. - editor.)

Fluoride, The Expensive Pollutant

The industries with major fluoride air pollution problems represent some of the most powerful interest groups in the country, including international companies.

In a highly competitive economic system, many companies will fight for their lives to avoid spending large amounts of money to control pollution. Many have well organized lobby groups. When plants are required to keep fluoride out of the air, they will, if permitted, take the next cheapest route and dump it in the water. It is in the interest of polluting companies to lobby for lax air pollution standards and encourage Governments, Health Departments, and Medical and Dental Associations to promote pollution of public drinking water supplies with toxic fluoride wastes.

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