FLUORIDATION

Judgment delivered by
Mr. Justice Kenny in the High Court,
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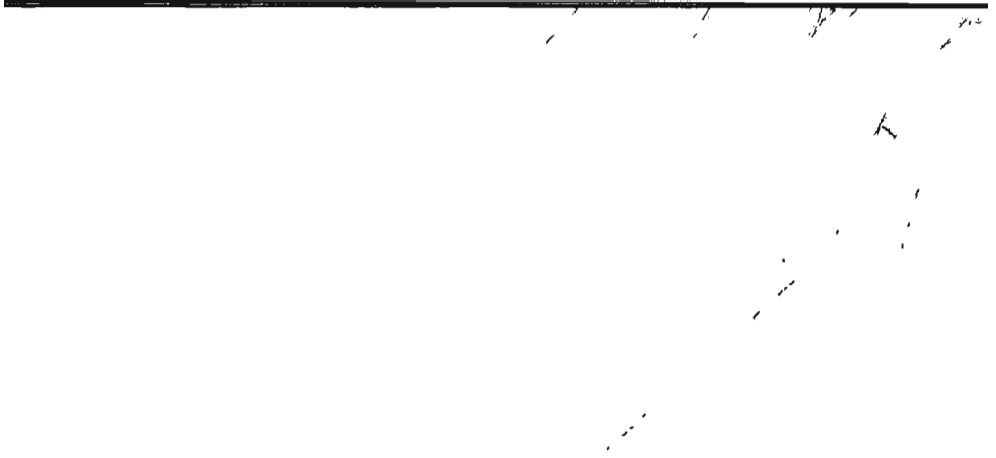

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(*Note.*—The paragraph numbers shown in the text and the Table of Contents below are not contained in the original judgment; they are inserted merely for convenience of reference.)

An appeal has been lodged by the plaintiff and at the time of printing this appeal is pending.

AN ROINN SLÁINTE,
Baile Átha Cliath.

DEPARTMENT OF HEALTH,
Dublin.

THE HIGH COURT, DUBLIN

1962 No. 915 P.

GLADYS RYAN

Plaintiff

AND

THE ATTORNEY GENERAL

Defendant

KENNY J.:

Judgment delivered 31*st July,* 1963.

1. In this case which has been at hearing for 65 days, the plaintiff, Mrs. Gladys Ryan, who resides in Dublin, challenges the constitutional validity of the Health (Fluoridation of Water Supplies) Act, 1960. This Act (which I propose to call " the Act of 1960 ") was passed on 28th December 1960. Section 2 of it provides that every health authority is to arrange for the fluoridation of water supplied to the public by sanitary authorities through pipes and that the Minister for Health may fix a date before which any specified health authority is to arrange for the fluoridation of water derived from a particular public water supply. Health Authority in the Act of 1960 means the Dublin Health Authority, the Waterford Health Authority, the Cork Health Authority, the Limerick Health Authority and every county council which does not appoint members to any of these four health authorities. The result is the creation of a statutory obligation binding every health authority in this country to fluoridate its water supplies coming to the public through pipes before a date to be fixed by the Minister.

2. The Act of 1960 gives the Minister power to make regulations : these must provide " for the specification of the amount of fluorine (which shall not exceed one part by weight of fluorine per million parts of water) which may be added to a water supply." Before the Minister makes any regulations he must have a survey carried out " of the incidence of dental caries in a representative sample of pupils attending full-time day schools " in the functional area of the health authority to which the regulations relate and he must also have an analysis carried out of the quantity of fluorine in the water supplied by sanitary authorities through pipes to the public in the functional area of the health authority to which the regulations relate. A report on this survey and on the analysis of the water before it is fluoridated must be presented to each House of the Oireachtas.

3. The principal features of the Act of 1960 are :

(1) it imposes an obligation coming into force on a day fixed by the Minister on every health authority to put fluorine to an extent not exceeding one part per million by weight into the piped water supplies reaching the public,

(2) it does not impose an obligation on anyone to drink or use the water which has been fluoridated,

(3) it does not give to anyone a right to a supply of piped water and it does not alter the position which existed before the Act of 1960 was passed in which those who got supplies of water through pipes did so under a contract with the local authority and not by reason of any legal right which existed apart from that contract and,

(4) it does not make it unlawful to extract fluorine out of the water coming to homes.

4. In 1961 the Minister had a survey of the incidence of dental caries in school children in the Dublin, Kildare and Wicklow Health Authority areas carried out and he also had an analysis made of the water in each of the public piped water supplies in those areas. The report showed a most alarming rate of dental caries among children between the ages of 5 and 17 while the analysis showed that there is very little naturally-occurring fluorine in the piped water supplies of the Dublin Health Authority area. The fluorine content of the piped water supplies in the Dublin Health Authority Area is less than 0.1 p.p.m. except in the Balbriggan/Skerries supply area where it is 0.15 p.p.m., in the Rush supply area where it is 0.1 to 0.15 p.p.m. and in the Kilternan/Ballaly supply area where it is 0.2 p.p.m. The method of analysis used enabled the fluorine content of water to be determined down to the level of 0.1 p.p.m.

5. On the 15th May, 1962, the Minister made regulations (Statutory Instrument No. 75 of 1962) dealing with the Dublin Health Authority area. They provide that the Dublin Health Authority is to arrange for the fluoridation of the piped water supply provided by the Dublin Corporation and of other piped water supplies in Dublin. They also provide that the amount of fluorine which may be added to a water supply shall be such that the water, after the addition of the fluorine, shall contain not more than one part of fluorine per million parts of water and not less than eight-tenths of a part of fluorine per million parts of water; the fluorine may be added to the public water supply either in the form of sodium fluoride or in the form of sodium silico fluoride. There is also a provision that the fluorine content of the public water supplies which have been fluoridated is to be determined each day by a colorimetric method and, in addition, is to be determined by a distillation method at intervals not exceeding 4 weeks. The regulations also provide that the sodium fluoride which is to be added to the public water supply is to contain a minimum of 98%

sodium fluoride (NaF) by weight and thus provide 44.3% available fluorine while if sodium silico fluoride is used, it is to contain 98% of that substance and thus provide 59% available fluorine. Therefore, the relationship of sodium fluoride to what the Act of 1960 and the regulations call fluorine, but which would have been more accurately described as the fluoride ion, is that 98% sodium fluoride gives 44.3% fluoride ion, or, putting it another way, that you get the amount of fluoride ion in sodium fluoride by dividing the amount of the percentage of sodium fluoride by 2.2.

6. I have used the word "fluorine" when stating the effect of the Act and of the regulations because it is the word used in them; the words "fluoride ion" would, however, have been more accurate. Indeed, much of the controversy in this matter results from the absence of an agreed terminology. The words fluorine, fluoride, the fluoride ion and sodium fluorine have been used by the witnesses with different meanings and the same unfortunate confusion is found throughout the scientific writing on the subject. "Our speech has its weaknesses and its defects, like all the rest. Most of the occasions for the troubles of the world are grammatical". (Montaigne; Apology for Reymond Sebond). It is therefore necessary to say something about the chemistry of the fluoride ion if only to explain the sense in which I use these words.

7. In chemistry most elements have several distinct manifestations. They may be listed thus :

(1) Their atoms, or molecules consisting of those atoms, may exist in a free state as elements.

(2) Their atoms may become ionised by the loss or gain of an electron or electrons and thereafter exist as ions of the element.

(3) Atoms or ions of the element may join with other ions to form compounds.

(4) An atom or atoms of the element may become bonded with carbon and then exist as an organic compound of the element.

8. The atoms of an element are all alike and possess characteristics unique unto themselves. Similarly ions of that element, derived from atoms which have lost or gained an equal number of electrons, are also all alike and possess unique characteristics. The addition or removal of one or more electrons to or from the atom brings about this phenomenon, and for this reason, atoms and ions of the one element have different characteristics and behave differently. There are also differences between compounds of an element and its atoms or its ions. Moreover, the organic and inorganic compounds of an element have properties which the other does not possess.

9. The element fluorine does not occur in the free state in nature. It can be produced only in the laboratory and when this is done, the free element is a noxious gas which reacts violently with many other substances. Throughout the remainder of this judgment I propose to use the word "fluorine" to mean the gas produced in a laboratory. Fluorine is not used in the process of water fluoridation. In nature, fluorine is found only in combination with other elements. In the solid minerals fluorine is present in the form of negatively charged fluoride ions in the crystal lattice paired off with positively charged ions of some other element. For example, in calcium fluoride the fluoride ions are combined with calcium ions. The fluoride ion differs from the atom of fluorine in that it possesses one additional electron.

10. When the compounds containing fluorine percolate out of the rocks by water action, they give a very weak solution in water and the positive and negative ions are separated by molecules of water and ions derived from water. The calcium and fluoride ions exist in solution as separate entities with properties completely independent of those of the compound or source from which they were derived. The same is true of sodium and fluoride ions when solid sodium fluoride is dissolved in water. All ions of fluorine, irrespective of their compound of origin, are the same and do exactly the same things in a chemical and in a bio-chemical sense. The fluoride ion naturally present in waters is derived from the solution of a wide range of minerals. In sodium fluoride, the fluorine exists as separate particles (ions) which have an electrical charge. When these substances dissolve in water at low concentration, the fluoride ions pass into solution and exist in the solution as separate entities with properties completely independent of the salt from which they were derived. Thus, the fluoride ions in a solution of calcium fluoride or sodium fluoride are identical and will do exactly the same things in a chemical sense.

11. In the language of chemistry substances like calcium fluoride and sodium fluoride are called inorganic substances. This has nothing to do with their location in nature, for inorganic substances may be found in minerals or in the body of a living creature. Fluorine is known to combine with the element carbon and, in the language of chemistry, any compound of fluorine with carbon is called an organic substance. The known organic compounds of fluorine are extremely stable and do not dissociate to give fluoride ions in water solutions. Small quantities of the fluoride ions exist naturally in most water supplies and are to be found in practically all foods. Although water usually contains small quantities of the fluoride ion, it does not contain organic compounds of fluorine. Fluoridation of the water supplies involves the addition of a soluble fluoride (sodium fluoride, sodium silico fluoride, or fluorspar) to the water. The process of fluoridating the water supply does not, therefore, add a substance that is foreign to the water but it brings about a small difference in the

concentration of the fluoride ions already present. The naturally occurring fluoride ions and the fluoride ions added by the process of fluoridation are chemically identical and there is no distinction between them. There is no change in the colour, taste or odour of water which has been fluoridated.

12. One of the features of the fluoride ion is that those who as children have for some time drunk water in which the ion is present at a concentration of 1 p.p.m. or more have less dental decay than those who as children have drunk water containing a minute quantity of the ion only. About 70 years ago dentists and medical observers noticed that those who drank water with a concentration of the fluoride ion of 5 p.p.m. had some mottling of the enamel of their teeth and that they had less dental decay than was to be found in others coming from places where the ion was in the water in minute quantities.

13. This association of a lower rate of dental decay with the presence of the fluoride ion at a concentration of 1 p.p.m. or more has been confirmed by a number of careful modern assessments of the prevalence of dental decay in some cities in the United States of America. These have shown that a high rate of dental decay goes with an absence of a recognisable amount of the fluoride ion in the drinking water and that a much lower rate of dental decay is associated with the presence in the water of the ion at a concentration of 1 p.p.m. or more. The most striking of these assessments were those carried out in the two communities of Newburgh and Kingston both of which are in the State of New York. In each of them there was a low concentration of the fluoride ion in the public water supply. The water in Newburgh was treated with sodium fluoride to bring the concentration of the fluoride ion in it up to 1.0 to 1.2 p.p.m. but the water of Kingston was not fluoridated. The dental and general health of the children in the two communities has been exhaustively examined and compared; a most striking reduction in the rate of dental decay among the children in Newburgh has been found and no ill effects on the general health of those living in that community have been observed. I have heard much evidence on this Newburgh/Kingston experiment: the results of it are accurately summarised, so far as dental health is concerned, in an article by Zachary M. Stadt called "Résumé of dental benefits of fluoride ingestion" in a book *Fluoridation as a Public Health Measure* published in 1954 by the American Association for the Advancement of Science. I propose to quote some passages from the article:

> "At Newburgh, New York, after 60 months of fluoridation, the percentage of 5 to 6 year-old children with all deciduous cuspids and first and second molars caries-free, had increased from 18.2 to 49.2 for a relative increase of 170%; during the same period at Kingston, New York, the control city, there was an increase in the same age group from 21.9 to 30%, a relative increase of 37%. At Brantford, Ontario, after 77 months of

fluoridation, the percentage of the 5-16 age group which demonstrated no present or past history of caries in the deciduous or the permanent teeth had increased from 5.18 to 15.97% for a relative increase of 208% in the number caries free. At Sheboygan, Wisconsin, after 65 to 66 months of fluoridation the number of caries-free children with no carious lesions of the deciduous teeth in the kindergarten group, 5 to 6 year old, increased from 20.4 to 47.8%, or an improvement of 134%; and in the group 12 to 14 years old, the number of children with caries-free permanent teeth increased from 2.77 to 4.2%, an improvement of 51%. At Evanston, Illinois, after 48 to 58 months, the number of children with immune deciduous dentition decreased by 20.2% for the 6 year olds, 6.0% for the 7 year olds, and 5.7% for the 8 year olds. This was the only one of the seven communities in which consistently negative results were recorded for the deciduous teeth. After 52 months of fluoridation in Ottawa, Kansas, where the communal water supplies previously had contained 0.3 p.p.m. fluoride, the results were indecisive for both the deciduous and permanent teeth of 6 and 7 year old children. In Madison, Wisconsin, 46.76% of the 5 year old children had no carious deciduous teeth after 42 months of fluoridated water consumption in contrast to 25.56% in the same age group during the year before the beginning of fluoridation. After 57 months of fluoridation in Lewiston, Idaho, the percentage of children with caries-free permanent dentition had increased by 68%, 58% and 148% respectively, in the 6, 7 and 8 year old age groups.

None of these communities is strictly comparable with another by reason of differences in location, economic status, nutrition status, ethnic origin of the inhabitants, amount of fluoride added, different method of caries evaluation, etc. Despite these facts, the increases in the number of children with caries-free dentition in 5 of the 7 communities are remarkably alike.

Effect on dental caries incidence in deciduous teeth

In Table 5 is presented a tabulation of the effects of fluoridation of public water supplies over periods varying from 30 to 78 months in 8 communities. Again there has not been uniformity in the methods used for estimating and recording of dental caries experience; however, the available results demonstrate beyond all reasonable doubt that there is an overall lower incidence of tooth decay in the deciduous teeth after 3½ or more years of fluoridated water consumption. For example, values are presented for the caries incidence of deciduous teeth of 6 year old children from 7 out of 8 of these communities. In six of these seven the following percentage reduction in carious deciduous teeth was observed: Grand Rapids, Michigan, 53.7; Newburgh, New York, 45.6; Brantford, Ontario, 49.1; Sheboygan, Wisconsin, 53.7; Evanston, Illinois, 7.0; Ottawa, Kansas, 10.0."

" Effect on dental caries incidence in permanent teeth

In Table 6 are recorded the available data of the effect of fluoridated water consumption on the incidence of dental caries in the permanent teeth of the children from 10 communities

where fluoridated water has been consumed for as little as 24 months to a maximum of 78 months. Obviously, only a few of the reports on permanent teeth concern children who have been exposed to fluoridated water from birth; hence the reductions noted are of a preliminary nature and cannot be considered the maximum to be expected when the full developmental period has occurred during fluoridation.

For the six year olds, the following percentage reductions for the permanent teeth were noted : Grand Rapids, Michigan, 66.6; Newburgh, New York, 77.6; Brantford, Ontario, 73.2; Marshall, Texas, 63.0; Evanston, Illinois, 73.6; Lewiston, Idaho, 76.8; Ottawa, Kansas, 15.0; and Charlotte, North Carolina, 9.0 for the white children."

"It is interesting to compare the dental caries incidence in first permanent molars after 4 years of fluoridation at Newburgh with the incidence prior to fluoridation and in the control city of Kingston. These data are presented for the 6 to 9 and the 10 to 12 years age groups in Table 7 and Figure 1. In the 6 to 9 age group, caries-free first permanent molars in Newburgh increased from 58.9% to 76.9% between the 1944/5 and 1949/50 examinations, an absolute increase of 18 per 100 first molars. In contrast, at Kingston the number of caries-free first permanent molars remained almost unchanged. The number of missing first permanent molars was reduced 60% in Newburgh compared to a 23% reduction at Kingston. The increase in the number of filled molars was approximately the same in both cities, indicating the same amount of dental services in both places. The most striking observation by the authors was the remarkable reduction in the percentage of untreated caries of the first permanent molars at Newburgh : 68% compared with 36% at Kingston."

14. There is also cogent evidence from Ireland of the association of the fluoride ion at a concentration of 1 p.p.m. in the drinking water with a significant reduction in dental decay. One of the surveys carried out under the Act of 1960 related to the health authority areas of Cork, Limerick and Waterford and an unusual concentration of the fluoride ion in the water drunk by those who live in Patrickswell, County Limerick, was found. This concentration and the state of dental health in children in Patrickswell is dealt with in a report presented to the Oireachtas. I propose to quote a passage from the report :

"After the dental caries survey team had completed their examinations of children in the selected schools in Limerick City and County, it was discovered that the public water supply serving the village of Patrickswell has a fluorine content of around 0.7 to 1.0 p.p.m. No other water supply in the City and County of Limerick was found to contain fluorine to any significant extent.

Up to 1949 this small village of 300 people was dependent on a local well for its water supply. In that year a public supply, drawn from a deep boring, was provided. Initially two public fountains were connected to this supply, for use by the inhabi-

tants of the village. During 1951 a large proportion of the houses in the village were connected to the supply and many of the remaining houses were connected in subsequent years.

As fluorine is not one of the substances normally looked for in the periodic analyses of public water supplies, the presence of fluorine in this supply was unsuspected until, in the course of the present series, an analysis of the Patrickswell supply, carried out on the 22nd March, 1962, specifically to establish whether or not the supply contained fluorine, showed that in fact it did to the extent of 0.95 parts per million. In view of this finding, two further analyses were made at intervals of some weeks; these showed a fluorine content of 0.7 and 1.0 parts per million respectively.

As Patrickswell National School did not happen to be one of the schools selected at random for the purpose of the dental caries survey in the Limerick area, the Medical Research Council of Ireland were asked to have a special examination carried out of the teeth of the children attending Patrickswell school. This dental examination was carried out by 3 of the 5 dentists who carried out the dental examinations in the Limerick area, using procedures identical with those employed in the latter examinations. The dentists when examining the teeth of the Patrickswell children and when recording the results of the examinations, had no knowledge of the particular water supply used by the children and took no part in the ascertainment of the water supply used by them.

On the basis of experience in other countries, it should be expected that even in this small community the results, in relation to dental caries status, of the ingestion of water containing fluorine should be apparent. The special examination of the teeth of the children attending Patrickswell National School does, in fact, show that the teeth of the children who have been using the naturally fluoridated public water supply in that village since birth or for the greater part of their lives have appreciably less dental caries than the other children attending the school and children in the rest of the City and County of Limerick. Thus, while the number surveyed is small, the general pattern of the findings corroborates the beneficial effect of fluoridated water.

Of 142 Patrickswell school children who were examined it was found that 72 had been exclusively using the public water supply since birth or for the greater part of their lives, 56 had been using water from other sources and 14 had used both types of water. A comparison has been made in Table I of Appendix IV of the dental caries rate of (a) 71 children using the naturally fluoridated public water supply, (b) 54 children using other supplies, and (c) children of the same age groups covered by the survey carried out in other schools in the Limerick Health Authority area. (The three 14 year-old children examined are not included in this table because no valid conclusion could be drawn from so small a sample). The average dental caries rate among children attending Patrickswell school who did not use the naturally fluoridated water supply is very similar to the average dental caries rate among children in the Limerick Health Authority area as a whole, whereas the dental caries rate of the

children using the Patrickswell public water supply is markedly lower. The average DMF (decayed, missing, filled) rate among children who since birth, or for the greater part of their lives, have been using the naturally fluoridated public water supply in Patrickswell is 52% lower (deciduous teeth) and 38% lower (permanent teeth) than among the Patrickswell children not using this naturally fluoridated source, and 53% lower (deciduous teeth) and 34% lower (permanent teeth) than among the children in the rest of Limerick City and County, in which no public water supply has been found to contain fluorine to any significant extent.

The percentage of children ages 5-14 years of age using the Patrickswell public water supply who are free from caries in their permanent teeth (47%) is appreciably higher than among Patrickswell children who did not use the public water supply (20%) and than among children of the same age group examined in the rest of Limerick City and County (32%).

It might be noted that the 71 children shown as using the Patrickswell public water supply include a number who did not commence using this supply until early childhood; these would not have obtained the maximum beneficial effect on their teeth of this naturally-fluoridated water. 6 of the 13-year-old children did not commence using this fluoridated water supply until their third year of life. All seven of the 12 year-olds did not start using it until they were between 1 and 2 years of age."

15. The results of the surveys made at Anglesey also show an association between the ingestion of water containing a concentration of 1 p.p.m. of the fluoride ion and a reduction in the rate of dental decay among children. I shall be referring to these surveys in a later part of this judgment.

16. The evidence that the ingestion of drinking water containing a concentration of about 1 part per million leads to a significant reduction in the rate of dental caries among children is, in my opinion, coercive. I accordingly find that the ingestion of such water (whether the fluoride ion occurs naturally in it or is introduced into it) produces a marked reduction in dental caries among children.

17. All the writing on the subject shows that the rate of dental decay among children living in the sophisticated and wealthy countries of Western Europe and North America is a serious problem. The causes of this are still a matter of debate; many theories about it have been put forward during the case but, fortunately, it is not necessary for me to make any finding on this matter as it is not relevant to any of the issues I have to decide. Professor Steyn, who came from the Union of South Africa to give evidence for the plaintiff, dealt with this topic in a very vivid way. He said that the preponderance of evidence showed that fluorine builds up the tooth enamel and makes it caries-resistant. He went on to say that caries is the most serious disease of our civilisation, not merely because it causes bad teeth but because bad teeth run down the human system and he

added that it was desirable that modern societies should take steps to deal with the problem of dental caries. Another indication of the gravity of the problem is to be found in a passage in a report made under the Act of 1960 and presented to the Oireachtas on the incidence of dental caries in school children in the Dublin, Kildare and Wicklow health authority areas in 1961. The report contains this passage :

> "It will be observed from these tables that, apart from girls in Kildare of 7 years of age, only about 4% to 5% of the children have caries-free temporary dentitions and that at 6 years of age about one-fifth of the children have 10 or more decayed or missing or filled temporary teeth. In the case of permanent teeth the percentage of children with dentitions free of caries drops practically to zero at about 14 years of age and at this stage about one-third of them have 10 or more carious teeth. At the later ages in this range the number of children examined is getting smaller so that one cannot expect complete regularity in the sequence. Nevertheless, the continued decline with increasing age in the proportion of children with caries-free permanent dentitions is most marked. In fact, of 911 children aged 15-18 years who were examined in the three areas only one single case of caries-free permanent dentition was found, while of the 588 children aged 14 years, only 7 had caries-free permanent dentitions."

18. In the summary which is part of the report it is stated that the survey discloses an extremely high individual incidence and a widespread prevalence of dental caries (decay) among school children attending full-time day schools in the City and County of Dublin and in the Counties of Kildare and Wicklow and that the incidence and prevalence were uniformly high throughout the three areas. It is also stated that among the children in the age group 15 to 18 years only one child was recorded as being entirely free of caries experience.

19. This evidence establishes beyond doubt that dental caries in children is a pressing problem and that its prevalence is likely to increase. It also establishes that this disease will have an ever-increasing bad effect on the health of the members of this community unless it is checked. Those who support the fluoridation of the public water supplies have never claimed that it will do away with the disease: what they claim is that it will significantly reduce its prevalence.

20. This case was at hearing for 65 days during which a great volume of scientific and medical evidence was given. This could easily lead to the belief that the High Court has jurisdiction to pass judgment on the policy and advisibility of legislation and to substitute a judicial view of policy and advisability for that of the Oireachtas. The issue of the advisability or desirability of legislation is a matter for the Oireachtas only for it has the sole and exclusive

power of making laws for the State (see Article 15, Section 2 of the Constitution). The jurisdiction (created by the Constitution) of the High Court relates not to the advisability of legislation but to the issue whether the Act under examination contravenes any provision of the Constitution or involves a violation of or interference with the rights given by the Constitution to every citizen. It is, therefore, necessary to consider the relevant provisions of the Constitution for only in this way can the questions and issues which the Court has to determine be stated.

21. The plaintiff's case is that the Act of 1960 is invalid because (1) it is a violation of the inalienable and imprescriptible rights guaranteed to the Family by Article 41 of the Constitution, (2) it is a violation of the inalienable right and duty of parents to provide, according to their means, for the religious, moral, intellectual, physical and social education of their children given by Article 42 of the Constitution and (3) it is a breach of the guarantee in Article 40 section 3 of the Constitution by the State " in its laws to respect, and, as far as practicable, by its laws to defend and vindicate the personal rights of the citizen ". On this third branch the plaintiff puts forward two independent contentions. The first is that Article 40 section 3 gives her a right of bodily integrity and that the Oireachtas in passing the Act of 1960 has not respected that right. The other contention is that the fluoridation of the public water supplies is or may be dangerous to the health of all or some of the citizens and therefore, that in passing the Act of 1960 the Oireachtas has failed to respect and, as far as practicable, by its laws to defend and vindicate the right of the citizen to life and bodily integrity.

22. All the Articles of the Constitution relied on are in that part of the Constitution which is headed " Fundamental Rights". Article 41 which deals with the Family provides in Section 1 subsection 1 : " The State recognises the Family as the natural primary and fundamental unit group of society, and as a moral institution possessing inalienable and imprescriptible rights, antecedent and superior to all positive law ", while subsection 2 provides : " The State, therefore, guarantees to protect the Family in its constitution and authority, as the necessary basis of social order and as indispensable to the welfare of the Nation and the State ". Not one of the counsel in this case has attempted to state what the inalienable and imprescriptible rights of the Family are and as the Constitution gives little help on this, I am in some difficulty in dealing with this argument. Inalienable means that which cannot be transferred or given away while imprescriptible means that which cannot be lost by the passage of time or abandoned by non-exercise. The right of the Family to educate the children of that Family is, I think, one of the rights which any moral philosophy would recognise but this right cannot, in my opinion, be one of the rights referred to in Article 41 for there is a separate Article (Article 42) dealing with Education and it is highly unlikely that the Constitution gives the Family two separate rights to educate, one

in Article 41 and the other in Article 42, particularly as the right given by Article 42 is detailed in 5 separate sections in that Article. Some clue to the ambit of the rights of the Family referred to in Article 41 is to be found in subsection 2 of Section 1 where there is a reference to a guarantee by the State to protect the Family in its constitution and authority. It seems, therefore, that the rights referred to in subsection 1 of Article 41 relate to the constitution and authority of the Family. It was argued by the plaintiff's counsel that the addition of the fluoride ion to drinking water affected the authority of the Family to decide what drink and food the members of the Family should consume and that the Act of 1960 was, therefore, an attack on the authority of the Family. If it be assumed for the purposes of this argument that fluoridation of water is capable of being a violation of any rights, it does not seem to me that it in any way affects the authority of the Family. At the time when the Constitution was enacted, there were a number of Acts of Parliament in force which prescribed minimum standards and contents for food and drink and I am entitled to take this legal background into consideration when interpreting the Constitution. In my opinion, legislation dealing with the contents of food or drink does not in any way affect the authority of the Family and the Act of 1960 is not an interference with the rights guaranteed to the Family by Article 41.

'23. The next branch of the plaintiff's case is that the Act of 1960 is invalid because it is an interference with the right given by Article 42 to the Family and to the parents to educate the children of the Family. Section 1 of Article 42 provides: " The State acknowledges that the primary and natural educator of the child is the Family, and guarantees to respect the inalienable right and duty of parents to provide, according to their means, for the religious and moral, intellectual, physical and social education of their children " while Section 2 provides : " Parents shall be free to provide this education in their homes or in private schools or in schools recognised and established by the State." It was urged by Mr. MacBride that the word " education " in this Aritcle should be given a wide meaning so that it would include rearing and nurturing and he went on to submit that the addition of fluoride ion to the public water supply will therefore be an interference with the right of the parents to educate their children. The word " education " undoubtedly had this wide meaning at one time but in 1937, when the Constitution was enacted, it had become obsolete. In the Shorter Oxford Dictionary issued in 1933 the meanings given for the word " education" are : "(1) the process of nourishing or rearing (this is marked with a sign to show that this meaning was obsolete in 1933) (2) the process of bringing up young persons (3) the systematic instruction, schooling or training given to the young (and, by extension, to adults) in preparation for the work of life. Also the whole course of scholastic instruction which a person has received ", and in other dictionaries, the meaning for which Mr. MacBride contends is also described as obsolete. Moreover, it seems to me that the terms of the Article

show that the word education was not used in this wide sense in the Constitution. Section 1 of the Article recognises " the right and duty of parents to provide, according to their means, for the religious and moral, intellectual, social and physical education of their children ", but in subsection 2 it is provided that the parents are free to provide *this* education in their homes or in schools recognised or established by the State. The education referred to in Section 1 must, therefore, be one that can be provided in schools and must, therefore, be one of a scholastic nature. It seems to me, therefore, that the fluoridation of the public water supply (even if it be harmful) does not interfere with or violate the rights given to the Family and to the parents by Article 42 of the Constitution. It was agreed during the argument that the puzzling contrast between the Family and the parents in Section 1 of Article 42 was not relevant to any of the issues in this case.

24. The third branch of the plaintiff's case is based on Article 40 Section 3 of the Constitution. Article 40 is the first of the Articles in the part of the Constitution which is headed " Fundamental Rights " and Article 40 is headed " Personal Rights ". The arrangement of the sections in this Article (in many ways the most important in the Constitution, for Article 5 declares that Ireland is a democratic State and what can be more important in such a State than the personal rights of the citizens) presents some problems. Section 1 gives equality before the law to all citizens as human persons. Section 2 provides that titles of nobility shall not be conferred by the State. Section 3 subsection 1 provides that the State guarantees in its law to respect, and, as far as practicable, by its laws to defend and vindicate the personal rights of the citizen while subsection 2 of that section provides : " The State shall in particular by its laws protect as best it may from unjust attack and in the case of an injustice done, vindicate the life, person, good name and property rights of every citizen ". Section 4 gives the right to personal liberty, section 5 deals with the inviolability of the dwellinghouse, while in section 6 the State guarantees liberty for the exercise of the rights of freedom of expression for convictions and opinions, of peaceful assembly and the right to form associations and unions. Whatever may be the extent of the general guarantee given by section 3 for personal rights, it is difficult to understand why it was inserted between the right to equality before the law and the other specified personal rights.

25. The first matter to be considered on this general guarantee is whether the High Court has jurisdiction to declare an Act of the Oireachtas unconstitutional because, in the opinion of that Court, it is a breach of the guarantee by the State " in its laws to respect, and, as far as practicable, by its laws to defend and vindicate the personal rights of the citizen ". I have to anticipate a later part of this judgment by saying that, in my opinion, this general guarantee relates not only to the personal rights specified in Article 40 but to those specified personal rights *and* other personal rights of the citizen

which have to be formulated and defined by the High Court. In the course of his argument the Attorney General conceded that the High Court had jurisdiction to declare an Act of the Oireachtas invalid if it did not respect, and, as far as practicable, defend and vindicate the personal rights of the citizen and if, in addition, the Oireachtas has acted oppressively or in bad faith in passing the Act; but when Mr. William Finlay was making the closing speech on behalf of the Attorney General, he referred in another context to a passage in the advice given to the President by the Supreme Court in relation to the constitutional validity of the Offences Against the State (Amendment) Bill, 1940, from which it would appear that a majority of that Court were of opinion that the High Court and Supreme Court had no jurisdiction to declare an Act of the Oireachtas unconstitutional because it was a violation of the general guarantee in section 3 (See *In the matter of Article 26 of the Constitution and in the matter of the Offences Against the State (Amendment) Bill,* 1940 (1940), I.R. 470). The passage is:

> " Article 40 deals with personal rights. Clause 3 thereof provides that the State guarantees by its laws to respect, and, as far as practicable, by its laws to defend and vindicate the personal rights of the citizen, and to protect from unjust attack and, in case of injustice done, to vindicate, the life, person, good name and property rights of every citizen."
>
> " It is alleged that the provisions of the Bill are repugnant to the guarantee contained in this clause. It seems to us impossible to accede to this argument. The guarantee in the clause is not in respect of any particular citizen, or class of citizen, but extends to all the citizens of the State, and the duty of determining the extent to which the rights of any particular citizen, or class of citizen, can properly be harmonised with the rights of the citizens as a whole seems to us to be a matter which is peculiarly within the province of the Oireachtas and any attempt by this Court to control the Oireachtas in the exercise of this function would, in our opinion, be a usurpation of its authority."

26. If it be assumed that advice given by the Supreme Court to the President binds the High Court in the same way as does a decision of the Supreme Court in a case between parties (and my view is that it does not), the passage does not bind me to hold that the High Court has not jurisdiction to consider the validity of an Act of the Oireachtas when it is claimed that it is a violation of the general guarantee in section 3 because the passage is wholly irreconcilable with the later judgment of the Supreme Court in *the matter of Philip Clarke* 1950 I.R. 235. In that case Mr. Justice O'Byrne when delivering the judgment of the Court said in relation to the passage I have quoted in the advice of the Supreme Court:

> "A passage at p. 481 in the judgment delivered by Sullivan C.J. *in re Article 26 of the Constitution and the Offences Against the State (Amendment) Bill,* 1940 was relied on as laying down the proposition that the court could not consider whether a

guarantee contained in the Constitution has been infringed by an Act of the Oireachtas. Such an interpretation of the passage would be inconsistent with the principle already referred to as having been laid down in that judgment. The passage must be read as a rule of prudence in the consideration of the question of express or implied repugnance, especially in matters such as those involved in the said Bill."

27. In my opinion, the High Court has jurisdiction to consider whether an Act of the Oireachtas respects, and as far as practicable, defends and vindicates the personal rights of the citizen and to declare the legislation unconstitutional if it does not. I think that the personal rights which may be involved to invalidate legislation are not confined to those specified in Article 40 but include all those rights which result from the Christian and democratic nature of the State. It is, however, a jurisdiction to be exercised with caution. None of the personal rights of the citizen are unlimited : their exercise may be regulated by the Oireachtas when the common good requires this. When dealing with controversial social, economic and medical matters on which it is notorious views change from generation to generation, the Oireachtas has to reconcile the exercise of personal rights with the claims of the common good and its decision on the reconciliation should prevail unless it was oppressive to all or some of the citizens or unless there is no reasonable proportion between the benefit which the legislation will confer on the citizens or a substantial body of them and the interference with the personal rights of the citizen. Moreover, the presumption that every Act of the Oireachtas is constitutional until the contrary is clearly established applies with particular force to this type of legislation.

28. The next matter to be considered (though I have already said something about it) is whether the general guarantee in Article 40 section 3 relates only to those personal rights which are specified in Article 40 or whether it extends to other unspecified personal rights of the citizen. If it extends to personal rights other than those specified in Article 40, the High Court and the Supreme Court have the difficult and responsible duty of ascertaining and declaring what are the personal rights of the citizen which are guaranteed by the Constitution. In modern times this would seem to be a function of the legislative rather than the judicial power but it was done by the Courts in the formative period of the Common Law and there is no reason why they should not do it now. A number of factors indicate that the guarantee is not confined to the rights specified in Article 40 but extends to other personal rights of the citizen. Firstly, there is subsection 2 of section 3 of Article 40. It reads : " The State shall, in particular, by its laws protect as best it may from unjust attack and, in the case of injustice done, vindicate the life, person, good name and property rights of the citizen." The words " in particular " show that subsection 2 is a detailed statement of something which is already contained in subsection 1 which is the general guarantee. But subsection 2 refers to rights in connection with life and good name and

there are no rights in connection with these two matters specified in Article 40. It follows, I think, that the general guarantee in subsection 1 must extend to rights not specified in Article 40. Secondly, there are many personal rights of the citizen which follow from the Christian and democratic nature of the State which are not mentioned in Article 40 at all—the right to free movement within the State and the right to marry are examples of this. This also leads to the conclusion that the general guarantee extends to rights not specified in Article 40.

29. In my opinion, one of the personal rights of the citizen protected by the general guarantee is the right to bodily integrity. I understand the right of bodily integrity to mean that no mutilation of the body or any of its members may be carried out on any citizen under authority of the law except for the good of the whole body and that no process which is or may, as a matter of probability, be dangerous or harmful to the life or health of the citizens or any of them may be imposed (in the sense of being made compulsory) by an Act of the Oireachtas. This conclusion, that there is a right of bodily integrity, gets support from a passage in the Encyclical Letter "Peace on Earth": "Beginning our discussion of the rights of man, we see that every man has the right to life, to bodily integrity and to the means which are necessary and suitable for the proper development of life; these are primarily food, clothing, shelter, rest, medical care, and finally the necessary social services."

30. If then the Act of 1960 imposes the consumption of fluoridated water on the citizens and if that is or may, as a matter of probability, be dangerous or harmful to the life or health of any of the citizens, the plaintiff's right of bodily integrity would be infringed and the legislation would be unconstitutional.

31. At an early stage in this case the Attorney General submitted that I should not hear evidence that the fluoridation of water was dangerous. He argued that the jurisdiction to declare an Act unconstitutional on the ground that it did not respect the personal rights of the citizen could be exercised only if the Act were oppressive or had been enacted in bad faith and that this had not been pleaded. The plaintiff has, however, pleaded that the fluoridation of the public piped water supply will be dangerous. The Attorney General also relied on the fact that when the Oireachtas was considering the Act of 1960, they had before them the report of the Fluorine Consultative Council who advised that the fluoridation of the public water supply at a concentration of 1 p.p.m. was not dangerous; he said that this established that the Oireachtas was not acting in bad faith or oppressively when enacting the Act of 1960. I decided to admit the evidence because a plea that the fluoridation of the public water supply involves an element of danger seemed to me to be a plea that the Oireachtas had not respected the rights of the citizen to life and to bodily integrity. Moreover, it seemed to me that a plea that the

process was dangerous involved a charge that the Oireachtas had acted oppressively, for a medical process which might be dangerous would, if imposed on the citizens, be oppressive.

32. The next issue to be considered is whether the fluoridation of the public water supplies, even if it be dangerous, is a violation of the plaintiff's right to bodily integrity. In my opinion, it is not. The plaintiff has no legal right to a supply of piped water and the Act of 1960 does not impose any obligation on her or on the members of her family to drink or use the water coming through the piped water supply. True that water today is a necessity of life and that the plaintiff probably has a right of access to a supply of water, but this does not give her a right to a supply of water which has not been fluoridated through the piped water supply. On this ground alone the case fails. Moreover, I am satisfied that the plaintiff and any of the citizens of the State can, by the expenditure of a few pounds, remove all or almost all the fluoride ions from the water coming through the piped water supply. I accept all the evidence of Dr. Fremlin on this aspect of the case.

33. It may be, however, that this approach is too legalistic or too narrow and because of this and because of the great volume of evidence which has been given about the risks said to be involved in fluoridating water, I propose to consider whether the fluoridation of a public water supply is or may be dangerous to the citizens of this State or to some of them. On this aspect of the case many distinguished witnesses have given evidence and I would like to thank them for the care which they gave to the preparation of their evidence and for the way in which they ransacked the great volume of literature on the subject so that they could bring before the Court anything in any language that would be of assistance. A special word of thanks is due to Professor Hodge who was in the witness box for six days and who gave his evidence with unfailing courtesy and in non-technical language. I would also like to pay tribute to Mr. MacBride, leading counsel for the plaintiff, who took upon himself almost the entire burden of the plaintiff's case, who had steeped himself in the literature on the subject and who cross-examined the witnesses for the defendant with skill and persistence.

34. The opponents of the fluoridation of the public water supply constantly use the words " poison ", " toxic " and " toxicity ". They say that a high concentration of the fluoride ion is poisonous and toxic. Evidence was given in this case to establish that a high concentration of the fluoride ion is toxic and it was then suggested that any introduction of the fluoride ion into the water must therefore involve an element of risk to health. This, however, begs the whole question for many substances used in modern medicine are, when taken at a sufficiently high degree of concentration or in considerable numbers, poisonous and even lethal. A layman knows that arsenic and strychnine are used in medicine today and also knows that these can

be poisonous: even the harmless and beneficial aspirin when taken in sufficient numbers can have fatal results.

35. Having heard the evidence and read the literature which it was agreed I should read, I am satisfied that the fluoridation of the public water supplies at a concentration of 1 p.p.m. will not, in our temperate climate, be dangerous to anybody, old, young, healthy or sick. I am also satisfied that there is no reasonable possibility that it may involve an element of danger or risk to life or health to any of the citizens of this country.

36. It would, I think, be sufficient for the purposes of this case to say that the plaintiff has not proved that the fluoridation of the public water supply is dangerous but I do not think that I should so confine myself. The evidence given on behalf of the plaintiff at the earlier stages in this case received wide publicity while the far more compelling evidence for the defendant received little public notice. It is possible that the evidence for the plaintiff, some of which was of a sensational character, may have created public uneasiness. Let me say then that I am satisfied beyond the slightest doubt that the fluoridation of the public water supplies in this country at a concentration of 1 p.p.m. will not cause any damage or injury to the health of anybody, young, old, healthy or sick who is living in this country and that there is no risk or prospect whatever that it will. The evidence on which I base this view consists of a number of separate items each of which is conclusive; when taken together, they are overwhelming.

37. Firstly, 44 million people living in urban areas in the United States of America are now receiving fluoridated water at a concentration of 1 p.p.m. The process of fluoridating water has been going on for 17 or 18 years in the United States of America and there is no trustworthy evidence whatever that it has caused any symptoms of damage or injury to health. Secondly, there is the evidence provided by the observations in Newburgh and Kingston and in Bartlett. Thirdly, there are the results of the careful observations made in Anglesey. Fourthly, there is the testimony of all the reports of the official commissions who have studied the matter: the members of all of them were unanimously of opinion that the fluoridation of the public water supply was safe. Lastly, there is the evidence in this case.

38. I have already referred to the striking reduction in the rate of dental decay in children which was produced by the fluoridation of the public water supplies in Newburgh. In 1945 the public water supply of Newburgh was fluoridated to bring the concentration of the fluoride ion in that water up to 1.0/1.2 p.p.m. and in 1955 and subsequent years, most careful examinations of the health of the children in Newburgh were carried out. I accept the whole of the evidence of Professor Hodge and of Dr. Schlesinger about these examinations.

The results were summarised in an article written by Professors Hodge and Smith in the publication called "Fluoridation as a public health measure" to which I have already referred. The title of the article is "Some public health aspects of water fluoridation" and it contains this passage (at p. 98) under the heading "Health of populations drinking fluoride-containing water":

> "*The Newburgh Kingston Study.* The body of information that bears most acutely on the safety of water fluoridation at 1 p.p.m. is being assembled in the Newburgh-Kingston Caries Fluorine Study (see elsewhere in this volume). Since May, 1945, the water supply of the city of Newburgh, New York, has been treated to bring its fluoride content up to approximately 1.1 p.p.m. The water supply of the companion city of Kingston has remained fluoride-free. As Schlesinger, Overton and Chase pointed out in 1950 'Before any public health procedure can be recommended for routine use, every effort should be made, within limits of available techniques, to ascertain the safety of the procedure in question. Although there is no acceptable evidence that naturally occurring fluoride in the concentration used in drinking water as a caries-deterrent exerts any deleterious systemic effects, it is desirable to make carefully controlled observations of children receiving fluoride introduced into their drinking water, especially while it is still possible to do so before public clamour for routine use of fluoride precludes control study.'
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> More than 500 children in each city have been selected for study. The ages range from 1.5 to 12 years; most of the age groups comprise 30 to 60 children. In addition, during each of the first three years a group of infants less than one year old were enrolled. Some selection was made to get children from families that probably will remain in the city for the duration of the study. Because the examinations were voluntary, matching of groups for such factors as socio economic status was not entirely successful. A research team conducts medical examinations in both cities led by a pediatrician who directs the public health nurse, laboratory technician and clerk receptionist. The medical examinations are given annually; in addition to the customary measurements and history, the physical examination pays special attention to tissues and organs that have been mentioned as sensitive to higher doses of fluoride, for example, skin, hair, nails, the formed elements of the blood, and the structure of the bone. Records are made, for example, whether the nails are normal or whether longitudinal striations or white marks are present. The skin is observed to see whether abnormal moisture, texture, colour or any other eruptions are present. A special group of 25 children of various ages in Newburgh has been given eye and ear examinations; the visual acuity is measured, visual fields are mapped, and audiometer tests are given.
>
> The results of this impressive list of careful and controlled examinations give to date a completely clean bill of health to water fluoridation under the conditions of this test. The children of the two cities are alike in height and weight. The blood picture

is normal, urine analyses are negative, the condition of nails, skin, and hair is entirely comparable, the results of the eye and ear examination are typical. The most convincing single similarity of observation probably comes from the x-ray examinations. Films are taken of the right wrist and both knees of each child annually. These are read blind by Dr. John Caffey, professor of clinical pediatrics, Columbia University; he has 'found no detectable difference in bone density in children in the two cities studied. Dr. Caffey also found both groups of children to be in the normal range of skeletal maturation on clinical estimation'.

In a preliminary report the results so far are summarised in these words: 'No deleterious systemic effects from the ingestion of fluoride in drinking water in the doses employed.' Since many of the questions most frequently asked about fluoride involve lengthy periods (for example enamel mottling arises in the first eight years of life during which enamel formation occurs), even a survey of four or five years work must be qualified. The authors take a conservative stand. 'It must be emphasised, 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 ten years' study cannot be eliminated at this time'."

39. Even more compelling is the evidence supplied by the examinations of persons in the towns of Bartlett and Cameron in Texas. The concentration of the fluoride ion in the water there is 8.0 p.p.m.: the control taken was Cameron, Texas, where the concentration is 0.4 p.p.m. The results of this study are summarised on page 358 of a publication called "Fluoride Drinking Waters" issued by the United States Department of Health, Education and Welfare. I have heard evidence about the Bartlett/Cameron study and I accept this summary as being correct. The passage is:

> "*The Bartlett-Cameron Study.* A comprehensive survey has been made of the health of persons exposed to 8.0 p.p.m. of fluoride present in the water in Bartlett, Texas, compared to a similar group of individuals exposed to 0.4 p.p.m. fluoride in the drinking water of Cameron, Texas. The participants resided in these two towns for at least 15 years when first examined in 1943. The second examination was made in 1953. Included in this investigation was a full medical history, physical, dental and x-ray examination and detailed urine and blood analysis. There was no tendency towards higher rates in these two population groups in respect to specific systemic abnormalities or laboratory findings excepting a higher incidence of dental fluorosis in Bartlett (8.0. p.p.m. fluoride). The difference between the age-corrected death rates of the two groups was not statistically significant. Thus, no clinically significant physiologic or functional effects could be attributed to a prolonged ingestion of drinking water containing as much as 8.0 p.p.m. of fluoride. With regard to deleterious bone changes, none were produced by ingestion of this high fluoride water. There was no unusual incidence of bone fractures, arthritis, hypertrophic bone changes or exostoses or

interference with fracture healing. There were no cases of poker spine and no associated functional or systemic effects. It may be noted that the excessive fluoride in this water supply did produce roentgenographic evidence of bone changes in 10 to 15% of the Bartlett population group. However, these changes were slight, often difficult to recognise and frequently equivocal in degree."

40. Similar results were obtained from studies in Colorado Springs, Colorado, where the concentration of the fluoride ion is 2.5 p.p.m. The results of studies in that city are summarised on page 359 of the same publication.

41. Similar results both in the reduction of dental caries among children by the introduction of fluoridation and the absence of any injury to health were found in Anglesey and I accept the whole of the evidence of Dr. Wynne Griffith who gave evidence about them. The results will be found summarised in a publication called "The conduct of the fluoridation studies in the United Kingdom and the results achieved after five years" issued by the Ministry of Health. Some of the passages which are particularly relevant are :

"Anglesey is mainly agricultural in character with some 50,000 population. Holyhead, the largest town, has a population of 10,000. The water is soft and the water supply for the whole county except Holyhead comes from one source. There are, however, two pumping stations, one of which serves the Gwalchmai zone and the other the Bodafon zone. Fluoride was added to the water pumped to the Gwalchmai zone but not to that for the Bodafon zone. Holyhead receives most of its supply from the pumping station serving the Gwalchmai zone but at times of heavy demand needs to take additional supplies from a secondary station. It was not practical to add fluoride to the supply from a secondary station; consequently the level of fluoride in the water reaching Holyhead has varied according to the extent to which it contained water from the unfluoridated source."

"The data showing the effects of fluoridation are those for the base-line years and those for 1961, that is, 5½ years after fluoridation began in the Gwalchmai zone at Anglesey and in Holyhead." "In the study area of ..... the Gwalchmai zone at Anglesey, the extent of dental decay as measured by the average number of carious teeth per child, has been markedly reduced in the younger age groups both absolutely and by comparison with the other area. The proportion of children free from caries has been substantially increased and the proportion of children with ten or more carious teeth has been greatly reduced. There has also been a substantial improvement in the dental health of the children living in Holyhead although, for reasons explained earlier in this report, the level of fluoride in Holyhead has been variable."

42. The conclusions in relation to the effect of fluoridation on public health in the same publication are :

" (1) Five years of fluoridation at a level of 1 p.p.m. in three study areas has brought about in each a substantial improvement in the teeth of young children.

(2) The results of fluoridation obtained so far are in line with American experience.

(3) No evidence of harm from fluoridation has been discerned despite continuous vigilance.

(4) The addition of fluoride to water supplies at a specified level has presented no technical difficulties."

43. The reports of the Commissions which have studied the matter provide cogent evidence of the safety of water fluoridation. There is, in the first place, the report of the Irish Fluorine Consultative Council which recommended the fluoridation of public water supplies at a concentration of 1 p.p.m. It did not recommend that the process be made compulsory but thought that its adoption should be decided by each local authority ; but the report of that most representative Council indicated that there was, in their view, no risk to health involved in the fluoridation of the public water supply. There is, in the second place, the report published in 1958 of the Expert Committee on Water Fluoridation set up by the World Health Organisation. The members were drawn from many countries and were very highly qualified ; one of them, Professor Ericsson, gave evidence in this case and I accept the whole of his evidence. This Committee summarised their conclusions in these terms :—

" 1. Dental caries is one of the most widespread and prevalent diseases.

2. There is no hope of controlling the disease by present treatment methods alone.

3. Among the numerous preventative methods, fluoridation of drinking water supplies is the most promising.

4. The effectiveness, safety and practicability of fluoridation as a caries-preventative measure has been established.

5. 1 p.p.m. fluoride has been shown to give maximum benefits; first by epidemiological studies where fluoride occurs naturally in the water and secondly, where fluoride has been added at optimum concentration through mechanical means.

6. Hundreds of controlled fluoridation programmes are now in operation in many countries. Some have been in progress for the past 12 years, so that conclusions are based on experience. No other public health procedure, during the initial stages of its application, has had such a background in time or extent.

7. The biological effects of fluoride have been described in nearly 3,000 clinical and experimental reports in the past 20 years. This literature is not only extensive but of broad scope.

8. Fluoride penetrates cells and in sufficiently high concentrations inhibits certain enzymes, but no evidence of enzymal inhibition has been found in persons drinking fluoridated water containing concentrations of fluoride optimal for dental health.

9. Most of the fluoride absorbed into the system is rapidly excreted, principally in the urine; the rest is deposited in the minerals of the bones and teeth.

10. When large doses or excessive amounts of fluorides are ingested for protracted periods (many years), the skeletal system exhibits structural changes. The clinical manifestations are classed (a) crippling fluorosis (20-80 m.g. of fluoride or more per day for 10 to 20 years; calcification changes in bone together with calcification of ligaments); (b) asymptomatic osteosclerosis (more than 5 m.g./1 of urine excreted daily for 5 to 10 years; hypercalcification in one or more bones without disability); and (c) mottled enamel (drinking water containing 2 to 8 p.p.m. fluoride or more during the first 8 years of life; interference with enamel formation, stained or in severe cases irregular enamel surfaces). Adequate factors of safety guarantee the absence of these changes when water containing 1 p.p.m. fluoride is drunk.

11. Toxic doses of fluorides (50 times that used in controlled water fluoridation) injure the kidneys. There is no evidence of kidney injury or any effect on concurrent kidney disease in the populations drinking fluoridated water where fluoride concentrations range up to 5 p.p.m.

12. No relation between thyroid disfunction and naturally fluoridated water has been established. In animal studies, daily doses in excess of 50 p.p.m. in the diet produced structural and functional changes in the thyroid. In humans, drinking water containing 1-5 p.p.m. is without demonstrable effect on the thyroid.

13. Growth and development, somatic and psychic, are normal in children drinking water containing 1 p.p.m. fluoride.

14. The formation of teeth and even their resistance to caries and their appearance are improved when water containing optimum concentrations of fluoride is consumed.

15. Over 3 million people in the U.S.A., over half a million in England, and large population groups in other countries have, during their lifetime, consumed water containing 1 p.p.m. fluoride or more. Mortality and morbidity rates

for five leading causes of death are comparable for cities in the U.S.A. with fluoride and non-fluoride public water supplies. No relation between fluoride and arthritic changes in bone has been found, nor have confirmed cases of allergy to water containing 1 p.p.m. fluoride been described.

16. The addition of fluorides to public water supplies has proved to be similar to other routine mechanical procedures widely employed in waterwork practice. Suitable equipment has been developed, reliable analytical procedures are available, and appropriate safeguards have been established.

17. No other vehicles or techniques for the prophylactic application of fluorides can at present replace the fluoridation of drinking water as a public health measure. Where water fluoridation cannot be used, research into other vehicles and improved methods of local fluoride application should, however, be encouraged.

CONCLUSIONS

1. Drinking water containing about 1 p.p.m. fluoride has a marked caries-preventive action. Maximum benefits are conferred if such water is consumed throughout life.

2. There is no evidence that the water containing this concentration of fluoride impairs the general health.

3. Controlled fluoridation of drinking water is a practicable and effective public health measure."

44. Then there is the report of the Committee set up in Ontario to report on water fluoridation as a public health measure. The members carried out a most extensive examination of the evidence and of the literature and heard many witnesses who were opposed to fluoridation. They recommended water fluoridation and reported that there was no risk to public health involved in it. There is also the report of the Commission in New Zealand; it was set up to consider the fluoridation of water supplies as a public health measure and reported in its favour. This report was impugned by some of the witnesses for the plaintiff in this case; one of them said that the members of the Committee did not include a biochemist and another said that he did not think that a Judge of the High Court in New Zealand was a suitable chairman! Lastly, there is the statement on the fluoridation of public water supplies by the House of Delegates of the American Medical Association. The American Medical Association is a most representative body of the medical profession in the United States of America and the House of Delegates of that Association recommended fluoridation of the public water supplies at a concentration of 1 p.p.m.

45. I come now to deal with the evidence in this case. I accept the whole of the evidence given by Professors Hodge and Ericsson and by Dr. Galagan. Both Professor Hodge and Dr. Galagan were in the witness box for 6 days and were cross-examined at considerable length on the literature on this subject. In the course of cross-examination Dr. Galagan was accused of perpetrating a scientific fraud in one of the articles which he wrote; I am satisfied that he completely vindicated himself of this charge. I also accept the evidence of Dr. Schlesinger, Dr. Arnold, Dr. Armstrong and Dr. Dirks. If their evidence in any way contradicts that of Professors Hodge and Ericsson or that of Dr. Galagan, I prefer the evidence of Professors Hodge and Ericsson and Dr. Galagan. I reject the evidence of Professor Gordonoff, of Dr. Rozeik, of Dr. Waldbott and of Dr. Dillon. There was a marked note of fanaticism and passionate conviction about their evidence. I got the impression that they were determined at all costs to make a case against fluoridation. Typical of this was the evidence of Professor Gordonoff. He was asked in cross-examination whether he thought that the fluoridation of public water supplies would reduce the incidence of dental caries; his guarded answer was " perhaps " although his own writings showed that he held the view that it would. The plaintiff's witnesses (except Professor Steyn) also had a habit of prefacing their more sensational charges with the words " it has been suggested " without giving any authority for the suggestion or indicating its source (the evidence in connection with the distressing condition of mongolism in children was a particularly glaring instance of this). There is absolutely no support in the literature or in the evidence for many of these suggestions.

46. The evidence of Professor Benagiano and of Dr. Fiorentini was based almost entirely on observations in the towns of Campagnano di Roma, Cesano, Bracciano, Anguillara and Castel Nuovo all of which are near Rome. These observations suggest that there is a relationship between the presence of the fluoride ion in the drinking water and a high incidence of goitre together with an unusual basic metabolic rate. These observations and the conclusions drawn from them by Professor Benagiano and Dr. Fiorentini are not, in my opinion, reliable. There are a number of reasons for this. The first is the utter uncertainty about the amount and the concentration of the fluoride ion in the waters in these towns. At an early stage in the case both these witnesses said that the concentration of the fluoride ion in the water in these areas was approximately 3.5 p.p.m. but when Dr. Fiorentini was recalled on Mr. MacBride's application on the 64th day of the trial, he said that the concentration was 0.6 to 1.73 p.p.m. or 0.61/1.73 m.g. per litre. This startling change may well have been caused by the confusion about sodium fluoride and the concentration of the fluoride ion which it gives; it will be recalled that 98% sodium fluoride by weight gives 44% available fluoride ion, but if there was a confusion, it was in the minds of Professor Benagiano and Dr. Fiorentini and was a circumstance which they

should have investigated before they gave evidence about these observations. The observations are also open to criticism because there was no control. A control is an essential part of any public health experiment and observation; it is got by taking an area similar in all respects except the presence of the element under investigation and then comparing the results. There was however no control for Campagnano and the other Italian towns. I am not satisfied that the higher goitre incidence in these towns has any connection with the fluoride ion in the water or its concentration. The unusual degree of mottling of the tooth-enamel found there is, I think, principally the result of malnutrition (see Massler and Schour : " Relation of endemic dental fluorosis to malnutrition ", in the Journal of the American Dental Association for February, 1952). I also reject the results of these observations in Italy because they are inconsistent with the results of the observations made in the United States of America where the examinations were more thorough and were carried out under ideal conditions.

47. Professor Steyn, who came from the Union of South Africa to give evidence, was a most impressive witness. He said that the preponderance of evidence was that the fluorine, as he called it, builds up the tooth enamel and makes it caries-resistant; he remarked that he agreed with this view. In his opinion caries is the most serious disease of our civilisation not merely because it causes bad teeth but because bad teeth run down the human system and he thought it desirable that modern society should take steps to deal with it. He favoured the use of fluorine in the battle against dental decay but thought it should be used topically, that is by application, and that it should not be put into the water supply. He also said that at a concentration of 1 p.p.m. fluorine does not produce severe mottling of the teeth. His objection to the use of fluoride ion in the water supply was that he thought that there was a connection, in the Union of South Africa at least, between the presence of the fluoride ion in water and a high incidence of goitre. I do not accept the view that the presence of the fluoride ion in water at a concentration of 1 p.p.m. will produce goitre in anybody : it seems to me more likely that the high incidence of goitre in many parts of the Union of South Africa is caused by iodine deficiency. I think that the Newburgh-Kingston observations show that the fluoride ion at a concentration of 1 p.p.m. or even higher does not cause goitre in any of those who drink water containing that concentration.

48. Dr. Sinclair, a Fellow of Magdalen College, gave evidence for the plaintiff : most of his evidence was a statement of what may happen if the fluoride ion is introduced into water. He conceded during cross-examination that many of the ill effects which he mentioned would not arise when the concentration of the fluoride ion in water was 1 p.p.m. I do not think that any of his evidence supports the view that the fluoridation of the public water supplies at this concentration is dangerous or that there is a reasonable possibility

that it may be dangerous. If any of his evidence supports this view, I reject it.

49. I propose now to deal with the principal ill-effects which, it is said, will be produced by the introduction of the fluoride ion into the public water system.

50. The first complaint is that the fluoride ion in water will have an ill-effect on *the skeleton.* Some of the fluoride ion ingested is deposited in the skeleton and some is excreted; about one-third to one-half of the fluoride ion ingested is deposited quickly in the skeleton and is thereby taken out of circulation in the human body. The evidence establishes that large doses of the fluoride ion are capable of producing simultaneously the conditions known as osteosclerosis (which is a thickening of the bone) and osteoporosis (which is a thinning of the bone). When the water contains the fluoride ion at a concentration of less than 5 p.p.m. there is no evidence that any skeletal changes except an increased deposit of the fluoride ion in the bones can be seen by x-ray or otherwise. When the water contains less than 5 p.p.m. of the ion, the evidence is coercive that it does not cause any osteosclerosis or osteoporosis. At a concentration of 5 p.p.m. when there has been ingestion of fluoridated water over a long period, osteosclerosis does, in exceptional cases, occur as a result but in most cases a concentration of 8 p.p.m. is required to do this. A person ingesting water with very little of the fluoride ion in it for seventy years would, at that age, have a concentration of approximately 1,500 p.p.m. of the fluoride ion in his bones. If it is assumed that one-third to one-half of the fluoride ion ingested is deposited in the skeleton (and I think that the evidence supports this view), a person aged seventy who had been drinking water fluoridated at a concentration of 1 p.p.m. all his life would have a concentration of about 4,000 p.p.m. of the fluoride ion in his skeleton at that age. I am satisfied that this concentration of 4,000 p.p.m. does not produce any harmful results and does not involve any hazard. This is confirmed by the animal studies which were described in great detail in this case. In some of these, water with a concentration of 50 p.p.m. of the fluoride ion was given for seven months to pigs and for eleven months to dogs and no skeletal changes were found at the end of those periods. The evidence also establishes that the deposition of the fluoride ion increases with age so that the bone samples taken from old people show an increased concentration of it caused by the presence of the fluoride ion in water. I am satisfied that a concentration of 1 p.p.m. of the fluoride ion in the water though it produces an increase in the concentration of the ion in the bone by a gradual process, does not involve any risk of damage to life or health for anybody, young or old.

51. The next ground of complaint against the introduction of the fluoride ion into drinking water is that it causes *mottled enamel or hypoplasia.* The existence of this originally led public health

officers and dentists to investigate the effect of the fluoride ion on teeth. A high concentration of the fluoride ion in drinking-water causes disfiguring mottled enamel, but also greater resistance to dental decay. If the water in Ireland is fluoridated to a concentration of 1 p.p.m., ten per cent of the children will develop mild, and very mild, mottling of their teeth. Dr. Galagan distinguished between disfiguring mottling and mild and very mild mottling. I accept the view that the mottling of the teeth of ten per cent of the children in Ireland will not be an indication of fluorosis or of damage or harm having been done to the children's teeth by the fluoride ion in the water which they have drunk. This mild and very mild mottling is not a condition which will be perceptible by most people ; indeed Dr. Galagan suggested that mild and very mild mottling might improve the appearance of the teeth. I am, however, satisfied that the mild and very mild mottling which will be produced in the teeth of some children is not an indication of any element of risk to health or of dental harm or damage to any of the children who get it.

52. Another ground of objection to the introduction of the fluoride ion into the drinking-water is that it would or might cause *goitre or other thyroid conditions*. The suggestion is that the fluoride ingested affects the functioning of the thyroid gland. I am satisfied that it does not. The basis for the view that it does is the assumption that there is an antagonism between the fluoride ion and iodine so that the fluoride ion will absorb the iodine which is in the human body or which is acquired from food and water. In my opinion, there is no antagonism between fluoride and iodine. The most probable cause of goitre is iodine deficiency : this is illustrated by the evidence given by Professor Demole who described the significant reduction in the incidence of goitre in Switzerland when people were persuaded to take iodine tablets. He added that the incidence of goitre fell dramatically when iodine tablets had been taken and he said that before they were made available, the inhabitants of some areas in Switzerland laughed at those from outside because of their small necks. Moreover, I think that the observations in the United States of America show conclusively that there is no connection between goitre and the ingestion of the fluoride ion.

53. Yet a further ground of objection to the introduction of the fluoride ion into drinking-water is based on its effects on *enzymes*. This is a highly technical matter; the witnesses were agreed that further research will be necessary before any firm conclusion can be drawn. I have not been able to find in the documents put in evidence any statement of what enzymes are, and when I asked Professor Hodge about this, he gave, in his usual very clear fashion, a description of their function. I propose to quote from his evidence : " The events that go on in the human body are, from the standpoint of the chemist who works with a test-tube, a very improbable state of events. May I take as an example the fact that one of the chief sources of energy in the body is sugar; in the body sugar is converted into

carbon dioxide and water by using some of the oxygen in the air which we breathe. A lump of sugar can sit on the table at room temperature or in the air in warm temperature without the slightest change although in contact with oxygen of the air. In order to burn sugar a chemist heats it up and ultimately it will burn to give carbon dioxide and water. In the body this goes on at the temperature of 37°C. which is the temperature we all have. To the chemist the burning of sugar at 37°C. is extremely improbable. The body achieves this reaction which we call burning by the use of enzymes. The enzyme is able to bring about the interaction of the sugar and the oxygen and is described as a catalyst. The job of a catalyst is to speed a reaction without taking part in it. Enzymes are protein in nature and highly specialised so that many enzymes are involved in the process by which sugar is transformed into carbon dioxide and water releasing into the body energy which would be formed if sugar were burned in the air, so that it is a source of energy; this is done without the wasteful use of heat. The protein enzymes should be thought of as a surface and on it the sugar molecules settle into a space and there is an electrical charge arrangement which exactly complements in space and changes the sugar molecule so that it fits exactly on the protein enzyme surface. On this spot the first step in the changing of sugar into carbon dioxide and water occurs and this slightly altered sugar goes to the other sites until the process is completed. Enzymes make this improbable reaction possible, they give us energy and maintain life. There are some enzymes which could be inactivated without risk but there are other enzymes which if they cease to function would cause death ". At a later stage in his evidence Professor Hodge remarked " We human beings are a very improbable organisation ".

54. It has been suggested by some of the plaintiff's witnesses that the ingestion of the fluoride ion will interfere with this enzymatic process. There is strong evidence that a high concentration of the fluoride ion interferes with the action of some enzymes but there is absolutely no evidence that a concentration of 1 p.p.m. or even of 2 or 3 p.p.m. will affect enzymatic action in any way; this conclusion gets support from the experiments on animals. In my opinion the evidence is coercive that a concentration of 1 p.p.m. will not affect enzymes or the enzymatic process in any way.

55. It is also suggested in evidence that the fluoridation of water will affect *kidney function.* Undoubtedly, large doses of the fluoride ion or high concentrations of it are capable of causing injury to the kidneys particularly in those who have a kidney disease but there is no evidence whatever that a concentration of 1 p.p.m. will cause any damage or injury to the kidneys or to the kidney function of anybody even of those who have a kidney disease.

56. A further ground of objection to the introduction of the fluoride ion is that it will *retard growth.* There is no evidence whatever that

there has been any growth retardation in children who have taken water fluoridated to a concentration of 1 p.p.m. and the Newburgh-Kingston observations seem to me to be conclusive that the fluoride ion has not this effect. Animal experiments have been carried out in which high doses of the fluoride ion have been given and concentrations of 100 p.p.m. were required to produce some retardation in growth.

57. Another ground of objection to the fluoridation of the drinking-water is that it may cause *gingivitis and periodontal disease*. The tissues which surround the teeth are called the gingiva : they are soft tissues and an infection which affects them produces a condition known as gingivitis. Periodontal disease, on the other hand, is one which affects the bony structure under the teeth (the periodontum is the bone underneath the teeth). The layman calls periodontal disease pyrrhoea. Dr. Galagan dealt fully with the suggested connection between the fluoride ion and gingivitis and periodontal disease and I accept his evidence. If one leaves out of consideration the observations made at Stratford, there is no evidence that there is any connection between the fluoride ion and gingivitis or periodontal disease; the high rate of periodontal disease found in Stratford is probably caused by poor oral hygiene.

58. This topic of gingivitis is of interest in another connection. In a number of instances the witnesses for the plaintiff referred to articles by named authors to corroborate their views but when I read the articles subsequently, they did not seem to me to support the views for which they were cited. The topic of gingivitis provided an example of this and also a most striking confirmation of Dr. Galagan's accuracy. When Professor Benagiano was giving evidence, he suggested that the fluoridation of the water supply could cause gingivitis and in support of this, he referred to what he called " experiments " by Dr. Keith Box described in the Journal of the Ontario Dental Association for 1955. He said that Dr. Box's article was " a study " of an area where the water contained 1 p.p.m. fluoride and in which 79.2% of the children had gingivitis He also said that he had not read the article but that he had seen it summarised in Italy. Dr. Galagan gave evidence that he had searched through the Journal of the Ontario Dental Association for 1955, that there were no articles in it by Dr. Box but there were two editorials in it written by Dr. Box which showed that he had not carried out the experiments or studies referred to but was commenting on studies carried out by others. That was the position when the evidence and speeches in this case concluded. I subsequently discovered that in paragraph 120 of the New Zealand Commission Report, an article by Dr. Box is quoted in which he wrote in April, 1955 : " I have never made a survey of gingival and periodontal diseases in any areas where the water was naturally fluoridated . . . and I have written or published nothing on this subject ".

59. Some of the witnesses for the plaintiff suggested that the ingestion of the fluoride ion can affect the functioning and operation of *the heart* and reference was made to the writings of a Japanese scientist, Professor Takamori. There is, however, nothing in the evidence to suggest that the heart conditions which Professor Takamori found were in any way connected with the ingestion of the fluoride ion. I am not satisfied that any reliable conclusions applicable to Ireland can be drawn from the cases which Professor Takamori examined because of the great differences in climate and nutrition. It was also suggested that the fluoride ion affects *mortality*. The evidence from the United States of America is, however, conclusive that the ingestion of the fluoride ion at concentrations higher than 1 p.p.m. does not in any way affect the expectation of life of human beings.

60. There are some suggestions in the literature that there is a connection between the ingestion of the fluoride ion and *cancer*: Mr. MacBride stated that the plaintiff was not suggesting this.

61. The Ontario Committee in their report referred to a work by Elwell and Easlick called " Classification and Appraisal of Objections to Fluoridation " and in paragraph 142 of the report a summary of the objections to fluoridation and the answers to the objections taken from that " monumental " work is quoted. I do not wish to lengthen this long judgment by quoting this exhaustive treatment of all possible objections to the fluoridation of water. It is enough to say that the authors and the members of the Committee conclude that none of the objections have any validity, a conclusion with which I respectfully agree.

62. Moreover, I accept the evidence that there is in the human body what one of the doctors called a "homeostatic process". This is a kind of guard or balance by which the defences of the body go into action when anything in the body goes wrong; when the illness is serious, the homeostatic process is not strong enough to save life but if there were any cases where the fluoride ion might produce some ill-effects in the human body (I am not satisfied that there are), the homeostatic process would go into action and would counteract any harmful effects which might be produced.

63. It was also suggested that if the fluoride ion had to be taken, there were other methods available which did not involve any element of risk. This seems to me to be primarily a question for the Oireachtas. If it is accepted that the problem of dental caries has to be dealt with (and I think it imperative that it should be), water fluoridation seems to me to be the only practicable method. Fluorine tablets are not a practicable method for their administration requires a degree of persistence in parents which, unfortunately, does not exist. It is difficult enough to get children to take medicine when they are ill but it would be impossible, I think, to get them to take

tablets regularly when they are well. The shortage of dentists makes the topical application of fluoride to the teeth impossible as a public health measure for all the children of the community.

64. Throughout the case the plaintiff's counsel sought to establish that the fluoridation of water at a concentration of 1 p.p.m. involved "a dangerous dosage" of human beings with the fluoride ion. The first step in this argument was to establish what dose of the fluoride ion would be dangerous; the next step was an attempt to establish that the total amount of the fluoride ion taken in the food, in some drugs, and in the air, when added to the ingestion of water with a concentration of 1 p.p.m., would amount to a dangerous dose. Strong reliance was placed on the quantity of the ion which is in tea and also on the fact that when a kettle of water is allowed to boil, some of the water will evaporate while the ion will not and it was argued that this would cause an increase in the concentration of the fluoride ion. It was also submitted that the Oireachtas is not entitled to take a risk with the health of the citizens and that a concentration of 1 p.p.m. in the water would, when taken with the other sources of the fluoride ion, involve a risk. I am convinced that the amount of the fluoride ion ingested at a concentration of 1 p.p.m. in the water together with the amount of the ion in the food, in drink, in the air and in drugs (insofar as we know it) does not involve any element of danger or risk to health.

65. There is some suggestion in the literature that the machinery which is used to put the fluoride ion into the water may be unreliable. This case was not made by the plaintiff. There is no evidence whatever that the machinery which will be used is unreliable. Even if it were, the daily check which the regulations make compulsory and the other check by the distillation method provide a complete safeguard against any risk from this.

66. In my judgment, the fluoridation of the public water supplies in this country is not a violation of any of the plaintiff's constitutional rights and this action must be dismissed.

Wt.—. P2352. 1,000. 1/64. C.&Co. (1244). G.9.