Fifty Years of Fluoridation (1945-1995)
by Richard G. Foulkes, M.D.

Increasing Dosage and Long Term Effects
Fluoride wording deleted from bill in Hawaii
Fluoride, teeth and the Atomic Bomb
Fluoride: we all live in a mellow apathy

The year, 1995, marks the 50th anniversary of fluoridation: the deliberate addition of fluoride to drinking water, for the avowed purpose of preventing tooth decay in children. Differences with orthodoxy are apparent in literature appearing from those in the dental profession and concerns over its viability as a social program are being expressed by its strongest supporters.

Decayed, Missing and Filled Teeth

In 1987, Dr. Allan Gray, then Director, Division of Dental Health Services for the province of British Columbia, Canada, published an article in the Journal of the Canadian Dental Association (vol 10, 763-764) pointing out that it was "time for a new baseline." He pointed to the finding that tooth decay, as measured by DMFT (Decayed, Missing and Filled Teeth) rates were falling "drastically" in non-fluoridated areas as well as fluoridated. Six years later, in 1993, Dr. D. Christopher Clark, Associate Professor, Faculty of Dentistry, University of British Columbia, wrote in the same journal (vol 59, 3, 272-279) that "[T]he traditional thinking about the way fluorides prevent dental caries has changed.

Recent studies have demonstrated that the role of fluorides in the prevention of dental caries is predominantly through remineralization, which is primarily a posteruptive phenomenon. The primary effect from fluorides is post-eruptive, not pre-eruptive, and more therapeutic than preventive." These "recent studies" are represented by those of Doctors O. Fejerskov and F. Manji of the Royal Dental College, Aarhus, Denmark and Dr. A. Thylstrup, Royal Dental College, Copenhagen, Denmark and others such as Dr. J.M. Ten Cate of the Academic Center for Dentistry, Amsterdam, the Netherlands. These European dental scientists contributed their views to an international symposium on fluorides that was held March 21-24, 1989 in Pine Mountain, Georgia, U.S.A. The proceedings of this Conference were published as a "Special Issue" in the February 1990 edition (Vol 69) of the Journal of Dental Research.

Special Issue of Journal of Dental Research

In the same Special Issue, Doctors H. Kalsbeek and G.H.W. Verrips of the Netherlands Institute for Preventive Health Care reported on their studies of dental caries prevalence and the use of fluorides in different European countries. They stated (on page 731) that "no significant association was found between the availability of fluoridated water and fluoride dentifrice and the DMFT in 12 year-old children." They found, also, that "[I]n most European countries, the 12 year-old DMFT index is now (1985-1988) relatively low as compared with figures from 1970-1974." Their findings agree with those found in the smaller population studied by Dr. Gray in 1987. Does this indicate a shift away from fluoridation on the basis of new scientific findings?
Is science the nemesis of fluoridation? Herschel S. Horowitz, of the National Institute of Dental Research, National Institutes of Health, Bethesda, Maryland U.S.A., could appropriately be called a "crusader" for the cause of fluoridation. He summarized (p760-764) his concern regarding the many factors that could influence public acceptance of the procedure. Horowitz classifies the factors as "socio-political."

These factors are:

1. The change in allocating Federal (U.S.) funds to States that prevents the "earmarking" of money for fluoridation as opposed to "block funding" in which fluoridation must compete with other public health priorities;
2. The perception by the public of dental fluorosis as a "problem" when they become increasingly aware of the high incidence being reported;
3. The publicity being given to the results of studies such as the 1986-1987 oral health survey of U.S. schoolchildren which showed a continuing decline in caries prevalence in both fluoridated and non-fluoridated groups, which called forth a declaration, by those reporting the data, that "caries is no longer a public health problem";
4. The public's perception that fluoridation is environmental pollution; and
5. The increase in public anxiety with regard to the many possible adverse health effects.

Dr. Horowitz expresses his exasperation with the democratic process. "In some localities," he writes, "politicians are empowered to make such decisions (i.e., to fluoridate) but, frequently, in order to protect their perceived re-election potential, they decide that a public vote should be held on community water fluoridation, which, in effect, transfers the responsibility to an uninformed or misinformed public." His opinion of those professionals who do not possess his zeal for fluoridation is not much higher than his perception of the public. "The public and health care practitioners," he writes, "are ill-informed or misinformed about the value and appropriate uses of fluoride, and about the relative benefits produced by fluoride compared with other methods promulgated for the prevention of caries."

Dr. Horowitz's first point appears to be an admission that the fluoridaters have had, in the past, a potent way to bribe financially strapped communities to add fluoride to their water supplies. This "incentive" has worked well in the past to tie fluoridation in with Federal grants for upgrading community water systems. It is noteworthy that he is not mentioning any curtailment of Federal funds that are used to promote fluoridation both in the U.S. and abroad.

Fluorosis

His second point concerns dental fluorosis. This has long been painted as a "mild cosmetic" change in the teeth of children and adults who were exposed to fluoride during dental development. There is sufficient understanding of the process underlying dental fluorosis and the implication of deposition of fluoride in the skeleton and soft tissues in papers that accompany Horowitz's in the Special Issue. Fejerskov states (p693) that "[the clinical features reflect that fluoride given in low concentrations over the long period of tooth development results in various degrees of enamel porosity (or hypomineralization)." He continues, "[I]n its mildest forms, the porosity is to be found
in the outermost enamel only, but the entire tooth surface is involved. With increasing severity, both the depth of enamel involvement and degree of porosity increase. Assuming a relatively constant exposure level (most commonly water-borne fluoride), all surfaces of a given tooth will be equally affected. "In more severe forms of dental fluorosis" Fejerskov continues (p694), "the tooth erupts into the oral cavity entirely chalky white. The degree of porosity (hypomineralization) of such teeth result in diminished physical strength of the enamel, and parts of the superficial enamel may break away."

Dr. G. M. Whitford, of the School of Dentistry, Medical College of Georgia, U.S.A., well-known for his work on the metabolism and toxicity of fluoride and support of water fluoridation, has this to say about prevalence (p546). "There is a growing body of evidence which indicates that the prevalence and, in some cases, the severity of dental fluorosis is increasing in both fluoridated and non-fluoridated regions in the U.S."

Later, he continues, "This trend is undesirable for several reasons: (1) it increases the risk of aesthetically objectionable enamel defects; (2) in more severe cases, it increases the risks of harmful effects to dental function; (3) it places dental professionals at an increased risk of litigation; and (4) it jeopardizes the perception of safety and, therefore, the public acceptance of the use of fluorides."

In countries such as China and India, that have large populations living in endemic fluorosis areas, the various degrees of dental fluorosis are seen as a continuum with accompanying bone deposition which leads, in many cases, to crippling skeletal fluorosis, paralysis and soft tissue disease. If dental fluorosis were to be "officially" recognized as an "adverse effect" by senior Government, it would be "game over" for fluoridation as a "safety factor" would be required that would lower the Environmental Protection Agency's (EPA) Maximum Contaminant Level (MCL) for drinking water to 0.2 mg/L fluoride (from its present 4.0 mg F/L). This would be very much lower than the "optimal" concentration of 0.7-1.2 mg/L fluoride recommended for water fluoridation.

This lower figure would be based on the 2.0 mgF/L concentration established (by EPA) as the level to produce dental fluorosis and a safety factor of 10. In actuality, dental fluorosis is related to total ingestion of fluoride of 0.75-1.0 mg fluoride per day (Whitford in The Metabolism and Toxicity of Fluoride, Karger, 1989). It is of interest that a recent Canadian review, Inorganic Fluorides, carried out by the Ministries of Environment and Health under the Canadian Environmental Protection Act and published in 1993, declined to assess either dental fluorosis or the beneficial effects of fluoride in the prevention of dental caries, the subject of Dr. Horowitz's third concern.

Dental fluorosis, to sum up, is a noticeable and undesirable cosmetic change due only to the influence of fluoride on developing teeth. Because it is associated with damage to the teeth and deposition of fluoride in the skeleton and soft tissues, it is an adverse effect with psychological as well as physical implications. The injury to the enamel, described by Fejerskov, must predispose toward caries, not act as a preventive. Dr. Horowitz and his pro-fluoridationist colleagues have good cause to be concerned about recent studies of effectiveness.
Cost Effectiveness

By the very nature of statistical science, selective, small scale studies can show reductions in caries as measured by the DMFT or DMFS (tooth surfaces) of 40% or better, the figure used to calculate "cost-effectiveness." For example, a British Columbia study compared the DMFS of 109 children in fluoridated Kelowna and 93 children in non-fluoridated Vernon. The DMFS of these 10 year-olds was 1.65 and 2.5 respectively. The "benefit" for the fluoridated group was 34%. But, the difference was 0.85 of a tooth surface! This is not clinically significant and is within "examiner error" that has been shown to be, typically, between 15-20%.

Dorothea F. Radusch wrote in the Journal of the American Dental Association (28, 1959-62) as long ago as December 1941 that this may be as high as 74% for carious tooth surfaces. When studies based on large populations are reported honestly, "the truth will out." Such is the case with the 1986-87 oral health survey of U.S. schoolchildren (39,207 children ages 5-17 years). This, as Horowitz pointed out, showed a continuing decline in caries prevalence in both fluoridated and non-fluoridated groups. Analysis of the data (obtained through the Freedom of Information Act) by Dr. John Yiamouyiannis, a well-known biochemist from Delaware, showed no significant differences in decay rates of permanent teeth or the percentages of decay-free children in fluoridated, partially fluoridated or non-fluoridated areas. This study was published in Fluoride, the journal of the International Society for Fluoride Research (vol 23, 2) in April 1990.

Analysis of the same data by Doctors J. A. Brunelle and J. P. Carlos of the National Institute of Dental Research (NIDR) and published by the U. S. Public Health Service in Health Benefits and Risks February 1991, the promoter's "Bible," showed a "benefit" of 17.7% which is within both mathematical error exhibited in their paper (Yiamouyiannis) and within "examiner error" and is, therefore, not significant.

Prof. Y. Imai of Japan studied 22,000 schoolchildren in 1972 in naturally occurring fluoride areas (nat) and found increased caries with increased levels of fluoride. A study of 23,000 elementary schoolchildren in Tucson, Arizona, by Dr. Cornelius Steelink in 1992, showed increased caries with increased levels of fluoride (nat) in drinking water as did Prof. S.P.S. Teotia of India who reported on a study (nat) of 400,000 children from 1973 to 1993. Dr. John Colquhoun found in a study of 26,405, 12-13 year old schoolchildren in New Zealand, in 1989, that those living in artificially fluoridated areas had slightly more caries than those living in non-fluoridated areas. Furthermore, both Colquhoun and Steelink showed in their studies that there was a definite positive correlation between low family income and the prevalence of caries. This was independent of the level of fluoride in drinking water and whether it was artificially added or occurred naturally.

Why is the public not better informed about this? Why do Dr. Horowitz and his colleagues, especially in the U.S., Canada, the U.K., Ireland, Australia and New Zealand, the major fluoridating countries, continue not only to hang on to this scientifically bankrupt procedure but also to promote it actively. It is of interest to note that dental researchers in largely unfluoridated Europe no longer consider that the systemic use of fluoride has a place in the primary prevention of tooth decay. Some of these, consider that topical application, under specific conditions, may prevent caries.
formation by "re-mineralization" of incipient lesions. Fluoridation does not prevent tooth decay but it contributes to dental fluorosis and other adverse health effects that will be discussed later. Can it be perceived as environmental pollution?

Environmental Pollution

Fluorine is the 13th most abundant element on earth. It is so volatile that it is found in nature as fluoride in combination with other elements, such as calcium, magnesium, phosphates etc. Fluoride is not an "essential element" so far as human nutrition is concerned. It is not recognized as such by the U.S. Food and Drug Administration (FDA) and has never been demonstrated as "essential" by animal experimentation. However, fluoride is essential for modern industry, the fluoride wastes of which are responsible for pollution of the air, land and water. The fluoride placed into the majority of drinking water supplies for the purpose of increasing natural levels, if any, to the "optimal concentration" required by fluoridation is in the form of hydrofluosilicic acid or sodium silicofluoride. These are waste products of the phosphorous and phosphate fertilizer industries.

These products are obtained from scrubbing factory stacks to remove wastes such as sulphur hexafluoride that would, otherwise, cause atmospheric pollution. These products are introduced into public drinking water systems with little regard to other contaminants that may be present such as lead, mercury, arsenic and radionucleides.

In the US, a Water Chemicals Codex addresses the Recommended Maximum Impurity Content (RMIC) for lead and arsenic but not radionucleide levels. George Glasser, reviewing the subject for the Sarasota Eco Report (Vol 4, No 12,) of December, 1994, states: "[A]nother coproduct from phosphate fertilizer manufacture is yellow-cake uranium. The radioactive coproduct is used in the manufacture of nuclear weapons and the nuclear power industry. The wastes from the manufacture of phosphate fertilizers are also contaminated with radium and are among the most concentrated radioactive wastes produced from natural materials. These radioactive wastes are referred to as naturally occurring radioactive materials (NORM) and the EPA has no regulations for NORM waste disposal." Neither the publication Toxicological Profile for Fluorides, Hydrogen Fluoride and Fluorine (F), prepared for the U.S. Department of Health in December 1991 nor the Canadian Government's 1993 review, Inorganic Fluorides, provide estimates of the amount of fluoride entering the environment via the fluoridation of water supplies.

The Canadian report does contain sufficient "clues" to enable an estimate. The example of Tacoma (population 250,400 (1990 census) in Washington State, gives an idea of the amounts. Fluoride plants' monthly reports were collected from the Tacoma City Water Department. The data are recorded in US gallons, pounds and "short," or US tons. The daily amounts, on average, are: 57,000,000 gallons of water processed through the system; 2,300 pounds (1.15 tons) of hydrofluosilicic acid and 4,100 pounds (2.05 tons) of sodium hydroxide are added. The hydrofluosilicic acid is "commercial strength," 24.20%. The daily amount of fluoride ion added to the water, and therefore, into the environment, is estimated to be 424.62 pounds (0.2 tons).

Annual discharge of hydrofluosilicic acid into the Tacoma water system, on average, is 419 tons. The annual amount of fluoride ion is 73 tons. It can be calculated that on the
basis of an intake of one pint of water per day for children aged 0-11 years, the "target group" of fluoridation, as estimated by Dr. F.J. McClure in 1943 and Dr. J.S. Walker, in 1963, children consume about 0.06% of the water supply. Therefore, 99.04% is used exclusively to carry fluoride elsewhere, largely through the sewer system where it is a source of pollution to the environment. One can truthfully state that "for every $1000 spent for fluoridation chemicals, less than fifty cents goes to children."

**Fluoride Discharged into Environment**

On the basis of the Tacoma data, it can be calculated that for every one million persons living in a fluoridated area, 292 tons of fluoride ions are discharged into their water supplies each year. For the population of 134 million Americans the A.D.A. states, who are on fluoridated water supplies, this is an estimated 39,000 tons of fluoride annually. The Canadian study, mentioned previously, permits a calculation of 2000 tonnes (1 tonne = 2240 lbs.) of fluoride annually discharged into the environment from fluoridated water supplies. This amount places this source of fluoride discharged in water second only to phosphate fertilizer manufacturing, but ahead of chemical production, coal-fired power, primary aluminium production, and others that are identified.

Fluoride, in community water systems, enters the environment in various ways. Surface runoff from fire fighting, washing cars, watering gardens may enter streams directly or through storm sewers at the "optimal concentration" of one part per million (ppm) or 1 milligram per liter (mg/L). Most enters during waste water treatment. T.T. Masuda reported in 1964, after studying a large number of US cities, that concentrations of fluoride in sewage effluent in fluoridated cities even after secondary treatment was 1.16-1.25 mg/L. This compares to 0.38 mg/L fluoride in unfluoridated sewage effluent.

Studies by L.L. Bahls, reported in 1973, and L. Singer and W.D. Armstrong, in 1977, demonstrated that the elevation of fluoride levels in sewage effluent could persist for a considerable distance, up to 16 km. in one instance. The promoters of fluoridation argue that dilution reduces concentration over distance. But, the amount of fluoride is deposited in sediment, either locally or, in the case of rivers, in the estuary. Fluoride in sediment may persist for 1-2 million years. It may re-contaminate water if dredging takes place. It also has a direct toxic effect on sediment-dwelling organisms. Those responsible for the 1993 Canadian Government Review, Inorganic Fluorides, concluded that inorganic fluorides are entering the Canadian environment at concentrations that may cause long-term harmful effects to biota in aquatic and terrestrial ecosystems.

With regard to the effects on aquatic organisms, the authors extrapolate laboratory findings to the field, to yield estimated adverse effects thresholds (lethal, growth impairment and decreased egg production) of 0.28 mg/L fluoride for fresh water species and 0.5 mg/L for marine species. These are exceeded by surface runoff and sewage effluent from fluoridated water systems. The author of this article and Anne Anderson published a review in Fluoride (Vol 7 No 4, 1994) showing how effluent from fluoridated water systems in British Columbia and Washington State could be contributing to the loss of salmon species in the Fraser and Columbia-Snake river systems.
This could be attributed not only to direct toxic effects on all stages of fish development and their feed; but also, to the inhibition of migration. This latter was shown by Drs. D. Daemker and D.B. Dey in their study of the John Day Dam on the Columbia river published in 1989. Fluoride is toxic in low concentrations to all living things. The authors of the Canadian review, in a section entitled "Ecotoxicity," present a review of the effect of inorganic fluoride, airborne in particular, on plants and animals, especially herbivores.

**Fluoride More Toxic than Lead**

Fluoride is known to be more toxic than lead and only slightly less toxic than arsenic. Recently, in 1994, N.P. Gritsan, G.W. Miller and G.G. Shmalkov reported their study on the effect of various pollutants on abnormal plant development in Southeast Ukraine. They found that among 17 elements, including fluoride, cadmium, lead and aluminum, fluoride was the most toxic. Since humans share the same enzyme systems and DNA mechanisms as other biota and fluoride is a proven enzyme and DNA repair inhibiting agent, why would anyone think that humans are immune from its toxic effects?

Dr. Horowitz appears to be more concerned about the "increase in public anxiety" that may lead to lack of public acceptance of fluoridation, than about the possible adverse effects of fluoride on humans. In September 1994, the 20th Conference of the International Society for Fluoride Research was held in Beijing, China. This Conference was jointly sponsored by the Ministry of Health, People's Republic of China, the World Health Organization and The National Natural Science Foundation of China. In attendance were 200 researchers from the host country and about 150 from other countries. The major area of concern was the prevalence of fluorosis in China. The "endemic fluorosis" areas of China contain a population of 100 million. Of these, 43 million people have dental fluorosis of all degrees of severity; 2.4 million have skeletal fluorosis, a severe crippling disease with bone deformities.

The Chinese presented papers using observations from studies of both experimental animals and humans showing the relationship between poor diet, especially calcium deficiency, repeated childbirth and duration of exposure, to the severity of the effects of chronic fluoride poisoning. The Chinese reported not only adverse effects on teeth and bones but also those involving soft tissues. Some of these occur at surprisingly low levels of total fluoride ingestion, some of which were within the range of total intake reported for fluoridated areas of the U.S. and Canada. They presented evidence of increased fractures, poor fracture healing and bone outgrowths (exostoses) as some of the skeletal effects.

With regard to soft tissue involvement, studies were presented that dealt with neurological lesions. They ascribed paralysis to direct action of fluoride on the central nervous system in addition to the effect of pressure on motor nerves by encroachment of fluorotic bone. Studies also showed that thyroid dysfunction, heart disease and abnormal electrocardiograms and cerebrovascular disease were more prevalent in the endemic fluorosis areas. An association was shown between chronic fluoride intoxication and lowered intelligence as measured by IQ tests; chromosomal abnormalities; decreased immunity; increased senile cataracts; and cancer. The Chinese scientists also reported higher infant death rates due to congenital abnormalities and
higher death rates generally in endemic fluorosis areas. They also reported variable synergistic effects between fluoride and aluminum, fluoride and arsenic, fluoride and selenium. The foregoing would almost appear to be the table of contents of Dr. John Yiamouyiannis’ book, Fluoride, the Aging Factor (Health Action Press, Delaware, Ohio), and the older publication, Fluoridation, the Great Dilemma, by Drs. George L. Waldbott, Albert W. Burgstahler and H. Lewis McKinney (Coronado Press, 1978).

Dr. Horowitz and his colleagues can be expected to attempt to refute this evidence of the potential harm from fluoridation by arguing that the endemic fluorosis areas in China are largely rural and that the people are impoverished, with poor nutrition, especially calcium deficiency. They would also point to the higher levels of fluoride in water, 2.5-5 mg/L, and to additional sources of fluoride such as coal burning for cooking and for drying corn, wheat and millet. They would deny that these adverse effects occur in the US where fluoridation has been practiced since 1945. To do this successfully, they would have to refute the many studies published in peer-reviewed journals, that show that in the U.S. there is a significant relationship between residence in fluoridated areas and most of the problems described by the Chinese.

These studies show increases in chromosomal abnormalities such as Down's Syndrome (mongolism) as demonstrated by Dr. Ional Rapaport in 1954 and 1957. They show, also, increased overall cancer deaths, (Drs. Dean Burk and John Yiamouyiannis, 1977); and deaths from osteosarcoma, a rare bone cancer, in young men reported by Dr. R. N. Hoover and others in 1991 and Dr. P.D Cohn in 1992. The studies on osteosarcoma were inspired by the finding of the U.S. National Toxicology Program in 1989 that there was a dose-related relationship between fluoride and osteosarcoma in male rats.

The study found, also, a relationship between fluoride and an extremely rare form of liver cancer in the experimental animals as well as cancers of other areas such as the mouth. When the findings were "peer reviewed," the conclusions were termed "equivocal," a term that gave rise to the controversy that continues to this day.

**Fluoridation and Hip Fractures**

They would also have to refute the studies that show a higher incidence of hip fracture in residents of fluoridated areas. This includes U.S. studies published in the Journal of the American Medical Association (JAMA) by Dr. S.J. Jacobsen in 1990 and Christa Danielson and others in 1992. Studies from abroad have shown the same relationship between fluoridation and hip fractures: Dr. C. Cooper (UK) in JAMA, July 24, 1991 and Dr. J. Colquhoun, New Zealand Medical Journal, August 1991. There are also studies showing the effect of low concentrations of fluoride on the immune system such as that in Complementary Medicine, 1992, by Dr. Shiela L. M. Gibson of the Glasgow Homeopathic Hospital.

There are studies from India where endemic fluorosis is a major public health problem. Publications from this country cover many aspects for which their extensive literature must be consulted. One important area of research in India deals with one of the most frequently encountered symptoms that occurs long before skeletal fluorosis becomes clinically obvious; gastrointestinal discomfort. Outstanding work on this has been carried out by Dr. A.K. Susheela and her co-workers at the All India Institute of Medical Sciences, Delhi. One of her papers, published in Fluoride (Vol 25, No 1) 1992
shows, by means of photographs taken through an endoscope, the unhealthy appearance of stomach mucosa when it is exposed to very low concentrations of fluoride. These texts should be consulted for further examples of scientific studies that counter the false notion that fluoride, even at optimal concentration, is without harm.

Those individuals and institutions that promote fluoridation have by their actions, created endemic fluorosis in the US, Canada and other countries that have adopted the practice. Like China, before defluoridation, 43% (or more in some studies) of children in these fluoridated areas exhibit dental fluorosis. Is it possible that 2.4% of the public have largely unrecognized skeletal fluorosis? How many deaths from congenital abnormalities could be laid at the doorstep of fluoridation? How many tons of antacids are consumed by North Americans for "functional dyspepsia" (that is, stomach ulcer pain without demonstrable ulcers) caused by drinking fluoridated water and beverages?

People living in endemic fluorosis areas, such as China and India, frequently exhibit as "early" signs of the development of later skeletal deformity, back stiffness along with joint and tendon pain. How many persons residing in fluoridated areas have these symptoms caused by fluoride? How many are misdiagnosed as "repetitive stress syndrome," "tendonitis" or "arthritis" of unknown type or cause?

Physicians Have Low Index of Suspicion

That we do not have a full picture is due to two major factors.

The first, is that physicians (and other health professionals) have a low index of suspicion that fluoridation could be associated with disease. They have been assured by the promoters that fluoride is safe and they cannot find fluoride listed in the commonly used texts in the differential diagnosis of various related diseases; for example, articles dealing with "functional dyspepsia," thyroid dysfunction, arthritis etc. do not present fluorosis as a possibility.

Second, the reason that we, in the U.S. and Canada do not see as many of the deformed and damaged teeth and severe bone deformities as in countries such as China and India may be owing to our good fortune in having adequate dietary calcium, magnesium and vitamin C, the deficiencies of which have been demonstrated to increase severity of fluorosis.

Dr. Albert Schatz reported on the increased infant death rates due to congenital malformations in Chile that were associated with water fluoridation. In his paper, published in the Journal of Arts, Science and Humanities in January 1976, he made the following statement: "The large scale, overall statistical studies which compare total populations in fluoridated and control cities in the United States actually conceal the very information that is purportedly being sought. This occurs because the relatively well-nourished majority numerically overwhelms those groups in the undernourished minority which are the most susceptible to fluoride toxicity."

When are in-depth studies going to be carried out on the adverse effects of fluoridation in the population of our own "third world," the impoverished living in the slums of fluoridated cities in the US? When is Canada going to do likewise? The Canadian
Government review of inorganic fluorides, after condemning fluoride as a threat to both aquatic and terrestrial plant and animal life and possibly affecting global warming, nevertheless adopt the view of the promoters that "inorganic fluorides (i.e., fluoride ions) are not entering the environment in quantities or conditions that may constitute a danger to human life or health."

The reader may recall that those responsible for this study deliberately avoided discussion of dental fluorosis in humans (although they did present it as a problem in their discussion of herbivores). The authors of the Canadian review state that, in spite of their conclusions, they cannot lightly dismiss the implications of the dose-response trend in the occurrence of osteosarcoma in rat experiments. They also express reservations regarding the potential of adverse effects upon human reproduction, development, the central nervous and immune systems; but only at levels required to produce skeletal effects.

**Poor Nutrition Increases Risk of Fluoride Toxicity**

In both countries, there is cause for concern about the relationship between poverty and poor nutrition and what we know about its increasing the severity of fluoride intoxication. In the US, a Report issued January 30, 1995 by the privately funded National Center for Children in Poverty stated that "more than a quarter of American children under age 6 were living in poverty in 1992." This is 6 million children. How many of these live in fluoridated cities? In Canada, the Canadian Institute for Child Health, a nonprofit organization funded in part by Health Canada, reported, in 1994, that 21% of Canada’s children, 1.2 million, live in poverty. It is ironic that the poor are the group that are frequently pointed to as being best served by fluoridation.

This is very wrong on several counts.

First, these are the most vulnerable to severe adverse health effects of all types.

Second, if we were to accept the most recent rationalization for fluoridation, to establish the means for "remineralization," the poor are the least likely to meet the preconditions laid down by such advocates as Drs. G. Rolla, D. Gaare and Bogaard of the Dental Faculty of Oslo, Norway.

These researchers write in their abstract on page 158 of the Proceedings of the Beijing Conference: "It can be concluded that fluoride is most effective in subjects with reasonably good, but not necessarily perfect, oral hygiene." Without the means to pay for dental care, it is hardly likely that the children of the poor, especially the "working poor," would employ oral hygiene to the standard described by Dr. Rolla et al.

Nation’s Health, the official newspaper of the American Public Health Association, one of the organizations that continue to endorse fluoridation, contains a relevant item in its issue for January 1995. The newspaper reports the findings of a study conducted at Harold Washington Elementary School in Chicago. This study involved 128 first, second, third and fourth grade graders that were given oral examinations in November 1993 and June 1994. "During the initial exam," the article relates, "dentists found 135 cavities. Parents were notified and given names of public aid dentists. However, when dentists conducted the second exam seven months later, they found 127 cavities,
representing both untreated cavities found in the first exam and new cavities. Altogether 23 students experienced an increase in cavities, while 32 experienced a decrease, meaning they received dental treatment. The remaining students experienced no change."

The author of the study, Susan Diamond MS, RD, concluded that many students at this inner city elementary school have never visited a dentist's office. She observed that only the occurrence of pain alerts many students' parents to bring them to the dentist. She attributes the low priority of dental care to lack of dental instruction at school and in the home. "Many students," she is quoted as saying, "do not own tooth brushes, and others must share them with family members." We must add that Chicago, according to the U.S.P.H.S. Fluoridation Census, 1985 has been fluoridated to 1 ppm since November 1968. In order that the foregoing is not interpreted as an endorsement of the topical use of fluoride, the reader is invited to look up the paper of Kalsbeek and Verrips presented in Georgia in 1989 where they found no significant relation between the decline in caries and the availability of fluoridated water or fluoride dentifrices.

Other investigators have reported similar findings: Dr. M. Diesendorf, who presented a study in Nature (July 1986) involving eight developed countries over a period of 30 years; and, Dr. John Colquhoun who reported in New Zealand Environment in 1991 that study of dental caries over time in New Zealand showed that a sharp decline was in evidence before fluoridation and before the availability of fluoridated tooth paste.

Toxic Dose is Probably 5 mg

Furthermore, some methods of applying topical fluorides to the teeth of children may be life-endangering. Dr. G. M. Whitford's paper presented to the Georgia symposium and included in the "Special Issue" of the Journal of Dental Research, concluded that the "probable toxic dose" (PTD) is approximately 5 milligrams (mg) of fluoride for each kilogram (kg) of body weight (1 kg = 2.2 lbs).

For a 2-year-old child (average weight 11.3 kg) the PTD is 57 mg. This quantity, according to Whitford, is contained in 57 grams (2 ounces) of a 1000 ppm fluoride tooth paste, 38 grams of 1500 ppm tooth paste, 248 milliliters (mL) (8 ounces) of a 0.5% sodium fluoride mouth rinse and only 4.6 mL (less than 1 teaspoon) of 1.23% Acidulated Phosphate Fluoride (APF) gel. A young child is expected to hold this highly toxic (12,300 ppm) material, poured into 2 trays of 2.5 mL each, for 5 minutes. How many parents are told by the dentist that if the child were to swallow the APF gel, he could die?

Whitford's Probable Toxic Dose may be lowered in the future. A mass poisoning with fluoride from a faulty water system in Hooper Bay, Alaska in 1993 indicated that the PTD may be as low as 0.3 mg of fluoride per kg body weight. The implication of this finding should be clear. If these facts concerning the possible adverse health effects of fluoride were to become known to the general public, it should increase the "public anxiety" that worries Dr. Horowitz and his fellow promoters. So far, little interest has been shown by the press. To the contrary, the media dutifully repeats verbatim the press releases put out by the endorsing agencies such as the American and Canadian Dental Associations (CDA and ADA).
A good example is the treatment accorded the 50th Anniversary of fluoridation. The press release from the ADA with its dateline "Chicago, January 24, 1995" bears the caption:

50 Years of Fighting Tooth Decay with Fluoride: 1945-1995. "On January 25, 1945," the text begins, "Grand Rapids Michigan embarked on a trend-setting study and became the first community to adjust the amount of fluoride in its water to an optimum level." The press release makes the statement that "more than 134 million Americans across the country are served by water supplies where the fluoride concentration has been adjusted to the optimal level for dental health. In Grand Rapids in 1945 before fluoridation, better than 99% of the children examined experienced dental decay. After the famed 'Grand Rapids Study', dental decay plummeted 65%.'"

Let us take a closer look at this landmark event. Prior to 1945, a search took place for the cause of dental staining in states such as Colorado and Texas. During the course of study, observations were made that this disfigurement appeared to confer some type of increased resistance to dental caries. The causative agent for the tooth discoloration ("mottling") was discovered to be fluoride naturally occurring in drinking water. A number of studies of this reported phenomenon were undertaken. The most important of these was the study of 21 U.S. cities by Dr. H. Trendley Dean of the U.S. Public Health Service.

These studies would not be given much credence today; they would not pass through the gates of peer review to enter the scientific literature. Dean's work, in particular, that is still pointed to as the “classic” basis for the fluoridation hypothesis, did not meet even Dean's own criteria for constancy of water supply. Mathematical errors abound. “Variation” and “examiner error,” the latter well-known to Dean, negated the results.

Dr. F.B. Exner, of Seattle, a Radiologist who became an international authority on fluoride and strong opponent of fluoridation, prepared a report for the City of New York in 1955 entitled Fluoridation of Public Water Supplies. This was an analysis of the published studies of Dr. F.J. McClure and Dr. H. Trendley Dean, both of whom were "pioneers" in the early days of research on the dental effects of fluoride. Exner described their reports as being unscientific and inaccurate. Exner even suspected fraud. It was, perhaps, inevitable that Dr. Exner was given the opportunity to aid Mr. Kirkpatrick Dilling in his questioning of Dr. Dean, under oath as a witness in a suit to enjoin fluoridation of Chicago's water supply (Schuringa et al. vs City of Chicago) in 1960.

Dr. Dean was forced to admit that the studies of Galesburg, Quincy, Monmouth and Macomb and the studies of 21 cities with 7,257 children did not meet his own criteria and were, therefore, worthless. Of course, this revelation took place 15 years after the trials began; but it is difficult to believe that there were not those in high positions in the U.S.P.H.S., including Dean himself, who recognized the defects in these studies.

Dr. Philip R.N. Sutton, of the Dental School of the University of Melbourne, in his monograph Fluoridation, Errors and Omissions in Experimental Trials (Melbourne University Press 1959, 1960), pointed out that the trials which took place not only in Grand Rapids but also in Newburgh and Evanston in the U.S. and in Brantford, Canada, constitute the main experimental evidence that has led to fluoridation as a
public health measure. The hypothesis that was to be tested was that "a concentration of about 1 part per million of fluoride in the drinking water, mechanically added, inhibits the development of dental caries in the user."

Criteria for a Proper Trial

To carry out such a study properly, certain conditions must be met.

First, the investigator must select the participating communities with a view to ensuring that when two groups, fluoridated and non-fluoridated are to be compared, the water supply to both the trial population and the control population must be similar in all respects except for the mechanically added fluoride. If it is desirable to compare the results of mechanically fluoridated water at 1 ppm with the results from a naturally fluoridated water supply it is important that the latter also be at a concentration of 1 ppm and that the analysis of both water supplies are similar with regard to other components such as calcium, magnesium etc.

Second, the populations under study must be similar in all important respects: age, socioeconomic status and, if it is significant, racial composition. It should go without stating that residence in either the test area or the control area must be constant.

Third, such a trial, if it is to mean anything, must be of sufficient duration to measure the dental status of permanent teeth after exposure for at least a “10 year lifetime.”

Fourth, the common-sense "rules" of research must be followed. Attention must be paid to the size of the sample population. There must be uniformity in what is measured; for example, DMFT. Examinations of both the test population and the control population must be undertaken before the trial begins and at predetermined intervals. Mathematics must be accurate and the results corrected for “variation” and “examiner error.”

Finally, as in any study of the possible effect of any treatment, statistical methods must be used to evaluate whether the results obtained are due to "chance" or to the treatment, in this case fluoride at 1 ppm in drinking water.

Dr. Sutton's study of the fluoridation trials is meticulously documented with reference to the written reports prepared by the investigators and an examination of data that was made available. On publication, the Australian Dental Association sent copies to each of the principal investigators for review. The second edition (1960) contains a section in which these reviews are reprinted and the objections are answered by Sutton. In general, not one of the experimental trials met the criteria presented previously. Each had one or more errors or omissions that invalidate any results that are purported as being supportive of the hypothesis. The following deals superficially with the defects. Sutton's work must be consulted for details.

Grand Rapids Study

Grand Rapids had Muskegon for its control. There were large differences in sample size so that variability was high. In the test city, for example, samples varied from 1,806 children to 3; in the control, in 12 categories less than 20 children were examined.
One “group” in the control city consisted of one child. This grossly affects the reliability of a mean rate. Different methods of sampling were used and changes in examiners took place with no assessment of examiner variability. The first examination of caries in Muskegon did not take place until after Grand Rapids was fluoridated. This was a poor beginning. Finally, the coup de grace, the control city Muskegon, was fluoridated in July 1951, six and one-half years after the commencement of fluoridation in Grand Rapids. This rendered Muskegon useless as a control and occurred at a time when few of the permanent teeth had erupted in the fluoridated test city.

The promoters of fluoridation have stated repeatedly that “at Muskegon Michigan, the control city where fluoride-free water is used, the incidence of dental caries is unchanged.” Sutton points out that some of those presenting this statement in 1954 and 1955 seemed unaware that the experiment had ended in 1951 with the fluoridation of the control. But, was this statement true?

The authors of the study (Arnold et al.), mentioned, according to Sutton, that “a similar comparison (to Grand Rapids) of results at Muskegon shows the percentage reduction to range from 1.5% in 6 year olds to a high of 15.5% in 11 year olds in the permanent teeth. The percentage reductions used were obtained by expressing the difference between the most recent and the original DMF rate as a percentage. Variations in DMF rates obtained in intervening years are ignored.

If the results for Muskegon had been computed in 1946 instead of 1951, the reduction would have been 40.7% instead of 1.5% in the six-year-old group, and 32.7% instead of 15.5% in the 11-year-old children. The Grand Rapids trial did nothing to support the case for the fluoridation hypothesis. The children of both artificially fluoridated Grand Rapids and the fluoride-free control, Muskegon, experienced a decline in dental caries during the period of the trial from January 1945 to July 1951.

This should come as no surprise today in the light of the studies of Kalsbeek and Verrips, Diesendorf, Gray and Yiamouyiannis mentioned previously in this review. Several questions arise.

Was Muskegon's water fluoridated to terminate the experiment because it was discovered that DMF rates were declining in both cities?

Why did "reputable" members of the dental profession repeat to audiences in major dental meetings that there had been no change in Muskegon when they should have known the facts?

Why did some of these appear to be unaware that the trial had been terminated?

The "result" stated in the ADA press release of a reduction in tooth decay in Grand Rapids as a result of fluoridation is deceptive advertising.

The authors should be brought to account by the authorities. The same order of decline may have been demonstrated for Muskegon if a properly constructed study had been allowed to run its course!
Other Trials

The Evanston, Illinois study with Oak Park, Illinois as control, got off to a bad start.

A United Kingdom Mission (1953) that studied the Evanston trial observed that in Evanston the economic level was high and dental care was "outstandingly good." But, comparison of the caries rates before fluoridation showed that the control area, Oak Park, was found to have a lower caries rate than Evanston. Sutton uses 21 pages of his 73-page original report to attempt to come to an understanding of the many manipulations of the student groups that took place, in order to compensate for the lower caries rates encountered in the control throughout the test period.

The United Kingdom Mission was informed that yearly examinations had been carried out since the commencement of fluoridation on February 11, 1947 and would be continued until 1962. At the time of the UK Mission report, no examination of the control city had taken place (since February 26, 1947); and, in Evanston, only one age group was examined each year.

Sutton points out that the design of the trial provided for only two examinations, 11 years apart, to be made in the control city. The second examination, scheduled for 1958, was commenced in 1956 when it was apparent that the water supply of Oak Park would be fluoridated. This examination was completed November 1956 soon after the fluoridation of Oak Park on 1 August. The data from this study were not published for 10 years. Much of the data had not been released at the time of Sutton's book in 1959!

The authors reporting on this study made incompatible statements regarding sample size and what Sutton describes as "extraordinary changes of opinion regarding the significance of results based on the same data." Of some note is the evidence in the data of the effect of fluoride in delaying tooth eruption. The results of examinations carried out in Evanston 1946-1951 suggest a progressive decline in the number of erupted first permanent molar teeth in six year-old children. The results obtained in examinations conducted in 1953 and 1955 were omitted from the published reports.

Brantford, Ontario, Canada was the site of two independent trials. One was conducted by the City Health Department, the other by The National Health and Welfare Ministry. There were so many mathematical and other errors in the City report that its results, as Sutton states, must be treated with caution. The National Study is reputed to be the most complete of the 10-year North American trials.

Again, a bad start. The trial began over two and one-half years after the commencement of fluoridation of the Brantford water supply. Those responsible for the study probably reasoned that little change was to be expected in DMF rates until about six years after the commencement of fluoridation - the so-called "structural theory" popular at the time that has now, as indicated by the ADA Press Release, been replaced by the "remineralization" rationalization.

Sarnia, Ontario was selected as the "fluoride-free" control and Stratford, Ontario as the control city with natural fluoride to 1.3 ppm. The City of Brantford, over a period of 15 years, had provided more free dental services for children than most Canadian cities. As a result, the children of Brantford compared to those in the controls had both a
higher treatment and a better oral hygiene status. This was recognized by the authors of the report. No pre-fluoridation survey was carried out in this study.

The initial examination in 1948, not surprisingly, showed that tooth mortality (teeth which are missing or which must be extracted) was much higher in the controls. As in the other studies, there are marked deficiencies and omissions in the compilation and reporting of data. This, along with the absence of caries rates in Brantford and Sarnia prior to fluoridation, makes it impossible to establish that there was a marked reduction in the test city due to fluoridation.

The City of Newburg, New York was the test area; Kingston, New York was the "fluoride-free" control. These two cities situated on the Hudson River about 30 miles apart were said to be comparable in all ways, including comparable water supplies, except that Newburg's would have an addition of sodium fluoride. Again, as in other studies, the control city had no examinations until after fluoridation started in the test city on May 2, 1945. However, the major problem was that the water supplies were not comparable. The source of Newburg's water was surface water; Kingston's was obtained from mountain spring impounded. Analysis carried out by the US Geological Survey showed them to be of vastly different composition.

The water in Newburgh (N) had much higher values than Kingston (K) in the following: calcium (N 35.0 ppm, K 6.6 ppm), magnesium (N 3.6 ppm, K 0.9 ppm) and hardness (N 102 ppm, K 20.0 ppm). Eight other characteristics of Newburgh water were at least 4 times higher than those of Kingston. A 1949 statement from the American Waterworks Association (quoted by Sutton) is to the effect that the experimental verification of the fluoride-dental caries hypothesis “obviously necessitates the use of a nearby ‘control’ city with a water supply comparable in all respects to that to which fluoride is being added.” In spite of this the study proceeded with, as Sutton describes it, a wide variation in the methods used in data collection and result presentation.

There were changes in examiners and statisticians. The study was also confounded by uncertainty with regard to shifts in the population of both the test and control areas. The final report of the study (1956) found a decrease in the “percent difference” between the DMF rate per 100 erupted teeth of children aged six to nine years in Newburgh and Kingston compared to the previous (1955) report. A trial period of 10 to 12 years was originally mentioned in the first report of the study. Sutton states that “in view of the decrease in the ‘percent difference’...it is unfortunate that the trial was stopped as soon as the minimum period proposed by the authors had elapsed.”

In May 1989, Dr. J. V. Kumar and others of the New York State Department of Health, published a study of the current situation in Newburgh and Kingston in the American Journal of Public Health (Vol 79, 50). Their analysis of dental caries data revealed that caries prevalence declined in both Newburgh and Kingston. The difference in terms of DMFT for 7-14 year old children was shown graphically to be less than one tooth; i.e., Newburgh 1.5, Kingston 2.0. This is probably within examiner error and not significant. They pointed out the confounding effect of other sources of fluoride such as fluoride drops, tablets and dentifrices that have contributed to dental fluorosis in the children of both cities.
It is not difficult to imagine the reception that Sutton's monograph encountered in some circles. He records in an editorial in the January 1990 issue of Fluoride that the distributors of the book were approached by the Nutrition Foundation and others to suppress the monograph in the U.S.A. In addition, the printer's type of edition was destroyed without authority. He notes, also, that his book was omitted from the Index to Dental Literature published by the ADA.

Dr. Sutton adds, almost as a footnote, that in 1984 emphasis was shifted by the World Health Organization, a major promoter, from the Newburgh etc. trials to the further 128 studies listed in a book written by Murray and Rugg-Gunn in 1982. Sutton investigated the scientific status of their references in 1988. His conclusion: "Murray and Rugg-Gunn, in what appears to have been a comprehensive worldwide search, were unable to locate even one study which demonstrated that fluoridation reduced dental caries."

Why, after the expenditure of what must have been millions of dollars and uncountable man-years has it been impossible to demonstrate proof of the fluoridation-caries hypothesis?

**Fluoridation Does Not Prevent Caries!**

The answer is simple: fluoridation does not prevent dental caries!

Dr. Rudolph Ziegelbecker, Director of the Institute for Environmental Research, Graz, Austria, ran through his computer the results of all published studies of the relationship between fluoride in water and dental caries. These studies included Trendley Deans' 21 cities and 23 others. He reported in Fluoride in 1981 that he found no relationship. Ziegelbecker followed up this study on what he felt were selected data, with data from the World Health Organization's (WHO) Oral Health Data Bank and Oral Health Pathfinder Study.

Using these data, collected in 1987, he again contradicted the reports that there was an inverse relationship between dental caries incidence and water fluoride levels. His findings, reported in Fluoride (Vol 26, No4) October 1993 pointed out that in most countries the relationship tends to be direct rather than inverse; that is, dental caries increases as water fluoride increases.

This finding conflicts with the belief of the promoters of fluoridation; but it is in accord with other studies, some of which were mentioned previously. Noteworthy in this respect are those of Imai (Japan), Colquhoun (New Zealand), S.P.S. and M. Teotia (India) and Steelink (USA). Ziegelbecker adds the studies of S.K. Ray et al. in India (1981) and O. Chibole in Kenya (1988).

Let us return again to the A.D.A. press release. The manipulated numerical values (one hesitates to call them statistics) that are used in the press release are reminiscent of those seen in such advertisements as: "Three out of four Doctors prefer Camel cigarettes," or, more recently "choose Tylenol over Aspirin." "Half of the children entering first grade today have never had a single cavity." This may be true; but as may be seen from studies of caries over time, this has nothing to do with either fluoridation
or fluoride dentifrice. "In Grand Rapids, in 1945 better than 99% of the children
examined experienced dental decay."

This is presented to us without any details regarding the age of the children, the size
of the sample or whether this is a mean or average. As Sutton pointed out, there was
enormous variation in the size of samples so that variation as well as examiner error
made exact determinations impossible. If we accept that only one child in one hundred
was caries-free, the next statement is deliberately ambiguous. "After the famed 'Grand
Rapids Study,' dental decay plummeted 65%.'"

We have to ask:

"where did this take place and when did this take place?"

The figure probably comes from the 1956 final report on the Grand Rapids Study by
Drs. F.A. Arnold, H.T. Dean et al. in Public Health Reports in which they stated: "In
children born since fluoridation was put into effect, the caries rate for the permanent
teeth was reduced on the average by about 60%." This claim has been used since by the
ADA, the WHO and other promoters; but such reduction, as we have seen, could be
equally true of the children in Muskegon, the control that was fluoridated before any
proper comparisons could be made.

The studies made subsequent to 1956, demonstrate that there has been a general decline
in dental caries in the developed world and that the number of decayed, missing and
filled teeth in children who had been fluoridated all their lives are no fewer than those
children reared in non-fluoridated areas. Several paragraphs of the press release tell us
in gushing terms how “incredible” the “benefits” are. The emotive statements tone
down the reductions to "20% to 40%" and inform us about “remineralization”; not
telling us, of course, that the original concept of “restructuring,” the rationalization for
systemic fluorides, has been abandoned. There is an appeal to adults that fluoride helps
decrease root decay for which properly structured studies are lacking. The press release
lists a number of organizations that, it is implied, assure us that fluoridation can benefit
all “in a safe and extremely cost-effective manner.”

When we know that fluoride does not prevent dental caries, cost-effectiveness is nill. To
the contrary, fluoridation is costing us dearly, more than we can calculate at the present
time, to treat its dental and other adverse effects. The figure given for cost effectiveness
is calculated from the per capita expenditure for fluoridation chemicals, the average
cost of a filling and a reduction in caries of 40%. Most of which collapses like a deck of
cards when it is recognized that the reduction of caries is a “statistical illusion.” Not
illusory, however, is the large amounts of taxpayers’ money that is being spent to supply
the chemicals for this purpose.

If the hypothesis were proven to be genuine, the facts remain: for every $1,000 spent on
chemicals, less than fifty cents goes to children and adverse effects on humans and other
creatures in the ecosystem would greatly overbalance the “benefits.” The press release
ends with the “national health objective” for the year 2000 to increase to at least 75% of
the portion of US population served by community water systems providing optimal
levels of fluoride.
In view of all the evidence currently available, such contemplated action is a disgrace! Dr. Herschel Horowitz, in a paper published in the Journal of Public Health Dentistry (Vol 52, 4) in 1992, stated: “When Grand Rapids, Michigan, began to fluoridate its water supply in 1945, relatively few other sources of fluoride existed in the United States. At that time only about 1.7% of the US population lived in communities in which the natural amounts of fluoride in drinking water were at optimal or greater than optimal concentrations and few food products had appreciable concentrations of fluoride, e.g. tea and seafood.” He pointed out that by 1955, more than 15% of the U.S. population had access to drinking water with optimal or greater concentrations of fluoride; by 1965, 30%; by 1975, 49%.

He estimated that at the time of his writing (1991), more than 130 million persons or 53% of the U.S. population lived in areas with “optimal” or greater concentrations of fluoride in their drinking water. He recognized that this has caused total fluoride consumption to rise in both fluoridated and non-fluoridated areas because of the incorporation of fluoride in beverages and foods prepared in fluoridated areas.

In an editorial in Fluoride (Vol 24 No 1) 1991, Roy R. Kintner reviewed studies to that date of total fluoride intake. A total intake baseline prior to fluoridation projects in the U.S. was estimated at 0.45-0.55 mg fluoride per day for an adult. These were based on studies predating 1950. Subsequent studies show increases in both fluoridated and non-fluoridated areas. The rise in low fluoride cities “came about due to contamination of food and beverages through the importation of commercial products produced and/or prepared in neighboring communities when they adopted fluoridation.”

Mean Adult Intake, 2.7mg Fluoride

Kintner reported that the mean adult male intake, in a fluoridated community in 1991, was 2.7 mg fluoride per day. The estimated daily fluoride exposure for young adults (11-19 years), adults (20-64 years) and male adults (20-64 years) in the upper 1st percentile were, in mean values, respectively: greater than 4.3 mg fluoride per day (mg F/day); greater than 5.6 mg F/day; and, greater than 6.0 mg F/day. Estimates presented in the USPHS publication Review of Fluoride Benefits and Risks 1991 (tables 10 and 11) show that 2 year-old (20kg) children may ingest 2.3 mg F/day in low fluoride areas (less than 0.3 ppm) and 3.6 mg F/day in optimal (0.7-1.2 ppm) fluoridated areas. These estimates include fluoride obtained from the use of fluoride dentifrice twice a day and fluoride supplements (0.5 mg/day) in low fluoride areas.

It can be calculated from these tables that a 50 kg adult has a total intake of 2.2 mg fluoride per day in low fluoride areas and greater than 6.0 mg fluoride per day in optimal fluoridated areas. The intake of a 200 pound (91 kg) male athlete or heavy industrial worker replenishing himself with food and water in a fluoridated area is, conceivably, in excess of 12 mg fluoride per day! Kinder points out that these total intakes of fluoride places a significant portion of the U.S. population at or above the 4-5 mg fluoride per day level.

Dr. F.J. McClure in a 1945 paper published in the Journal of Industrial Hygiene and Toxicology recommended that this not be exceeded. It should come as no surprise that children consuming these amounts of fluoride during their tooth-forming years in both low fluoride and fluoridated areas develop dental fluorosis.
In British Columbia, for example, 65% of the children in the sample from fluoridated Kelowna had mild or moderate dental fluorosis of one or more tooth surfaces; in non-fluoridated Vernon, 55% were similarly afflicted.

Adults do not have a “marker” of intoxication such as dental fluorosis to signal a high level of fluoride intake. It may be the case that the original dental and public health promoters did not anticipate that their actions would raise total fluoride levels to their present high values. In their haste to initiate the artificial addition of fluoride to drinking water, they failed to carry out the projections required to predict the consequences.

Lack of adequate information at the time may excuse mistakes of the past; but failure to learn from these mistakes and take appropriate action could be interpreted as negligence. Dr. Horowitz and his fellow fluoridation promoters consider the increased numbers of fluoridated communities as “progress” along the path to a society that will, ultimately, be freed from tooth decay. Those who are familiar with the historical development of the concept of fluoridation and the evidence of its lack of effectiveness and of its adverse effects on teeth, the skeletal system and soft tissues, must disagree.

**Endemic Fluorosis**

All of the evidence points to fluoridation as the deliberate creation in the United States and elsewhere of an extensive area of endemic fluorosis. Endemic fluorosis, not dental caries, is a major public health problem in 1995. This could be as serious as it is in China, India and elsewhere. The population at risk is more than 130 million in the United States alone.

The year 1995 does mark a 50th anniversary. To anyone who knows the facts, this is not a celebration of the conquest of tooth decay by some "magic bullet." It is an event marking the beginning of a period of fraud, deception and betrayal. There are those in the dental profession who call for “a new baseline” or a “change in traditional thinking” and a general acceptance in Continental Europe that the systemic use of fluoride to prevent dental caries is passé. There has been an obvious switch on the part of the ADA elite from the “structural” to the “remineralization” rationalization. However, in the US, Canada, Ireland and the United Kingdom, orthodoxy regarding fluoridation is entrenched. Fluoridation, especially in the United States, has been established as a “National Goal” or “Mission.”

Billions of taxpayers’ dollars have been spent over the past 50 years to fulfill this mission. As is typical of so many government sponsored endeavors, this mission will continue even though there is ample evidence that the fluoride-caries hypothesis is invalid and that fluoridation has created a major public health problem, endemic fluorosis. And, in spite of the fact that fluoridation poses a definite threat to the environment. Only the withdrawal of public support can end such an institutionalized government program as fluoridation, supported as it is by professional elites.

Dr. Horowitz is correct. The public will call for a halt to fluoridation when they learn that the program is a misuse of increasingly scarce resources. The program is a failure and costing us dearly in terms of treatment for adverse effects and losses in the ecosystem due to fluoride pollution.
How can the public continue to support once they learn that dental fluorosis is not merely cosmetic but a sign that we have poisoned our children?

How can they continue support when they learn that the adverse effects of fluoride are well-founded, especially when total fluoride intake is considered?

There is a disturbing tendency on the part of many in the research community to search only for “positive” results. These, especially when they deal with human health, are more likely than “negative” findings to lead to the staking out of a special territory. Cynthia Crossen, in her book Tainted Truth, the Manipulation of Fact in America (Simon and Schuster, 1994) presents many examples of cases in which this has occurred; for example, the “Oat Bran Miracle” that wasn't.

Once an idea such as “1 ppm fluoride, artificially added to drinking water, prevents dental caries” becomes desired territory, only those studies supporting or enhancing it are the coin of the realm. Research that produces results that are contrary is dross. If the research does not support the hypothesis, the latter remains sound but the research “doesn't work.” The early research of Dean and others are examples of manipulating the results, either intentionally or through ignorance of scientific method to obtain positive support for the hypothesis underlying fluoridation.

The "trials" in Rapid City, Evanston, etc. were a graphic example of research that “didn't work.” Again, either through ineptitude or calumny. Some defenders have intimated that these were not scientific studies to compare the results of a fluoridated population with controls, but were demonstrations that fluoride could indeed be added to the water supply without any immediate mechanical problems or apparent adverse effects. Like any commercial product, fluoridation has been promoted over the past fifty years to the point that to millions it is “truth.”

Built upon the early trumpeting of the power of fluoride to banish tooth decay, a number of applications have arisen over the past half century: dentifrices for use in the home and in the dental office; oral fluoride tablets, drops and mouth rinses. The companies manufacturing/marketing these products commission their own research and fund dental meetings on the subject. The list of corporate sponsors of the International Conference held in Pine Mountain, Georgia that has been referred to a number of times in this article, includes many familiar names: Chesebrough-Ponds; Unilever; Johnson and Johnson; Procter and Gamble; Colgate-Palmolive; Bristol Myers; and others.

One other name that has an interest and publishes a magazine for dentists is the Princeton Resource Center; this has nothing to do with the university of the same name but is financed by M&M/Mars. Standing in the background letting others work for them are those industries that supply the raw materials used for fluoridation or who benefit from the image of fluoride as benign.

Without fluoridation, millions of tons of hydrofluosilicic acid would have to be funneled into holding ponds and treated at great expense, rather than have it turn a profit. Smelter operators, faced with legal suits concerning fluoride damage to the ecosystem, including humans, can shrug their shoulders and say “it's good for children's teeth, isn't it?”
Additional references for studies cited in the text available on request.

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Fluoride, teeth and the Atomic Bomb