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82D CONGRESS, 2d Session } HOUSE OF REPRESENTATIVES { REPORT No. 2500

INVESTIGATION OF THE USE OF CHEMICALS IN FOODS AND COSMETICS

JULY 10, 1952.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

Mr. DELANEY, from the Select Committee To Investigate the Use of Chemicals in Foods and Cosmetics, submitted the following

REPORT

[Pursuant to H. Res. 74, 82d Cong., 1st sess.]

FLUORIDATION OF PUBLIC DRINKING WATER

I. INTRODUCTION

The Select Committee To Investigate the Use of Chemicals in Food Products was created under the provisions of House Resolution 323 (81st Cong., 1st sess.), agreed to June 20, 1950. Among other things, the resolution authorized and directed your committee to conduct a full and complete investigation of the nature, extent, and effect of the use of chemicals in the production, processing, preparation, and packaging of food products to determine the effect of the use of such chemicals upon the health and welfare of the Nation. The authority granted to the committee was extended by House Resolution 74 (82d Cong., 1st sess.), agreed to February 2, 1951.

In the interest of simplicity, the subject matter of the committee's investigation was divided into four parts, and a separate report issued for each section. The first three reports, submitted on May 12, 1952, June 17, 1952, and June 30, 1952, were entitled, respectively, "Fertilizers," "Cosmetics," and "Food." Section 201 (f) of the Federal Food, Drug, and Cosmetic Act defines "food," in part, as "articles used for food or drink for man or other animals." Since water is a food, the committee's views on the fluoridation of public drinking water could have been included in the food report. In view of the importance of the subject, however, the committee decided to consider it separately. Your committee, therefore, now respectfully submits its fourth and final report, entitled "Fluoridation of Public Drinking Water."

Seven days of public hearings were devoted, almost entirely to fluoridation. The committee confined itself to hearing scientific

94008—52

testimony concerning the safety and efficacy of this procedure. Eighteen witnesses, qualified by their background and training, and representing both sides of this controversial subject, presented their views and recommendations.

II. Discussion

About 20 years ago scientists determined that the presence of fluorine in the drinking water of certain areas of the country was the cause of a permanent discoloration or mottling of the teeth of the inhabitants of these areas. Later, workers of the United States Public Health Service and others reported that, up to a point, an inverse relationship appeared to exist between the quantity of fluorine and the incidence of dental decay in persons consuming these waters. There also seemed to be a direct relationship between the quantity of fluorine in the water and the extent and severity of the mottling of dental enamel (1).

Fluorine is a gas, and is found naturally in combination with various mineral salts as a fluoride compound (2). These compounds are very poisonous (3). The acute toxic effects of fluorides have little bearing upon the hazards which may be associated with its use in public drinking water for the purpose of reducing dental decay. As in the case of most chemicals used or proposed for use in food, the hazard, if any, will result from the cumulative action of small quantities ingested over a relatively long period of time.

The major portion of the scientific opinion in this country is that the addition to communal water supplies of fluoride compounds, in a quantity sufficient to equal the proportion of about one part of fluorine to one million parts of water, presents no hazard to the public health. Such highly qualified and reputable organizations as the American Medical Association, the National Research Council, the American Public Health Association, the American Dental Association, and the Association of State and Territorial Health Officers have endorsed the program of fluoridating the public drinking-water supply. The United States Public Health Service has issued an unqualified endorsement of the program (4).

A minority view is held by a number of qualified scientists, who believe that the safety of this procedure has not yet been sufficiently demonstrated. It is their position that the proponents of fluoridation are proceeding too rapidly in recommending that communities fluoridate their water supplies immediately (5).

There is little, if any, dispute that children who drink water containing approximately one part per million of fluorine from birth until the age of 8 or 9, while the teeth are being formed, as a general rule will have fewer cavities than children drinking water containing no fluorine. The extent of the reduction of dental decay to be expected under such a program can only be approximated at this time, but estimates range from one-third to two-thirds reduction (6). In any event, regardless of what the exact percentage may be, a substantial reduction in the incidence of dental decay is to be expected under an artificial fluoridation program, although a really precise estimate will not be available for several years, when controlled community pilot studies now under way are completed. Likewise, the severity and extent of the mottling of teeth which may occur among children ingesting the water are not

entirely clear. It appears that percentagewise, the number of children who may develop some mottling of their teeth as a result of fluorine ingestion will be very small. This may appear as white flecks in the tooth enamel, and in some cases may be present on the front teeth (7).

The area of controversy concerning the fluoridation of water arises over the question whether a sufficient amount of investigation and study has been completed to justify a recommendation of universal application of this procedure at this time. As indicated earlier, the majority of scientific opinion is that fluoridation of drinking water in amounts up to one part per million of fluorine is safe. The view of the minority group is not that it is known that the ingestion of fluoridated water at one part per million will result in injury to health, but rather that it is not known with any degree of certainty exactly what subtle physiological effects may ensue and that a number of important questions still remain unanswered (8).

It is known that fluorine is a very toxic element, but comprehensive chronic toxicity animal studies have not been conducted with water to which inorganic fluoride compounds have artificially been added (9). It was testified that normal kidney function will efficiently excrete almost all of the fluorine ingested through fluoridated water, and that the small amount that remains will be stored primarily in the bones and teeth, little being stored in the soft tissues with the possible exception of the thyroid gland (10). However, no studies have been published concerning the effect or disposition of fluorine if ingested by persons with impaired kidneys. Nor does it appear that any long-term controlled studies have been conducted to determine the precise effect of fluorine upon the soft tissues (11). It has recently been reported that the fluoride content of placental tissue taken from women residing in an area which fluoridates its water was considerably higher than the fluoride content of placental tissue from women residing in an area whose water supply contains merely trace amounts of fluorine. It is not known how much, if any, of the fluoride passes to the fetus, or whether it is harmful, healthful, or neutral to the mother or child (12).

Proponents of fluoridation rely heavily upon epidemiological studies and analyses of the vital statistics of communities which have had natural fluorine in their drinking water for many years, to prove that inhabitants of such areas are not afflicted with any different or more severe illnesses than persons from nonfluoride areas. It is estimated that there are more than 3 million persons living in such communities (13). In an epidemiological study all observations are related to the group, and it is the group statistics which control. This type of study is contrasted with a clinical study, in which the observations remain related to the particular individual under study (14). It was the opinion of some of the witnesses that epidemiological studies or analyses of vital statistics could not be relied upon to determine whether the physical conditions of particular persons, such as those afflicted with a kidney ailment, would or would not be worsened by the ingestion of fluoridated water. Thus, the professor emeritus in biochemistry of the University of Wisconsin testified on this point:

> I wonder whether really there has been any accumulated evidence from expert examination to show that there were no untoward influences over the time. As a matter of fact, we simply do not know.
>
> As I always emphasize, the toxic limit is a tremendously important matter and when we find communities ingesting a fluorine content such as indicated and

nevertheless have gotten along well and apparently have had no recorded pathology, yet we wonder how well controlled was the examination and whether there is not something after all that did develop that we do not know anything about (15).

Fluoridation proponents testified that there is no reason to believe that drinking water to which fluoride compounds have been added will have any effects different from water containing fluorine naturally. There was other testimony that it cannot be assumed with certainty that this will be so (16).

In order to test, on a community-wide basis, the dental and other physiological effects of adding fluorides to drinking water, that is, whether the ingestion of fluoride compounds in water have the same effects, in every respect, as water containing natural fluorine, a series of pilot programs were inaugurated. In 1945, sodium fluoride was added to the water supplies of Grand Rapids, Mich., and Newburgh, N. Y. In 1946, similar projects were started in Evanston, Ill., Sheboygan, Wis., Marshall, Tex., and Lewiston, Idaho (17). None of these pilot experiments has been completed. It is estimated that a minimum of 10 years is required to assess the advantages and disadvantages, if any, of these programs. At least one of these studies is designed as a 15-year study (18). In none of these studies is the adult or old-age population being studied to determine what physiological effects fluoridated water will have on these groups (19).

The Newburgh, N. Y., study, for example, is designed as a 10- to 12-year study in order to allow for the calcification of the crowns of most of the permanent teeth. The neighboring city of Kingston, N. Y., whose water supplies are fluorine free, is being used as a control city. It was testified that about 3,200 children of each city are being examined periodically, dentally and medically. The data for the 7-year medical examinations in Newburgh, and 6-year medical examinations in Kingston, show no difference in the findings among the children studied in these cities (20). But the official report of the Newburgh-Kingston study, published in June 1950, stated:

> The results thus far in the study have disclosed no deleterious systemic effects from the ingestion of fluoride in drinking water in the dosage employed. It must be emphasized, however, that a longer period of observation is required before final conclusions can be drawn. The possibility of demonstrating cumulative effects of fluoride in the final years of the 10-year study cannot be eliminated at this time (21).

Among the special studies planned in conjunction with the Newburgh-Kingston experiment were comparative bone-density studies of the children, and studies to determine the mode of excretion of fluoride in the urine of children having impaired kidney function compared with a group of children of the same age with normal kidney function. The director of the study declared that the bone-density studies had not been conducted because the proper type of equipment could not be obtained. He testified that the urinary excretion studies have been completed, but have not as yet been published. These data show variations in high and low retention. The children with damaged kidneys did not all show the same picture (22). Furthermore, no study has been made of the effect of fluoridated drinking water, if any, on adults or the aged who may be suffering from chronic diseases or impaired kidney function (23). Proponents of fluoridation believe that the likelihood of injury to anyone from the ingestion of

fluoridated water in the amounts recommended is very remote, although it is admitted that investigative work on this problem has not been completed (24).

None of the witnesses was irrevocably opposed to the principle of fluoridating water supplies for the purpose of reducing dental decay. It can be said that a number of scientists are opposed to the program at this time. In substance, their position is that there are too many unanswered questions concerning the safety of this procedure to permit recommendations to be made that would result in the consumption of fluoridated water by many millions of people every day of their lives. It is their view, generally, that recommendations for universal fluoridation of water supplies should not be made until further research into the effects of the ingestion of fluoridated water by adults, the aged and the ill is completed and final results of the studies now in progress known. These scientists maintain that when a highly toxic substance such as fluorine is recommended for inclusion into the Nation's communal water supplies, so that every person, regardless of his age, state of health, or possible personal reactions to fluorine is required to drink it, affirmative evidence beyond a reasonable doubt should be presented that no one will be injured. They are not ready to accept the position, taken by one proponent of this program, that it is a "calculated risk" (25). They believe that the reduction of dental decay in the population is a highly commendable goal, but that the situation is not so serious today that risks should be taken with the health of even a small number of persons, at least until we know with some certainty what types of persons may be adversely affected and to what extent (26). This is especially true when alternatives to the fluoridation of public drinking water exist. Representatives of the United States Public Health Service testified that the periodic topical application of a fluoride solution to the teeth of children will result in a 40 percent reduction in dental decay. With this method, the substance is not ingested and no problems of possible toxicity and mottling are presented (27).

We are learning more about the effects of fluorine every day. Thus, recent reports of laboratory research indicate that the effect of fluorides on dental decay may possibly be influenced considerably by the absence or presence of magnesium in the water. Other studies suggest that it may not be safe for infants and other children suffering from malnutrition to drink fluoridated water, although properly nourished children will not be affected (28).

Another problem to be considered is the mottling of teeth sometimes caused by fluorine. Even so-called mild mottling may be unaesthetic. The testimony before the committee, including photographs taken and statistics gathered by the proponents of fluoridation, indicate that some children will suffer some degree of discernible mottling of the teeth when fluorine in the amount of one part per million is added to drinking water (29). As stated by one expert witness, many may prefer that their children suffer from a degree of mottling rather than from tooth decay greater than that which would be experienced if fluorine were not added to the drinking water (30). Others, however, may have a different opinion and may wish to make their own choice, not to have the decision made by others, even if the others constitute the large majority of the medical profession or of the general public.

The committee is not concerned with the term "mass medication." The important problem is not whether fluoridation is or is not mass medication, but whether it contains any elements of hazard to any portion of the population. Nevertheless, since the question was raised at the hearings, the committee wishes to point out that the fluoridation program does constitute medication, and medication with which the entire population must necessarily be treated. The term "drug" is defined, in part, in section 201 (g) of the Federal Food, Drug, and Cosmetic Act, as articles intended for use in the diagnosis, cure, mitigation, treatment, or prevention of disease in man or other animals, and articles intended to affect the structure or any function of the body of man or other animals. Medicine deals with the prevention, cure, and alleviation of disease. A reduction of the incidence of dental disease is the aim of fluoridation. It is safe to say that fluoridation is mass medication without parallel in the history of medicine. An anology is vaccination, which is designed to prevent smallpox and not to treat persons who are afflicted with the disease.

It may be contended that people must submit to vaccination regardless of their personal predilections. The difference is one of degree. Persons who are not vaccinated and contract smallpox may become disfigured or die. More important, they may endanger the entire community. The community health requires, therefore, that the wishes of the individual, including those of persons who may suffer some adverse reaction, be submerged. Even so, it is a physician who administers the medication and who watches the patient. Fluoridated water, however, must be drunk by everyone and without personal medical supervision or guidance. Furthermore, dental decay is not contagious, nor can it be said to constitute a serious danger to health. This would seem to be particularly significant since there are other methods (although perhaps not as efficient as the fluoridation of communal water systems) of reducing dental decay and, as indicated, other techniques of applying fluorides such as topical application, where no hazard whatever exists (31).

There is no real similarity between the chlorination of water and the fluoridation of water. Chlorine is added to drinking water to destroy harmful bacteria in the water, whereas fluorides are added for the purpose of effecting a physiological change in the body which results in a reduction in the incidence of dental decay. It may be noted, in this connection, that chlorine may be gotten rid of readily by a slight heating of the water, whereas fluorides cannot be driven off by heating or boiling (32).

III. Conclusions and Recommendations

The Surgeon General of the United States Public Health Service testified before the committee as follows on the problems created by the ever-increasing utilization of chemicals in our food supply:

> The contamination of air, water, food, and milk with chemicals and the resultant effect on health is of concern to the Public Health Service. The rapidity with which new compounds are being introduced in the production, processing, storage, packaging, and distribution of foods is alarming, particularly in view of the fact that the toxic effects of so many of these chemicals and the compounds which they form when introduced into the food are unknown. Because of the fact that many individuals in the United States are exposed each day to these potential hazards, the Public Health Service wholeheartedly endorses the study which this committee is undertaking (33).

In the opinion of your committee, the fluoridation of the public drinking water of a significant portion of the population of the Nation is an integral part of the problem adverted to by the Surgeon General. Water is consumed by every person in a community, regardless of his age, physical condition, or possible personal reactions. It is essential, therefore, that all the facts concerning fluoridation be disseminated, and an opportunity given to the people of each community to decide for themselves whether they desire to assume, at this time, the calculated risk inherent in the program.

The committee is of the view that a sufficient number of unanswered questions concerning the safety of this program exists as to warrant a conservative attitude. The committee believes that if communities are to make a mistake in reaching a decision on whether to fluoridate their public drinking water, it is preferable to err on the side of caution. This would seem to be particularly true since there are reasonable alternatives to fluoridating the public water supply, even if these alternatives are not quite as effective. The topical application of fluorides to the teeth of children may be more cumbersome, and perhaps more expensive, than the simple addition of fluorine to drinking water. Nevertheless, it is a feasible program, and one which will provide comparable protection for children's teeth for the period needed to acquire evidence beyond a reasonable doubt that no hazard exists to any portion of the population by reason of the addition of fluorides to drinking water.

The advisability of fluoridating the public water supply of the Nation is essentially a local problem, to be determined for itself by each community. Your committee is not recommending that Federal legislation be enacted in this field. The committee strongly urges, however, that research now under way be continued and expanded and that further studies, not limited to an examination of the vital statistics, be conducted to determine the long-range effects upon the aged and chronically ill of the ingestion of water containing inorganic fluorides.

Respectfully submitted.

JAMES J. DELANEY, New York, *Chairman.*
THOMAS G. ABERNETHY, Mississippi.
E. H. HEDRICK, West Virginia.
PAUL C. JONES, Missouri.
A. L. MILLER, Nebraska.
GORDON L. MCDONOUGH, California.
WALT HORAN, Washington.

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(2) Hearings, part 3—1521, 1536, 1565–1566, 1774.
(3) Hearings, part 3—1533, 1536, 1565, 1578, 1789.
(4) Hearings, part 3—1483–1484, 1500, 1674, 1695, 1709, 1742, 1766, 1777.
(5) Hearings, part 3—1516, 1524–1525, 1533–1534, 1538, 1565, 1585, 1594, 1600, 1611, 1619.
(6) Hearings, part 3—1484–1485, 1514, 1546, 1548, 1554, 1565, 1585–1586, 1594–1595, 1603, 1605, 1614, 1640, 1676, 1704, 1739, 1767–1768.
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(8) Hearings, part 3—1494–1495, 1514–1517, 1518, 1533–1534, 1538, 1541, 1566–1567, 1570, 1572, 1578, 1580, 1581–1582, 1594, 1596, 1598, 1600, 1601, 1610, 1613, 1617, 1619, 1783.
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(12) Hearings, part 3—1751.
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(17) Hearings, part 3—1484.
(18) Hearings, part 3—1508–1509, 1548.
(19) Hearings, part 3—1494, 1500, 1518, 1552–1553.
(20) Hearings, part 3—1740.
(21) Hearings, part 3—1754.
(22) Hearings, part 3—1753.
(23) Hearings, part 3—1518, 1756, 1758–1759.
(24) Hearings, part 3—1484, 1493, 1500–1501, 1549, 1756, 1759, 1783–1784.
(25) Hearings, part 3—1784.
(26) Hearings, part 3—1516, 1533–1535, 1585–1586.
(27) Hearings, part 3—1516, 1522, 1611, 1621, 1671–1672, 1706.
(28) Hearings, part 3—1510, 1577; Proceedings of Society for Experimental Biology and Medicine, 1951, vol. 78, 719–723; letter dated April 28, 1952, and attachments, from Dr. Albert E. Sobel, head, department of biochemistry, the Jewish Hospital of Brooklyn.
(29) Hearings, part 3—1645, 1651–1654, 1682–1685.
(30) Hearings, part 3—1696.
(31) Hearings, part 3—1574, 1628, 1632, 1708.
(32) Hearings, part 3—1537, 1600.
(33) Hearings, 1950—129.

[1] Citations are to representative references, and are not intended to reflect all supporting testimony. All reference citations indicate the committee hearing volume involved and the page numbers in that volume. The designation "1950" refers to the 878-page volume of the committee hearings held during 1950, entitled "Chemicals in Food Products, Hearings Before the House Select Committee To Investigate the Use of Chemicals in Food Products, Eighty-first Congress, Second Session." The designation "Part 1" refers to the 582-page volume of the hearings held during 1951, entitled "Chemicals in Food Products, Hearings Before the House Select Committee To Investigate the Use of Chemicals in Food Products, Eighty-second Congress, First Session, Part 1." The designation "Part 2" refers to the volume containing pages 583–1053 of the hearings held during 1951, entitled "Chemicals in Foods and Cosmetics, Hearings Before the House Select Committee To Investigate the Use of Chemicals in Foods and Cosmetics, Eighty-second Congress, First Session, Part 2." The designation "Part 3" refers to the volume containing the hearings held during 1952, entitled "Chemicals in Foods and Cosmetics, Hearings Before the House Select Committee To Investigate the Use of Chemicals in Foods and Cosmetics, Eighty-second Congress, Second Session, Part 3."

ADDITIONAL VIEWS ON THE FLUORIDATION OF WATER

I have signed the committee report on the question of fluorides in water. I agree with that report.

In my opinion the United States Public Health Service has been premature in urging universal use of fluorides in water. They have gone beyond the scope of their duties, or what is expected of them by Congress and the people, in urging communities to adopt the universal fluoridation of water without knowing the results of experiments that are now in progress.

The Public Health Service should concern itself with good public health measures and the prevention of disease. If it goes into the propaganda field, it will lose its effectiveness and the confidence of the public. The American Medical Association points out on page 1488 of the hearings, in the last sentence of its statement, and I quote:

> In places where children are subjected to warm temperatures and consequently drink large amounts of water, a lower concentration of fluorides may be necessary to avoid mottling of the teeth.

In other words, in hot weather, not only children, but adults, drink from 2 to 10 times as much water as they would in cold weather, and thus would get a larger dose of fluorides. The possibility of storing the fluorides in the soft or bony tissues of the body might be a serious factor in undermining the health of the individual.

I do feel that the judicious use of 1 p. p. m. of fluorides in water or milk will reduce dental caries in children by about 50 percent. The fluorides should be given from the first year through the ninth or tenth year. It has been pointed out that there are other factors that control dental caries—the diet, the amount of carbohydrates, and the general health of the child are perhaps of more importance than the question as to how much fluorides he may have in his drinking water.

It should be pointed out that there are other ways of giving fluorides besides putting them into the water. Tablets are now available that can be given to the child two or three times a week; or drops can be placed in the milk that the youngster drinks.

When it comes to figuring the cost, it should be remembered that if the formula from the Census Bureau is followed, only 1 person out of 8 in the population will be under 8 years of age. It is admitted dental caries are reduced about 50 percent from fluorides in the drinking water. Therefore, when considering the cost, you will only help 1 out of 8 people by putting fluorides in the communal water supply and that 1 by only 50 percent.

The Food and Drug Administration won a lawsuit from a brewery because the brewery used fluorides in making beer. It is my understanding also that the Food and Drug Administration would not permit the addition of fluorides to bottled water.

I would also point out that while it is said generally that the American Medical Association has given its unqualified approval to the use of fluorides in water, the hearings before the committee seem to make

such approval a qualified one. In the statement of the American Medical Association found on page 1709 of the committee hearings, the secretary of the association declared:

> The councils purposely refrained from making any recommendation that communities support or oppose projects for the fluoridation of water supplies. It was the opinion of the councils that this question should be answered by the dental profession.

Also in the same statement, in speaking of the house of delegates, we find these words:

> Again, however, the house of delegates did not urge or recommend that any communities undertake to fluoridate their water supplies.

From the above statements, it would seem that the councils and the house of delegates of the American Medical Association did not give an unqualified endorsement for the use of fluorides in drinking water.

It should also be recognized that while there are some three or four million people living in areas where there are fluorides in the water, these fluorides come in a natural combination with other elements of nature. This can give an entirely different reaction than when raw fluorides by themselves are placed in the drinking water.

In reading the testimony we do find that the very people of the United States Public Health Service who now so earnestly urge the use of fluorides in drinking water were, as late as 1950, according to their published papers, saying, and I quote:

> The evaluation of the effects of fluorides in water has not been established and must wait until the experiments now in progress are completed.

Again, Dr. David Ast, who heads up the laboratory experiments in Newburgh and Kingston, N. Y., said in a recently published article in the American Journal of Public Health, and I quote:

> Final conclusions regarding the possible systemic effects of fluorides in the dosage employed should not be drawn before termination of the 10-year study.

The public interest in the fluoridation of water is tremendous. I am convinced that further experiments should be carried on to ascertain what effects fluorides may have upon the child who is ill or upon the adult who has a chronic illness. These experiments are now in progress. They should be completed before the universal use of fluoridation is recommended.

I am convinced that many of the groups who now endorse fluorides in water are merely parroting each other's opinions. They have done no original research work themselves. If the Public Health Service needs additional funds to carry on exhaustive experiments, money ought to be granted to it by the Congress.

It should be understood that communities that desire to add fluorides to the water should, in justice to their people, give them complete information. Where communities have had an opportunity to vote upon the question of adding fluorides to the drinking water, it is generally rejected. They should know that it is still in the experimental category, and that experiments now in progress have not been completed. In my opinion, there is no urgency about the matter.

A. L. MILLER.