MISPLACED TRUST IN OFFICIAL REPORTS

Fluorides in the Environment, a highly touted new book by Boyce Thompson Institute (Ithaca, NY) emeritus scientist Leonard H. Weinstein and University of Newcastle (UK) agricultural and environmental science biology professor Alan W. Davison,[a] contains a large array of reference information and is therefore potentially a very useful resource work. But when it comes to considering relevant data in key areas of disputed health topics, the book falls woefully short and reveals itself for what it really is: a rubber stamp for blatantly biased and often-mistaken official commission and government committee reports that repeatedly deny or ignore evidence of serious toxic effects from chronic exposure of humans and animals to fluoride. In view of the many years of fluoride research experience by both authors and their obvious thorough acquaintance with the journal *Fluoride*, the well-informed reader can only wonder why they fail to cite and discuss well-documented findings that plainly and clearly contradict such misleading reports. Citing over 900 references, including 35 research reports in *Fluoride*, the book is arranged in nine chapters covering:

- history of fluorine and sources of fluorides;
- the uptake, transport, and accumulation of inorganic fluorides by plants and animals;
- effects of fluorides on animals and people;
- effects of fluorides on plants
- some case histories of fluoride contamination;
- monitoring and identifying field effects of fluorides;
- environmental protection standards for fluoride;
- natural organofluorine compounds;
- manufactured organofluorine compounds.

Especially valuable are the critical insights offered for problems encountered in: (a) conducting and evaluating field surveys for damage by fluoride to animals, plants, and vegetation; (b) biomonitoring for fluoride contamination; and (c) establishing appropriate air quality criteria for fluoride; and determining the amounts of fluoride in air, soil, vegetation, and water.

Unfortunately, the underlying bias of the authors in not mentioning or evaluating available evidence that goes against the grain of official thinking is already apparent in the Preface where opposition to water fluoridation is pejoratively (and falsely) dismissed as "a vocal minority" that "does not use robust science" and "relies too heavily on non-peer reviewed documents and resorts to conspiracy theories and scaremongering." But in the text (Ch. 3), instead of citing and

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discussing peer-reviewed research studies showing serious toxic effects and lack of significant dental benefits from fluoridation, they ignore them and simply pass on blanket denial statements by the US Centers for Disease Control and the National Institute of Dental and Craniofacial Research based on faulty earlier surveys and a badly outdated 1993 report of the US National Academy of Sciences National Research Council. They cite the current NIDCR claim that fluoridation, beginning in Grand Rapids, MI in 1945, reduced tooth decay by 60%. However, this claim has been shown to be largely an artifact resulting from changes in initial and subsequent data selection.[1,2]

By contrast, the more recent, 1986–1987 US National Institute of Dental Research examination of over 39,000 schoolchildren 5 through 17 years of age in 84 communities with fluoridation, partial fluoridation, or no fluoridation—which was not cited—revealed only minor, insignificant differences in decayed, missing, and filled permanent teeth.[3] A similar survey, also not cited, of life-long resident second and sixth grade children in seven principal geochemical regions of Missouri likewise found no significant difference in tooth decay between localities with "optimal" (0.7 or more ppm) or "sub-optimal" (less than 0.7 ppm) fluoride in the drinking water.[4] Again not mentioned is the fact that in communities where fluoridation has been discontinued, as in Canada, Cuba, East Germany, Finland, Holland, and the US, tooth decay rates have not increased but continued to decrease.[5] Improved nutrition and better dental care appear more likely to account for decreasing caries rates than water fluoridation.[6]

Even more disturbing is the absence of any real consideration of well-documented reports of serious toxic effects of fluoride in drinking water besides dental fluorosis. Among these, fluoride disturbances of thyroid function,[7] whose regulatory effects extend throughout the body, are of special concern because of recent findings of significant neurological impairment in both animals and humans.[8-11] During the past decade, further evidence for an association of waterborne fluoride with increased Down syndrome births among younger mothers,[12] increased osteoarthritis, and greater susceptibility to bone fractures[13] has also appeared. Unfortunately, these and other reports of serious toxicity from relatively low-levels of chronic fluoride exposure are dismissed by the authors simply on the basis of official reviews claiming there is "no credible scientific evidence" (p. 69) when, in fact, there is an abundance of such evidence as published and cited over the years in this journal.[14]

Although the authors note (p. 70) that livestock and other vertebrate herbivores "are much more prone to develop fluorosis than animals that feed at other trophic levels," they ignore findings contradicting a 1974 NAS-NRC publication proposing an average tolerance level for young dairy heifers of 40 ppm fluoride/dry matter and 50 ppm for mature dairy heifers (p. 75; also Ch. 7). These tolerance levels were based on studies conducted by Suttie *et al*.[15] on two-year-old heifers in which such levels of fluoride were claimed to cause "no deleterious effect on

the ability to produce milk in normal amounts, although at the peak intake of fluoride, "a reduction of milk and butterfat production in certain cows," did occur. The "normal amounts" of milk in the Suttie experiment was 13.6 kg/day/cow, whereas today a milk yield of 30 or more kg/day/cow is expected. Moreover, in modern dairy operations, stock replacement is internal, often under field conditions. The newborn calf is exposed to fluoride transplacentally from the dam, and her life starts with a higher fluoride burden than the previous generation. The calf is exposed to fluoride-contaminated feed during growth, when she is most susceptible to fluoride intoxication, and her calf is then exposed to a still higher level of fluoride *in utero*. This "generation effect" was not involved in Suttie's experiments, nor was the effect of fluoride studied during the most rapid period of skeletal growth.

Because about half the calcium in cow milk is derived from the feed and the other half from the skeleton,[16] it is critical that release of calcium from bone to produce milk is not impaired, which occurs with increased levels of bone fluoride. In studies not cited by Weinstein and Davison, catastrophic loss in milk production has been observed with cows with moderate dental fluorosis feeding under field conditions on an estimated 15 ppm fluoride/dry matter.[17-18] Obviously, with today's high milk yields, less interference with release of skeletal calcium is a *sine qua non*, and a lower tolerance of dietary fluoride is required.

In Chapter 5, occurrences of industrial environmental fluoride contamination, especially from aluminum smelters in the United Kingdom, Canada, the United States, and Brazil, are considered in some detail, especially for the period 1950–1980. Although valuable data along with 29 full-color plates are presented on phytotoxicity to vegetation as well as adverse effects on animals but less on humans in relation to such events, the authors do not make it clear that at least one of them (LHW) has appeared as an expert witness for industry in some of the cases involving litigation. Volcanic sources of fluoride contamination are well illustrated with eruptions of Mt Hekla in Iceland, but three major industrial fluoride pollution disasters of the last century—in the Meuse Valley in Belgium, Cornwall Island on the St. Lawrence River in Canada, and Donora, Pennsylvania—are not even mentioned.

Coverage of manufactured organofluorine compounds in the last chapter is fairly broad and extensive, particularly in regard to fluoropolymers, surfactants, anesthetics, agrochemicals, and halocarbons, along with our limited knowledge of their effects on the environment. Omitted, surprisingly, is any mention of or concern about sulfuryl fluoride as a grain and food fumigant leaving a considerable fluoride residue, now being advocated as a replacement for methyl bromide.

As a comprehensive review of effects of fluorides in the environment, this book is clearly of interest to a wide range of researchers. Unfortunately, as a resource for reliable information concerning water fluoridation and appropriate fluoride tolerance levels for dairy feed, and the full ramifications of industrial fluoride

pollution, it is less than trustworthy and often misleading, since in these areas it depends almost entirely on biased, frequently questionable, and even erroneous official reviews and self-serving industrial reports.

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