

FLUORIDATION, 1979

*Scientific Criticisms
and Fluoride Dangers*



Philip R. N. Sutton

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by

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A personal submission to the Committee of Inquiry
into the

Fluoridation of Victorian Water Supplies

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With an Appendix

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PREFACE

This submission was prepared specifically to comply with the Terms of Reference of the Committee of Inquiry into the Fluoridation of Victorian Water Supplies. Of necessity it was prepared to meet the revised dead-line specified by the Committee.

New and important information which has come to hand since this document was submitted in August, 1979, has been added as an Appendix.

For a serious consideration of fluoridation it is necessary to consider a much wider coverage of several aspects of this subject. It is suggested that at least three of the more recently published books, mentioned in the references, are essential reading: The Fluoride Question (Gotzsche, 1975), Environmental Fluoride, 1977 (Rose and Marier, 1977) and Fluoridation: The Great Dilemma (Waldbott et al., 1978).

In addition, the Report on the Quality of the Environment and the Fluoridation of Drinking Water, written by a ministerial committee appointed by the Government of Quebec, Canada, has just been printed and will be available soon. Judging by the abstract of its contents, this is a very important publication.

In my submission the discussion of dental fluorosis was in section XIX. This has now been moved to section XIII, therefore the original sections XIII to XVIII have become XIV to XIX, respectively.

January, 1980

P.R.N.S.

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INTRODUCTION.

The Terms of Reference of this Inquiry instruct the Committee to receive 'new evidence concerning the effects on humans of fluoridation of water supplies' which 'would warrant a review of the Health (Fluoridation) Act.' (Victorian Government, 1973).

The expression 'new evidence' is vague, but is taken to refer, primarily, to material which was unlikely to have been brought to the attention of the members of the Victorian Parliament before the passing of the Health (Fluoridation) Act in 1973, or which has been published or become known since that time. Of course it will be necessary to mention earlier publications, in order to make the 'new' material intelligible or to place it in its proper context. Unless earlier work is considered, practically all the evidence which is still cited in favour of fluoridation, including the key experimental trials, cannot be taken into account.

Common sense dictates that those who advocate the compulsory medication of whole populations, such as the Victorian Health Department, should be required to prove, beyond reasonable doubt, that the process is efficacious and is safe for every member of the community. However, it appears that the Terms of Reference absolve the Health Department, and others, from that sensible requirement.

Instead, the onus is placed on those who oppose artificial fluoridation to produce 'new' evidence.

As the Deputy Speaker in the House of Lords, Lord Douglas of Barloch, said in 1960:

'The fact remains that the onus of proving that fluoridation is beneficial to the teeth rests upon those who assert it, and so does the onus of proving that the continuous ingestion of fluorides involves no risk of cumulative toxicity. This onus of proof has not been satisfactorily discharged.'

The difficulty in obtaining answers from official bodies to questions relating to fluoridation, is illustrated by the fact that the Premier of Western Australia wrote to the National Health and Medical Research Council requesting information about 'accepted safety limits for fluoride absorption, fluoridated water in hemodialysis, and Australian research or scientific discussion on fluorides.' Four and a half months later he had not received a reply. (Cant, 1972).

Even more remarkable is the statement of the Hon. Dr D. Everingham (1977) that, when he was Australian Minister for Health, 1972 to 1975, he requested his Departmental advisers to produce for him a statement of the scientific justification for water fluoridation. After reminders, two years later he finally received a short and unsatisfactory reply. He said:

'I indicated that I did not regard this as scientific evidence and requested the same; in particular claims of Waldbott and Rapaport that fluoride allergy or Down's syndrome (mongolism) are found to be associated with water fluoridation should, I suggested, be refuted in scientific fashion, not by rhetoric or appeal to established authority. I am still waiting to see such refutation.'

The Editorial in the 'Geelong Advertiser' of May 14, 1979(a), said that the Terms of Reference 'seem to be loaded in favour of the status quo.'

The case for artificial fluoridation remains the same. It was stated by Dr L.G. O'Brien, the President of the Australian Dental Association, Victorian Branch, on April 26, 1979. He claimed that:

'The simple truth is that there is no scientific controversy over the safety or effectiveness of fluoridation.'

I submit that the evidence which will be documented in the following pages clearly indicates that that statement is incorrect and, therefore, that the Act must be, at least, reviewed — if not immediately repealed.

SUMMARY

1. Fluoridation has been promoted by: (a) valueless 'endorsements' by various organizations, based mainly on hearsay, (b) the repression of opponents of fluoridation, and (c) the suppression of new evidence against it.
2. Fluoridation compulsorily medicates every member of the community with small doses of a poisonous substance through their domestic drinking water. It contravenes medical ethics and may violate religious and personal convictions. It should not be confused with chlorination, which is intended to treat the water, not the consumer.
3. Claims that artificial fluoridation will reduce the number of dentists required by the community have not been proved.
4. There is an increasing rejection of fluoridation overseas. In Western Europe, plants which had been in operation for many years were closed and there is now an almost complete rejection of fluoridation.
5. Opposition to fluoridation is expressed in most of the letters on the subject sent to the Medical Journal of Australia.
6. The concentration of fluoride in the domestic tap is very difficult to regulate and usually it is not at the specified level.
7. It has been necessary to add lime to the Melbourne water to combat the 'severe corrosion' which fluoride produces in water pipes.
8. Recent publications suggest that increasing the alkalinity of water, by adding lime, may be hazardous unless the water is also chlorinated.

9. Claims that fluoridation will produce a marked decrease (approximately 60 per cent) in the prevalence of dental caries have proved to be, at least, grossly exaggerated.

10. Dental fluorosis, due to chronic fluoride poisoning of tooth-forming cells, will occur in at least ten per cent of children who drink fluoridated water from the time of birth.

11. The 'optimum' or 'optimal' fluoride concentration in drinking water (said to be approximately 1 p.p.m.) is the one which promoters of fluoridation consider is the most favourable one for teeth — they rarely consider its effect on the rest of the body.

12. Fluorides are being ingested in increasing quantities from sources other than water — from food, toothpaste and from fluoride pollution in the atmosphere. Little is known of the fluoride levels in the Melbourne air for the Environment Protection Authority does not monitor fluoride.

13. There cannot be an 'optimum' total fluoride level for every member of a community for this value varies with each individual.

14. The important factor of temperature variations between seasons has been ignored when fluoridating our water.

15. The fluoride concentration of drinking water which is specified in the Act is an arbitrary one.

16. Despite the addition of lime to Melbourne's waters they are still exceptionally 'soft', with low concentrations of calcium which is the antidote for fluoride poisoning.

17. Recent publications suggest the possibility that cases of skeletal fluorosis may develop in Victoria, particularly in those who live near fluoride-emitting factories.
18. Little is known of the psychological reactions of individuals afflicted with dental fluorosis, nor of the direct effects of fluoride on the central nervous system.
19. Recent discoveries give support to the finding that an increase in mongoloid births is associated with increasing levels of fluoride in water supplies.
20. Fluoridated water, apart from affecting the teeth, may have severe effects on other organs of the body. It should not be used in kidney dialysis machines.
21. It is now definitely established that some people cannot tolerate fluoridated drinking water. They become ill, but recover when distilled water is substituted for their domestic water for drinking and cooking.
22. Claims that there is a large margin of safety with fluoridation are false and are 'patiently naïve'.
23. Fluoridation introduces a 'fluoride circuit' which has an uncontrollable effect on man and his environment.
24. Despite claims to the contrary, the reported link between artificial fluoridation and increased cancer mortality has not been disproved. On the contrary, preliminary data from Birmingham, U.K., strongly support the presence of such a link.

THE METHODS USED TO PROMOTE FLUORIDATION.

It is essential for anyone who undertakes a study of the fluoridation of domestic water supplies to learn something of the methods used to promote this procedure. This should be done before considering the scientific side of this controversy for, without that knowledge, some of the facets of the fluoridation discussion will be incomprehensible.

Normally, scientific programmes are accepted or rejected on their merits, as judged by studies of the original data by a group of scientists chosen so that each of the many aspects which must be investigated is covered by at least one expert in each field. Fluoridation departs from that custom. It was commenced mainly on the advice of public health dentists and officials with little participation in the trials by competent statisticians, chemists, engineers, pharmacologists, toxicologists and physiologists. It is notable that much of the criticism of fluoridation comes from scientists trained in those fields.

Fluoridation is the first measure designed to affect the health of the population which, instead of being accepted on the consensus of scientists, has been 'sold' to individuals and governments by propaganda and by endorsements, as though it is a commercial product. In a sense, of course, it is.

Professor C.M. McCay, in 1957, said:

'The whole program of fluoridation has been done with too much haste and without careful research and study.

The trouble is that profits are involved for some and emotions have been created in others.'

Dr A. Aslander (1966) said:

'The fact that fluoridation has gained such prominence is easily explained. It is promoted by very clever, very lavish and very unscrupulous propaganda. It is a display of masterly commercialism. And the promoters have been able to engage the interest of politicians.'

The Victorian Health (Fluoridation) Act, of December 11, 1973, provides that the 'net capital costs and expenses' will be 'provided by Parliament', and it makes fluoridation compulsory for the whole State by stating that any person or 'any water supply authority contravening or failing to comply with any of the provisions of this Act or of the regulations thereunder shall be guilty of an offence against this Act; and shall be liable to a penalty of not less than \$200 nor more than \$1,000 and in the case of a continuing offence, to a daily penalty not exceeding \$40.'

Less than a year prior to the passing of that Act, the Secretary to the Premier of Victoria wrote:

'I am directed by the Premier to acknowledge your letter of 9th December, 1972, concerning fluoridation of Victorian water supplies.

Mr. Hamer has asked me to say that the Government is not prepared to make fluoridation of water supplies compulsory and will not direct local bodies to introduce it.' (Green, 1973a).

As no significant new information in favour of fluoridation was published during that year, why did the Victorian Government completely reverse its attitude on this matter?

Prior to the passing of the Act, statements were made that all the experts had been consulted. This was not the case. Neither of the political parties sought information from any of those in Victoria who were widely known for their opposition to artificial fluoridation. Even Professor Sir Arthur Amies, C.M.G., Dean of the University of Melbourne Dental School for more than thirty years, was ignored.

The methods used to promote fluoridation will be considered under four main headings:

- (1) Political action to introduce fluoridation.
- (2) Promotion of fluoridation by 'endorsements'.
- (3) Repressive actions against those who question or oppose fluoridation.
- (4) Motives of those who promote fluoridation.

(1) Political Action to Introduce Fluoridation.

In 1961, the Journal of the American Dental Association published an article by Dr D.R. McNeil, who said:

'We cannot escape the fact that fluoridation has been wrested from the hands of the scientist and deposited squarely in the middle of the political arena. Fluoridation is now a political problem. We are striving to reach the minds of men so that they will take political action.' 'I have seen, and understood, the reluctance of citizens to become embroiled in a vicious hate campaign often unparalled in the history of the community.' He spoke of 'more funds allotted by the U.S. Public Health Service to finance the battles.' 'In short the war should be carried out on a thousand fronts simultaneously.'

More recently, an article in the British Dental Journal urged the dental profession to 'organize for the next battles' (Burt and Petterson, 1972) and said:

'Fluoridation everywhere is a political matter and the dental profession has to be prepared to treat it as such.'

In 1978 the U.S. Public Health Service journal Public Health Reports, published an article entitled 'Fighting the Latest Challenge to Fluoridation in Oregon'. It said that in 1976 the State fluoridation group 'hired an experienced campaign director to coordinate efforts and give full-time oversight. Although costly, this was essential.' (Rosenstein et al., 1978).

This determination to force in fluoridation is also seen in Australia. For instance, in 1959, Professor N.D. Martin said that before Sydney's water was fluoridated a full-scale education programme would be held 'to break down public opposition.'

If the decision regarding fluoridation rests on a political rather than a scientific basis, then the often-repeated false claim, that 'laymen' should have no part in the decision whether or not they are to be forced to consume extra quantities of fluoride, obviously is not valid.

(2) Promotion of Fluoridation by 'Endorsements'.

Artificial fluoridation is now endorsed by a multitude of associations and organizations, from the World Health Organization to school parents clubs. This impresses

people who have not been trained in scientific methods, and also some impressionable scientists. For instance, in a speech in the House of Representatives, in 1964, Sir Robert Menzies mentioned no fewer than twenty-three of these endorsing bodies. Of course these endorsements are announced by the executive officers, it does not follow that the majority, or even a large number, of the members of an organization support fluoridation.

Professor H.A. Schweigart (1967) said that it should be asked who was responsible for the German organization of dentists requesting the government to fluoridate the drinking water, despite the fact that most of the 35,000 members had not been interviewed to obtain their views on this problem. He said:

'In a similar way the Deutsche Gesellschaft für Zahn-, Mund-und Kieferheilkunde asked for the fluoridation of drinking water and defamed the opponents — many of them with highest scientific reputation — as not competent and not qualified.'

However the executive of that society failed to gain the support of its members for that action. He concluded by saying that it is a great pity that there are parallel cases in other countries.

Dr A. Horton (1970) asked 'why the Press seems to infer that the A.M.A. speaks for all its members' when "letters to the editor" show that a number of doctors oppose mass medication by fluoridation. 'Why give fluoride in such a haphazard manner to everybody?'

I do not know of a properly-conducted ballot being held to determine the proportion of Victorian dentists who support fluoridation. Some years ago there was a survey of a small and biased sample.

(a) The Dominant Role of the U.S. Public Health Service in the Promotion of Artificial Fluoridation. The U.S.P.H.S. was the first, and remains the main, promoter of artificial fluoridation. Its first endorsement was on June 1, 1950, only five years and four months after the commencement of the proposed 10-year first fluoridation trial: 'As a result of new evidence from its Grand Rapids project.' (Lohr and Love, 1954). It was pointed out (Sutton and Amies, 1958) that, in children who had been drinking fluoridated water all their lives, 'at that time very few, if any, of their permanent teeth had even erupted.' Therefore there was no evidence of either benefit or harm to the permanent teeth, for they could not be examined.

Soon afterwards, that key U.S.P.H.S. study was effectively destroyed by the fluoridation of the control city. The results reported from that study are still widely cited as evidence for fluoridation. A report from statisticians stated that, in that study, 'The authors appear to have demonstrated an unfortunate disdain for some of the pre-requisites of valid research.' (De Stefano, 1954).

The U.S.P.H.S. still remains the main source of financial support for the promotion of fluoridation.

(b) Australian Endorsements of Fluoridation. The U.S. practice of 'selling' fluoridation to the public and to governments, by citing the names of endorsing bodies, has been adopted in Australia. The Federal Vice-President of the Australian Dental Association (A.D.A.) recently mentioned as endorsers the Australian Department of Health, the Health Commission of N.S.W., the N.S.W. Cancer Council and seven overseas bodies. He said that space would not permit a listing of the 'multitude of professional associations and respected individual scientists who have endorsed fluoridation.' (Australian Dental Association, 1979).

The main endorsing bodies are the National Health and Medical Research Council (N.H. & M.R.C.), the A.D.A. and the Australian Medical Association (A.M.A.). Recently they joined with the Australian Federation of Consumer Organizations (A.F.C.O.) in a joint statement which attacked what it described as 'an organized and ill-informed campaign against fluoridation.' (N.H. & M.R.C., A.M.A., A.D.A., and A.F.C.O., 1979). The Chairman of Council, N.H. & M.R.C. (1979) said :

'The NH&MRC were unanimous in their support of the controlled fluoridation (where necessary) of water supplies as one of the greatest and safest improvements in public health available to us.'

Of course, as the former Federal Minister for Health, Hon. Dr D.N. Everingham (1970) said:

'The authorities mostly referred to in supporting fluoridation are political (A.M.A., WHO etc.) and journalistic rather than scientific research societies like Britain's Royal Society.'

(c) The Basis for Endorsements. The endorsements of fluoridation by these Australian and overseas bodies are not based on studies which they have conducted. As Lord Douglas of Barloch expressed it, when referring to the British Medical Research Council, the WHO, and various medical and dental associations:

'None of these bodies has done any original research which would justify recommending fluoridation. They have rested themselves upon the opinion of others.'

'In the end this large and apparently authoritative body of opinion is seen to be an inverted pyramid resting mainly upon the interpretation by a few persons of a selection of statistics of the experimental trials.' 'It is indeed characteristic that the opinions expressed upon this subject become increasingly dogmatic as each one in turn is based upon the opinion of another and become further removed from the facts which ought to be their foundation.'
(Douglas of Barloch, 1960).

(d) Scientific Decision by Majority Vote. It is frequently stated that the majority of scientists favour fluoridation. The Editor of the Journal of the Dental Association of South Africa (1959) said:

'Whether the scientists who favour fluoridation are in the vast majority we are not in the position to state. In any case, numerical strength is no yardstick by which to measure rightness or wrongness. The history of medicine teems with examples of one lone scientist being proved correct in the face of a host of opponents.'

* See appendix 7e, p. 266.

(e) Scientists and Scientific Organizations Opposing

Fluoridation. In the case of fluoridation it is by no means a case of 'one lone scientist', for a very large number of scientists are opposed to that process. Many of these are senior men and women of considerable standing, some of whom have allowed their names to be listed as opponents of fluoridation. One list contains the names of twelve Nobel Prize winners who 'have expressed reservations about the safety of the artificial fluoridation of public water supplies.' (London Anti-Fluoridation Campaign).

When endorsements of fluoridation are cited, there is never any mention of these scientists, nor of the opposition of prestigious bodies such as the International Society for Research on Nutrition and Vital Substances. When it passed its Resolution 39 opposing fluoridation, its Scientific Council consisted of more than 450 members, sixty per cent of them being professors, drawn from 75 countries. (Professor Albert Schweitzer was the Honorary President for nine years.) All their resolutions were approved by the entire membership, with a consensus ranging from 93 to 100 per cent of the votes. (International Society, 1967).

Professor H.A. Schweigart, the President, revealed that the Society had frequently dealt with the fluorine problem, and that the pros and cons had been carefully weighed. Experts from several countries had 'examined conscientiously the argumentation' before their resolution

* See appendix 7c, p. 265.

number 39 was published. The translation from the German:

'The Scientific Council of the International Society for Research on Nutrition and Vital Substances recommends that all governments, State Parliaments and City Councils, concerned with the problem of fluoridation of drinking water and protection from dental caries, should refrain from fluoridating drinking water, which measure is actually a medication, as long as the scientific aspects of this problem are not satisfactorily clarified.' (International Society, 1967).

(f) A Comment on the Endorsement of Fluoridation by the National Health and Medical Research Council, the Australian Medical Association, the Australian Dental Association and the Australian Federation of Consumer Organizations. An important insight into the true value, in fact the deceptiveness, of endorsements by organizations, even by those four leading Australian ones, was given recently at a meeting at the Australian National University, at which I was present. It was called to hear an American lecturer, Dr J. Yiamouyiannis, and to discuss the question of a link between artificial fluoridation and cancer mortality, revealed by him and Dr Dean Burk (1977). The spokesman appointed to oppose Dr Yiamouyiannis was Professor R. Thorp (who is, I understand, a retired professor of pharmacy). A subsequent statement by Dr M. Diesendorf (1979) described the outcome very accurately. He said:

'In short, the "debate" was a complete walk-over for Dr Yiamouyiannis. This was surprising, because just before Dr Yiamouyiannis's arrival in Australia, Professor Thorp, speaking on the media on behalf of the NHMRC, the Australian Medical Association, the

Australian Dental Association and the Australian Federation of Consumer Organizations, had made a strong attack on Dr Yiamouyiannis and stated positively that there was no link between fluoridation and cancer.

Since the spokesman for these eminent authorities was unable to substantiate his claims scientifically, it seemed fair to ask who in Australia assessed the scientific papers on both sides of this controversy and advised the NHMRC, the AMA, the ADA and the AFCCO that there is no link between fluoridation and cancer?

To the amazement of the uncommitted members of the audience at the ANU debate, Professor Thorp was unable to answer this question.

The answer, I suspect, is simply. There is no one.

The NHMRC, AMA, ADA and AFCCO have simply, without thinking, accepted the advice of their opposite numbers overseas. These in turn have unthinkingly accepted the results of the US National Cancer Institute, Doll and Kinlen, and Oldham and Newell, whose work contains the same well-documented error and which in addition has been scientifically criticized by Dr Yiamouyiannis and Dr Burk.'

Dr Diesendorf continued:

'Does fluoridation cause cancer? I do not know, because it is very difficult to prove causal links in epidemiology.

However, I do know that Dr Yiamouyiannis and his co-author, Dr Dean Burk, have produced a substantial piece of research (published in 'Fluoride', volume 10, pages 102-123) which shows a correlation between fluoridation and cancer death rate and has not been convincingly refuted in the two years since its publication.

The response of the medical and dental authorities has been to produce long lists of authorities which have endorsed fluoridation, and to make insinuations

about the character and integrity of Dr Yiamouyiannis and Dr Burk.'

He concluded:

'Does fluoridation cause cancer? I do not know, but one thing is clear: neither do the NHMRC, AMA, ADA and AFCCO.' (Diesendorf, 1979).

(3) Repressive Actions.

Recently the more reprehensible side of the fluoridation promotion is becoming widely known. This comprises four elements: (a) The discouragement of scientific discussion on fluoridation and involvement in it. (b) The repression and even abuse of scientists and others whose findings and publications cast doubt on any aspect of fluoridation.

(c) The suppression or disregard of evidence against fluoridation. (d) Actions to ensure that new evidence against fluoridation is difficult to publish.

(a) The Discouragement of Discussion on Fluoridation.

The United States Public Health Service (U.S.P.H.S.) distributes enormous funds to its many agencies. (U.S. Congress, 1977). It also finances many research grants, both in the U.S. and in other countries. This control of grants has a restricting effect on the scientific discussion on fluoridation, which is a process strongly promoted by the U.S.P.H.S. American professors have admitted to me that they have to think of their grants and, therefore, avoid the subject of fluoridation. This is understandable for, apart from the financial aspects,

there is the distinct possibility that, if they questioned fluoridation, they would be abused and 'damned by association'. (This matter will be mentioned later.)

Mr Ralph Nader said:

'I think the way out is first to recognize that there are a great number of scientists in this country and abroad who are afraid to speak out on the subject [fluoridation]. The H.E.W. [Health, Education and Welfare Department, U.S.P.H.S.] has been known to deal with this kind of person rather harshly in the dissemination of research grants.' And 'you just don't expect to be treated well by H.E.W. in its massive research granting if you come out against this type of thing. It's a matter of professional intimidation here.' (Nader, 1971).

Dr F.H. Quimby (1970) cited an article which said that Dr A.A. London (who had investigated fluoridation for many years) sought a chance to speak at an American Dental Association symposium on fluoridation. He wanted to mention new evidence on side effects. His request was refused on the grounds that: 'The theme of the Symposium is not controversy, but additional documentation of the universality of experience of the safety and effectiveness of fluoridation, world wide. Presentation of the type of paper you propose would be an insult to the scientific community today.'

The Assistant Chief, Division of Dental Public Health, U.S.P.H.S., advised Australian dentists not to permit fluoridation to become a subject for public debate. (Galagan, 1959). Commenting, Sir Stanton Hicks said that that advice discloses 'what in my opinion is a dangerous

trend in our day and age. This is the tendency of the pseudo-scientific expert to use his authority to impose his views.' (Hicks, 1961).

In Australia, academics and institutions are reluctant to become involved in the fluoridation discussion. In my eleven years at the University of Melbourne Dental School, except for many discussions with Sir Arthur Amies, the subject of fluoridation was taboo, at least in my hearing. This reluctance extends to institutions. In 1974 the Victorian branch of the Australian Kidney Foundation was asked to comment on the safety of using fluoridated water for dialysis. The enquiry was passed to their Australian headquarters, who said:

'...we would not contemplate getting involved in a question such as this which has generated so much controversy.'

Two years later the Foundation said:

'The Australian Kidney Foundation has no specific statement to make regarding the fluoridation of water in relation to patients with kidney disease.' (Kincaid-Smith, 1976).

On April 21, 1979, the Australian Broadcasting Commission presented both sides of the fluoridation discussion in a segment of its programme 'Four Corners', and was subjected to tremendous criticism for having aired the subject. The Executive Producer of 'Four Corners' commented on those who claim that fluoridation is 'perfectly safe', saying:

'Few self-respecting scientists would be so dogmatic in dismissing the possibility of evidence to the contrary emerging in the future.' 'And when experts disagree over matters of public safety, surely it's a legitimate subject for debate in programs like Four Corners .' 'Dr Kramer even blames Four Corners for filming bags of fluoride bearing poison labels. Fluoride is a poison. Such warning labels are required by law. To have deliberately concealed these labels or avoided filming them would have constituted the very bias of which Dr Kramer accuses us.' (Reid, 1979).

(b) Repression and Abuse of Opponents of Fluoridation.

Many attempts have been, and are, made to denigrate those who question the official claims for fluoridation. This process has been going on for many years. For instance, the Assistant Chief, Division of Dental Public Health, U.S.P.H.S., (Galagan, 1959) said that 'the opposition'

'... seems to be composed of four distinct kinds of people.' These he termed: 'the hatemonger, the pseudo-health believer, and the person who opposes fluoridation for personal notoriety' and 'the fourth, or rugged individualist, group.'

The American Dental Association's Bureau of Public Information, in a re-issue of a publication entitled 'Comments on the Opponents of Fluoridation', (1961) grouped several reputable scientists with alleged members of the John Birch Society, the Ku Klux Klan, an escapee from a mental hospital, and others, in an obvious attempt to 'damn by association'. That dossier condemned the 300 members of the Medical-Dental Committee on the Evaluation

* See appendix 7d, p. 266.

of Fluoridation, solely because it was such a small proportion of the 300,000 physicians and dentists in the U.S.

Dr A.A. London (1967) recounted how, in the early 1950s :

'Promotional zeal threw caution to the winds and lent itself to the use of smear, derision and defamation with intent to stifle and drive out opposition. Thus physicians and dentists rather than chancing this type of abuse are kept in line for fear of becoming "involved".'

Dr G.L. Waldbott (1974a) stated that he could supply the names of more than twenty highly competent physicians [in the U.S.] — one a Nobel Prize winner — who have either diagnosed or confirmed the diagnosis of serious illness from fluoridated water. However:

'These men are reluctant to present their data to the medical profession: they do not wish to become engaged in a controversy characterized by personal disparagement, threats, and reprisals, to which every scientist who openly opposes fluoridation has been subjected. By merely reporting data unfavourable to fluoridation they would become known as "antifluoridationists" a designation which would alienate them from many of their colleagues and interfere with their practice.'

This repression also includes journalists who have been victimized for having the temerity to assume that the consumers of fluoridated water, the public, should have the right to be informed of both sides of the question. For instance, the well-known medical journalist Anne-Lise Gotzsche, formerly of the 'General Practitioner', wrote a two-page Special Report on Fluoridation for the

London 'Sunday Times' (September 2, 1973). Despite the fact that her article presented both sides in a factual manner, and was accurate, she lost her job. In a letter to the Lancet (Nov. 3, 1973b) she said that she had talked

'.. to dentists who have had to give up their research, to other medical researchers who feel it necessary to publicly declare themselves in favour of fluoridation and yet privately insist that they are against.'

She mentioned that opposition to fluoridation is growing in American universities

'..to the point where at least one research project has been started investigating the claims by scientists who insist that they have been intimidated.'

In the House of Representatives, Hon. D.J. Killen (1963) said:

'I object with bitterness to the way in which people will set out deliberately to smear and to slander those individuals who have reservations about fluoridation or who may have clear-cut opposition to it.'

At the Tasmanian Royal Commission on Fluoridation, Professor J.B. Polya (1967) in his submission said:

'... my status and livelihood have been repeatedly threatened by zealous supporters of fluoridation.'

Such smear tactics, unfortunately, still occur.

Dr J. Yiamouyiannis, the co-discoveror of a link between artificial fluoridation and increased cancer mortality (Yiamouyiannis and Burk, 1977) visited Australia recently. After a 'torrid Sydney press conference' (Eckersley, 1979) he (not his data) was attacked in full-page newspaper advertisements (Nicholas, 1979) in Nowra, where he had

* See appendix 1a, p. 253.

been asked to discuss his findings prior to a referendum. The Acting Chairman of the Fluoridation Sub-Committee, A.D.A. (Victoria), described him, over the radio, as 'some crank doctor' from America. (Oakley, 1979).

One of the results of his visit was the decision to end the fluoridation of the Queensland Gold Coast's water supply after it had been in operation for ten years. An Editorial (1979d) comment was: 'Yet, once again, local bumbledom preferred to heed the unscientific twaddle and superstitious scare-mongering of the anti-fluoride lobby.'

When he was here Dr Yiamouyiannis said:

'They have lost out on the science — all they have left is character assassination.'

(c) The Suppression of Published Evidence Against Fluoridation. Ever since the premature endorsement of fluoridation by the U.S.P.H.S. in 1950, determined attempts have been made to suppress or to disregard published evidence which can be considered to question fluoridation. One technique is to cite only the first study by an author, ignoring later and more damaging ones. (e.g. Taylor, 1954 not 1965; Rapaport, 1956 not 1959; Sutton, 1959 not 1960; Yiamouyiannis and Burk, preliminary data, not 1977 and 1978.) Anne-Lise Gotzsche (1973b) said that she had 'talked to despairing doctors [in the U.K.] who have found it necessary to write off to Sweden to obtain the full facts' on fluoridation.

Dr E.C. Hamlyn, Medical Officer to the House of Commons All Party Committee on Freedom of Information, U.K., said in 1978:

'I am now a confirmed opponent of the idea of adding fluoride to public water supplies, and having looked into it I regard the campaign being carried out by the Department of Health and others in favour of water fluoridation as perhaps the best possible evidence of the need for a Freedom of Information Act to ensure that public authorities make available to the public such information as they have a right to possess.'

*

A recent and very important case is the attempt by the U.S. Cancer Institute to neutralize the claim by Drs J. Yiamouyiannis and D. Burk (1977) that there is a link between artificial fluoridation and cancer mortality. A U.S. Congressional Inquiry, in 1977, revealed that the Institute, which received more than \$ 800,000,000 annually as a part of the U.S.P.H.S., although it had endorsed and promoted fluoridation for more than 25 years, had never undertaken an experimental investigation to test whether fluoride in water is carcinogenic. The Institute then announced that it was about to commence a three-year study on experimental animals. The American cancer researcher Dr A. Taylor published studies on animals more than twenty years ago, in 1954. In 1965 he and Nell C. Taylor reported that as little as 1.0 p.p.m. fluoride in drinking water considerably stimulated the growth of tumour transplants in mice.

Recently in Australia there have been attempts to suppress important evidence. Many articles have appeared

* See appendix 6a, p. 264.

in newspapers denying the, unrefuted, link between artificial fluoridation and cancer mortality, which was discovered by Drs J. Yiamouyiannis and Dean Burk, the eminent cancer researcher (see American Men of Science and Marquis Who's Who in the World, Vol. II).

The recent visit of Dr Yiamouyiannis provided an ideal opportunity for his critics to refute his claims on scientific or statistical grounds. However, despite many invitations, not one of them was prepared to discuss his data with him. His lecture at the Australian National University was reduced to half an hour, the remaining lecture time being wasted, because the retired professor, who used the time, admitted that he knew little of cancer.

(d) Difficulties in Publishing New Material which Questions Fluoridation. There have been many cases reported of the refusal to publish letters and papers which were considered to question fluoridation. A letter to the Editor of the British Dental Journal (Mummery, 1974) cited instances of its failure to publish letters which questioned fluoridation. In 1974 F.R. Bertrand wrote:

'The freedom of the press does not apply to the B.D.J., and its dictatorial policy on fluoridation; one result of which is that no article against fluoridation has been published for over 16 years.'

Anne-Lise Gotzsche (1975) said that the Journal of the American Dental Association had refused to publish papers by Dr R. Zielgelbecker of the Institute of Environmental Research, Graz; and letters from Professor

Albert Schatz, on the grounds that he should not be allowed to use the Journal as a 'platform for his anti-fluoridation views.' Recently Professor R.S. Scorer (1979) stated that the paper by Drs J. Yiamouyiannis and Dean Burk, revealing a link between artificial fluoridation and cancer mortality, was refused publication by a 'prestigious British journal' in case it caused public alarm.

Such difficulties apply even to books. Two cases may be mentioned. Professor Albert Schatz (1965) reported:

'Two years elapsed between the 1962 symposium [held in Bern, Switzerland on 15-17 October, 1962, after being transferred from Holland 'because of opposition from dental interests in that country'] and publication of The Toxicology of Fluorine in 1964 because of efforts that were made to suppress the book. For example, one publishing house, which puts out dental and medical literature, agreed to print The Toxicology of Fluorine and invested some 10,000 Swiss francs in setting the text up in type. But it was then warned that if it went ahead and published this particular book the dental community would stop patronizing it. In the face of this threatened economic boycott and enticed by an offer of compensation to cover all expenses incurred (approximately 10,000 Swiss francs), the publisher "dropped" the book.'

It was later published by Schwabe & Co.

My monograph Fluoridation: Errors and Omissions in Experimental Trials was published by the Melbourne University Press in 1959 and copies were sent to America.

(a) The agents there, Cambridge University Press, were immediately approached by the Executive Director of the Nutrition Foundation Inc. of Park Avenue, N.Y. (letter Jan. 20, King, 1960). His letter said:

'The professional standing of the Cambridge University Press among scientists and educators would seem to preclude publication of such a book by Cambridge University Press.'

(b) The three 'Book Reviews' in the Australian Dental Journal were written by authors whose work the monograph criticized and by their associates. (Their comments were quoted at length in the second edition, and replies given to the 83 points raised in the reviews - Sutton, 1960).

(c) The 'stack' of type at Melbourne University Press, at that time always held for at least six months, was melted down soon after publication, without authority. It cost M.U.P. £400 to reset the type for the second edition.

(d) Neither the first nor the second edition was (as would normally be the case) included in the Index to Dental Literature (published by the American Dental Association) nor were favourable commentaries — but the adverse criticisms were indexed.

(e) In November, 1959, the Dental Research Advisory Committee of the N.H. & M.R.C. referred the first edition to a Sub-committee consisting of Associate Professor N.D. Martin and the statisticians Professor H.O. Lancaster and Professor M. Belz. (Professor Belz, with his staff, had checked all its computations prior to publication.) More than three years later Professor Martin was instructed to submit a report for the next meeting of the Dental Advisory Committee. (N.H. & M.R.C., 1963). Access to that report was refused.

Professor Albert Schatz (1965) quoted, in capital letters, the words of Thomas Jefferson:

'IF THE BOOK IS FALSE IN ITS FACTS, REFUTE THEM. IF IT IS FALSE IN ITS REASONING, DISPROVE IT. BUT FOR GOD'S SAKE LET US FREELY HEAR BOTH SIDES.'

(4) The Motives of Those Who Promote Fluoridation.

What are the motives engendering this promotional fervour? They may be divided into: (a) Altruistic, (b) Financial, and (c) Prestige considerations.

(a) Altruistic motives. The discussion on fluoridation started in Victoria in the early 1950s. At that time I was a member of the ten-man Dental Health Education Committee which was set up by the A.D.A. to devise and conduct educational programmes to reduce the prevalence of dental caries. It was a thankless task, due mainly to the almost total lack of response from the community. Then came the concept of fluoridation, strongly advocated by a well-known American clinician who was visiting Victoria. The idea was enthusiastically adopted by the Committee — although two of us had reservations — and we employed a public relations firm to advance the idea. The response from the public was practically nil.

I am convinced that the main motive of most dentists who advocate fluoridation is still their desire to reduce the dental caries problem, having been assured

by their own Association, the A.D.A., the A.M.A., the N.H.& M.R.C. and others, that artificial fluoridation is both very effective and completely safe. Of course there are some who have additional motives. As Sir Arthur Amies said, speaking of fluoridation in 1959:

'The passion to regulate the lives of others is deep-seated in many individuals. When this is based on political expediency it is bad, and when it is inspired by an idealism which wishes to inflict benefit on others it can become dangerous.'

As early as 1956 dentists were told:

'The groundwork has been carried out, and it now falls to the lot of the individual dentist to become a fanatical protagonist of fluoridation.' (Christensen, 1956).

('Fanatic' — 'Person filled with excessive & mistaken enthusiasm'. Oxford Dictionary).

(b) Financial Advantages from Promoting Fluoridation.

During the early days of fluoridation in the U.S.,

'Chemical Week' said that:

'... the market potential has the fluoride chemical makers goggle-eyed.' 'Standing to benefit from the boom are chemical companies and equipment firms.' Also 'any apathy or opposition on the part of the public is made up for by the USPHS's zeal in drumming up the program. It is asking for federal money to develop interest.' (Editorial, 1951).

Many more statements indicating the financial gain have been made. In 1976 the Royal College of Physicians Committee on the Fluoridation of Public Water Supplies said that most of the fluoride added to water supplies 'would be

derived from sources that would otherwise have been discharged into the sea as waste.'

The Senior Executive Engineer, Operations and Maintenance, Victorian State Rivers and Water Supply Commission (Hirth, 1977) said:

'There is a tendency at the present time for water supply authorities to buy fluoride powders to a price, taking what is virtually an incidental by-product from an industrial process, rather than fixing a specification to suit the real needs of the authority.'

He said that Melbourne uses a sodium silicofluoride slurry.

Drs Gabovich and Ovrutskiy (1977) said that:

'This reagent is a by product of the fertilizer industry, so that it is readily available and cheaper than other reagents.'

More important than the direct financial gain from the sale of fluoride chemicals is the question of decreasing the problem of the disposal of toxic wastes. This is a grave problem, and a spokesman for the Reynolds Aluminium Company is quoted as saying that it is cheaper to pay fines than to control fluorides. (Caldwell and Zanfagna, 1974). 'The manufacturer's problem is disposing of acid that has been produced — he must ship it, sell it, get rid of it.' (Harper, 1951).

The Swedish scientist, Dr A. Aslander (1966) said:

'The real nature of fluoridation is that it is a vast commercial enterprise. Fluoride is a very obnoxious waste product extremely difficult to dispose of. The yearly production of fluorine in the U.S.A. has been estimated at 80,000 tons a year. From the commercial

point of view fluoridation is brilliant. By spreading fluorine over very large areas, unblushingly proclaiming — against scientific laws — that dental caries is caused by fluorine deficiency, and just as unblushingly maintaining that fluorine is harmless, a very difficult waste problem has been converted to a very profitable enterprise.'

(c) Personal Prestige. A strong motive, possibly the main one, which accounts for the tactics which have just been outlined — the continued promotion of fluoridation despite the rapidly mounting evidence against it, and the abuse and repression of scientists and others who oppose it — is the question of personal prestige. Persons and organizations endorsing fluoridation, saying that it is safe and effective, fear the loss of prestige which will result when the dangers of fluoridation become more widely known and force its abandonment.

Professor Albert Schatz (1965) said:

'There are powerful forces which now have a vested interest in perpetuating fluoridation because their reputations depend on its continuation. For many years, certain individuals have claimed and insisted that fluoridation is absolutely safe and, consequently, there is neither merit nor purpose in considering toxic effects of fluoride in connection with fluoridation. To acknowledge, at this late date, that the subject is open and fit for discussion would be an admission of serious errors in judgement on the highest levels.'

Unfortunately, a similar position has developed in Australia. There are many individuals and senior

endorsing organizations and associations who must consider that their reputations are threatened by the increasing rejection of fluoridation.

As the Director of Laboratories, New York Department of Water, Gas and Electricity (Nesin, 1956) pointed out more than twenty years ago:

'Certainly the proponents of fluoridation are not intent upon poisoning or harming anyone, however the dilemma of prestige is a very difficult matter to resolve.'

THE NATURE OF ARTIFICIAL FLUORIDATION.

(1) The Fundamental Difference between Chlorination and Fluoridation.

At the time of the passing of the Act the nature of fluoridation was widely misunderstood. Many considered it to be similar to chlorination, not realizing that there is a fundamental difference between those two processes. The purpose of chlorination is to treat the water to render it safe for use, whereas the purpose of fluoridation is not to treat the water, but to compulsorily medicate every individual in the community through their water supply. It does this both directly, through their drinking water, and indirectly, when they consume watered or water-containing products. As Dr J.W. Hogarth (1962) said:

'Chlorination and fluoridation are in no way analogous, nor are they related cases, except in the similarity of words, and there it ends.'

(2) Is Fluorine an Essential Element?

The question whether fluorine is an essential element, in man, has not yet been decided. In 1963 the U.S. Food and Drug Administration stated that fluoride is not established to be essential to human nutrition and would not be classified as a nutrient. The WHO (1970a) said that it is not known with any certainty whether fluorine

'... is an essential element in animal (including human) metabolism,'...'it has not yet been possible to produce an otherwise adequate fluorine-free diet for experimental animals.'

In any case this question is not important for:

'The need is infinitesimal and the supply in common food must be sufficient. Fluoridation means a surplus of fluorine.' (Aslander, 1966).

(3) Terminology — Fluorine, Fluoride.

In 1958 the WHO Expert Committee on Water Fluoridation said:

'Fluoridation of water-supplies employs the fluoride ion as the active agent; a number (at least six) of simple and complex inorganic fluoride salts serve as sources. The element fluorine is not used as such; for this reason "fluoridation" rather than "fluorination" is the preferred term.'

The Committee repeatedly used the term '1 p.p.m. fluoride'.

Professor D. Steyn, a pharmacologist, when commenting on that report, said: 'I take it that "fluoride" should read fluorine as 1 ppm "fluoride" would mean less than 1 ppm fluorine.' (Steyn, 1958b).

However, in the fluoridation literature this inexact expression has been widely adopted (but not in Europe), and '1 ppm fluoride' or '1 p.p.m. fluoride' means a fluoride salt, ^{solution} which contains 1 p.p.m. fluorine.

(4) Fluoridation Contravenes Medical Ethics.

The revolutionary process of artificial fluoridation contravenes standard medical practice and ethics. It was first introduced in the U.S.A. in 1945, without prior tests on animals and without the assent of the individuals who were used in the experiment. (Hurme, 1952; Taylor, 1952).

Sir Stanton Hicks (1956), formerly Professor of Human Physiology and Pharmacology, University of Adelaide, and Advisor to the Australian Army on Foodstuffs and Feeding, said that:

'I submit that medication of a whole populace variable in individual response, regardless of individual age, state of teeth, of general health, rate of consumption of water, and so on, is quite unscientific and unethical, and that passive acceptance of the right of a government or municipal authority to implicate such medication through its water supply is to sacrifice a fundamental principle of medical practice. This may well redound to our discomfort at a later date.'

(5) The Concentration of Fluoride in Natural Water Supplies.

Proponents of fluoridation frequently say that it is only the 'adjustment' of the fluoride level to the 'optimal' one. They brand all drinking water which contains less than approximately 1 p.p.m. fluoride as 'fluoride deficient'. For instance, Professor Linus Pauling (1967) said that 'water that is deficient in fluoride' should be 'brought up to this level by the addition of fluoride' until it reaches 'the average for natural water'. Surprisingly, he did not specify that 'average' concentration.

Before artificial fluoridation schemes commenced, approximately 4.3 per cent of the population of the U.S. had 'access to communal water supplies containing fluorine in the amount of 0.5 ppm or more.' (Hill et al., 1949). However they did not necessarily drink such water. For instance, in Colorado Springs, which had '...about 2.6 p.p.m. F', due to the 'high prevalence of dental fluorosis' dentists and pediatricians 'have

recommended since 1935 that parents provide their children with low fluoride water during the development of the permanent teeth as a preventive measure against this disease. The local dairies have cooperated by supplying low-fluoride (0.2 p.p.m. F) bottled water.' (Gerrie and Kehr, 1957).

Artificial fluoridation is a mechanical process which produces an unusual condition in the water. As Lord Douglas of Barloch said in 1960:

'In the first place fluorides in the quantities advocated are not usually found in natural water supplies. Where they occur, it most commonly is in water from deep wells. It is consequently *prima facie* improbable that the biological evolution of human beings has resulted in a constitutional need for fluorides.' Also 'communities can exist whose dental health is excellent although the water supply contains little or negligible amounts of fluoride.'

Surveys of the natural fluoride content of N.S.W. and Tasmanian waters show that less than 0.2 p.p.m. fluoride was found in 91% (Jones, 1949) and 93% (Reid and Martin, 1946) of surface waters. Almost all the higher concentrations were in supplies from springs and wells. This appears to be the case in all countries. The WHO Chronicle in 1970(a) said that 'Surface waters are generally low in fluorides.'

'The normal fluoride level for most waters ranges between 0.1 and 0.3 ppm. This is true throughout the world and is the environment in which man has evolved and adapted himself to. This is reflected by the blood level of fluoride which is 0.15 ppm.' (Yiamouyiannis, 1978).

(6) Fluoridation is Compulsory Medication.

Promoters of fluoridation frequently state that *it provides* a nutrient, it is not mass medication. Therefore several of the many contrary views will be cited.

Testifying before a U.S. Committee on Chemicals in foods, Dr A. Taylor (1952) stated that 'fluoridation is very definitely a type of medication, whereas chlorination is not.'

Dr F.B. Exner in 1961 said: 'Whether a substance is a food or a drug is determined by the purpose for which it is used.'

The U.S. Food and Drug Administration stated, in 1963, that fluoride 'used for its therapeutic effect is a drug.'

The International Society for Research on Nutrition and Vital Substances (1967) said that fluoridation 'is in reality a medication.'

In 1967, Dr R. Kerr said:

'Fluoridation of public water supplies amounts to compulsory mass medication and is morally quite unjustifiable. It infringes human freedom -- the freedom of a doctor to treat his patients as he thinks best, and the freedom of the patient to choose whether to accept or reject the medication advised. Any doctor can now treat his young patients with fluoride if he thinks it desirable. And every child can have it in accurate dosage if his doctors and parents wish it, but there is no need to force the rest of the population to ingest a toxic substance every day of their lives in uncontrollable doses, knowing that it will quite certainly harm some people, and having no idea whatever what the effect will be on the rest.'

The fact that artificial fluoridation is a form of medication is also acknowledged in Australia. In 1970, Dr R. Horton said that letters to the Australian Medical Journal show that 'a number of doctors regard mass medication as uncertain, unfair, inaccurate and unethical.' Dr I.R. McDonald (1968) of Toowoomba said: 'It would appear that water is an inappropriate vehicle for fluoride medication in this community.'

Professor Sir Arthur Amies said, in 1959:

'Fluoridation of domestic water supplies involves the administration with therapeutic intent of a chemical preparation to young and old, dentate or edentulous, well and ill, without individual examination and regardless of individual desire.'

Some legal aspects of fluoridation are stated in a 1977 memorandum by Paul M. McCormick, Research Fellow, Nuffield College, Oxford. He stated:

'From the legal point of view fluoridation is compulsory medication. It is done without the permission of the person at the receiving end. In English Law medical treatment without consent is only permitted by court order or for the mentally ill or for minors with the consent of their guardians. It therefore implies that either a person has forfeited his legal rights by criminal activity or that he is unfit through youth or insanity to exercise them. Fluoridation of the water supply puts every individual in this position. It is an affront to the human dignity which is explicitly recognized as a major objective in the United Nations Universal Declaration of Human Rights. The foundation of the legal rights and liberties of the individual is the principle of his responsibility for his

conduct and his own interests, chief among which is his health. As John Stewart Mill wrote, "over his own body and mind, the individual is sovereign".'

He concluded by saying that the principle that the State is sovereign over the mind and body of the individual, 'however benevolent in any given case, it is the principle of totalitarianism.'

(7) Fluoridation May Violate Religious and Personal Convictions. Compulsory medication is abhorrent to many people. Writing in the Christian Science Monitor, Dr F.B. Exner (1961) said:

'.. if the fluoride, in fluoridation, is used as a drug it violates the religious rights of all who have religious objections to the use of drugs.'

Professor Douw Steyn stated that:

'The fluoridation of drinking-water is illegal, immoral and unethical and seriously infringes the religious convictions of many millions of people throughout the world. We dare not deny any individual the right to decide for himself, or herself, in this matter as their attitude constitutes no danger to their fellow-beings or to communities' [as dental] 'decay is not a disease which is transmissible.' (Steyn, 1958b).

In the House of Representatives, Mr J.R. Fraser (A.C.T.) in a debate in 1963 on the decision to fluoridate Canberra's water supply, said:

'I still maintain my very strong personal objection to the means by which it is proposed to administer the fluoride, namely by adding it to the water supply. I object to being required to take a medication which I would not myself choose to administer.'

(The vote was given 55 Ayes and 55 Noes).

An Editorial (1964) in the Melbourne 'Age' said that:

'.. the problem is not simply one of bad teeth, but also of pure water and personal rights. The remedy must be one that treats the teeth, not the water supply, the individual, not the community.'

(8) Fluoridation — 'The Favoured Pollutant'.

A WHO Technical Report on Environmental Pollution prepared by five WHO Scientific Groups in 1968, listed fluoride among the 'water pollutants having potential long term effects.'

In 1972, Dr C.G. Dobbs called fluoridation 'the most widespread and permanent act of pollution of the human environment ever contemplated.'

FLUORIDATION AND DENTAL MANPOWER REQUIREMENTS.

It has been claimed for many years that fluoridation will reduce the number of dentists required by the community. That claim was strongly pressed at the time the Act was being considered. Naturally it has a strong appeal to governments who are faced with meeting the shortage of dentists. (The graduate output of the Melbourne Dental School has remained essentially static for many years.) At that time few people questioned that claim.

(1) Studies by Professor B.L. Douglas.

In 1972 Professor B.L. Douglas and his co-workers studied the 'Impact of water fluoridation on dental practice and dental manpower' in seven towns in the U.S. These had water supplies containing 0.7-1.2 p.p.m. fluoride naturally, and were 'matched' with seven towns with 'fluoride-deficient' water supplies. Contrary to their expectation they found that, although dentists in the naturally fluoridated towns served 14 per cent more people, 'their characteristics and practices appear to be virtually unaffected by fluoridation'.

Seven years earlier Professor Douglas, with Sylvia Coppersmith, reported on a survey by 'Health Bulletin' of the number of practicing dentists in fluoridated and non-fluoridated cities. Newburgh (fluoridated in 1945) in 1965 had a population of 30,000 and 35 dentists, compared with Kingston which had a similar population and 38 dentists. (It may be mentioned that 34 years after Kingston served as the nearby untreated 'control' town for the Newburgh trial it still rejects proposals to fluoridate.) Grand Rapids

(fluoridated in 1945) had 115 dentists per 100,000 population, but nearby unfluoridated Flint had only 70 dentists per 100,000. Fluoridated Toledo had 80 dentists per 100,000, but unfluoridated Dayton had 87 dentists per 100,000. They concluded:

'This indicates that there is apparently not a lesser need for dentists in those cities with fluoridation as compared with fluoride-deficient cities.' (Douglas and Coppersmith, 1965).

(2) Dentists in Basel (Switzerland).

The German Association of Gas and Water Experts reported, in 1975, on the effect of fluoridation in Basel (Switzerland). They said that in 1960 Professor Gutherz predicted that by 1967, as a result of fluoridation, of the 10 dentists practising in 1960 only 6 would be required. However, by 1967 the number of dentists had increased to 17, and three years later, after 10 years of fluoridation, there were 18 dentists and 5 practising dental auxiliaries. In 1975, the Swiss Health Department suggested that fluoridation should be discontinued due to its ineffectiveness.

(3) The Number of Dentists in Fluoridated and Non-Fluoridated 'Representative American Cities'.

The 1976 (but not the 1977 or the 1978) edition of C.B.S. News Almanac, published figures showing the number of dentists per 100,000 population in 'Representative American Cities'. These included 30 of the 40 most populous cities (1970 census), 16 of which had been artificially fluoridated

'TYPICAL' U.S. CITIES. NUMBER OF DENTISTS PER 100,000 POPULATION.

(Data from C.B.S. News Almanac, 1976)

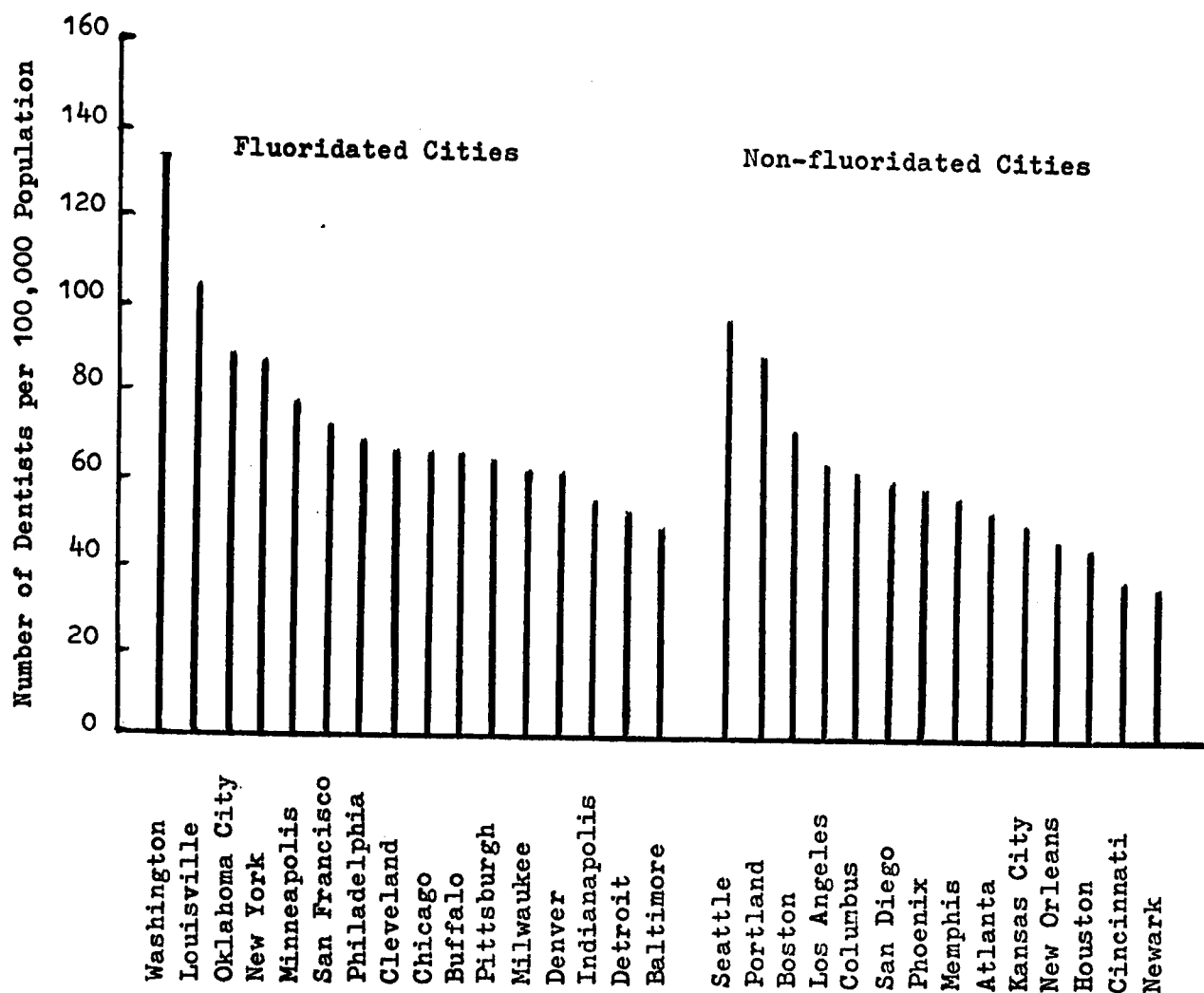


Fig. 1. Showing the number of dentists per 100,000 population in artificially fluoridated and non-fluoridated 'typical' U.S. cities. Fluoridation commenced between 1952 and 1956, except for New York, 1965, and Detroit, 1967. More than 20 years later (10 years for New York and Detroit) the number of dentists per 100,000 in the fluoridated cities listed in the Almanac was higher than in the non-fluoridated ones. These data give no indication that fluoridation reduces the demand for dentists.

prior to December 31, 1969, 14 between 1951 and 1957, New York in 1965 and Detroit in 1967. (U.S. Department of H.E.W., 1970). The remaining ten largest cities comprised Dallas (naturally fluoridated, with 53.5 dentists per 100,000 people, and nine cities which were not listed in that Almanac, two of which were naturally and 3 artificially fluoridated and 4 non-fluoridated cities.

The number of dentists per 100,000 population were:

<u>Fluoridated Cities</u>		<u>Non-fluoridated Cities, at Dec. 1969</u>	
New York	88.8	Los Angeles	63.5
Chicago	67.2	Houston	44.5
Philadelphia	71.0	San Diego	61.9
Detroit	53.9	Boston	72.0
Baltimore	48.6	Memphis	55.4
Washington	136.2	New Orleans	46.6
Cleveland	67.9	Phoenix	58.3
Indianapolis	55.5	Columbus	62.6
Milwaukee	64.4	Seattle	96.0
San Francisco	73.2	Kansas City	50.0
Pittsburgh	64.6	Atlanta	53.0
Denver	61.4	Cincinnati	37.5
Buffalo	66.7	Portland	90.1
Minneapolis	77.1	Newark	36.0
Oklahoma City	89.2		
Louisville	105.1		

An estimate of the total number of dentists in each city was obtained by calculating the number of dentists per 100,000 x population ÷ 100,000. The mean number of dentists per 100,000 population were:

Fluoridated cities - 76.7; Non-fluoridated cities - 59.2.

These data are displayed in Fig. 1.

THE NUMBER OF DENTISTS PER 100,000 POPULATION IN ARTIFICIALLY FLUORIDATED TEST CITIES, IN THE U.S.A., AND IN MELBOURNE AND VICTORIAN COUNTRY AREAS.

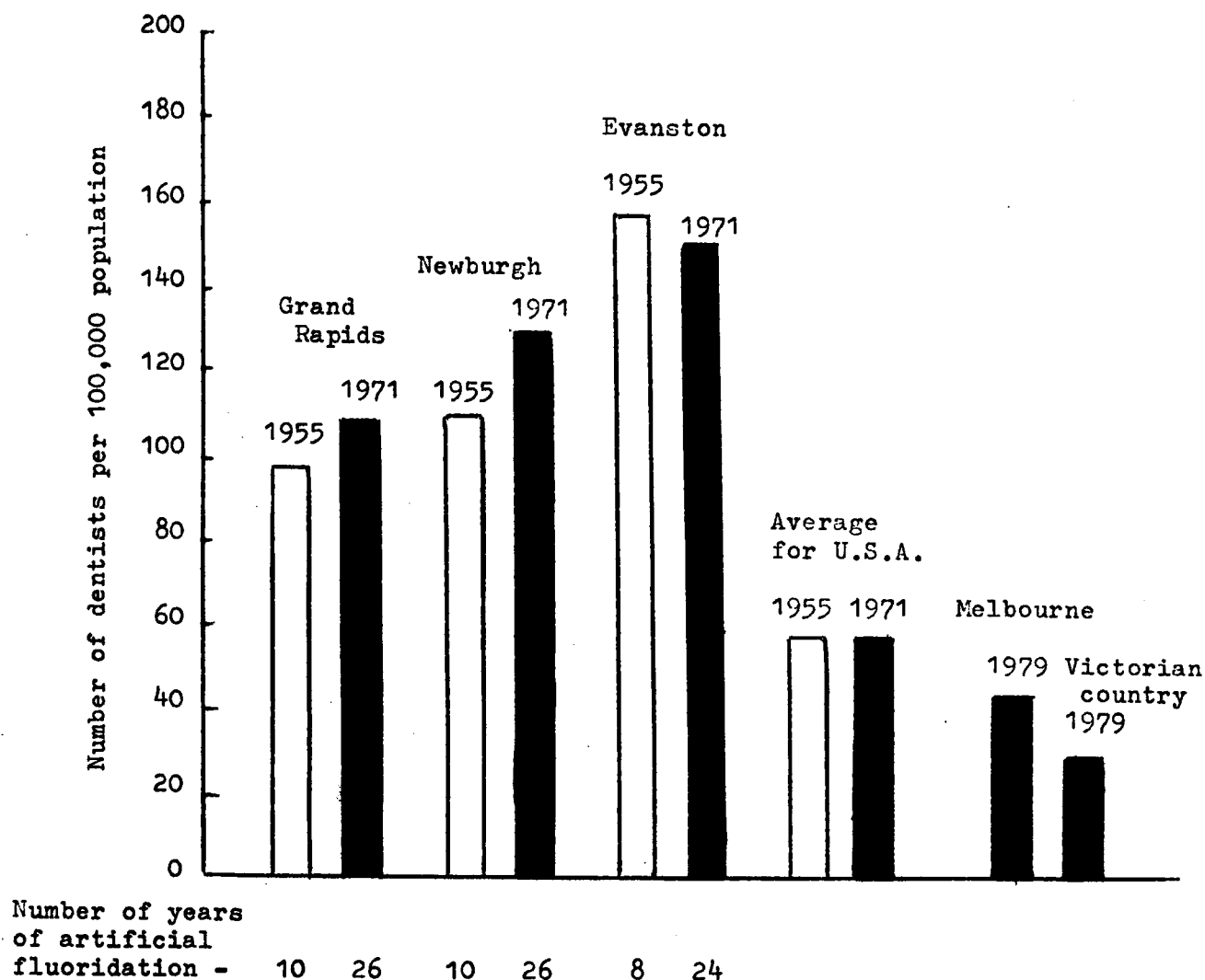


Fig. 2. Comparison between the number of dentists per 100,000 population in the three main American fluoridation trial cities, in 1955 after ten years of fluoridation, and in 1971 after 24-26 years fluoridation. Also, the average in 1955 and 1971 for the whole of the U.S.A., and in 1979 for Melbourne and for Victorian country areas.

After 24-26 years of artificial fluoridation the number of dentists per 100,000 people in these three trial cities showed an overall increase since 1955, although the U.S. average had remained the same. It was twice the U.S. average, and more than 2½ times as many dentists per 100,000 population that are found in Melbourne.

(4) The Number of Dentists in U.S. Fluoridation Trial Cities.

In 1973 I wrote a letter to the Lancet which nullified one of the claims which it had made in a Leading Article (1973). My letter, which was not published, pointed out that, by 1955, the fluoridation trials at Grand Rapids and Newburgh had been in progress for approximately ten years and the Evanston one for eight years. More than fifteen years later, in 1971, in the whole of the U.S. the number of dentists per 100,000 people was the same as in 1955 (i.e. 59). However, in these three artificially fluoridated cities the number of practicing dentists per 100,000 had increased from 115 to 121. (Data from the American Dental Directory 1971, Statistical Abstracts U.S. 1971 and World Almanac, 1973 — including all practising dentists but omitting academics and administrators.)

These three cities, after approximately 25 years of artificial fluoridation, then had more than twice the number of dentists per 100,000 people as was the average for the whole U.S. In Evanston after 23 years of fluoridation there ~~were~~ the remarkably small number of 665 people per dentist. This is less than a third (0.3) as many people per dentist as there are in Melbourne and suburbs (2252) and about a fifth (0.21) as many (3171) as in the rest of the State. (Victorian figures, Dental Board, June, 1979.)

These data are shown in Fig. 2.

(5) Comment.

Dentist/population ratios are determined by many factors. However, the fact that there was a high proportion of dentists in the three main trial U.S. cities after approximately 25 years of artificial fluoridation (and the other data mentioned above) does not support the contention that the demand for dental manpower will decrease after the introduction of fluoridation.

Footnote.

Old fallacies die hard. A letter, dated August 1, 1979, written by the Secretary of the Victorian Branch of the Australian Dental Association, stated:

'In a community with a fluoridated water supply the dental manpower required to maintain a good standard of dental health in a community is almost halved.'

THE INCREASING REJECTION OF FLUORIDATION OVERSEAS.

At the time of the passing of the Act artificial fluoridation was said to be widely, and increasingly, accepted overseas. Its acceptance is now definitely on the wane.

(1) Western Europe.

Fluoridation has always been treated with scepticism in Europe. A senior European dental professor, in 1971, described it to me as 'an American madness'.

Since then it has been discontinued in Sweden, Belgium, Holland and West Germany. It has now been rejected, almost entirely, in Western Europe, and fluoridation plants which had been in operation for many years have been closed. Sir G. Sinclair (1972) asked the British Secretary of State for Social Services whether he would reconsider the advisability of continuing fluoridation in view of the fact that the Swedish Parliament had repealed the law permitting fluoridation and, after 17 years of trial, the only fluoridation project in Germany had stopped. He stated that France, Germany, Italy, Luxembourg, Norway, Denmark, Sweden, Austria, Spain, Yugoslavia and Greece had decided against fluoridation.

The Secretary of State for Social Services queried the cases of Sweden and Germany, saying that he understood that in Sweden the repeal of legislation was not based on medical or scientific evidence, and that in Germany fluoridation was suspended because of doubts about its

legality, doubts which the Federal Government was seeking to remove with amending legislation. (Sinclair, 1972).

Sweden, in fact, had discontinued fluoridation in 1969 after a ten-year experimental programme. They asked the World Health Organization (WHO) to produce evidence that fluoridation is safe. No evidence was produced, and fluoridation was made illegal on November 18, 1971. (Sweden, 1971).

In the Federal Republic of Germany fluoridation was again rejected, as recently as December, 1978, on the advice of the panel which advises the government on scientific matters. (German Consul, 1979).

Holland was the most fluoridated country in Europe, with approximately half of the population drinking fluoridated water. In 1976, after 23 years of fluoridation, all plants were closed down on medical and legal grounds. (Moolenburgh, 1974, 1977). In 1976, a study of the opinions of adult Danes found that more than twice as many were opposed to fluoridation as were in favour of it and that 'compared with an earlier Danish study, a shift towards more expressed opposition to water fluoridation seems to have taken place.' (Schwarz and Hansen, 1976).

It has been suggested that this general rejection of fluoridation in Western Europe was because of legal difficulties. Surely, if there was any desire to introduce fluoridation any such difficulties could have been removed by legislation.

The present position in Western Europe is:

Rejected fluoridation:

Austria, Belgium, Denmark, France, Greece, Holland, Italy, Luxembourg, Norway, Spain, Sweden, W.Germany and Yugoslavia.

One small experimental town fluoridated:

Finland, Portugal, Switzerland.

In December, 1975, the Swiss Health Department suggested that this one town should cease fluoridation 'due to its ineffectiveness'.

(2) The United Kingdom.

In the U.K. two of the original four treated towns have discontinued fluoridation. More than 25 years after those four plants were installed the British have not accepted fluoridation. (Special Writer, 1979). In 1976, Dr M. Bresler said that only 8.6% of Britain's population drink fluoridated water. He pointed out that:

'Selective fluoridation can be used everywhere at a fraction of the cost of water fluoridation. Surely this is a more scientific, economic, and acceptable way of preventing dental caries.'

(3) The U.S.A.

Even in the U.S., which is its home, fluoridation appears to be on the wane despite the continued strong promotional pressure by the U.S. Public Health Service, which was responsible for the introduction of this process in 1945. In July, 1978, 'Consumer Reports' said that since 1973, [when the Victorian Act was passed] voters in hundreds of

* See appendix 6b, p. 264.

U.S. cities and towns have rejected fluoridation.

(Anonymous, 1978).

In Australia, the proportion of the population drinking fluoridated water probably is now higher than in any other country.

Recently Professor Arvid Carlsson (1978) of Sweden, said:

'I am quite convinced that water fluoridation, in the not-too-distant future will be consigned to medical history.'

SUPPORT FOR, AND OPPOSITION TO FLUORIDATION BY AUSTRALIAN
MEDICAL AND DENTAL GRADUATES.

Correspondence in the Medical Journal of Australia, 1955-1979.

The suggestion is frequently made that the number of medical graduates who advocate fluoridation greatly exceeds the number who are opposed to this medication.

If the very small number of letters on fluoridation published in the Medical Journal of Australia during the past 24 years is any indication, very few physicians have taken a real interest in this subject.

Apart from several 'neutral' letters, the correspondence comprised:

From dental graduates -

14 letters (from 8 dentists) in favour of fluoridation.

3 letters (from 2 dentists) opposing this measure.

From medical graduates -

9 letters (from 6 physicians) in favour of fluoridation.

33 letters (from 14 physicians) opposing this process.

The statements and counter-statements made during this correspondence make one thing clear — in Australia, as well as overseas, there is a marked difference of opinion amongst dental and medical graduates in regard to the safety of artificial fluoridation.

THE DIFFICULTY IN CONTROLLING FLUORIDE CONCENTRATION.

The Health (Fluoridation) Act decrees that the level to which fluorides are to be built up is to a maximum 'average optimum concentration' of 1 p.p.m. fluoride. (Victorian Government, 1973). No permissible range of concentration is stated, nor the period over which the average is to be determined. The 'maximum concentration determined by the [Health] Commission' is not stated.

When the Act was passed the considerable difficulty in carrying out that instruction does not appear to have been appreciated. This difficulty was pointed out by the German Association of Gas and Water Experts (1974), who said:

'Certainly it is technically possible to adhere to such a dosage in larger works, but the maintenance of the optimal concentration of fluoride throughout the network of pipes to the ultimate consumer cannot be guaranteed.'

They added that:

'The impossibility of regulating the total quantity of fluorides ingested by any individual makes nonsense of the demand for very precise dosage added at the waterworks.'

This difficulty in the distribution of fluorides in reticulated water also occurs in 'naturally fluoridated' water supplies. The authors of the Evanston trial reported that:

'In some instances reporting communities have indicated

that the fluorine content of the water, when drawn from its source, differed from the fluorine content of the same water when it was collected at some point in the distribution system.' (Hill et al., 1949).

Professor J.B. Polya (1967), of the University of Tasmania, said that:

'Since all but the most expensive materials for the reticulation of fluoridated water (rubberised pipes or Monel metal) react with fluorides, the concentration of fluoride at delivery points may differ greatly from from concentrations at the mixing point.'

Failure to obtain the specified concentration of fluoride at the taps of the consumers has been reported many times from the U.S. In the Evanston study (one of the four key studies held in the U.S. and Canada), eleven years after the commencement of the study the authors reported that:

'Except for the time immediately after the introduction of the Chicago fluoridation program, the F content of the western suburbs has been well below the desired optimum level of 1.0 ppm.' (Hill et al., 1958).

Many other cases of failure to attain and maintain the desired level of fluoride have been reported. For instance, the booklet Current Status of the Fluoridation Discussion (London et al., 1963) lists 13 cities with levels of from 0.0 to 1.6 p.p.m. fluoride. (The level of 1.6 p.p.m. is higher than the permissible maximum.) Chicago had values of 0.0 to 1.2, Long Island, 0.0 to 1.3, and Baltimore, 0.30 to 1.40, but the average at that plant

* See appendix 4i, p. 262.

was 0.99 p.p.m. In Hastings, New Zealand, 66% of the readings were below the permitted range at the plant (with 51% below 0.5 p.p.m.) and 25% were greater than 1.11. The apparatus was then replaced with new equipment, but still almost 25% of the readings at the treatment plant were not within the required range (with 8.4% too low and 16.3% too high — how high was not reported). (Ludwig, 1958).

*

In Victoria in 1973, the Health Inspector of the town of Melton (Mr A.C. Morris) reported to the council that samples had revealed fluoride concentrations of 1.7, 1.8 and 2.6 ppm, all three levels being above that which is permissible in the U.S., and 2.6 p.p.m. is definitely in the toxic range. He also told the council that, as many people did not realize that their water was being fluoridated, they were still administering fluoride tablets to their children and using fluoridated toothpastes. (Many people in Melbourne still do not know that the water is fluoridated, and fluoride-containing toothpastes are still permitted to be sold and, in fact, constitute practically the total sales.)

This difficulty in regulating the concentration of fluoride has already been demonstrated in Melbourne. Monitoring the fluoride concentration supplied through a domestic tap, by an electro-chemical method using an Orion electrode (specified in WHO, International Standards for Drinking Water, 1971) has shown a range of readings, in 1979, from virtually 0.0 p.p.m. to 0.9 p.p.m., with a

* See appendix 4j, p. 263.

mean value of approximately 0.5 p.p.m. fluoride.

The question which arises is this: If the M.M.B.W. engineers are adding 1 p.p.m. fluoride at the water works, where is the remaining fluoride going? Are some areas of Melbourne, from the same dam and outlet station, obtaining more than 1 p.p.m. or, as has been observed in the U.S., is fluoride accumulating on the walls of pipes?

The Director of Laboratories, New York Water Supply, said:

'At the interface with the walls of the pipes the flow of water is virtually nil' and concentrations of 'trace elements might be several hundred times that in the moving water.' (Nesin, 1962).

Analysis of the incrustation in pipes removed in Seattle showed 1,044 p.p.m. fluoride on the inside of a pipe and 476 p.p.m. in sludge. (Peniston, 1972).

Overseas reports (e.g. Plumbing Engineer, Oct., 1956) indicate that this incrustation and sludge breaks away and flows free in the pipes, blocking filter systems.

(Institute of Plumbers, 1956).

* See appendix 16, p. 276.

PLUMBING PROBLEMS RESULTING FROM FLUORIDATION.

At the time that the Act was being considered, little, if any, mention was made of the plumbing problems which have been reported to follow fluoridation in some cities in the U.S.A.

As early as 1951, soon after the first use of sodium silicofluoride solutions in artificial fluoridation, it was reported in the Journal of the American Water Works Association that: 'Sodium silicofluoride solutions have been found to destroy steel pipes very rapidly.' (Harper, 1951). Melbourne uses a 'sodium silicofluoride slurry'. (Hirth, 1977).

In 1956, one early case was mentioned in the 'Quarterly Newsletter' of the Institute of Plumbers of Australia (1956). Under the heading 'Fluorides in Industry, Effects on Water Pipes', an article mentioned that, in a large steel tank, protectively painted, corrosion had taken place removing the baked enamel and penetrating the steel. In a cement tank the cement had deteriorated causing the sand to sink to the bottom.

It reported:

'Fluorides are doing a real cleaning job on the inside of the underground water mains of the town of North Andover's public water supply! Their corrosive action will soon require their replacement. Fluoridation is softening the heavy rust formation that has collected on the inside of the town water mains over the years,

to a semi-soft consistency. As it frees itself, it carries along with the water. The water brings this semi-soft sludge to our filters.'

In November, 1974, the Seattle Water Department proposed adding 200 to 500 tons of lime to the supply to solve the rising tide of corrosion complaints. However, nine months later the council revoked their decision as there was no information on the effect of lime on people. (Article, 1975). Are the effects now known?

The 'softness' of Melbourne's waters posed problems when fluoridation was introduced. Dr M. Harris (1976b), University of Aston, Birmingham, said that when artificial fluoridation is commenced, 'lime water, $\text{Ca}(\text{OH})_2$, will also have to be added, especially to soft waters to stop iron from leaching out of pipes.' The Victorian Minister of Water Supply said that: 'The most suitable material for pH adjustment is hydrated lime and this will be added to the water as part of the fluoridation process.' (Granter, 1976). The Senior Executive Engineer, Operations and Maintenance, Victorian State Rivers and Water Supplies Commission, said:

'At this time laboratory tests on the water (for both Melbourne and the Peninsula) had shown that the addition of fluoride, even in the form of sodium silicofluoride, could depress the pH from around about 7 to as low as 6.5, and this would necessitate the addition of about 2 to 3 p.p.m. of hydrated lime at each fluoridation plant, in order to avoid severe corrosion and "red" water in the reticulation system.' (Hirth, 1977).

He stated that a 'sodium silicofluoride slurry' was to be employed in Melbourne, and that 'it appeared that nowhere

* See appendix 10d, p. 273.

else in the world was this being done.' This 'locally made slurry was produced from a phosphate rock imported from Morocco.'

For the Peninsula scheme the supplies of powder were 'Likely to come from Belgium or Denmark.' (Both those countries have rejected artificial fluoridation.)

FLUORIDATION AND THE SAFETY OF THE WATER SUPPLY.

In 1976, Dr M. Harris of the Department of Pharmacy, University of Aston, Birmingham, raised a question which does not appear to have been considered in Victoria.

He said:

'Ostensibly, lime water is added [to fluoridated water] to stop iron from leaching out of pipes.

Another reason, seldom admitted or forgotten, is to provide enough calcium and alkalinity to reduce the cytotoxicity of acid solutions of fluoride.

What was once a near neutral water a little above pH 7, becomes an alkaline water having the taste spoiled, and incidentally making lime-sensitive plants less able to cope with their environment. Since the fluoridation of Birmingham's water supply in the early 1960s the hydrogen ion concentration has often been at pH 8.6. At this pH there is a danger of Vibrio cholerae proliferating, especially in hot weather, and so chlorination is, or should be, maintained at maximum level.' (Harris, 1976b).

Drs K. Helgeland and J. Leirskar reported, in 1976, that in cell cultures using human epithelial cells, when the pH of the incubation medium was lowered in the range of 7.0 to 6.4, an enhanced cytotoxic effect of fluoride was found and also a twofold increase in the intra-cellular concentration of fluoride.

In 1976, the Victorian Minister of Water Supply, explaining why it was considered necessary, when fluoridating Melbourne's water supplies, to add lime in addition to fluoride, said:

'... the addition of fluoride chemical to the water supplied to the Metropolis causes the pH of the water to be lowered to levels which are unacceptable in water supplied for domestic consumption.

Melbourne's water is generally slightly acidic and the reduction in pH occurs largely as a result of the low mineral content of the water. The magnitude of the reduction varies with the source of the water and is as high as 0.6 in water drawn from the Maroondah Reservoir.' (Granter, 1976).

The 1973 M.M.B.W. 'Typical complete chemical analysis of water supplied to Melbourne and Metropolitan Area' showed the pH as 6.5-7.0. If that pH range was reduced by 0.6, as stated by the Minister, the level would be below the figure of 6.4, the bottom of the pH range used by Helgeland and Leirskar (1976) in their study of cytotoxicity.

Since fluoridation was introduced in Melbourne, monitoring of a suburban domestic tap has revealed many pH readings which exceeded 8.6, some of them being as high as 10.0. It will be recalled that Dr Harris (1976b) stated that at pH 8.6 there is a danger of Vibrio cholerae proliferating. A spokesman for the M.M.B.W. said that Melbourne water is not chlorinated except for brief periods, such as after the installation of new mains.

(In passing, it may be mentioned that recently in Melbourne cases of cholera were found in travellers who had just returned from overseas.)

Comment. If the above-mentioned statements are correct, will we be forced into the following chain of events?

(a) As a result of introducing fluoridation in an attempt to reduce dental caries, mainly in children, many of whom, according to a study in Sydney by Enno, Craig and Knox (1976), now 'consume more prepackaged fluids than actual tap water', be forced to (b) add and maintain maximum chlorination of our water supplies to (c) protect us from the potentially dangerous proliferation of bacteria in alkaline water (Harris, 1976b). (d) This alkalinity having been produced by the lime added to the water by the M.M.B.W. (Granter, 1976) to 'reduce the cytotoxicity of acid solutions of fluorides' (Harris, 1976b) and to counteract their effect in producing 'severe corrosion of the water pipes' (Hirth, 1977).

THE EFFICACY OF ARTIFICIAL FLUORIDATION IS QUESTIONABLE.

At the time of the passing of the Fluoridation Act, claims that fluoridation would reduce the prevalence of dental caries by approximately sixty per cent were widely accepted.

Professor N. Martin (1964) said:

'That means that two out of three decayed teeth are actually prevented.'

It is remarkable that such claims for the marked efficacy of artificial fluoridation in reducing caries have been accepted for so long, and so widely. As Dr A. Aslander said:

'Fluoridation is an illusory promise, a mirage, that has lead many people, even scientists, astray.' (Aslander, 1966).

During the past five years there has been an increasing awareness that the claim, that fluoridation is remarkably efficacious, is false.

(1) The Determination of Changes in Dental Caries Prevalence.

The decision whether there has been a decrease in dental caries in a community cannot validly be made on personal opinions, however well qualified the observer may be.

If one doubts that, consider the following statement by a very experienced clinician, before Melbourne was fluoridated:

'.. it is a delight for any dentist to inspect the mouths of any of the 5.5 million Australians who enjoy the benefits of fluoride.' (Dooley, 1973).

Lord Douglas of Barloch (1960) said:

'The case for fluoridation of water supplies rests entirely upon statistical evidence. It does not rest upon

* See appendix 4b, p. 260.

clinical evidence from doctors who have administered fluorides to their patients for long periods and have observed the results upon individuals.'

Therefore it is necessary to assess the efficacy of fluoridation from the results of long-term experimental trials. These are of two main types — 'longitudinal' trials and 'controlled' trials.

(2) Longitudinal Trials of Fluoridation.

Trials without controls, often called 'longitudinal' trials because the final data obtained in the test town are compared with the original data, are not valid.

Professor W.I.B. Beveridge, in his book The Art of Scientific Investigation said of such studies:

'A common fallacy, for instance, is to compare groups separated by time — the data of one year being compared to data obtained in previous years. Evidence in this way is never conclusive, though it may be usefully suggestive. "If when the tide is falling you take out water with a twopenny pail, you and the moon can do a great deal." ' (Beveridge, 1961).

Sir Austin Bradford Hill, said:

'The advent of the controlled trial has led to the rapid abandonment of useless methods.' (Hill, 1966).

Unfortunately the necessity to use a control city when setting up a fluoridation trial is not often recognized by those who have not been trained in scientific methods — and sometimes even by those who have been. Indeed the N.H.& M.R.C. , in 1965, said that in 'The assessment of benefits accruing from fluoridation' 'the fluoridated community should be used as its own control.'

Unfortunately every fluoridation trial in Australia has used this method — termed 'useless' by Sir Austin Bradford Hill (1966).

(3) The Need for Controls in Experimental Trials.

The assessment of the efficacy of artificial fluoridation can be decided only by careful and accurate study of data obtained from properly designed and conducted controlled experimental trials held over a period of at least ten years.

As Sir Ronald Fisher (1951) said:

'If the design of an experiment is faulty, any method of interpretation which makes it out to be decisive must be faulty too.'

The necessity for these trials to be controlled, by the use of an untreated city for comparison with the test one, is obvious to any trained experimenter, and was realized before the first fluoridation trials were set up in America in 1945. For instance, when the Evanston trial was being organized, Blayney and Tucker (1948) said:

'A study of this nature must have an adequate control.'

A statement by the American Water Works Association (1949) said that the experimental verification of the fluorine-dental caries hypothesis 'obviously necessitates the use of a nearby "control" city with a water supply comparable in all respects to that to which fluoride is being added.'

Sir Derrick Dunlop also, in the Medical Journal of Australia in 1967, emphasized the necessity for controls when conducting clinical trials.

In 1953 a National Health and Medical Research Council resolution specified the use of a control city in the proposed Australian fluoridation trial — which was not established. Unfortunately, as has been mentioned, this 'obviously' necessary requirement has been disregarded in all Australian projects, and in many others elsewhere. None of them employed a control, and in some there was a marked increase in the dental care of children soon after the commencement of fluoridation. The same thing has occurred in Melbourne with the establishment of a course for training dental nurses who will provide dental treatment for children. There were 100 graduates in the first two years and it is expected that the annual output will be 40 nurses per year, all very well trained and highly motivated in preventive methods and instruction. This output, all restricted to the treatment of children, is approximately the same as the total output of dental graduates to serve the whole community. Obviously, the results of a survey of Melbourne children made before fluoridation cannot validly be compared with conditions found in several years' time.

Similar changes have occurred in other areas.

'Supplementary measures such as improved diet, particularly fresh fruits in season instead of sweets and soft drinks, topical application and increased dental care have been acknowledged to have been instituted in several U.S. communities.' (Ziegelbecker and Thomson, 1973).

Fluoridation was commenced in America in 1945 by the U.S. Public Health Service which established the first experimental trial at Grand Rapids, and the U.S.P.H.S. has

been promoting fluoridation ever since that time.

(4) The Premature Establishment of Fluoridation Trials.

The first fluoridation trials were commenced at a time when very little was known of the effects of fluoride , except those relating to teeth.

An Editorial in the Journal of the American Dental Association in 1944 (Dr L. Pierce Anthony, Editor) stated:

'While these data are certainly speculatively attractive as leading to possible mass treatment of caries, our knowledge of the subject certainly does not warrant the introduction of fluorine in community water supplies generally.

Sodium fluoride is a highly toxic substance, and while its application in safe concentrations, and under strict control by competent personnel, may prove to be useful therapeutically, under other circumstances it may be definitely harmful.

To be effective, fluorine must be ingested into the system during the years of tooth development, and we do not yet know enough about the chemistry involved to anticipate what other conditions may be produced in the structure of the bone and other tissues of the body generally.'

He concluded:

'Because of our anxiety to find some therapeutic procedure that will promote mass prevention of caries, the seeming potentialities of fluorine appear speculatively attractive, but, in the light of our present knowledge or lack of knowledge of the chemistry of the subject, the potentialities for harm outweigh those for good.'

Three months later the U.S. Public Health Service commenced the first trial of artificial fluoridation. (Dean et al., 1950). No mention was made that the inhabitants of the

trial city, Grand Rapids, were consulted, or even notified, before they were used in this experiment.

(5) The Small Number of Fluoridation Trials with Experimental Controls.

Anyone who investigates this subject seriously (instead of merely parroting the opinions of others, based on hearsay) will soon realize that very few genuine fluoridation trials have ever been attempted. Therefore claims for the efficacy of fluoridation are based on very limited experimental data.

'It must be emphasized that the fluoridation hypothesis in its entirety rests on a very narrow base of selected experimental information. It is this very base which is vulnerable to scientific criticism. And, it is upon this very narrow base that the very impressive array of endorsement rests like an inverted pyramid.' (Nesin, 1956).

The first four main trials — in Grand Rapids, Newburgh and Evanston, in the U.S., and at Brandford, Canada, are still the most cited studies established to test the efficacy of artificial fluoridation. However very few investigations of the numerical data published by their authors have been published. Those results have now been repeatedly criticized and the criticisms have not been shown to be incorrect.

(6) Fluoridation Demonstrations.

Some projects, spoken of as fluoridation trials, were in fact mere 'demonstrations' in which 'the prestige of official bodies has already been committed to one conclusion in the

matter.' (Dobbs, 1957). For instance the British Ministry of Health (1955) Reference Note, referring to the areas chosen for the first fluoridation projects in Great Britain, said:

'These areas are to be the subject of controlled demonstrations, not experiments, for the results to be expected are already fully attested by American experience.'

The author of the New Zealand project at Hastings said:

'A study has been instituted in this city to demonstrate the effectiveness of the programme in reducing the prevalence of dental caries.' (Ludwig, 1958).

Indeed, the Assistant Chief, Division of Dental Public Health, U.S. Public Health Service, said:

'The fact is that the projects at Brantford, Grand Rapids, Newburgh and Evanston were designed' ... 'to demonstrate the effectiveness of the procedure.' (Galagan, 1960).

(7) The Terms 'Controlled Study' and 'Controlled Fluoridation'.

The use of these terms in reports on fluoridation may mislead those who are trained in experimental procedures. The two terms have entirely different meanings.

'Controlled study' is used rarely and, in most cases, denotes the use of an untreated control city to compare with the test one.

'Controlled fluoridation', however, simply means that the fluoride feeding apparatus was 'carefully controlled' — that the tap was turned on the desired amount. The WHO Chronicle (WHO, 1969b) referred to 'the controlled application of fluorides.' 'Controlled fluoridation' was defined by the U.S. Department of Health Education and Welfare, Public Health Service (Fluoridation Census, 1969) as 'the conscious

maintenance of the optimal fluoride concentration in the water supply.' (U.S. Dept. Health E.W., 1970).

Even the WHO Expert Committee in Water Fluoridation (1958) used the term in that misleading way, stating that:

'Hundreds of controlled fluoridation programmes are now in operation in many countries. Some have been operating for the past 12 years, so that conclusions are based on experience.'

No reply was received from the WHO to an inquiry regarding the names of those 'controlled fluoridation programmes'. In fact, only a very small number of studies with control cities existed — the term 'hundreds' was pure myth. At that time there were only four studies of any importance. When some of their numerous shortcomings were reported (Sutton, 1959), Dr C.G. Dobbs (1960) said that it was:

'... disturbing that the various committees and professional bodies who have considered and published reports favourable to fluoridation have either failed to perceive, or else have chosen to suppress any mention of these quite obvious and elementary grounds for criticism.'

Those five main trials which were studied (Sutton 1959, 1960), in Grand Rapids, Newburgh, Evanston and Brantford (two trials were conducted in Brantford), remain the main basis of data available to judge the results of fluoridation.

Later, the commencement of other controlled trials was announced. One was the Hastings trial in New Zealand, but when the author found that the dental caries rates in the proposed control city of Napier were considerably lower than those in the test town, the control was abandoned. (Ludwig, 1958).

Another trial was at Tiel-Culenberg in Holland (Kwant, 1973). The comparability of the test and the control towns has been criticized (Ziegelbecker and Thomson, 1973). Those critics said:

'An analysis of the figures of the Tiel/Culenburg survey in the Netherlands and those of Grand Rapids, Michigan, U.S.A., after 10 years of fluoridation which provides the basis of fluoridation in Holland shows that the claim of benefits to teeth from fluoride added to drinking water is not supported by the data presented.'

Fluoridation is now banned in the Netherlands.

(8) Results, Reports of Results, and Opinions of Fluoridation Trials.

Recently more interest has been taken in the results published from the few fluoridation trials. It is regrettable that very few studies have been made of the published data. The statisticians who have done so are uniformly critical of the methods used in these trials. Twenty years ago it was pointed out (Sutton, 1959) that endorsements of the efficacy of artificial fluoridation were based mainly on the stated opinions of the authors of those fluoridation trials, and of others. This continues to be the case and endorsements are still founded on this nebulous base.

In its First Report (the only one), the WHO Expert Committee on Water Fluoridation (1958) devoted only 16 lines to the results of fluoridation. Under the heading 'Results of Fluoridation', instead of results being considered, comment was confined to: 'Reports of the results after 10 years

of controlled fluoridation in three cities.'

Examinations of the data obtained in these trials, which have been published by endorsing bodies, are inadequate, almost absent. It is an understatement to term this failure regrettable.

The remarkable fact of the lack of examination of these data continues to be demonstrated repeatedly. Many who actively support fluoridation are very vague about the data on which the whole process is supposed to be based, and may not know even the names of the test and control cities in the trials which were established.

In the promotion of fluoridation it is still the so-called 'expert opinion' of which notice is taken, not the accuracy and the reliability of data.

(9) The Gross Errors in the Main American/Canadian Trials of Artificial Fluoridation.

In the very important and, despite statements to the contrary, disputed question of the efficacy of artificial fluoridation, reliance is still based mainly on the Grand Rapids, Newburgh and Evanston studies in the U.S. and on one of the two trials held in Brantford, Canada. These were set up between 1945 and 1947. Twenty years ago many gross errors were found in the reports from those four trials and numerous omissions and mis-statements in them were pointed out. (Sutton, 1959). Not one of those grounds for criticism has been refuted. It was concluded that:

'The sound basis on which the efficacy of a public health measure must be assessed is not provided by these five crucial trials.'

* See appendix 13, p. 274.

(10) Additional Errors in the Evanston Trial Data.

In January, 1967, which was the twentieth anniversary of the commencement of the Evanston trial, an entire special issue of the Journal of the American Dental Association was devoted to a report on that study. In this, all the original tables, complete with their gross numerical errors, were reproduced, despite the fact that these had been pointed out some eight years earlier (Sutton, 1959) and some of them had been acknowledged by the authors (Sutton, 1960). In addition several faulty tables were published for the first time. The tables then showed three different statements regarding the number of children aged 6-8 years who were examined in Evanston during the 1946 examination:

- (i) 1991 children - see Tables 10, 11, 30, 40 and 47.
- (ii) 1985 children - see Tables 7, 8, 16, 18, 21 and 32.
- (iii) 1754 children - see Tables 24 and 25.

There were also no fewer than six different statements of the number of children aged 12-14 years examined in Evanston in 1946:

- (i) 1703 children - see Tables 15 and 32.
- (ii) 1702 children - see Table 47.
- (iii) 1701 children - see Tables 11, 30, 41, 44 and 45.
- (iv) 1697 children - see Tables 7, 9, 12, 13, 17, 19, 22, 31.
- (v) 1556 children - see Table 26.
- (vi) 1146 children - see Table 46.

Between the sum of the two highest statements of the number of children examined in Evanston in 1946, and the sum of the two lowest statements of children examined in the same year in the same study in the same city, there is a difference of 794 children ($1991 + 1703 - 1754 - 1146 = 794$).

These errors were mentioned 12 years ago to the Tasmanian Royal Commission on Fluoridation.

Since that time I have not heard of any mention of them or of a criticism having been made of the numerical data published in that report. It appears that, in the manner common in fluoridation trials, those erroneous tables have been accepted at their face value, without investigation.

Twenty years ago it was pointed out (Sutton and Amies, 1958) that:

'This uncritical attitude to these studies is rife.'

'Also, it has been assumed that associations and individuals that ... accepted the responsibility of publicly advocating fluoridation, have undertaken independent examinations of the data, and not merely repeated the opinions of others.'

It is pertinent to point out that, in the Foreword to that article in the Journal of the American Dental Association, Dr F.A. Arnold, Jr., the Assistant Surgeon General, Chief Dental Officer, U.S. Public Health Service, in 1967 said:

'Here, in a single report, are data on the effect of water fluoridation on dental caries so completely documented that the article is virtually a text book for use in further research. It is an important scientific contribution toward betterment of the dental health of our nation. It is a classic in this field.'

It is indeed a classic — a first-class example of the errors, omissions and mis-statements which abound in the reports of these fluoridation trials.

(11) The question of delayed eruption of teeth. An important factor which may occur when fluoridation is introduced is that of a delay in the eruption of teeth. In 1937, Dr Kaj Roholm said that: 'The teeth may be delayed in eruption.' However Dr C.D.M. Day (1940) could find no evidence of delayed eruption in his patients in India. Dr E.M. Short (1944) said that concentrations of fluoride of 2.6 p.p.m. appeared to be associated with delayed eruption, but found no significant differences with less than 2.0 p.p.m.

The evidence for delayed eruption following fluoridation is still conflicting. Some state that delay in eruption occurs because the deciduous teeth, being less carious due to fluoridation, are retained for a longer period than they are in non-fluoridated communities.

In the Evanston fluoridation trial there was a suggestion of a progressive decline in the number of erupted first permanent molar teeth in six-year-old children. Unfortunately, no definite conclusion could be reached because the authors failed to publish the requisite data in the following reports. (Sutton, 1959).

Dr R. Feltman and G. Kosel (1961) reported that, with the use of fluoride tablets:

'There being a delay in the eruption of the teeth, in some cases by as much as a year from the accepted eruption dates, this may be a factor in the lesser incidence of decay. The teeth delayed in eruption have the opportunity to mature more prior to becoming exposed to the forces that trigger the caries mechanism.'

Of course, if there is a delay in eruption as a result of fluoridation, there will be a delay in the onset of dental caries, for unerupted teeth cannot decay. (See appendix 17c).

(12) Reduction or retardation of dental caries. As has been mentioned, the assessment of the results of the changes in dental caries prevalence in a population cannot be made by clinical impressions. Sir Derrick Dunlop (1967) said:

'Thus, the clinical impression persisted for hundreds of years that blood lettings, sweatings, vomitings and purgings were good for people.'

However, even when data are obtained from a controlled trial there arises the important matter of the interpretation of the results.

The authors of the Evanston trial (Blayney and Hill, 1967) spoke of 'this reduction and retardation of lesions.' They said:

'We presume that a lifetime exposure to fluoride, with the increasing resistance of the enamel surface to caries attack, results in either the carious process beginning at a later time or the decalcification progressing at a slower rate, or both.'

There are two main ways of looking at data from fluoridation trials. The first, used in promoting fluoridation, is to express the result as a percentage reduction in dental caries at various age groups, usually using the D.M.F. (decayed, missing and filled) index. The difference between the first and the last D.M.F. reading is divided by the first reading and the change expressed as a percentage. In the case of a controlled study, the difference between the test and the control is expressed as a percentage of the control figure. That method has been criticized, amongst many others, by Dr C. Dillon (1956) who said that 'the calculations of the proponents of communal

fluoridation can support no statistical conviction.'

His argument is too lengthy to be reproduced here.

An engineer, K.K. Paluev (1958) prepared the following table to explain the 'percentage reductions' obtained by that method of calculation. It makes the reasonable assumption that there is an increase of 1 D.M.F. tooth per year in two children, or groups of children, and that the onset of caries commences two years later in the fluoridated group than in the non-fluoridated one.

Total number of decayed teeth at each age.

Age	Non-fluoridated	Fluoridated	Difference	Per cent 'Reduction'
6	1	0	1	100
7	2	0	2	100
8	3	1	2	66
9	4	2	2	50
10	5	3	2	40
Total	15	6	9	'60% average'
9/15 = 0.60				

Some remarkably impressive results can be obtained by this percentage reduction method of expressing data. For instance the Commonwealth Department of Health journal Health in 1961 claimed that in New Zealand there had been a 'World Record' success with 'fluoridation. The claimed '74% reduction' in dental decay in permanent teeth on examination of the data proved to be a 'decrease' of 1.04 D.M.F. teeth in a small number of 6-year-old children, in a study without any provision for eliminating possible bias by an examiner who had stated that the study was 'to demonstrate the effectiveness of the programme in reducing the prevalence of dental caries.' (Ludwig, 1958).

The slogan that fluoridation 'decreases decay by 60%' has been remarkably successful, it has become a truism in some circles, but is now being questioned by practitioners working in artificially fluoridated areas (Schofield, 1966).

The other approach to the same data is to consider the difference as due to a retardation of caries.

Dr R. Weaver (1944, 1948) in his study of caries in North Shields and in naturally fluoridated South Shields, said:

'I think that the most important lesson to be learned from the North and South Shields investigation is that the caries-inhibitory property of fluorine seems to be of rather short duration.' He also said:

'There is, therefore, some justification for saying that fluorine inhibited caries in South Shields children to such an extent as to reduce the incidence of caries by nearly half — a really remarkable result. I suggest, however, that such a comparison can be most misleading. The 12-year-old children in South Shields averaged 2.4 DMF permanent teeth, whilst the corresponding children in North Shields averaged 4.3 DMF permanent teeth. The question which really needs to be answered is "How many years does it take for the figure of 2.4 in South Shields to reach 4.3?" . The answer is approximately three years.'

He concluded that 'there is in fact no very striking difference in the incidence of caries in the two towns.'

This observation that fluoridation defers the development of caries was mentioned in an Editorial in the Journal of the American Dental Association in 1944. It said:

'... it has been found that the presence of fluorine in the drinking water has a retarding influence upon dental caries.'

'DELAY' IN DENTAL CARIES RATES (D.M.F.) IN PERMANENT TEETH

AFTER 10 YEARS OF ARTIFICIAL FLUORIDATION IN THREE CITIES

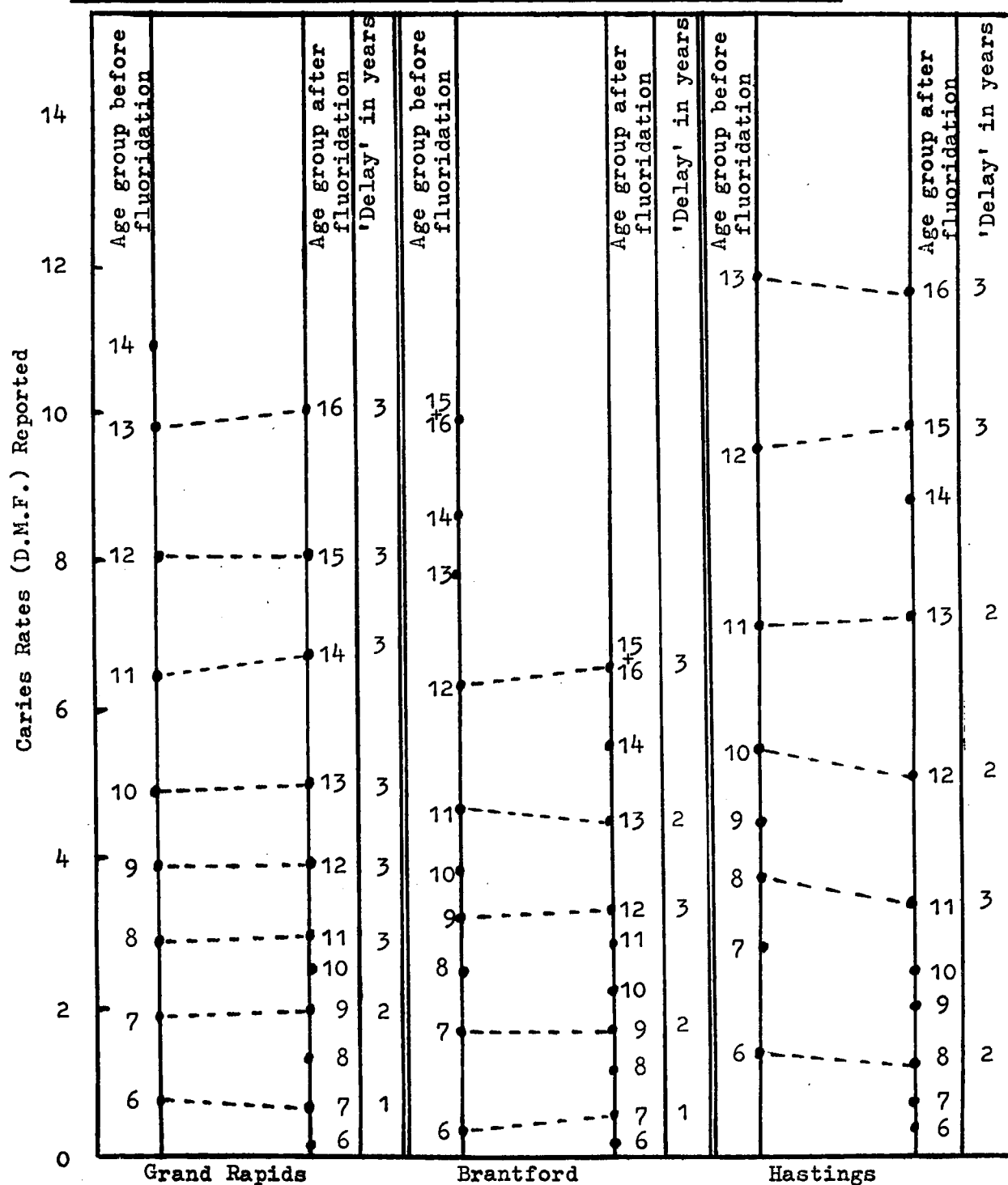


Fig. 3. The approximate 'delay' in dental caries (D.M.F.) rates after 10 years artificial fluoridation in Grand Rapids, U.S.A., Brantford, Canada, and Hastings, New Zealand.

That observation has been made in other naturally fluoridated areas. In 1963, F.A. Irving reported that:

'... in the high fluorine water supply areas [in Essex] there is only a deferment of the onset of decay, and despite the fluoridated water there are still decaying teeth.'

The same effect has been detected in the data from artificial fluoridation trials. Fig. 3 depicts the 'delay' in the D.M.F. rates reported after ten years artificial fluoridation in the three trial cities: Grand Rapids, U.S.A.; Brantford, Canada; and Hastings, New Zealand. The controls for both the Grand Rapids project and the one at Hastings, were abandoned early in those trials. The National Health and Welfare study in Brantford had many deficiencies (Sutton, 1959, 1960). The data from the other two main trials, at Newburgh and Evanston, were published in such a manner that similar comparisons cannot be made.

The 'delay' in these three studies (taking the published data at face value) was, except in the youngest age groups, between two and three years, similar to the three-year delay reported by Dr Weaver (1948).

The British experimental data were considered by Dr C.G. Dobbs (1972) who said that:

'...after an initial postponement, the rate of progress of the disease is unaffected. It has now become obvious that, in Britain at any rate, fluoridation does not provide the major solution to the dental caries problem that was suggested by the earlier propaganda.'

Those British data were depicted by Professor A. Schatz and

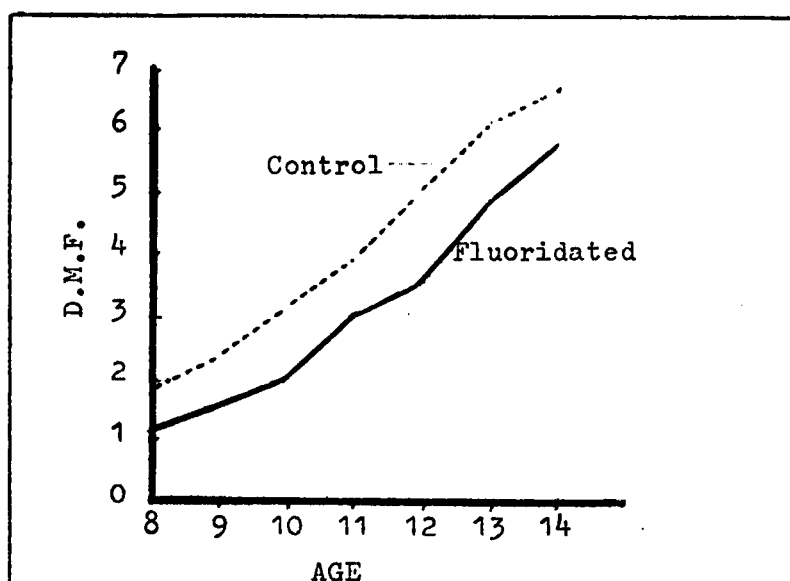


Fig. 1. Curves showing DMF values for children of different ages in fluoridated and control areas.

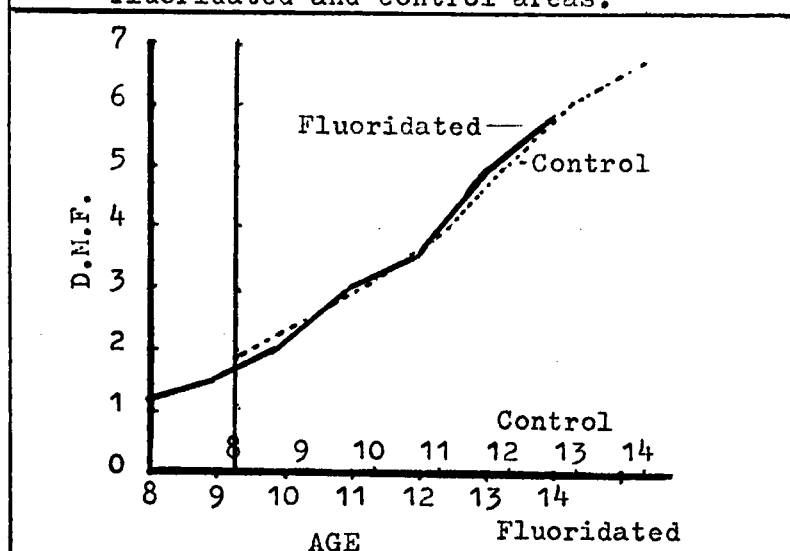


Fig. 2. Curves from Fig. 1 drawn with the control moved to the right to show that caries develops at the same rate in both the fluoridated and control groups.

Fig. 4. This figure is redrawn from two figures published by Professor A. Schatz and Dr J. Martin (1972) which depict D.M.F. values published in 1969 by the British Committee on Research into Fluoridation, which claimed that 'the fluoridation of water supplies at the level of 1 p.p.m. F is a highly effective way of reducing dental decay.' (Table 3, The Fluoridation Studies in the United Kingdom and the Results Achieved after Eleven Years. H.M.S.O., London. 1969).

Dr J. Martin, see Fig. 4.

Their illustration clearly shows that, after the initial delay in the onset of caries, the D.M.F. rate increases at almost exactly the same rate in both the control area and the fluoridated one.

The question should be considered whether this delay phenomenon is wholly or partly due to a delay in the eruption of teeth. Unfortunately, data which might have thrown light on this matter were not published. Also, there is a considerable degree of uncertainty in the caries data released from the fluoridation trials due to the many errors in their experimental methods (Sutton, 1959, 1960).

(13) Reports by statisticians.

Twenty years ago Professor D.G. Steyn (1958a) suggested that, before proceeding with fluoridation, those concerned should, in the interests of many millions of people, 'subject the American method of statistical analysis to severe scrutiny in the light of the criticisms levelled at it. In this way a great future tragedy may be averted.'

Some of the shortcomings of the four main fluoridation trials were pointed out the following year (Sutton, 1959).

Anne-Lise Gotzsche (1973b) said:

'I have shown dental statistics to scientists working in other and unrelated fields — in, for instance, biochemistry — and, I'm afraid, they simply laugh at the "reshuffling", statistical "weighting", the sudden disappearance of up to 1000 research subjects, &c.'

Judging from the few publications which consider the efficacy of fluoridation, those who promote and endorse

this process have not taken Professor Steyn's advice.

Dr M. Harris (1976a) said:

'I know of no fluoridation investigation involving dental examination which was carried out under the direction of an academic statistician.'

Fortunately, statisticians are now beginning to look at the data published in fluoridation trials.

One of the first comments by statisticians was made on the first fluoridation trial, run by the United States Public Health Service, at Grand Rapids. Extracts of their report were published in a county dental journal (De Stefano, 1954) and have been ignored. They said:

'The authors appear to have demonstrated an unfortunate disdain for some of the pre-requisites of valid research.' And 'in the first place, the sampling design of the experiment is embarrassingly conspicuous by its absence'.

They also said that:

'... the lack of sophistication shown in selecting the sample leads to complete bewilderment as to the precise effects or the extent of the effect of fluoridation.'

It should be noted that it was upon the results reported from that study on which the United States Public Health Service based its, very premature, endorsement of fluoridation.

This was followed by endorsement by the American Dental Association, leading to the vast superstructure of endorsements by all manner of societies and associations, which were mentioned in section IV.

In 1974, Professor R.S. Scorer of the Department of Mathematics, Imperial College of Science and Technology,

London, published some comments. They concerned the annual reports of the Medical Officer of Health regarding the Anglesey Dental Service. At that time Anglesey had been fluoridated for nearly 19 years. Professor Scorer said:

'It is quite remarkable that one of the Annual Reports should have referred to the "dramatic" improvement resulting from fluoridation when there are no figures at all to support this.' 'There are no perceptible trends of any kind, and it is quite impossible to detect any influence of fluoridation at all. If anything, teeth have got worse.' (Scorer, 1974).

The same year, Dr R. Ziegelbecker (1974) of the Institute for Environmental Research, Graz, Austria, studied the same reports and also the data published in The Fluoridation Studies in the United Kingdom and Results Achieved after Eleven Years. (See Fig. 4, p. 87.) He said:

'The inescapable conclusion from the official data concerning the development of dental health in Anglesey is that the fluoridation of drinking water introduced in 1955 has not been successful.'

He also said:

'The fluoridation of drinking water has not resulted in a reduction in the average number of treatments required or in the average number of fillings and extractions in the deciduous and permanent dentitions.'

Professor Scorer (1975) also published comments on a paper by Professor D. Jackson et al., (1975) which compared children in fluoridated Anglesey with those in Bangor and Caenarvon. He commented:

'It is a very badly designed investigation by even the

most modest epidemiological standards.'

'The study does not come up to the standards worthy of a university, nor would it merit publication in a reputable journal.'

Dr Ziegelbecker (1975) also commented on that study (Jackson et al., 1975). He said:

'The cause of this contradiction lies in the exceptionally faulty design and the faulty interpretation of the results of the GWYNEDD DENTAL HEALTH STUDY by its authors.'

'The result of the study could have arisen solely from the selections made and is a flagrant contradiction of other long-term and official data on Anglesey which provide an incontestable record of the failure of fluoridation.'

Unfortunately, even today, twenty years after a study was made of the four main (and one minor) American/Canadian fluoridation trials (Sutton, 1959, 1960), very few published comments have been made on those key trials. (It is pertinent to mention that the findings in that study were checked, in detail, by Professor Maurice Belz and three members of his staff at the Department of Mathematical Statistics, University of Melbourne.)

Professor Per Ottestad, Department of Mathematics, Agricultural College of Norway, examined the data of those American/Canadian trials, and additional material from Sweden, and said in 1969:

'No one who is in close contact with sound research and who has seriously considered the question of research method, would accept the so-called scientific basis that is being advanced for promotion of fluoridation.'

Professor Ottestad said that a comparison of the data published in those trials indicates that:

'... a hypothesis that assumes fluoridated water to have the same effect as water with the same natural fluoride content, cannot be accepted. The reason, of course, is that there are other factors than fluoride which influence the DMF rate, probably other elements in the drinking water.'

*

He concluded:

'The experiments which have been made on adding fluorides to drinking water were so unsatisfactorily planned and carried out, that the results are inadequate as a basis for estimating the effect of fluoridation in, for example, North America, and most certainly in Norway if fluoridation is to be practised here. There is no doubt, moreover, that other factors play a part.'

Twenty years ago it was concluded (Sutton, 1959) that:

'The sound basis on which the efficacy of a public health measure must be assessed is not provided by these five crucial trials.'

Since that time, not even one of the many observations on which that statement was based has been found to be incorrect. Particularly since the results of the British trials have been examined by statisticians, it can now be confidently stated that the claims for great dental benefits as a result of artificial fluoridation have been, at least, greatly exaggerated.

* See appendix 4c, p. 261.

TOXICITY — DENTAL FLUOROSIS.

Dental fluorosis or 'mottled teeth' has always been an important factor in the fluoridation discussion, for cases occur whenever artificial fluoridation is commenced. There is much misunderstanding regarding this condition. Some knowledge of it is essential when studying the toxicity of fluoridation and of fluoride ingested from other sources.

Dental fluorosis is a condition of the tooth characterized by faulty formation of the enamel. (Faulty enamel can also be produced by illness and from malnutrition, the position of the malformation indicating the age at which the child was sick and the area of tooth affected showing the duration of the illness.)

(1) Dental Fluorosis Indicates Chronic Fluoride Poisoning
Dental fluorosis was described, in 1943, by Dr D. Ast (who subsequently became the main investigator in the Newburgh fluoridation trial) as 'the first objective indication of chronic fluorine poisoning.' Many similar statements have been made by others, including the Medical Research Council (1949).

This fact is generally admitted except by the most dedicated fluoridation promoters. For instance, Professor Noel Martin of Sydney, in reply to a question whether dental fluorosis is an indicator that people might be being poisoned, said: 'No, no, it's an indicator of fluoride in the diet, it's an indicator of fluoride affecting the formation of teeth.' (N.D. Martin, 1979).

* See appendix 17d, p. 278. ** See appendix 2b, p. 258.

Dental fluorosis can develop only during the formative period of the enamel of the teeth concerned, to the age of approximately four to five years in the case of the incisors. Periods of chronic fluoride poisoning which may occur after the enamel development is complete and when the teeth have erupted will not be indicated by 'mottling'.

(2) The Prevalence of Dental Fluorosis in a Fluoridated Area.

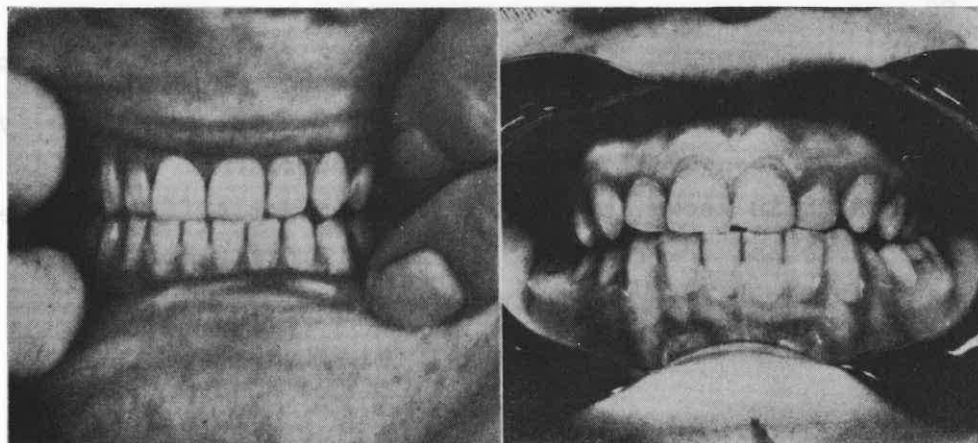
It is now admitted, even by those who are in favour of fluoridation, that ten per cent [at least] of children raised on fluoridated water since birth will exhibit some degree of dental fluorosis (N.D. Martin, 1979), but the claim is made that the lesions are so inconspicuous that it requires an expert to detect them. As will be seen later in this section, that claim is not correct.

Comments that the degree of dental fluorosis, occurring in some children drinking fluoridated water, is of 'no cosmetic importance' ignore the essential point — that any degree of fluorosis is evidence that the child experienced a period of chronic fluoride poisoning. As Dr W. Gibbs (1968) said:

'There is no evidence that this damage is directed selectively to the ameloblast [enamel forming] cells only.'

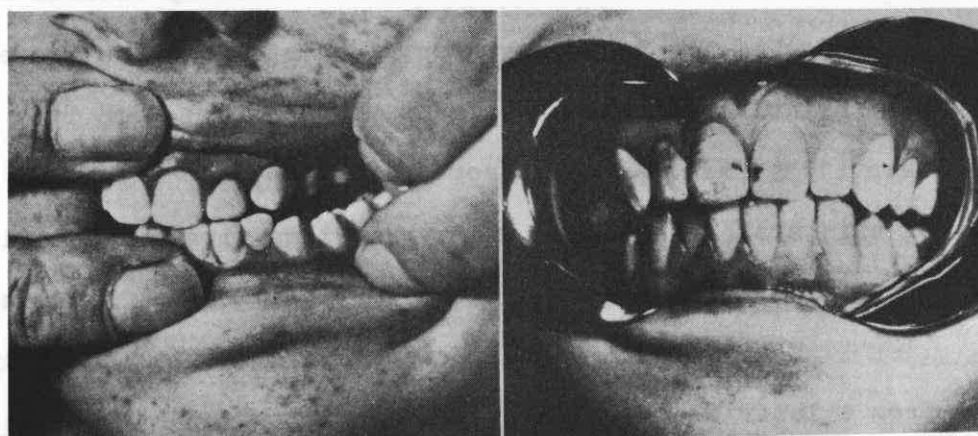
(3) Factors Affecting the Degree of Dental Fluorosis.

The degree and the appearance of dental fluorosis depends on the degree of poisoning which, usually, varies with the total amount of fluoride ingested by the individual, their personal susceptibility and the levels of protective substances in the water and the diet, which have been discussed already. The area of tooth affected depends on the duration of the exposure to toxic doses.



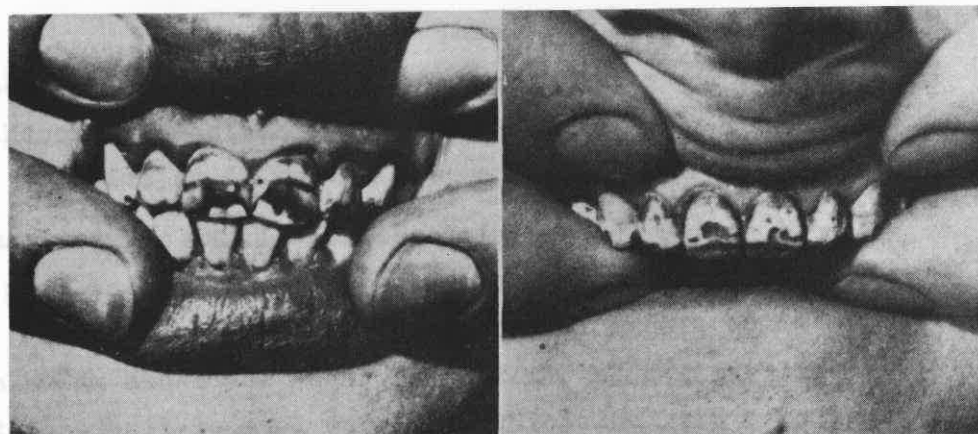
Normal

Questionable



Very Mild

Mild



Moderate

Severe

Fig. 8. Photograph of the illustration published by Dr H.T. Dean (1942) to explain his descriptions of the appearances of the various classes in his classification of dental fluorosis.

Professor A. Schatz and Dr J. Martin (1964) reported:

'Under certain conditions, fluoride toxicity actually increases as the concentration decreases! This is what is known as a paradoxical effect.' 'For these reasons, the issue of fluoride toxicity cannot be resolved by considering only the concentration of fluoride in the water.'

(4) The Classification of Dental Fluorosis.

Dental fluorosis cannot be considered sensibly without a knowledge of the various grades of damage. These grades were established more than forty years ago by Dr H.T. Dean (1934) and, although some slight modifications of this system have been used, his classification is still the standard for assessing and describing dental fluorosis.

The following descriptions are abbreviated mainly from a later description by Dr Dean in the book Fluorine and Dental Health from which the accompanying illustration (Fig. 8) was taken. (Dean, 1942).

'Normal. The enamel presents the usual translucent semi-vitriform type of structure. The surface is smooth, glossy, and usually of a pale creamy white color.

Questionable. The enamel discloses slight aberrations from the translucency of normal enamel, ranging from a few white flecks to occasional white spots. This classification is utilized in those instances where a definite diagnosis of the mildest form of fluorosis is not warranted and a classification of "normal" not justified.

Very Mild. Small, opaque, paper white areas scattered irregularly over the tooth but not involving as much as approximately 25 per cent of the tooth surface. Frequently included in this classification are teeth

showing no more than about 1-2 mm. of white opacity at the tip of the summit of the cusps of the bicuspid or second molars.

Mild. The white opaque areas in the enamel of the teeth are more extensive but do not involve as much as 50 per cent of the tooth.' (Dean, 1942). 'Faint brown stains are sometimes apparent, generally on the upper incisors.' (Dean, 1934).

Moderate. All enamel surfaces of the teeth are affected and surfaces subject to attrition show marked wear. Brown stain is frequently a disfiguring feature.

Severe. Includes teeth formerly classified as "moderately severe" and "severe". All enamel surfaces are affected and hypoplasia is so marked that the general form of the tooth may be affected. The major diagnostic sign of this classification is the discrete or confluent pitting. Brown stains are widespread and teeth often present a corroded-like appearance.' (Dean, 1942).

It should be noted that:

'The child is classified on the basis of the severest form of dental fluorosis for two or more teeth.' (Dean, 1942).

Therefore, if only one tooth is classified as 'mild' and others as 'very mild', the classification is 'very mild' although the presence of even one 'mild' upper incisor greatly affects the appearance.

(5) The Index of Fluorosis.

This is a score used to indicate the degree of dental fluorosis in a community. For each individual the following scores are given: Normal = 0, questionable = 0.5, very mild = 1, mild = 2, moderate = 3, severe = 4. The average score of the community is the Index of Fluorosis.

(6) 'Objectionable Fluorosis'.

This term, or 'objectionable mottling', requires some explanation. These terms are used by public health officials. They disguise the fluorosis damage to the most-affected individuals by combining their degree of fluorosis with less-affected or unaffected members of the community. If the degree of dental fluorosis in a town is said to be 'not objectionable'; this does not mean that no child, or its parents, will regard its mottled teeth as 'not objectionable'. On the contrary, a proportion of the children can have unsightly mottling which is very objectionable to them, but if a sufficient number of children have little or no visible mottling, so that the mean score, the index of mottling, is less than 0.4, then the mottling in that community is considered to be 'not objectionable' from the point of view of the public health officials.

As Dr Colin P. Harrison (1963) of Melbourne expressed it:

'It may be heart-warming for the person with mottled enamel to know that the condition of his teeth is causing the public health authority no sleepless nights; but by what right does the authority decide that the mottled enamel is of no significance to him?'

(7) Teeth with Mottled Enamel are Imperfectly Formed.

It has been known for more than sixty years that fluorosed teeth are structurally weak and 'when the teeth do decay the frail condition of the enamel makes it extremely difficult to make good and effective fillings.' (Black and McKay, 1916).

Dr Kaj Roholm, in his classic monograph Fluorine Intoxication wrote, in 1937:

'The enamel changes must be regarded as irreparable; they are very disfiguring, especially when accompanied by pigmentation. In the mild degrees the strength of the tooth does not seem to be reduced and the caries frequency is not remarkably high. In the severe degrees the enamel is brittle and the tooth as a whole little resistant' [to caries].

Dr C.H. Boissevain (1933) said:

'Once a mottled tooth starts to decay, however, it deteriorates rapidly, as they are difficult to repair because of the brittle enamel and hard dentin.'

Much of the definitive research on dental fluorosis was done by Drs Margaret Smith and H.V. Smith (1940). They said:

'There is ample evidence that mottled teeth, though they are somewhat more resistant to the onset of decay, are structurally weak, and that unfortunately when decay does set in, the results are often disastrous.'

I have myself observed such rapid destruction in teeth of Polynesian and Micronesian children who had 'very mild' to 'moderate' fluorosis.

(8) The Appearance of Dental Fluorosis — 'Mottled Teeth'.

In 1916, Drs G.V. Black and F.S. McKay described the appearance of teeth having dental 'mottling', saying:

'When not stained with brown or yellow they are a ghastly opaque white that comes prominently into notice when the the lips are opened, which materially injures the expression of the countenance of the individual.'

In the pro-fluoridation literature, teeth which were described as 'ghastly opaque white' are now called 'pearly white'. An

article in the Journal of the American Dental Association by Dr V.L. Diefenback et al. (1965) claimed that fluoridation is a 'cosmetic enhancement' making the teeth more beautiful.

The lesions of dental fluorosis are initially white but, depending on the degree of damage, and unknown factors, the area may later take up brown stain, most commonly seen on the upper incisors. Attempts to remove this stain are usually unsatisfactory, and the stain returns. As their presence ruins the appearance of the child, and may induce a marked psychological reaction, they must be removed by crowning the teeth or in some cases filling the affected areas. Abrasion of the stained areas with pumice (a practice amongst Micronesians) may remove most of the stain but, of course, severely damages and weakens the tooth. (Sutton. 1978).

(9) The Unknown Prevalence of Dental Fluorosis in Victoria.

It is not suggested that a large proportion of children in Melbourne who have been drinking fluoridated water since birth will, when their teeth erupt, exhibit dental fluorosis which will in a few years time become stained. Present evidence is inadequate to assess the risk but, because of our exceptionally 'soft' water, it is very likely that the prevalence of fluorosis will be unusually high. (Twelve insurance companies were approached to find out whether they would issue a policy to cover the cost of repairing the damage to teeth from dental fluorosis. All of them refused to write such a policy.)

The Micronesians mentioned above lived on coral atolls until the age of at least six years and, during the

development of their tooth enamel, drank rainwater and water from shallow wells containing 0.2 to 0.7 p.p.m. fluoride.

The atmosphere was free of fluoride from industrial pollution, but they would obtain some from sea spray and from their diet which contained seafoods.

(10) The Important Factor of Climate — Daily Temperatures.

Drs Smith and Smith (1940) said:

'.. to one who is familiar with the disfiguring defect known as mottled enamel which affects the teeth of every person who drinks water containing as little as 1 p.p.m. of fluorine during the years of tooth formation, this recommendation [to introduce fluoridation] seems, to put it mildly, unsafe.'

Their observations were made in Arizona, where Drs D.J.

Galagan and G.G. Lamson found, in 1953, that:

'In the water supplies of the Arizona communities studied, concentrations of fluoride above 0.8 ppm resulted in objectionable fluorosis; concentrations of 0.6 to 0.8 ppm resulted in an occasional diagnosis of fluorosis; concentrations below 0.6 ppm did not cause objectionable fluorosis.'

The mean annual temperatures of those communities were between 19 and 22 degrees C, which is similar to that of Melbourne which is 19.9 degrees C. (Of course inland country districts are higher.)

The summer temperature, not the mean annual one, is the temperature to be considered when discussing the question of dental fluorosis. Normally the consumption of water, and therefore of the fluoride it contains, increases in

summer. Unless that increase is offset by a decrease in the intake of fluoride from food and other sources, the probability of the development of fluorosis, and of its more severe grades, is increased. In Melbourne, the mean maximum temperature for January is 26.5 degrees C — almost twice that for July (13.5 degrees C — Bureau of Meteorology).

The importance of the high summer temperature — which has been disregarded here — is well recognized in Russia. Drs R.D. Gabovich and G.D. Ovrutskiy (1977) said:

'It is advisable to send children living in centers of endemic fluorosis to a resort for 2-3 months in the summer where the water is low in fluorine. Examinations which we made in communities whose drinking water contains 1.5-2.5 mg/l fluorine showed that children who left a given locality for 2-3 months for a number of years in early childhood either had no signs of fluorosis or were affected with mild forms of the disease. The majority of children who did not leave the endemic region revealed fluorosis damage, including severe forms.'

Will those children who develop fluorosis here show evidence of a seasonal variation in intensity?

(11) Short Periods of Chronic Fluoride Poisoning Produce Dental Fluorosis.

When enamel is developing, only short periods of chronic fluoride poisoning (or poisoning from some illnesses) are sufficient to produce a band of mottled enamel. It is surprising, but that basic fact is not always understood. Even the Chairman of the Fluoridation Committee of the N.S.W. Branch of the Australian Dental Association in 1968 assured the public that '16 years' constant exposure to 2 mg. per

day is necessary to produce visibly objectionable fluorosis.' (Freeman, 1968).

The short periods required were demonstrated, as long ago as 1933, when Drs Margaret Smith and Edith Lantz fed fluoride to albino rats or gave the animals subcutaneous or intramuscular injections with sodium fluoride. By injecting fluoride 'every other day', they found, in erupting incisors:

'Eight rings of abnormally dull white and corroded areas alternating with normal pigmented areas.' 'As in the case of human teeth, normally formed enamel did not become mottled upon fluoride intake.'

(12) The Concentrations of Fluoride at which Dental Fluorosis Occurs.

In Colorado, fluoride naturally present in the water supplies produced dental fluorosis which was commonly known as 'Colorado brown stain'. In 1933, Dr C.H. Boissevain analyzed 169 water supplies in that area and compared the results with the prevalence of fluorosis. He found 'very little mottled enamel' in two cities with 0.5 p.p.m. and 0.2 p.p.m. fluoride, and said:

'We have seen that wherever fluorine-containing water is drunk, mottled enamel appears.'

He concluded by saying:

'Children less than five years old should drink water free from fluorine.'

Despite such reports, supporters of fluoridation used to say that no dental fluorosis could occur with fluoridation at 1.0 p.p.m. They now admit that ten per cent of children who drink water containing that concentration, from birth, will develop some degree of dental fluorosis. (N.D. Martin, 1979).

It is highly probable that that estimate is a conservative one, for there have been many reports of dental fluorosis occurring at much lower concentrations of fluoride. Several of these, from different times and from different locations, will be mentioned to illustrate that point. Dr D.C. Badger (1949) said that 'dental fluorosis was observed in 30 per cent of the children who drank water containing 0.9 p.p.m. of fluorine.'

Drs K.A. Rosenzweig and I. Abkewitz (1963) studied an area in Israel which drew its drinking water from twenty wells. Their fluoride content ranged from 0.35 to 0.95 p.p.m., 'most of the 20 wells containing 0.66 - 0.75 ppm'. They said that the 'fluoride content of the local water supply .. is definitely too high, and the amount of fluorosis observed is not justified by the slight reduction of caries prevalence.'

Dr K. Ueda et al., (1964) found that, in Japan:

'Contrary to the prediction, considerable numbers of very mild and mild cases were still found in the domestic water group consuming as little as 0.5 to 0.6 ppm of fluorine.'

Drs R.D. Gabovich and G.D. Ovrutskiy (1977) said that in countries with a hot climate, such as India and Morocco,

severe dental fluorosis damage is widespread while fluorine concentration in drinking water is only 0.3-0.5 mg/l.'

Dr S.S. Jolly et al. (1973b) studied endemic fluorosis in the Punjab, India, and said:

'Because the minimum threshold for the causation of dental fluorosis is well below 1 ppm — possibly in the range of 0.5 ppm — the level of 1 ppm fluoride in water accepted as safe in the western world is not applicable in India. It must be emphasized that no linear relationship exists between the levels of fluoride in water and the incidence of dental fluorosis.'

The fluoride content of the water supply is only one factor, although a very important one, in determining whether fluorosis will develop in an individual. There are many other factors — which will be mentioned later — in the water supply and in individuals which modify the prevalence of dental fluorosis.

THE 'OPTIMUM' FLUORIDE CONCENTRATION IN DRINKING WATER.

In the fluoridation literature the words 'optimal' and 'optimum' are used frequently in connection with the fluoride concentration of the drinking water and, much less often, when speaking of the total fluoride intake, including that provided by the water supply.

When a naturally or artificially fluoridated water supply is described as having an 'optimal fluoride concentration', the author considers that the concentration is the most favourable for the teeth. Whether the ingestion of water containing fluoride at that level is advantageous or detrimental to the other parts of the body is very rarely considered. As one consultant physician said to me:

'You would think that the body was nothing more than a set of teeth.'

When the 'optimal' concentration of fluoride is under discussion, not only are other organs of the body ignored but also the periodontal tissues which support the teeth and attach them to the bone surrounding their roots. Few comparisons have been made between the condition of the periodontal tissues of people living in naturally fluoridated areas and the condition found in those who have low-fluoride water supplies. In any case, it should not be assumed, as has been done, that the results of artificial fluoridation will be the same as those found in naturally fluoridated areas. Professor Per Ottestad (1969) said that

a comparison of the data published in fluoridation trials shows that:

'.. a hypothesis that assumes fluoridated water to have the same effect as water with the same natural fluoride content, cannot be accepted.'

Most advanced periodontal disease, leading to extensive loss of teeth, is seen in adults aged 30 years or more. As artificial fluoridation commenced in America and Canada just over thirty years ago, it is still too soon to gain any real idea of its effects on the prevalence of advanced periodontal disease in adults in North America. Of course the effects in Victoria, which has exceptionally soft water supplies, could be considerably different from those seen in America.

One important factor in producing periodontal disease is the presence of abnormal trauma between contacting teeth. This is usually reduced by attrition — the wearing away of a part of the teeth. It is stated that artificial fluoridation will harden the tooth enamel — with higher fluoride concentrations in the water brittle enamel is formed. This hardening may reduce the rate of normal attrition between teeth, and therefore increase the trauma on them, leading to an increase in periodontal disease and to tooth loss in adults.

The idea of instituting artificial fluoridation arose from observations made in the U.S.A. that, although dental fluorosis occurred in naturally fluoridated areas the caries rates were low. The level of 1.0 p.p.m. fluoride was selected for use in the Grand Rapids project because it

was considered to be the highest concentration of fluoride which could be added to a water supply without the associated index of dental fluorosis being sufficiently high to be of public health significance.

In 1950, Dr H.C. Hodge published a graph (using a logarithmic scale) which depicted the average index of dental fluorosis, in children aged 12-14 years, in 21 U.S. cities. These values were drawn as two straight lines, one for towns with less than 1.0 p.p.m. fluoride in their water and the other for the remaining towns, with a third straight line showing the average dental caries experience for those children in each town. These three lines intersected at a point indicating approximately 1 p.p.m. fluoride. He said:

'This point is probably the best available guide for the selection of the concentration of fluoride to be established artificially in demonstration studies of the effectiveness and the safety of fluorides in the control of dental caries.'

Later the fluoride concentration used in American schemes was adjusted to take into consideration the climate. The WHO Chronicle said that the 'optimum level is not an absolute value, it may range from 0.6 ppm to 1.2 ppm.' (WHO, 1969b).

In 1953 the N.H.& M.R.C. resolved (in part) that:

'...it is emphasized that concurrent research is essential in order to assess the results of the treatment of the water and to determine accurately the optimum concentration of fluoride under Australian conditions.'

The N.H.& M.R.C. continued:

'The amount of fluorine to be added must be carefully determined and adjusted to meet climatic and environmental changes.'

'A properly controlled national study of water fluoridation under Australian conditions should be instituted immediately.'

Unfortunately, no study was commenced.

The Director-General of the WHO (1969a) said:

'Fluoridation of public water supplies requires an accurate maintenance of the optimal level, which may vary from 0.6 to 1.2 p.p.m. for different geographic and climatic areas and according to seasonal changes in mean temperature and average drinking-water consumption figures.'

However, in 1971, the N.H.& M.R.C. recommended that, in Australian fluoridation projects, 'a uniform concentration should be maintained irrespective of seasonal variations in the particular area concerned.' That advice has been adopted by the Victorian Health Commission — confirmed, as far as was possible, by monitoring the erratic domestic concentrations. The important factor of 'seasonal changes in mean temperature' mentioned by the Director-General of the WHO. (1969a) has been ignored. Also, although the 'average drinking-water consumption figures', if they were known, would almost certainly be considerably different in, for instance, Mildura and Melbourne, the Act leaves it to the discretion of the Health Commission to specify the maximum concentration of fluoride to be used. Another factor is the increasing use by children of prepackaged drinks. The fluoride content of those sold in Sydney

varies considerably (Enno, 1975; Enno et al., 1976).

Those promoting fluoridation strive to give the impression that water containing approximately 1 p.p.m. fluoride is the normal situation, and that all waters which have a lower fluoride concentration are 'fluoride deficient' waters. The official figures, in the book Natural Fluoride Content of Communal Water Supplies in the United States (U.S. Department of Health, Education and Welfare, 1959), show that, at that time, only 1,903 communities, with a population of 6,952,302 had one or more water source containing at least 0.7 p.p.m. fluoride. The authors of the fluoridation trial in Evanston (Hill et al., 1949) said that 'approximately 4.307 per cent of the entire population of the United States' had 'access to a communal water supply containing fluorine in the amount of 0.5 ppm or more.' Therefore, soon after artificial fluoridation commenced in the U.S., more than 95 per cent of the population were using water supplies containing less, in many cases considerably less, than a half the level of approximately 1.0 p.p.m. fluoride used in artificial fluoridation. Of course the world average for the fluoride content of domestic water supplies is not known, but the WHO (1969b) stated in its Chronicle that:

'Surface waters are generally low in fluorides (less than 1 ppm), while underground or subsoil waters, which have a greater opportunity to contact fluorine-bearing rocks, usually contain higher levels.'

Therefore, despite statements by those promoting fluoridation, domestic water supplies containing approximately 1 p.p.m. fluoride naturally are not the usual condition in

untreated waters. On the contrary, they are distinctly unusual, and comprise only a very small minority of natural waters.

'It is consequently *prima facie* improbable that the biological evolution of human beings has resulted in a constitutional need for fluorides.' (Douglas of Barloch, 1960).

In many areas it is obvious that the level of 1.0 p.p.m. fluoride in a water supply is too high, even 0.6 p.p.m. — the lower end of the range of concentrations mentioned by the WHO Director-General (1969a). This is indicated by the development of levels of dental fluorosis which are 'objectionable' even to the public health officials. (Sensible people who know that fluorosis is a sign that chronic fluoride poisoning has occurred, surely must consider that any level of fluorosis is undesirable.)

As will be seen in section XIII, in certain areas many cases of fluorosis were observed although the fluoride concentration was as low as 0.5 p.p.m. (Ueda *et al.*, 1964) and even 0.3 to 0.5 p.p.m. (Gabovich and Ovrutskiy, 1977). The resolution on fluoridation passed by the Twenty-second World Health Assembly (WHO, 1969c), said that fluoridation should be introduced 'where the fluoride intake from water and other sources for the given population is below optimal levels.' Therefore, in areas in which the amount of fluoride ingested from sources other than water is sufficient to produce dental fluorosis, the optimum concentration of fluoride in the water supply is zero.

OTHER SOURCES OF FLUORIDE.

The WHO resolution on fluoridation (1969c) stated that 'other sources' of fluoride must be taken into account when determining the fluoride concentration considered desirable for a domestic water supply.

Sources of fluoride other than from water supplies include: (1) Food, (2) Toothpaste and medicaments and (3) The atmosphere.

(1) Fluoride in Food.

In the important study Environmental Fluoride 1977 (Rose and Marier, 1977) it was stated:

'One of the major factors thought to be contributing to the increase in human exposure to fluoride is the increasing fluoride content of foods. Such an increase can arise from three main sources, namely, the use of fluoridated water in food and beverage processing, the exposure of crops to airborne fluoride (and to water-borne fluoride in areas irrigated with fluoridated water — Auermann, 1973) and the use of fluoride-containing fertilizers.'

Drs R.D. Gabovich and G.D.Ovrutskiy (1977) said that the amount of fluorine in the diet is affected not only by the amount in individual foods, but also by a number of other factors. They include the nature of the peoples' food which is determined by the quantitative amounts of individual food products in the diet, culinary technique, the amount of fluorine in seasonings, preservatives and, finally, the

possible transfer of fluorine to food from the cooking vessel. That possibility was raised by a study in 1975 which found that when fluoridated water (1 p.p.m.) was boiled down by between a half and a third of its volume the concentration of fluoride increased to nearly 3 p.p.m. (Full and Parkins, 1975).

Fluoride is much less toxic in food than it is in water (Steyn, 1958b) and the rate of absorption from solid foods is slower and less complete. (Weddle and Muhler, 1954; Marier, 1964).

Dr G.L. Waldbott (1963) surveyed the fluoride content of foods, and concluded:

'Fluoride is present in nearly every food; the highest concentrations are found in tea, seafood, bone meal, spinach and gelatin, the least in citrous fruits, vegetables, eggs and milk. The amount of fluoride ion taken into the system in food is unpredictable; it is dependent on numerous factors pertaining to the food, its processing, and preparation, and on the food habits of the individual consumer.'

At present there is a 'general lack of current information on the fluoride content of foods and beverages.' (Farkas and Parsons, 1974). In view of the increasing consumption of bottled and canned drinks, a study in Sydney (Enno et al., 1976) is of interest, for it found that a majority of those drinks had 'fluoride concentrations well below that of Sydney water', which is fluoridated.

Another factor will arise if we follow the present American craze for drinking bottled 'mineral' water.

'Americans are expected to spend \$ 111 million on the stuff this year.' ('Age', Aug. 27, 1979). In America, low-fluoride

water is sold for children, to prevent dental fluorosis.

Dr E. Auermann (1973) pointed out that:

'During the course of years, the total fluoride uptake increases because of the rise in fluoride level in food products.' 'Knowledge concerning the dietary total fluoride uptake in humans is still limited in spite of the worldwide propagation of fluoridation of drinking water.'

A review of the total fluoride intake and fluoride content of common foods (Carol S. Farkas, 1975) suggested that the data on the fluoride content of foods should be updated, and said:

'In current publications and textbooks most data regarding the fluoride content of common foods as well as tables showing the average daily intake of fluoride in various countries, are based upon work carried out up to thirty-seven years ago. Such work does not allow for the effect of fluoridated drinking water on fluoride levels of processed and cooked foods.'

'Data in tables published in the 1970's, citing average fluoride ingestion, were found to be based upon a small sampling. Some figures presented were found to include misquoted data.'

The author mentioned cases of:

'... the biased choice of data which constitute the basis for the conclusion that "diets are usually low in fluoride and remarkably uniform world wide".'

(She cites Drs H.C. Hodge and F.A. Smith as the authors of that claim, both of whom have been prominent promoters of fluoridation for more than twenty years.)

The review continues:

'In view of these facts, one cannot but question the reliability of older data in tables utilized in 1970

and later to indicate that little fluoride is consumed in the diet.'

(a) Fluoride in processed foods. Dr E. Auermann (1973)

said that the fluoride levels in processed food:

'... differ from those of raw products, depending upon the method used in processing and the material with which the food comes in contact during processing. On the other hand, in food which was prepared with fluoridated water, 2 to 5 times higher fluoride levels were found than in food in a nonfluoridated area.'

It was estimated that the:

'... widespread use of fluoridated water (1.0 ppm) in food processing and preparation will probably mean a foodborne fluoride intake of ca 1.0-1.2 mg per day.'
(Marier and Rose, 1966).

'Although the Marier and Rose data were available in the literature, the 1970 WHO report on Fluorides and Human Health relied upon the 1949 figures by McClure instead of the more recent data.' (Farkas, 1975). (This section of the WHO book was written by Dr J.C. Muhler, another prominent fluoridation advocate.)

(b) Fluoride in beverages. 'Tea, depending on its source and grades, contains large concentrations of fluorides.'

(McClendon and Gerston-Cohen, 1957). The many publications on this subject cite considerably different values. The range is at least from 80 to 600 p.p.m. fluoride. (Schatz and Schatz, 1972). A Russian report (Gabovich and Ovrutskiy, 1977) said that if it is taken into consideration that the average amount of fluorine in domestic varieties

of tea is 70 mg/kg, then with the presence of 70% water-soluble fluorine, 1 g of tea is the source of 0.05 mg of fluorine. In Britain, strong tea can contain up to 0.6-1.4 mg/l of fluoride and a cup of tea as much as 0.3 mg of fluoride (Martin, 1965).

In a tea-drinking community, such as Victoria, tea must be an important source of fluoride.

In beer, the amount of fluoride depends on the fluoride concentration in the water, and is close to it. (Gabovich and Ovrutskiy, 1977).

Carol Farkas (1975) pointed out that the reliability of older data should be questioned even though it has been used in tables published recently. She said:

'An interesting case in point is the figure given for the fluoride content of beer in the WHO table, namely 0.20 ppm, a value derived from a paper by P. Clifford in 1945, as recorded in McClure's 1949 table. For beer processed with fluoridated water Marier and Rose obtained .68 ppm fluoride. Yet the WHO report in 1970 presented the lower 1945 data by McClure.' (Clifford, P. Assoc. Off. Agr. Chem. J., 28: 277, 1945; McClure, F.J. Publ. Hlth. Rep., 64: 1061, 1949).

(c) Fluoride in watered vegetables. Professor A. Schatz and Dr Vivian Schatz in 1972 pointed out that:

'What happens when fluorine is added to the soil depends on such factors as the form in which it is applied, the amount of fluorine, how much lime and phosphate are present, the species of plants grown, and the soil type and its geology.'

They cited several papers which indicate that there can be a considerable increase in the fluorine content of common

foods, mainly due to the use of fertilizers. In one district in Japan, during a period of seven years the fluoride content of wheat rose by 64%, of pumpkin by 429% and in watermelons it increased by 831%.

The 12th International Convention on Vital Substances, Nutrition, and Civilization Diseases, at Prague, said that:

'The fluoridation of drinking water releases a fluorine circuit which includes vegetables, fruit and other horticultural products as well as milk, and has an uncontrollable effect on the human organism.'

(International Society, 1967).

Recently Dr B.S. Walker (1979) of Canberra, pointed out that far more water is used to irrigate vegetable gardens than reaches the mouths of school-age children and that vegetation absorbs fluorine from the soil. He then asked:

'In the light of the above, can anyone "expert" or not, give me an absolute assurance that the lettuce grown in my backyard will never become toxic through excess fluorine.'

That problem does not appear to have been investigated.

(d) Fluoride in sprayed fruits and vegetables. Fluoride residues on and in fruits and vegetables, from the use of agricultural sprays, can be considerable. In 1968 the N.H. & M.R.C. listed:

'Substances which, when used as directed, usually result in detectable residues in or upon foods and for which the following tolerances apply.'

This list includes sodium silicofluoride (as F), 7 ppm.

(Melbourne's water is fluoridated by adding a sodium

silicofluoride slurry — Hirth, 1977).

Similarly, in 1976, the U.S. Environmental Protection Agency stated:

'A tolerance of 7 parts per million of combined fluorine is established for residues of the insecticidal fluorine compounds cryolite and synthetic cryolite (sodium aluminium fluoride) in or on each of the following raw agricultural commodities.'

The list mentioned 49 varieties of vegetables and fruits. According to Dr D.C. Badger (1949), that level of 7 p.p.m. was established by the U.S. Food and Drug Administration on the testimony of Dr H.V. Smith and co-workers. They said:

'Each [166 gram] apple then contains 1.16 mg of fluorine or the equivalent of 1.16 ppm of fluorine in 1 liter of water. This would cause mild mottling of the enamel if apples are eaten consistently, even though there is no fluorine in the drinking water.' (Smith, 1949).

The use of agricultural sprays has increased greatly. How often nowadays does one find a grub in an apple, or even between the leaves of a green vegetable?

(2) Fluoride in toothpaste, mouthwashes and tablets.

The importance of toothpaste as a source of fluoride intake has been disregarded. The danger of repeatedly swallowing fluoride in toothpaste, two or three times a day, in a community with fluoridated water has not been brought to the attention of the public, and children are permitted to use fluoridated toothpaste without supervision. Dr J.L. Hardwick (1975) found that 'Children aged 4 and under are prone to swallow much or all of the dentifrice they use.'

The Department of Health, German Federal Republic (1976) said that when fluoridation is present it is of the utmost importance that a simultaneous additive intake of fluoride from toothpaste, tablets or salt does not take place.

Most toothpastes sold in Victoria contain fluoride. American trials used concentrations of from 700 to 2000 p.p.m. F (Stookey, 1970). The amount of fluoride ingested from toothpaste varies in different studies, but it can be considerable. In teenage children a single brushing with a dentifrice containing 0.15% sodium fluoride resulted in a fluoride retention, for each time of brushing, of about 60% of the soluble fluoride and 30% of the total fluoride content of the dentifrice (Winkler et al., 1953). With the recent introduction of fluoridated toothpaste with various attractive tastes, the quantities swallowed may be expected to increase, particularly in the case of young children who, with their light body weight, are particularly susceptible to an overdose.

*

Dr Ingrid Hellstrom (1960) found that 'following the use of a 0.1% NaF mouthwash, an average of 2.0 mg of fluoride in adults and of 0.85 mg in children was retained'. That is more than three times the dose recently suggested for young children consuming fluoride tablets. (Council on Dental Therapeutics, 1977). Of course, if the mouthwash was used more than once a day the overdose would be even greater.

* See appendix 15, p. 276.

For many years the use of sodium fluoride tablets, containing 1 mg fluoride, has been advocated by some clinicians for children living in areas in which the water supply is not fluoridated. Initially the dose recommended was one tablet (1 mg F) per day, but because of the development of dental fluorosis in many children using that dose, in 1963 the American Medical Association suggested that, for children less than three years old, the daily dose must not exceed 0.5 mg. In 1977 the Council on Dental Therapeutics again halved that dose, for children less than two years old, to 0.25 mg per day — a quarter of the dose originally recommended for those children. Tablets containing 0.5 mg fluoride are now available and 0.25 mg ones will be on sale soon. This matter is discussed in section XXVI which demonstrates that there is no safety margin with fluoridation.

An important problem which occurs in Victoria, is the practice of some parents continuing to administer fluoride tablets to children drinking fluoridated water. Fluoridation was introduced into Melbourne with very little publicity, and many people still do not know that they drinking fluoridated water.

In 1962, the U.S. Public Health Service issued a warning, through Professor P. Jay, that in areas with fluoridated water the use of fluoride tablets and other supplements was not only unnecessary but was definitely contraindicated. (Waldbott et al., 1978).

However, in Australia pro-fluoridation spokesmen have taken the opposite view. Professor N. Martin (1973),

* See appendix 1b, p. 255.

in a statement endorsed by the Fluoridation of Public Water Supplies Advisory Council of the N.S.W. Department of Health, said:

'After the age of six when the anterior teeth are fully formed, and there is no possibility of any unaesthetic fluorosis, a parent..... could be advised with safety to continue the supplement which was being used prior to fluoridation. This would then at the maximum level of intake represent no more than the consumption of a drinking water containing two parts per million.'

The Chairman of the Fluoridation Sub-committee of the Victorian Branch of the Australian Dental Association (Levant, 1977) said:

'There is an extremely wide tolerance, and the taking of tablets after the introduction of fluoride into the water supplies is not dangerous.'

*

The Chairman of the Fluoridation Committee of the N.S.W. Branch of the Australian Dental Association (Freeman, 1968), at the time when Sydney water was being fluoridated, said that 'the appropriate authorities' recommend that children ingesting fluoride supplements continue to use those supplements for approximately six months. He said:

'It is obviously possible that, at times up to this cut-off date, some children will be ingesting the equivalent of 2 mg. of fluoride per day. It should be clearly understood that no harm whatsoever occurs at this level.'
'Over a period of months only, it is reasonable to expect no discernible effects.' He considered that '16 years' constant exposure to 2 mg. per day is necessary to produce visibly objectionable fluorosis.'

That is an extraordinary statement for it is widely known

* See appendix 2a, p. 255.

that, far from requiring '16 years' constant exposure to 2 mg. per day', dental fluorosis can develop within a short period (even a few weeks) of exposure to a toxic intake of fluoride. Indeed, all fluorosis in the incisors, including 'visibly objectionable fluorosis', must have developed when the enamel of those teeth was forming during the first five years of life. (See section XIII). The dose of 2 mg fluoride from water and tablets, every day, stated here by Freeman, and by Martin (1973), to be safe for children, is a toxic dose. For that reason the German Federal Republic Department of Health said that it is of the 'utmost importance' that fluoride supplements are not taken simultaneously with fluoridated water. (Department of Health, 1976).

* The use of tablets without the fluoridation of the water supply is widely advocated, provided that the parents are fully informed of the hazards. This would eliminate religious and ethical objections to fluoridation, it would be much cheaper, and would adhere to the medical principle of giving a measured dose to the patient (and not to others). Dr R. Feltman and G. Kosel (1961) administered fluoride tablets to children and to gravid women, and said:

'One per cent of our cases presented evidence of undesirable side effects from fluoride therapy. It is pointed out that if a patient is affected by fluoride, by this method, the allergen or intoxicant can be removed readily from the diet by discontinuance of the dietary supplement.'

* See appendix 1c, p. 255.

(3) Atmospheric Fluoride.

There is still little awareness of the important problem posed by the increasing pollution of the atmosphere by fluoride. It is a true pollutant for, except in minute amounts, it is not normally found in the atmosphere. Except under exceptional circumstances, such as volcanic activity, all soluble fluoride found in the air in excess of $0.05 \mu\text{g}/\text{m}^3$ can be assumed to have originated from man-made sources. (Rose and Marier, 1977).

(a) Absorption of fluoride from the atmosphere. Airborne fluoride may be absorbed either directly through the lungs or indirectly from food.

Dr A.L. Knight (1975) pointed out that: 'Airborne fluorides are readily absorbed in the lungs.' There is evidence of 'efficient and probably essentially-complete absorption of inhaled fluoride into the body.' (Rose and Marier, 1977).

Some airborne fluoride is self-administered as a result of using those aerosol products in which the propellant contains fluoride, and some is absorbed from breathing air which is contaminated, mainly by industrial emissions. The fluoride content of some anaesthetics is of importance to operating room staff.

Inhalation from cigarettes 'may be another significant source of fluoride intake by humans.' (Rose and Marier, 1977). Those authors said that Okamura and Matsuhisa (1965a) found a range of from 35 to 640 ppm F in

cigarettes, with an average of 163 ppm for Japanese cigarettes and 236 for American ones yielding, respectively, 157 and 244 $\mu\text{g F}$ per cigarette.

In view of the present evidence that fluoride is a carcinogen, it could well prove to be a major factor in the association between cigarette smoking and lung cancer.

A WHO report Research into Environmental Pollution includes fluoride, with arsenic and beryllium, in the local air pollutants 'because serious long-term effects have occurred in man and animals living in communities adjacent to industries emitting these substances.' In a table listing 'Air pollutants with recognized or potential long-term effects on health at usual air-pollution levels' the report said that fluoride causes fluorosis and 'promotes or accelerates lung disease.' (WHO, 1968).

(b) Industrial pollution. Both Melbourne and Geelong have a number of industries of the types listed as major emitters of fluoride pollutants.

The situation in Melbourne may improve when the new gas-powered power station replaces the present briquette (brown coal)- powered one which is situated only four miles, and usually to windward, of the centre of the city. In 1974, the journal Fluoride abstracted a study by staff of the University of Dresden (Dässler et al., 1973) on fluoride emissions from brown coal electrical power plants. This was instituted when it was found that there was an increasing mortality amongst bees near those installations. Fluorides are considered to be a major cause of death of bees in

* See appendix 12a, p. 273. ** See appendix 19a, p. 282.

industrial areas. They found that when the coal was burned at 1000 degrees C, between 78 and 100 per cent of the fluoride content escapes as a gaseous compound. The authors estimated that emitted fluoride gas travels between one and two kilometers, in contrast to dust containing particulate fluoride which has a wider expansion radius depending on the topography of the area, the height of the chimneys, particle size and many other factors. They said that emission of fluoride from power plants has received little attention and damage to the environment near such plants is usually attributed mainly to SO₂.

The atmospheric fluoride emitted from the Point Henry aluminium plant has been monitored, when atmospheric conditions are favourable, as far east as Mount Eliza, a distance of approximately 35 miles. However most of the fluoride emitted 'falls out' within a two-mile radius of the plant. (Hayes, 1979).

This problem is a major one for :

'Industrial fluoride emissions into the atmosphere in the United States total more than 100,000 tons per year and 88% comes from the manufacture of steel, brick, tile, glass, porcelain, aluminium, fertilizer and the combustion of coal.' (National Academy of Sciences, 1971).

Drs R.D. Gabovich and G.D. Ovrutskiy (1977) estimated that around fluorine plants 'man inhales from 1.5 to 12 mg fluorine with air per day.' They said that 'In one industrial region of Lincolnshire (England) the air is so polluted with hydrogen fluoride that the grass contained up to 2200

* See appendix 19b, p. 282. ** See appendix 19c, p. 283.

*** See appendix 17a, p. 276.

mg/kg fluorine. Cows pastured in this region suffered from osteomalacia, the fluorine content of their urine reached 69 mg/l and 15,000 mg/kg in bones. Among children living near the plant dental fluorosis was widespread and the fluorine content of their urine was 4.2 mg.l.'

Drs R.A. Papetti and F.R. Gilmore reported, in 1971, that:

'Air pollutants that have caused widespread injury to livestock in the United States are confined chiefly to two substances, fluorine (fluorides) and arsenic (mainly as As_2O_3).' 'These compounds settle on or react with animal fodder, and accumulate to concentrations much greater than occur in ambient air. Livestock eating this fodder suffer acute or chronic poisoning, resulting in loss of strength and weight, and frequently in death.'

However the main source of fluoride in dairy cattle can be the mineral supplements in purchased cake or grain balancers. (Griffiths-Jones, 1977).

(c) The spread of fluoride contamination. Fluoride contamination of the atmosphere affects people, animals and plants not only in the immediate vicinity of fluoride-emitting industries but also for a considerable distance from the plant. For instance cattle in the Columbia River valley developed advanced chronic fluorosis, with bony swellings, lameness and poor condition although some of the herds were 8 miles from the source of the fluoride pollution, an aluminium plant. (Udall and Keller, 1952).

In her very accurate book, The Fluoride Question, Anne-Lise

*See appendix 14, p. 275. ** See appendix 17b, p. 277.

Gotzsche (1975) said:

'At the first European Congress on "The Influence of Air Pollution on Plants and Animals" at Wageningen in April 1968, it was stated that airborne fluorides had destroyed 400,000 hectares of European forests. It was also claimed that in Norway, fluoride injuries to coniferous forests could occur at a distance of 32 kilometres from the emitting source. It was stated at a symposium in Barcelona in 1969 that a German survey of areas with coal-burning industries revealed that rainwater could contain up to 14 ppm fluoride, or 88 times the level in the control areas. These levels correlated directly with those found in vegetation. Moreover, grazing near a fluoride-emitting factory could result in a 50-100 increase in intake. In one German survey, forage was shown to supply more than 90 percent of the fluoride ingested by cattle.'

Even when a serious attempt is made to eliminate this problem a grave situation may persist. In 1973 it was reported that, as a result of fluoride pollution in Montana:

'Forest insects were found to accumulate fluorides.' 'Even though the company reduced fluoride emissions by 67 percent between 1970 and 1971, data collected in 1971 indicated that vegetation in Glacier National Park, 7 air miles distant from the source, was still accumulating abnormal amounts of fluoride.' (Carlson, 1973).

In the discussion regarding the proposed establishment of a very large aluminium smelter at Portland, no mention seems to have been made of the effect which atmospheric pollution with fluoride may have on the surrounding pasture lands.

(d) Diverse types of damage from fluoride. The very diverse types of damage which fluoride emissions into the atmosphere may produce in man, animals and plants, are well illustrated by information from Czechoslovakia. A report in the journal Science of the first meeting of the International Society for Fluoride Research (Marier, 1968), mentioned a series of papers from Bratislava's Research Institute of Hygiene (Balazova, Lezovic and Macuch). The report said that in industrial regions:

'Air concentrations as high as 1.13 milligrams of fluoride per cubic meter were recorded; close to the factory the fluric distribution was 61 per cent solid and 39 percent gaseous. Farther away, the distribution was 15 percent solid and 85 percent gaseous. In afflicted areas, fallout from fluoride-bearing particles was 7337 kilograms of fluoride per square kilometer; that is, a 90-fold increase over the 82 kilograms per square kilometer found in a control area. Surface waters, at a 10-kilometer distance from the factory, contained 10.9 milligrams of fluoride per liter. Within a 5-kilometer distance tree leaves were necrosed, had a decreased chlorophyl content, and the amount of fluoride was 7 to 72 times more than that normally found. Vegetables and fruit were disfigured in shape and color, and contained from 5 to 21 times more fluoride than did control samples. All bee colonies had died, and 95 percent of the cattle were afflicted with fluorosis; this condition was confirmed by fluoride analysis in several tissues.'

Marier's report on these Czechoslovakian papers continued:

'In comparison with a control group, local children had a decreased hemoglobin and increased erythrocyte level, with two to three times more fluoride in their teeth, fingernails, hair, and urine. The children's daily

intake of fluoride was estimated to be 2.15 milligrams per day, of which 1.40 milligrams was obtained from food, 0.55 milligrams from air, and 0.20 milligrams from drinking water (deep well: low fluoride content). In the control area total daily intake of fluoride was 1.0 milligram of which 0.8 milligram was ingested with food. The fluorine intake in the industrial area was therefore more than twice that found in the control region.'

If, as these authors reported, children can ingest from atmospheric pollution 0.55 mg of fluoride per day — more than half the suggested 'optimum' intake from drinking water, and more than the total dose now suggested for young children — clearly this source of fluoride should have been taken into account when the level of fluoride to be added to Victorian waters was decided. No evidence has been found that that was done.

(e) Atmospheric fluoride is not monitored by the Victorian Environment Protection Authority. 'In 1967, the American Association for the Advancement of Science listed fluoride as the third most serious air pollutant in a group headed by sulphur dioxide and ozone. In 1966 the National Conference on "Pollution and Our Environment" in Montreal decided that "prolonged exposure to ambient air concentrations of less than 1 part per thousand million parts of air volume of fluoride may create a hazard ... in this respect fluorides are 100 times more toxic than sulphur dioxide".' (Gotzsche, 1975).

Despite this, the most recent report of the Environment Protection Authority (1978) of Victoria does

not mention fluoride. Recently a member of the staff of the E.P.A. stated that they do not monitor fluoride and do not know of any government department which does. He said:

'We have not been asked to do so.'

*

It is remarkable that the Health Department, which has supported fluoridation for many years, has not asked for the testing of atmospheric fluoride, at least since it became widely known, through the 1968 WHO Technical Report Research into Environmental Pollution, that 'serious long-term health effects have occurred in man' in communities which have industries which emit fluoride. Both Melbourne and Geelong have many such industries.

**

As Anne-Lise Gotzsche wrote in 1975:

'Again, as in so many other fields of fluoride science, the public hasn't been told, the work hasn't been done, and the public hasn't been told that the work hasn't been done. Fluoride pollution is not supposed to exist.'

Truly as Dr C.G. Dobbs said in 1972:

Fluorine is 'The Favoured Pollutant'.

* See appendix 4h, p. 262.

** See appendix 12b, p. 274.

THE 'OPTIMUM' TOTAL FLUORIDE INGESTION.

The Twenty-second World Health Assembly of the WHO (1969c) passed a resolution on Fluoridation and Dental Health.

This said (in part) that the Assembly:

'Recommends Member States to examine the possibility of introducing and where practicable to introduce fluoridation of those community water supplies where the fluoride intake from water and other sources for the given population is below optimal levels.'

That Resolution can be expressed as: $o - i = f$, where 'o' is the 'optimal level' for total fluoride intake per day; 'i' is the total daily intake of fluoride 'from water and other sources' for the given population; 'f' is the additional daily amount of fluoride which should be provided by the fluoridation of the water supply.

It is obvious that the value 'f' will be a strong influence in determining the fluoride concentration required in the water, and that until 'f' is known no rational approach can be made to the fluoridation of a community water supply. Furthermore, the value of 'f' cannot be known unless both 'o' and 'i' are known. (For consideration of 'i' see sections XV and XVIII.)

Therefore, before commencing the fluoridation of a water supply it is essential to know the 'optimal' total daily consumption of fluoride by the population concerned.

One would expect that this fundamental value would be readily available, but a search of much of the literature

will soon show that it is very elusive — the WHO Resolution did not state the 'optimal level', nor did its Director-General (WHO, 1969a), nor has anyone else.

Those who mention the matter of total fluoride intake still place much reliance on tables published in the early 1970s, such as in the WHO book Fluorides and Human Health (WHO, 1970b). However, Rose and Marier (1977) said:

'Farkas [1975] concludes that composite tables on fluoride intakes published prior to and during the early 1970's were based on insufficient data and included misquoted data. Having examined the original sources, we conclude that these Tables require major revision.'
(See also section XV.)

Areas of endemic dental fluorosis (see section XIII) are due to many of the population having an excessive total intake of fluoride, but generally other factors are ignored and the effect is attributed solely to the fluoride content of the water supply being too high. Also, in a community, the Index of Fluorosis (see section XIII) is used to denote whether the total fluoride intake is too high, other examinations are undertaken only rarely. However, dental fluorosis is an unsatisfactory indication of current fluoride ingestion because it is always out of date. For instance, the prevalence and the degree of fluorosis in the anterior teeth of 14-year-old children provides no information regarding the current ingestion of fluoride, but it gives some idea of their level of fluoride intake when the tooth enamel was forming 9 to 14 years previously. Therefore, even if the fluoride content of the drinking water remains the

same, it is almost useless as an indicator of the present level of fluoride ingestion, for there is little doubt that the amount of fluoride obtained from sources other than water is increasing. Professor A. Carlsson (1978) said:

'Information from the U.S.A. and Canada shows that a considerable increase in total fluoride intake has occurred during the last decades.'

He said that estimates indicate that the present fluoride intake in localities without fluoridation is as great as the initially calculated intake in fluoridated areas.

Any consideration of the 'optimum' or of the maximum permissible total daily ingestion of fluoride must take into account the age and the body weight of the individual. Therefore the question of total fluoride intake will be considered under three headings: (i) the foetus, (ii) children, and (iii) adults.

(i) The foetus. Drs R. Feltman and G. Kosel (1961), in their study of the administration of fluoride tablets containing 1.0 mg, 1.2 mg and 0.825 mg F, to 361 pregnant women (with 240 controls) and 672 children 'through their eighth year of life' (with 461 controls), found that:

'.. fluoride ingested by gravid women enters the maternal circulation, is stored in the placenta and passes through the placental barrier to enter the foetal blood supply.'

Dr I. Gedalia and his three associates (1964) compared samples of maternal blood, cord blood and whole placental tissues, in three groups of women who were consuming water with low (0.06-0.15 ppm F), medium (0.5-0.6 ppm F) and high (0.6-0.9 ppm F) fluoride contents. They reported that:

'.. when the fluoride intake is low, fluoride freely passes through the placenta, but when the fluoride intake is high, the placenta plays a regulatory role and protects the foetus from excess.'

Drs R.D. Gabovich and G.D. Ovrutskiy (1977) said:

'It can be assumed that the comparatively rare incidence of fluorosis in deciduous teeth is connected with the ability of the placenta to inhibit considerably the intake of fluorine by the foetus.'

*

Therefore the custom of prescribing fluoride tablets to pregnant women, which still occurs, is contrary to the physiological requirements of the foetus, and the small amount of fluoride which passes through the placenta would be obtainable from the normal maternal diet.

(ii) Children. Drs Gabovich and Ovrutskiy (1977) said that:

'.. mother's milk contains very small amounts of fluorine, even when water containing high concentrations is consumed.'

They analyzed breast milk in two cities. With water containing 0.3 p.p.m. fluoride the average milk content was 0.163 mg/l, and with a water concentration of 4.1 p.p.m. the milk contained 0.275 mg/l fluoride. They commented:

'Therefore, it can be concluded that increased consumption of fluorine increases its content in breast milk but only slightly (approximately the same as in the blood).'

In 1973, the Medical Journal of Australia published an article on 'Optimum Fluoride Intake' by Professor N.D. Martin, which was endorsed by the Fluoridation of Public Water Supplies Advisory Committee of the N.S.W. Department of Health and 'adopted as a statement of policy on this matter.'

* See appendix 17g, p. 280.

Professor Martin said:

'.. as the amount [of fluoride] excreted in breast milk is extremely low' .. 'the breast-fed child should be given a fluoride supplement even though the mother is consuming fluoridated water.' His recommendation was 'half a milligram of fluoride per day for children to the age of one year.'

Commenting on that recommendation a pharmaceutical chemist (L.J. Kausman, 1973) said:

'The breast-fed baby creates real problems for the fluoridation theory. Professor Martin acknowledges that the breast-fed baby receives little or no fluoride from breast milk. A logical and accepted argument runs that breast milk contains optimum amounts of nutrients for proper development of the child, and the absence of a particular substance is evidence that the substance is not required for any normal development of the child. Even when the feeding mother is on a high fluoride diet, low fluoride breast milk prevails. This stubbornness might lead the reader to question assertions that fluoride is useful and harmless to the breast-fed child.'

He concluded by saying that:

'.. the concept of fluoride-deficient mother's milk is too difficult to accept.'

Professor A. Carlsson (1978) pointed out that animal experiments have shown that drugs can 'produce specific permanent disorders in the learning ability and other subtle behavioural components', and said:

'One wonders what a 50-fold increase in the exposure to fluoride, such as occurs in infants bottle-fed with [fluoridated] water-diluted preparations, may mean for the development of the brain and other organs.'

Professor Carlsson continued:

'Again, problems associated with this can be solved only by precise and comprehensive epidemiological studies in which, for example, breast-fed and bottle-fed babies are compared in localities with a varying water fluoride content. No studies of this kind have yet been made.'

It should be noted that the Council on Dental Therapeutics of the American Dental Association suggested, in 1977, that for children less than two years of age the dose of fluoride in tablet form should be 0.25 mg daily. In a Report, it said that if the water supply contains more than 0.2 p.p.m. fluoride that dose must be reduced. (Driscoll and Horowitz, 1978). This is only half the dose previously suggested. Therefore, those who still adhere to the advice given by the N.S.W. Department of Health at the time when the Victorian Fluoridation Act was passed, are administering twice the currently-recommended dose to the young children under their care. As a result, at least some of these children are developing fluorosis in their front teeth — how severe the fluorosis is only time will reveal.

The Council on Dental Therapeutics recommended that children aged 2 to 3 years should receive 0.5 mg fluoride per day and those aged three years or more 1.0 mg daily. In both cases they specified that the dose must be reduced if the domestic water supply contained 0.2 p.p.m. or more fluoride. The Council also specified that if the fluoride level exceeded 60% of 'the concentration recommended for community water fluoridation in a geographic region' fluoride

supplements must not be prescribed. (Driscoll and Horowitz, 1978).

Unfortunately the Victorian public has not been informed of that prohibition and, judging from the large number of fluoride tablets which are still sold, many children must be ingesting far too much fluoride, particularly if the amount absorbed from fluoridated toothpaste is taken into account. (See also sections XV and XXVI.)

The Council on Dental Therapeutics said:

'There is no evidence that the doses recommended by the Council produce esthetically unacceptable dental fluorosis.' (Driscoll and Horowitz, 1978).

(In section XIII some comments were made on the term 'objectionable fluorosis' which is used in the jargon of public health officials, now called 'aesthetically unacceptable' fluorosis.) The above-mentioned statement by the Council on Dental Therapeutics is a tacit admission that some degree of dental fluorosis occurs in children ingesting the doses of fluoride which it suggests.

Therefore, even in the U.S. with its hard waters, there is little doubt that the doses recommended by the Council on Dental Therapeutics — 0.25 mg to age two years, 0.5 mg between two and three years old and 1.0 mg for children aged three years or more, per day — are above the 'optimum' level of fluoride ingestion.

(iii) Adults. Dr C.G. Dobbs (1972) said:

'So far, after 26 years of fluoridation, neither the actual nor the "optimal" fluoride intake has ever been determined for any "given population" served by a

* See appendix 9b, p. 268.

community water supply. Hitherto reliance has been placed upon wild extrapolations on a national basis from a few dietary studies, some of them as old as McClure's in 1943.'

In 1971, Ralph Nader related that Professor Barry Commoner had asked the U.S. Public Health Service to provide information on total fluoride intake. They did not reply. After 'constant hammering', about eighteen months later they gave a figure for the average intake for adults in p.p.m., but did not give data for children.

In 1972, Carol Farkas made a survey of 'over 200 "experts" in the fields of nutrition, dentistry and medicine' regarding the maximum safe daily intake of fluoride from all sources. Professor N. Jenkins replied:

'I do not think there is yet a consensus on the maximum safe dose of fluoride ingestion.'

Other replies which she received bear that out, for the estimates for the safe daily ingestion by adults of fluoride from all sources ranged from 2-3 mg to 6-7 mg. An even higher value was stated by Dr J.L. Hardwick (1975) who said:

'..the consistent ingestion of fluoride at the level of about 8 mg daily in adults appears to be safe from cumulative hazards.'

These "experts" did not state the figure which they considered to be the 'optimum' one. However, as that value cannot exceed the maximum permissible one, unless there was general agreement that the 'optimum' was 2 mg or less, their opinions regarding the 'optimum' value would differ.

The 15th International Convention on Civilization Diseases, Vital Substances and Nutrition, held from 8th to 14th September, 1969, passed a Resolution No. VIII which was published in its Bulletin 39a. (International Society for Research, 1969). This considered the Resolution on Fluoridation and Dental Health which had been passed two months previously by the WHO (1969c).

The Convention commented:

'The Resolution passed by the W.H.O. is an admission that fluoridation has not yet been investigated carefully enough from the medical and scientific point of view. This is borne out by the second part of the Resolution which requests the Director-General to continue to encourage research into the etiology of dental caries, the fluoride content of diets, the mechanism of action of fluoride at optimal concentrations in drinking water and into the effects of greatly excessive intake of fluoride from natural sources.'

The Convention said that:

'From this the conclusion can be drawn that

1. the etiological circumstances of dental caries have not yet been satisfactorily elucidated,
2. not enough is known about the mechanism of action of fluoride,
3. not enough is known about fluoride intake from various foods.

Bulletin 39a continued:

'.. these matters were discussed and evidence from a number of researches was assembled which led to the conclusion not to recommend fluoridation of drinking water supplies but to chose the alternative of dental care combined with other well-tried methods instead.'

The endorsement of fluoridation by the WHO (1969c) has received much publicity and many people would expect it to be scientifically reliable and based on a careful study of the available evidence both for and against fluoridation. It followed a report prepared by the WHO Director-General. (WHO, 1969a).

The International Convention said:

'Mention shall be made of the fact that unfortunately the documentation of the report of the Director-General of the World Health Organization is very incomplete, because no mention is made, and no reference given to, the principal researches on fluoride toxicity, e.g. Roholm's "Fluoride Intoxication", the researches of Col. Shortt and his successors in India from 1937 to the present time, Theorell on enzyme inhibition, Rapaport on mongolism, Rodriguez in Spain and Steyn in South Africa on skeletal fluorosis, Feltman and Kosel on side effects of fluoride, Waldbott on fluoride allergy and many others. There are no reports and statements of experts' committees and study groups and resolutions of organizations against fluoridation of drinking water supplies. The often discussed publications and resolutions of our Society, the opinions of eminent scientists, and the decisions of Governments not to permit fluoridation of public water supplies are not mentioned.' (International Society for Research, 1969).

The statement in favour of fluoridation is contained in paragraph 2 of the Resolution of the WHO (1969c), most of which was cited at the commencement of this section. Fluoridation was suggested :

'... where the fluoride intake from water and other sources for the given population is below optimal levels'.

The International Society for Research on Civilization Diseases and Vital Substances (1969), commenting on that statement in the WHO Resolution, said:

'Without going into the details of the argument attention must be drawn to the fact that it will be impossible to give effect to this resolution, because it does not state (neither does the report of the Director-General on which it was based) what is the "optimal level" of intake of fluoride.

There cannot be any optimal level of intake for a given population. It is the intake of each individual which matters. This is certainly not the same for each individual. It will vary with age, sex and individual bodily reaction. Some individuals are more sensitive to fluoride than others, for example persons suffering from kidney trouble are less able to excrete fluoride and more liable to injuries from it.

In any case even if the "optimal level" of fluoride intake were known, it is impossible to achieve it by adding fluoride to the public water supply, because of the very great differences in consumption of water by different individuals (one to 12 litres per day). Taking into account these differences, the daily intake of fluoridated drinking water can introduce into the organism quantities of fluoride which toxicologists, pharmacologists and hygienists consider toxic.'

We end this section almost where we began, for we do not know the 'optimum intake' of fluoride. However, we now know that there is no such value and that the WHO resolution endorsing fluoridation cannot be carried out for it specifies a method for determining the intake of fluoride from water supplies which is impossible to execute.

THE FACTOR OF TEMPERATURE AND SEASONAL VARIATIONS.

The concentration of fluoride to be used in Victorian water supplies, which is laid down in the Act, is close to, but not exceeding, 1 p.p.m. fluoride. Provided that each individual consumes one litre of water per day, by drinking it or in prepared food, the dose of fluoride ingested will be one milligram. That is the dose specified when administering fluoride to children who are more than three years of age.

A fallacy of the fluoridation case is the claim that all people drink about the same amount of water. Of course they do not. Apart from personal preference, there are many other factors, one of which is the daily temperature. This has an effect, sometimes a marked effect, on the amount of water consumed and, therefore, on the dose of fluoride ingested from water. Recently Professor T. Dawson (1979) said that workers at Broken Hill drink up to 11 litres per day. If this had been fluoridated water — or beer made with fluoridated water — they would have been ingesting from beverages alone, approximately 11 mg of fluoride daily, which is far in excess of even the highest estimates made for the safe total daily ingestion of fluoride from all sources.

Both the U.S. and the Victorian climates can be called 'temperate' ones, but the mean annual temperatures are very different. This is shown in Fig. 5, which compares the mean annual temperatures of the Australian capital cities with those of the four major fluoridation test cities in the U.S.

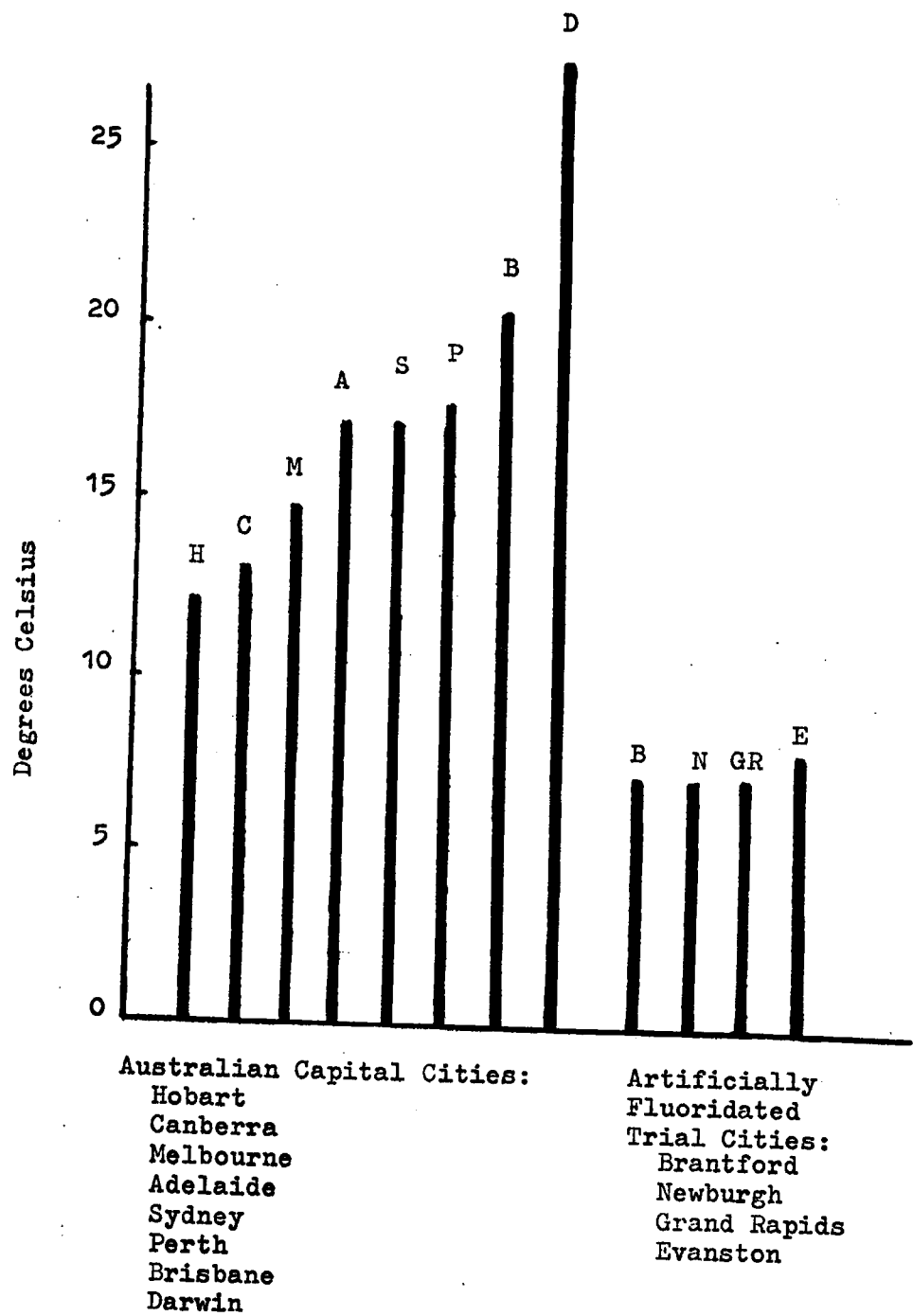
MEAN ANNUAL TEMPERATURES

Fig. 5.

The mean annual temperatures of the Australian Capital Cities compared with those of the four main American and Canadian fluoridation trial cities.

It can be seen that, by our standards, the weather in those four cities is cold — much colder than in Hobart — and their mean annual temperatures are only half that of Melbourne. Despite this marked difference between our climate and those of the test cities in America, the concentration of fluoride specified in the Act is the same as the 1 p.p.m. used in Grand Rapids, Evanston and Brantford, and only slightly less than the 1.2 p.p.m. used in Newburgh.

In addition, no evidence has been found that there is a variation in the fluoride concentration in the Melbourne water between the summer and the winter periods. This is despite the fact that the mean maximum temperature here in January (26.5 degrees C) is almost exactly twice that (13.5 degrees C) found in July.

As was pointed out in section XIII, only short periods of higher intake of fluoride are necessary to produce chronic fluoride poisoning and, therefore, areas of dental fluorosis in developing teeth (apart from effects on other organs). In 1954, the N.H. & M.R.C. said that the concentrations considered appropriate for summer and for winter should be averaged and the resulting value 'maintained without variation throughout the year.' However it is the maximum temperature which matters when considering dental fluorosis. Therefore that recommendation of the N.H. & M.R.C. is unsound and it is not in accord^{with} the practice in many American communities.

As the daily temperature is an important factor in determining the fluoride content of water which is considered

to be desirable, the comparisons shown above indicate that (apart from other considerations) the concentration of fluoride recommended for Victorian waters, in the Act, is too high — particularly in the summer months.

THE FLUORIDE CONCENTRATION SPECIFIED IN THE ACT IS AN
ARBITRARY ONE.

Paragraph 5. (3) of the Health (Fluoridation) Act 1973

states:

'Nothing in this Act shall authorize a water supply authority to add fluoride to an extent that results in an average optimum concentration in excess of one part fluoride per million parts of water.'

Also, paragraph 6. (3) states:

'The water supply authority adding fluoride to a public water supply —

(a) shall so regulate the concentration of fluoride that such concentration shall not exceed the maximum concentration determined by the Commission; '.

Neither of those paragraphs specifies the acceptable range of the concentration or the period over which the 'average optimum concentration' — whatever that means — is to be calculated. It is assumed that the objective is to maintain a concentration close to, but not exceeding, 1 p.p.m. fluoride.

The WHO resolution (1969c) suggested introducing fluoridation:

'... where the fluoride intake from water and other sources for the given population is below optimal levels.'

That statement was reinforced by an article in the WHO

Chronicle (1969b) which said:

'Only when the natural fluoride intake from all sources

(including water) has been assessed is it possible to calculate the level to which the fluoride content of water supplies needs to be adjusted. In tropical areas the level may be about 0.6 ppm, in temperate areas 1.0-1.2 ppm.'

Therefore, if it is decided to add fluorides to the domestic water supplies, before determining the concentration to be added, it is necessary to know, for each area supplied:

- (i) The fluoride intake from 'other sources', and
- (ii) The 'optimal level'.

Those 'other sources' include fluoride in food, toothpaste, tablets and medicaments, and in the atmosphere. As has been seen, the fluoride content of foods is considerably different, even in the same type of food, the concentration varying with the soil in which it is grown, the use of agricultural sprays, method of cooking, and other factors. In a place like Melbourne, where there are large ethnic groups with considerably different food habits and methods of cooking, there are more than usual variations in individual food preferences, quantities eaten and drinking habits. The factors to be considered in attempting to assess the fluoride content of the food of a community are almost endless.

Similarly, the fluoride intake from toothpaste, tablets and medicaments depends on the personal habits of the individual. No evidence has been found of a survey having been made in Victoria to determine the fluoride intake from food, toothpaste and medicaments.

One thing is certain, the important factor of inhalation of atmospheric fluoride has not been investigated by the Environment Protection Authority (1978). The conclusion is inescapable — the fluoride intake from 'other sources' in Victoria is not known.

Resolution No. VIII of the 15th International Convention on Civilization Diseases, Vital Substances and Nutrition (International Society, 1969) said (in part):

'There cannot be any optimal level of [fluoride] intake for a given population. It is the intake of each individual which matters. This is certainly not the same for each individual. It will vary with age, sex and individual bodily reaction.'

In Victoria, values are not known for both of the factors which the WHO specified must be considered when determining the fluoride concentration of a water supply. Therefore it is obvious:
The fluoride concentration specified in the Act is an arbitrary one.

THE TOXICITY OF FLUORIDATION AND THE EFFECT OF OTHER
CONSTITUENTS OF THE WATER.

Toxicity from ingesting fluoride may be acute or chronic.

A third category — long-term — has been suggested, in which the toxic effects do not appear until after the ingestion of fluoride has continued for many years.

When speaking of the toxicity of fluoridated water (approximately 1.0 p.p.m. F) the discussion is of chronic toxicity from the ingestion of many small doses of fluoride and, possibly, of long-term results. It is irresponsible to suggest that, in the ordinary course of events, people will develop acute poisoning from drinking fluoridated water. (Of course, as mentioned in section XXV, some individuals are sensitive to, and become ill from, very small doses of fluoride.) Several rare cases of acute poisoning from drinking fluoridated water have, however, been reported. They were due to the malfunction of the fluoridation apparatus. For instance, on April 16, 1974, at a rural school in North Carolina, twelve adults and 201 students experienced nausea and vomiting two to five minutes after drinking orange juice prepared with water. None of the other 126 students became ill. It was found that the fluoride feeder had continued to operate although the water pump had failed. Laboratory analysis of the orange juice showed a fluoride content of 270 mg/litre instead of 1 mg/litre. (Clark et al., 1974).

* See appendix 10a, p. 270.

Fluoridation promoters frequently make the deceptive claim that it is necessary to drink more than fifty bathtubs full of fluoridated water before being poisoned. That claim is based on the likelihood that acute fluoride poisoning would ensue if the fluoride content of that large amount of water was concentrated and drunk as a single dose. Spokesmen making that statement are either ignorant or are out to deceive. The usual problem from fluoride ingestion is the cumulative effect of the many small doses taken each day over a long period.

The possible long-term hazards of fluoridation, and the necessity to maintain studies to test for them, have been mentioned by a number of scientists. In 1965, Professor D.G. Steyn, the Chief Research Officer, Life Sciences Division, Atomic Energy Board, Pretoria, said:

'As harmful effects of the ingestion of minimal amounts of fluorides may be in evidence only after some decades, it is obvious that the above observations, tests, etc. should be conducted over periods of at least twenty to forty years.'

The International Society for Research on Nutrition and Vital Substances (1967) agreed, saying:

'...long-range clinical investigations and biological tests should be conducted over several decades, since it is impossible to come to reliable conclusions as to the danger or harmlessness of fluoridation of drinking water before that time. Since numerous factors have to be considered in this field of research, it would be necessary to include as many test persons as possible, thereby covering the entire terrain, which includes age,

pregnancy, feeding of mothers, state of health, drugs, water, nutrition and beverages.'

No evidence has been found that 'long-range clinical investigations and biological tests' are being conducted here.

An important discovery which affects consideration of the toxicity of fluoride was that 'there are two forms of fluoride in serum, exchangeable and non-exchangeable.' (Taves, 1968). That finding was confirmed by Drs W.D. Armstrong and L. Singer (1970) who said that blood

'...plasma contains two forms of fluoride. One form is free and ionic, the other bound and non-ionic. It is the former kind of plasma fluoride that can be expected to participate in physiological reactions.'

In a paper given to the International Society for Fluoride Research, H.A. Cook (1976) said:

'The fluoride ion, which is what we mean by "fluoride", is intensely toxic to all life. It inhibits essential enzymes and kills living cells, but only if it is free and thus able to exert its toxic effects. However it has a very great propensity to be combined, or bound, and this fortunately reduces its toxicity. Were this not so, then the ubiquity of its distribution would ensure that there would be no living organism on the earth.'

'The toxicity of the fluoride ion is thus shown to be exerted when it is free, and it can be said to be proportional to the degree of freedom of the ion, while the completely bound fluoride ion is non-toxic.'

Professor N.P. Buu-Hoi (1962) said:

'... the most spectacular manifestations of fluorido-toxicosis are connected with impairments in the manifold

functions of calcium in the body.'

In 1946, J.T. Irving found, in the teeth of rats, that:

'.. when the blood calcium is raised the action of fluorine on the predentin is greatly lessened or prevented, while when the blood calcium is lowered, this effect of fluorine is caused in rats previously found not to show it. These observations strengthen the theory previously put forward that the action of fluorine on teeth is related to the level of the blood calcium.'

It should be realized that sensitivity to fluoride varies considerably and is different in different classes of animal. It is important to know, when considering the results of animal experiments, that 'man is much more sensitive to fluorine than the rat' (Roholm, 1937) — between six and ten times more sensitive.

Although the concentration of fluoride in drinking water is an important factor in determining the amount ingested and the prevalence of fluoride toxicity, it is not the only factor.

Professor A. Schatz and Dr J.J. Martin (1964) said:

'.. the issue of fluoride toxicity cannot be resolved by considering only the concentration of fluoride in the water alone.'

Drs R.D. Gabovich and G.D. Ovrutskiy (1977) concurred, saying:

'.. the incidence of fluorosis and its frequency are not due only to a certain concentration of fluorine in the water. Natural and social conditions, affecting the reactivity of the body and the physiological condition of the central nervous system, can intensify or weaken the effect of fluorine.'

They found that increasing calcium in food decreases fluoride retention in the skeletons of animals, and said:

'The excretion and deposition of fluorine in the body can be affected by the acid-base equilibrium as well as by the amount of proteins and vitamins in food. For example, lack of vitamin C in the diet increases the deposition of fluorine in the body and enrichment of diets with ascorbic acid and several other vitamins which stimulate metabolic processes reduces the deposition of fluorine.'

They said that no specific anti-fluorosis agents are known, but for protection against fluorosis 'the goal is a fully adequate diet from the physiological point of view.'

There are considerable difficulties in recognizing the effects of fluoride toxicity in its early stages.

Even when marked symptoms occur they are not obviously due to fluoride toxicity for they mimic other diseases.

Dr P.H. Springell (1975) pointed out that, with a pollutant:

'.. it is extremely difficult to diagnose subclinical effects, and thus to decide whether there is a threshold below which there are no undesirable symptoms.'

Dr Stephen Boyden (1972), Urban Biology Group, A.N.U., said:

'Unfortunately, the tests to which chemical compounds are usually subjected in efforts to determine their so-called "maximum permissible doses or concentrations" do not take into account possible changes in mental function, mood and so on, and also would often fail to pick up long-term or chronic effects on the organism. Furthermore, the tests are seldom, if ever, designed to pick up possible synergistic or additive effects of different environmental pollutants of this kind. The danger is thus a very real one that, because of pseudoadaptation ... an insidious deterioration of health may occur in a

human population as a consequence of increasing environmental chemicalization, without producing any appreciable effect on mortality and fertility rates, and without society even recognizing that a state of ill health exists.'

However, in some people, obvious illness does occur from ingesting small doses of fluoride. Drs R. Feltman and G. Kosel (1961) reported that side effects occurred in one per cent of pregnant women and children given fluoride tablets under supervision. They said:

'By the use of placebos, it was definitely established that the fluoride and not the binder was the causative agent. These reactions, occurring in gravid women and in children of all ages in the study group affected the dermatologic, gastro-intestinal and neurological systems. Eczema, atopic dermatitis, urticaria, epigastric distress, emesis, and headache have all occurred with the use of fluoride and disappeared upon the use of placebo tablets, only to recur when the fluoride tablet was, unknowingly to the patient, given again.'

The daily intake of fluoride from a fluoridated water supply is supposed to be similar to that from taking a tablet containing approximately 1 mg fluoride, such as were administered by Drs Feltman and Kosel. In a large city, if the proportion of people (or of children and pregnant women) affected even approaches the one per cent which they observed, the number of people with recognized, or unrecognized, side effects from ingesting fluoride will be very large.

Professor Arvid Carlsson (1978) of the Pharmacological Institute, University of Göteborg, pointed out that:

'If we assume for a moment that water fluoridation brings

about an increase of 5 - 10% in any common disease, e.g. cancer,' ...'the percentage increase is so small that only precise epidemiological studies on a very large amount of material can be expected to reveal it.'

He said also:

'Our health authorities will in future be involved to an even greater extent with the problems which this pollution brings in its train, problems of a very high degree of complexity as regards difficulties in quantitative surveying, interactions with other substances, etc. Our community will require even greater resources to be put to use to hold chemical exposure down to an acceptable level. The fact that in this situation a poison should deliberately be distributed throughout our environment in enormous quantities represents an ill-considered action.'

When claims are being made for the safety of the long-term ingestion of fluoride, despite its toxicity, it is highly likely that the Bartlett-Cameron study will be cited. The results of this study were published in the U.S.P.H.S. journal Public Health Reports (Leone et al., 1954). This study has been cited on a very large number of occasions. Dr A.A. London (1967) said:

'Briefly, a group of 116 people in Bartlett, Texas, with a natural fluoride content of 8 ppm in its water supply, was compared with a so-called "control" group of 121 people in Cameron, Texas, with about 0.5 ppm fluoride in its water supply. Cameron cannot be considered a non-fluoride city.'

The first examination was made in 1943. Fourteen of the Bartlett subjects and four of the Cameron ones died before the second examination, ten years later, in 1953; 'while about 60 to 90 in Bartlett, 80 to 90 in Cameron remained at

risk in the study areas and were re-examined, for various abnormalities, by an entirely different team in 1953.'

His paper considered that paper in some detail and he referred to 'the ludicrous inadequacy of the Bartlett-Cameron study as a basis for assurances of "safety".'

Professor D.G. Steyn (1964b), referring to that study, said:

'Grave doubts as to the validity of this, so very often repeated, statement exist.'

He cited his earlier paper (1964a) which had considered several aspects of the study, one finding being that, of the people who had been dentally examined in Bartlett in 1953, only 11 had lived there all their lives and 60% came to live there after the age of 14 years. Also, there was considerable doubt regarding the history of the water supply in Bartlett. Professor Steyn said that, prior to the few years which preceded the study, the fluoride content of the wells used was probably substantially less than 8 p.p.m. Drs R.D. Gabovich and G.D. Ovrutskiy (1977) said:

'The varied character of the groups (by age, kind of work) and their small number deprive this work of conviction.'

The fact that this study continues to be cited, over and over again, indicates that there is still no better evidence to suggest that the long-term ingestion of fluorides, at the concentration of 8 p.p.m., is safe. (Apart from, of course, the development of very 'objectionable' dental fluorosis.) It is remarkable that this obviously deficient study should continue to be cited as strong evidence for the safety of fluoride ingestion for all people, everywhere.

In 1958 Professor Steyn (1958a) discussed the toxicity of fluoride at some length in his book The Problem of Dental Caries and the Fluoridation of Water Supplies, which has 558 references. Later that year (1958b) he said:

'It is the author's considered opinion as a toxicologist and pharmacologist of more than 30 years experience that under certain conditions, especially with certain types of water, artificial fluoridation of public water supplies may, and does, constitute a grave danger to human health.'

*

The recent book: Fluoridation the Great Dilemma (Waldbott et al., 1978), considers many more aspects of the toxicity of fluoride than it has been practicable to mention here.

To conclude these general comments on the toxicity of fluoride, the opinion of Professors T. Gordonoff and W. Minder (1960) will be cited. In the Summary of their review of fluorine in the book World Review of Nutrition and Dietetics they said:

'Because of its varied activities, there can be no question of anything but an accurately measured supplement, and in no circumstances an addition to drinking water, which makes impossible any kind of exact dosage and control.'

Finally, in this discussion on the toxicity of fluoridation, the effect of the other constituents of the water will be mentioned because this aspect is of particular interest in Victoria for our water supplies are exceptionally soft.

* See appendix 7b, p. 265.

Since the fluoride content of Melbourne's water supplies has been raised from less than 0.1 p.p.m. to approximately 1.0 p.p.m., there also have been changes in the concentrations of some of the other constituents of the water. One of these, as has already been mentioned, has been intentional in order to protect the water pipes from corrosion due to the increase in the fluoride concentration. (Hirth, 1977).

(1) The Importance of other Constituents of the Water.

When considering artificial fluoridation, many people speak only of the fluoride content of the water, ignoring the ~~influence of the other constituents.~~ However, their influence of other constituents. However, their importance has been recognized for many years. In 1949 the American Water Works Association said that the experimental verification of the fluoride-dental caries hypothesis: ^{seriously resembles the test of a "control"} city with a water supply comparable in all respects to that to which fluoride is being added.'

Professor D.G. Steyn (1958b) said:

'It is obvious that the results (in regard to dental decay and toxicity) observed in a particular place with fluorine-containing water can, and should, not be applied to a different water supply, let alone to water supplies in different countries.'

In 1972, Dr Margaret Crawford referred to:

'... a problem concerning fluoridation of water supplies in this country which has not received sufficient attention — that is, the relationship between fluoride and other ions present in drinking-water, in particular iodine.'

HARDNESS OF WATER SUPPLIES

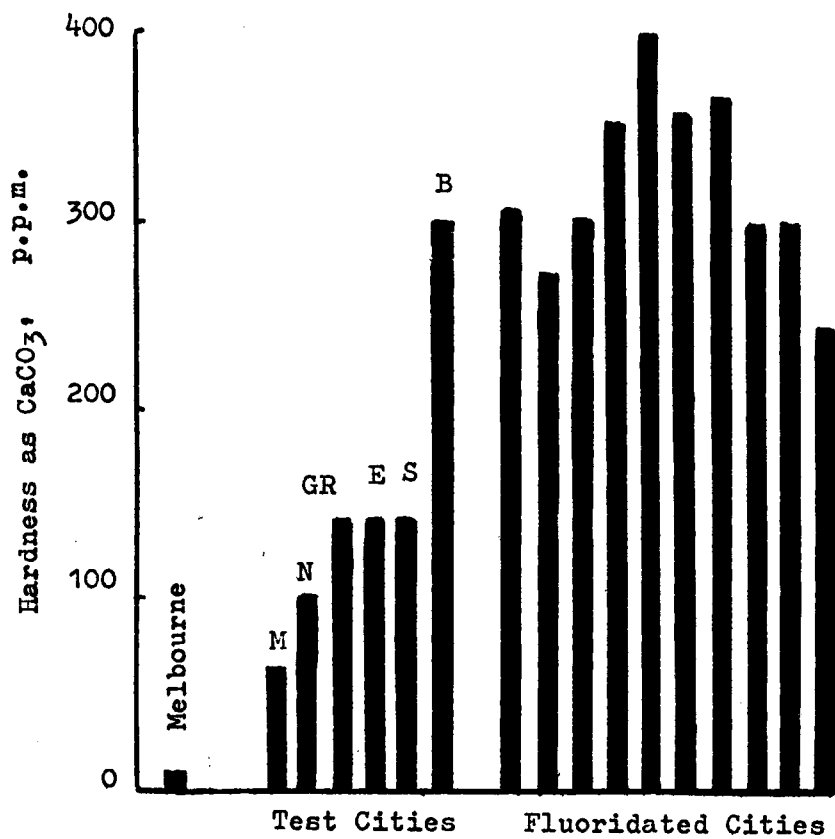


Fig. 6.

The hardness (as CaCO₃) of Melbourne water (M.M.B.W., 1973) compared with those of 16 artificially fluoridated cities visited by the United Kingdom Mission (1952).

Test cities: Marshall, Newburgh, Grand Rapids, Evanston, Sheboygan (U.S.A.) and Brantford (Canada).

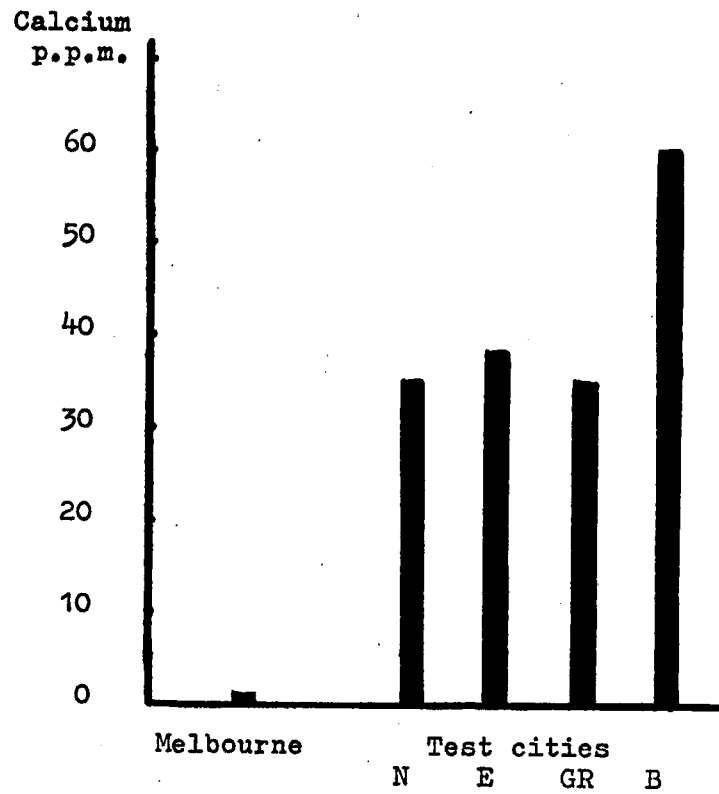
CALCIUM IN WATER SUPPLIES

Fig. 7.

The Calcium content of Melbourne water (M.M.B.W., 1973) compared with the four main fluoridation trial cities.

Melbourne	1.6 p.p.m.
Newburgh	35.0 p.p.m.
Evanston	38.0 p.p.m.
Grand Rapids	35.0 p.p.m.
Brantford	60.0 p.p.m.

(2) The 'softness' of Melbourne Water.

When considering other characteristics of the water, a factor of particular interest is the 'hardness' of the water, due mainly to its calcium and magnesium content. Melbourne's water supplies are particularly 'soft'.

Melbourne and Metropolitan Board of Works 'typical analyses' of our water in 1973 showed a hardness of 10.0 (as CaCO_3) with calcium 1.6 and magnesium 1.1 mg/l. The same values were given for the Sylvan dam in the 1978 report, but the Cardinia dam had a hardness of 27 mg/l, with calcium 6.0 and magnesium 2.0 mg/l.

Figs. 6 and 7 show the Melbourne (Sylvan dam) calcium and hardness levels and, for comparison, the values for the American test cities and for other cities visited by the U.K. Mission (1952) to inspect American fluoridation projects. Soon after their visit, two of the fluoridation test cities, Marshall and Sheboygan, ceased to publish data. Those diagrams show the exceptional softness of Melbourne water (Sylvan) and its very low calcium content.

Many references are made to the 'naturally fluoridated' town of West Hartlepool, in England. Its water supply has a hardness of 500, a calcium concentration of 100 p.p.m. and of magnesium 150 p.p.m. These figures are, respectively, 50, 62 and 136 times the concentrations present in the Sylvan dam. (Fremlin and Mathieson, 1967).

The Birmingham, England, water is considered to be a soft water by world standards for it contains 'only about 12ppm of calcium' and 1 ppm of magnesium. That calcium concentration is 7.5 times the figure for Sylvan and twice that of Cardinia. It was found that, when concentrated by boiling, 'naturally or artificially fluoridated waters behave in much the same way but in a way entirely different from the solubility-product theory.' (Fremlin and Mathieson, 1967).

(3) Water Hardness — Calcium and Magnesium.

In considering the toxicity of fluoride in water, its hardness is of great importance. Calcium is the accepted antidote for fluoride poisoning, lime water or calcium chloride being used to wash out the stomach and calcium gluconate is injected intravenously. (Jacobziner and Raybin, 1964; Martindale, 1972). The very great differences, shown in Figs 6 and 7, between the hardness and the calcium content of Melbourne water and those of American test cities, indicate that considerable caution should be shown when basing the expectation of the toxicity of fluoridated water in Melbourne, or in Victorian country areas, on results obtained in American cities with much harder water supplies.

The International Society for Research on Nutrition and Vital Substances said that: 'Fluorine action involves primarily the antagonism between fluorine and other elements, especially calcium.' (International Society, 1967).

In an 'Occasional Survey' in 1960, the Lancet said:

'Fluorides usually occur naturally in water with a high calcium content, and the effects of fluoride may well be modified in soft water.'

'No compounds are known that will completely prevent the toxic effects of ingested fluoride, but compounds of calcium and phosphorus have been found to reduce the toxicity in small laboratory animals.'

Dr H. Spencer et al., (1978) said that; 'A lower incidence of endemic fluorosis is reported in areas with water high in magnesium and calcium.'

Professor S.S. Jolly et al., (1973a) also mentioned the protective effect of calcium, saying that:

'... other chemical constituents of drinking water which are protective against the development of fluorosis such as magnesium, calcium and total hardness,' 'magnesium seems particularly important'.

In experiments with rats it was found that increasing levels of ionizable salts of magnesium, aluminium, or calcium (in increasing order of efficiency) progressively reduced deposition of mineral fluoride by a factor of from one-third to three-fourths, respectively (Weddle and Muhler, 1954).

In 1926, before fluoride was known to be the cause of mottled enamel, Dr C.A. Pierle reported that:

'It is possible to produce mottling and brown stain in the teeth of animals by lowering the calcium intake below that needed for the growing animal.' 'It is also possible to prevent mottling by supplying the calcium requirement of the animal.'

The importance of the calcium content of the human diet in

reducing the prevalence of dental fluorosis was observed by Drs M. Massler and I. Schour in 1952. They found that:

'The nutritional status of the population, especially the calcium intake, affects the prevalence and the degree of mottling caused by the fluorine concentration in the water supply. The poorer the nutritional status and the lower the calcium intake, the more prevalent and the more severe the mottling.'

They found that in one undernourished Italian town with 1.3 p.p.m. fluoride in its water supply, 60% of the people had mottled teeth and the index of fluorosis was 1.2. However, in Joliet, Illinois, with the same fluoride content of the water, 25.3% had mottled teeth and the index of fluorosis was 0.46.

(4) Naturally Fluoridated Waters are usually Hard.

Despite the evidence to the contrary, some still say that the other constituents of the water can be disregarded, for at the low levels used in fluoridation there is almost complete ionization in the water supply. However, the question is not what happens in the water supply but what happens when an individual swallows fluoridated water.

In 'naturally fluoridated' areas the fluoride is almost always present in hard waters with a considerable calcium content.

'Particular emphasis should be placed on the Ca and Mg of hard waters which may constitute a protective mechanism not available in extremely soft waters.'

(Marier et al., 1963).

As has been seen, Melbourne's water is extremely soft.

In Russia it has been found that calcium definitely has a protective effect with high concentrations of fluoride in the water (of the order of 1.0-1.5 mg/l). (Gabovich and Ovrutskiy, 1977). (It is of interest that these workers regard 1.0 mg/l — the concentration to which our waters have been mechanically raised — as a 'high concentration' of fluoride.)

Therefore, when an individual swallows naturally fluoridated hard water, both the fluoride and its antidote, calcium, are swallowed in the same mouthful.

'Natural fluoride^{ion} concentrations much greater than 0.1 ppm in the fresh water systems of the world are rare.' (Harris, 1976b). Generally speaking, normal surface water supplies, derived from rainwater feeding streams, have a very low fluoride content. Melbourne had such a water before fluoridation commenced. On the other hand, water from 'unnatural' supplies, such as deep wells, is much more likely to have a high fluoride content, and is usually a hard water.

It has been known for many years that when soft water contains approximately 1 p.p.m. fluoride, that dental fluorosis is likely to occur in some children. In 1942 Dr C.F. Deatherage said:

'It is these soft waters which cause the most severe mottled enamel.'

As Melbourne has a particularly soft water, it is likely that our children will develop more dental fluorosis than the proponents of fluoridation expect.

SKELETAL FLUOROSIS.

Skeletal fluorosis is 'an unnatural thickening of bones — vertebrae, pelvis and long bones, sometimes with severe pain' which can eventually arise from drinking water containing 4-8 ppm fluoride. (Harris, 1976b).

A decade ago it would have been considered absurd even to consider the possibility that skeletal fluorosis could occur here, even after ingesting fluoridated water for many years. At that time the cases reported in the literature were in adults who had drunk water containing fluoride at 6 p.p.m. or more for long periods.

However, a brief mention of this subject is now required because of several papers published comparatively recently.

In 1973, Drs K.A.V.R. Krishnamachari and Kamala Krishnaswamy reported on twenty-four male patients with genu-valgum deformity, in India. 'All had evidence of spinal osteosclerosis along with extensive osteoporotic changes in the bones of the extremities.' They were all severe cases and, remarkably, included some subjects who were less than ten years of age and their water supplies contained from 3.5 to 6 p.p.m. fluoride. 'Sclerosis was observed in the spine even among children under 10 years of age.'

'The fact that they belonged to different villages situated miles apart, but that all the villages were endemic for fluorosis, and the similarity of the clinical picture, strongly suggests that the syndrome of genu valgum and osteoporosis is an expression of environmental fluoride toxicity.'

* See appendix 17f, p. 280.

That skeletal fluorosis is due to environmental toxicity, and not only to fluoride in the drinking water, is established by data cited in an editorial article in Fluoride in 1977 (b). The article states:

'Subsequently in a systematic survey of 2842 residents of the city of Dohna, DDR, Schmidt established that 29 persons (24 men, 5 women) were afflicted with skeletal fluorosis. None of these persons were employed at the nearby hydrogen fluoride plant. They were residing 350 to 2100 m distant from the plant. Near the smelter, the air contained from 0.52 to 0.75 mg/m³ (Maximum Allowable Concentration 0.03 mg/m³) .'

A more recent (1979c) editorial article, also in Fluoride, cites the case of a 27-year-old nurse who illicitly had been inhaling the fluorinated anaesthetic methoxyflurane (Penthrene) for about 9 years. The article states:

'...this patient's skeletal changes were preceded for 4 years by a variety of symptoms which had baffled the attending physicians; they had been unable to make a diagnosis. These symptoms were vague pain, "exceedingly painful bone", headache, polydipsia, polyuria, and epigastric distress. In addition, she had marked hypertension (blood pressure 220/130) which gradually subsided as she improved. The presence of a gastric ulcer is notable in view of recent reports by Czerwinski and by Franke which link fluoride with gastric ulcer. The patient also exhibited "multiple, fixed, exquisitely painful nodules on her extremities" probably a chemically induced lymphadenitis. She also had severe mental depression, another symptom often encountered in pre-skeletal fluorosis, which required extended hospitalization on the psychiatry service.'

(It is unfortunate that the journal Fluoride, with its wealth of medical information on this subject, is not listed as held in any medical library in Australia. Therefore the articles and abstracts which it publishes are not readily available to physicians. Indeed, the sole holding listed is at the Australian National Library, Canberra.)

The question should be raised: Will cases of skeletal fluorosis in time develop in Victoria? Consider the facts: (a) chronic fluoride poisoning can occur in children drinking fluoridated water, indicating a degree of chronic fluoride poisoning in early childhood. (b) Unfortunately, under-nourished children exist in Victoria. (c) Some individuals are intolerant to fluoride and develop marked side effects after only small doses. (d) Melbourne water is extremely soft. (e) The summer atmospheric temperature is high. (f) We are increasingly subject to ingest fluoride from sources other than water, such as from food, toothpaste and by inhaling atmospheric pollution.

In view of these developments, and as cases of skeletal fluorosis have been reported from England, Germany and America in people living near fluoride-emitting factories (Editorial, 1977b), it now seems most important to consider the possibility that skeletal fluorosis may develop in Victoria.

FLUORIDATION: PSYCHOLOGICAL REACTIONS TO DENTAL FLUOROSIS
AND DIRECT EFFECTS ON THE CENTRAL NERVOUS SYSTEM.

The discussion and the promotion of fluoridation has been almost completely concerned with its effect on the teeth. The known changes produced by fluoride on bones and soft tissues have received very little mention, despite the fact that the majority of papers in the medical, veterinary and agricultural literature are concerned with its toxicity.

One important aspect which appears to have been forgotten, in English-speaking countries, is the effect which fluoride in drinking water may have on the central nervous system and the psychological effects of unsightly dental fluorosis.

(1) Psychological Reactions to Dental Fluorosis.

Little concern has been shown for, or study made of, the reactions of children who have developed visible dental fluorosis as a result of ingesting the formerly-recommended dose of fluoride in tablets or through consuming fluoride in their drinking water. The mental stress, to both the child and its parents can be considerable, and stress can be a factor in the development of acute dental caries. (Sutton, 1962, 1965, 1966).

The important subject of the psychological reactions to dental fluorosis was mentioned over sixty years ago by Drs G.V. Black and F.S. McKay (1916). They said:

'A matter which should not be overlooked in this, is the mental attitude of these persons. I have found it very

difficult to obtain a good opportunity to examine these teeth in the mouth because the persons have been so sensitive to such observation. One of them told me that he had almost completely retired from society because people stared at him as though there was something about his countenance that was uncanny.'

Such unsightly degrees of dental fluorosis may occur as a result of consuming fluoride tablets, but it may be said that they cannot arise when the fluoride content of the water is only 1 p.p.m.. That is not so. Even if one ignores the certainty that fluoride is ingested from other sources, such as toothpaste, numerous reports have been published that the level of fluorosis in a community was 'objectionable' although the water supply contained less than 1 p.p.m. fluoride. (Galagan and Lamson, 1953; Rosenzweig and Abkewitz, 1963; Ueda et al., 1964).

My personal studies of Micronesians and Polynesians who drank both rainwater and water from wells containing a maximum of 0.7 p.p.m. fluoride, have included many subjects with 'mild' and 'moderate' fluorosis with brown staining. Their appearance was so objectionable to them that they endured the process of having their incisors abraided, generally with a pumice 'stone', in order to reduce the stained appearance. (Sutton, 1978).

In the Medical Journal of Australia Dr N. Long asked: 'Why should pre-war teenagers of outback Nhill require all their mouldy-looking fluoride teeth removed before entering the marriage market, when their bore drinking-water only contained 0.8 ppm of fluoride?' (Long, 1970).

It is said that the daily consumption of a fluoride tablet (1 mg F) will produce a similar result to drinking water containing approximately 1 ppm fluoride. In 1976, Dr K. Johnson reported mottling of the teeth of some of his patients in Melbourne, saying:

'It was found that the daily consumption of the recommended dose of one fluoride tablet has resulted in a similar incidence of enamel mottling in the patients in this practice as in the U.K., but the percentage of teeth involved is greater, 11.4 per cent as compared with 7.9 per cent.'

Of the 38 children of average age 12 years given tablets, 15 (39%) had fluorosed teeth, but there were no enamel opacities in 10 other children. He said that:

'.. several parents have expressed dismay at their childrens' appearance and even going so far as to state that "They wish they had never given them fluoride tablets".'

I know three physicians whose children have been damaged in this way.

In the present obsession with the question of the reduction of dental caries rates in populations, above all other considerations, concern for the individual child has largely been lost. For instance, Professor Linus Pauling said that:

'In general, only mild or very mild mottling of the enamel is caused by the concentration of fluoride recommended in the fluoridation of drinking water.'

He expressed his opinion that:

'The disadvantage of occasional mild mottling of the enamel

is far outweighed by the advantage of great decrease in dental caries.' (Pauling, 1967).

As has been seen, the appearance of every child afflicted with 'mild' dental fluorosis is ruined.

(2) Direct Effects of Fluoride on the Central Nervous System.

Professor D.G. Steyn (1958b) said: 'Fluoride is a neuro-toxin, and the central nervous system tissue contains neuro-kreatin.' Also 'it is known that some fluoride accumulates in those parts of the body where kreatin is located.'

In the English translation of the Russian book Fluorine in Stomatology and Hygiene (Gabovich and Ovrutskiy, 1977)

the authors state:

'From the above it becomes evident that fluorine, affecting metabolism in nerve cells and disturbing receptor function and the transmission of nerve impulses, can influence the function of higher sections of the central nervous system, which should be reflected in the cortical regulation of vegetative processes and conditioned reflex activity.'

They mention that Gabovich, when studying the 'ability of spinal centers to summarize subliminal impulses' found deviations in rats consuming water with a fluorine concentration of 6 mg/l. (Rats are between six and ten times more resistant to fluoride toxicity than is man.)

The Executive Director of the Feingold Association of New York for Hyperactive Children said, in 1976:

'Fluoride is one additive that cannot be tolerated by children in this group. It has a severe adverse reaction upon their nervous system.' (Gelardi, 1976).

(3) Possible Psychological Results from Fluoridation.

In 1972, the Australian Medical Journal contained an article by Dr Stephen Boyden, of the Urban Biology Group, Australian National University. Dr Boyden pointed out that one of the most marked environmental changes which is taking place is the increasing 'chemicalization' of the environment.

He said that:

'.. it is important to appreciate that the first symptoms of exposure to many toxic chemicals are not physiological, but psychological, and include such symptoms as confusion, personality changes, fatigue, loss of memory and mental dullness. Or, to put it another way, behaviour is exquisitely sensitive to toxic substances in the environment.' (Brown, 1966; Boyden, 1972).

If such symptoms occur from exposure to increased doses of toxic fluoride, as a result of the fluoridation of the domestic water, is it likely that more than a few people will suspect that the cause of those symptoms is to be found in the water supply?

FLUORIDATION AND CANCER MORTALITY.

A very important development since the passing of the Act has been the publication of a paper by Drs J. Yiamouyiannis and D. Burk in 1977, in the specialist journal Fluoride. This paper revealed a link between artificial fluoridation and increase in cancer mortality in the ten largest fluoridated cities (1960 census) in the United States.

It is understood that Dr Yiamouyiannis addressed the Committee during his recent visit to Australia, therefore the data presented in that study will not be discussed here.

(1) Early Papers which suggest that Fluoride may affect Cancer.

For many years data have been available which suggest that the ingestion of fluoride may affect cancer, but little investigation has been undertaken. For instance, the U.S. National Cancer Institute has promoted fluoridation for many years, but at the Congressional investigation into its work (U.S. Congress, 1977) it was revealed that it had not conducted even one study to determine whether fluoride affects cancer. The Institute then announced that it was about to commence a three-year study on animals.

Dr R.A. Holman said, in 1961:

'Many observations have suggested that agents which decrease the catalase of cells may predispose to tumor formation.'

'Since fluoride can inhibit catalase and since it is a cumulative poison, the danger of increasing the cancer-inducing potential in humans must be considered.

Although there is not to my knowledge any good positive

* See appendix 4f, p. 262.

evidence linking fluoride with known cancer cases, the whole question of fluoride intake from food, water, insecticides, and industrial processes should be much more thoroughly investigated.'

Professor Douw Steyn (Chief Research Officer, Division of Life Sciences, Atomic Energy Board, Pretoria, South Africa) in 1964(a), said:

'The fluoride ion, being an active general enzyme poison, may be a factor in triggering cancer.' 'In this respect, we must give special consideration to catalase.'

'Catalase inhibition is known to be associated with mutagenic processes and the development of viruses, and it is known that many of the proven carcinogenic agents can inhibit this enzyme.'

Professor Steyn (1964a) said that he agreed with the statement of Dr Holman (1962) that:

'Sodium fluoride is a potent catalase poison and is cumulative. The use of sodium fluoride is fraught with great danger, and in any case it does not deal with the prime cause of dental caries, which is generally recognized as being a sophisticated and chemically adulterated food supply.'

(2) Comments by Professor Albert Schatz.

In 1976, Professor Albert Schatz was awarded the Grand Prix Humanitaire de France, the highest distinction in France for meritorious service to humanity, in recognition of his outstanding scientific achievements.

In 1972 Professor Schatz and Dr Vivian Schatz stated:

'Fluorine is, among other things, a carcinogen. It is therefore important to minimize our total daily fluorine intake.'

They made the following comments:

'Okamura and Matsuhisa became interested in fluorine as a result of their research on the geographical distribution of mortality due to gastric cancer.' (Okamura and Matsuhisa, 1967). 'They found a correlation between fluorine content of rice and death rates for gastric cancer. There were also geographical and annual correlations between these death rates and the amounts of phosphatic fertilizers applied to rice paddies. The fertilizers used contained 0.01 to 9.88% fluorine.

Okamura and Matsuhisa (1965b) also found that the 1960 death rates from gastric cancer correlated with the fluorine content of "Miso" in 28 prefectures of Japan. "Miso" is a fermented product made from rice and soybeans.'

They continued:

'Our analysis of official health statistics from Birmingham, England, show that the death rates from leukemia and from all types of cancer were significantly greater from 1965 to 1969 [after the fluoridation of Birmingham in 1964] than from 1958 to 1964' (Birmingham, 1968; Miller, 1970).

'As recently as 1970, Soviet investigators expressed concern about the possibility that fluorine in drinking water might cause cancer.' (Gabovich and Tsiprian, 1970).

'In 1965, Taylor and Taylor found that fluorine and other halogens accelerated the growth of tumor transplants in mice and embryonated eggs. As little as 1.0 ppm of sodium fluoride in the drinking water stimulated growth of tumor transplants in mice.

Fluorine also produced deformities in toad embryos (Kawakara and Kawahara, 1954) and melanotic tumors in Drosophila (Rapaport, 1963). Finally, fluorine caused "a consistent and highly significant increase" in

"the production of recessive lethal mutations by X-rays in Drosophila sperm." (Mukkerjee and Sobels, 1968).

These and other reports validate Alexander Levitt's warning, in 1948, that fluorine and other halogens "may be responsible for geographic or regional occurrences of" several "diseases, including cancer."

(3) Papers linking Fluoridation with Cancer Mortality.

Two papers based on official figures may be mentioned briefly.

(a) In 1977, Margaret Brady reported on data from the Birmingham, U.K., Health Report, 1973. She said that:

'Birmingham began fluoridation towards the end of 1964, and in the preceeding ten years from 1954 there was little or no over-all rise in the cancer death rates, but after the introduction of fluoridation in 1964 there was a marked rise as is shown in the accompanying graph, just as in the report for many American cities by Drs. Yiamouyiannis and Burk. While this graph does not prove that fluoridation was responsible for all of the higher cancer death rates, it gives cause for great concern.'

(b) In 1977 Dr V.A. Cecilioni reported that he had obtained cancer death data for the years 1966 to 1974 from the Vital Statistics for the Province of Ontario, Canada. This covered 26 fluoridated and 23 non-fluoridated cities with populations of 10,000 or more (1971 Ontario census). The total number of cancer deaths for the 9-year period was 16.6% higher in the fluoridated cities. When 12 of those cities were compared with 12 non-fluoridated ones of similar size, the crude cancer death rate per 100,000 population was 27% higher in the fluoridated cities.

Three years earlier, Dr Cecilioni (1974) had studied the incidence of cancer in the steel city of Hamilton, Ontario. He said:

'A review of the mortality rates for cancer for the years 1966 to 1970 in Hamilton reveals a considerably higher death rate from cancer in Hamilton than in the less industrialized city of Ottawa. The highest rate (65 per 100,000) occurred in the proximity of the steel mills, compared with the death rates (23 and 12 per 100,000) farther distant. Admission records at two large Hamilton Hospitals showed a close correlation between respiratory disease and the daily pollution index.'

Dr Cecilioni had previously found that airborne fluoride was a major contaminant derived from the manufacture of steel.

(4) Comments on the Report by Drs Burk and Yiamouyiannis Regarding a Link between Artificial Fluoridation and Increased Cancer Mortality.

(a) Statistical aspects. Under examination, both of these authors established that they had considerable expertise on statistical matters. However, they also had to advise them the eminent statistician, Dr W. Edwards Deming (See Who's Who in America, 38th Ed.). The Chairman of the 1977 Congressional Enquiry into the activities of the National Cancer Institute asked Dr Hubert Arnold, Department of Mathematics, University of California, Davis, for an assessment of the Burk-Yiamouyiannis study. He responded:

'I have examined that study and find that they have made a very thorough examination of the extensive available

data and that they have correctly applied valid statistical methods. Their conclusions that there is a definite link between cancer and fluorides in the drinking water of a number of large cities is valid statistically.' (Arnold, 1977).

(b) Association and causation. The point has been made by several commentators that the Burk-Yiamouyiannis study reveals merely an association, and that association does not prove causation.

That is so, but it should be remembered that it was the demonstration of a like association, only an association, between smoking cigarettes and the prevalence of lung cancer, which caused the tremendous outcry against smoking, and which motivated government efforts to reduce this habit. As Sir Austin Bradford Hill (1966) pointed out, action on the basis of probability is 'how we usually conduct the affairs of medicine as well as our lives.'

In a situation such as the present one, in which a chemical is being administered to the whole population which may shorten the lives of a large number of people, great care must be taken. When it is found that a strong association such as the present one exists, based on a very large sample, and when the obvious variables of age, race and sex have been considered and determined not to be the main cause of the association; until another factor or factors is established as the cause of the association, prudence dictates that the administration of the chemical be discontinued.

(c) The Response in Australia to these Fluoridation/
Cancer Mortality Results.

The findings of Drs Burk and Yiamouyiannis have been attacked in Australia in newspapers, particularly since this fluoridation/cancer link was mentioned in the A.B.C.'s 'Four Corners' television programme on April 21, 1979. The critics, as usual, cited authorities, in this case the U.S. National Cancer Institute (Hoover et al., 1976), the Royal College of Physicians (1976), Doll and Kinlen (1977) and the Royal Statistical Society (Oldham and Newell, 1977). They did not mention the replies, such as by Dr Yiamouyiannis (1977) nor the proceedings in the U.S. court case in 1978, mentioned below.

In Holland, the disclosure of this fluoridation/cancer mortality link was an important factor leading to the abandonment of fluoridation after many years' experience. However, in Australia the reaction to this same information by bodies, such as the N.H. & M.R.C., the A.M.A., the A.D.A. and Public Health groups has been most odd. After all, the main responsibility of these bodies should be the health of the population, and they therefore should be expected to study this new development. Instead the response by the spokesmen for their Executives has been (as pointed out Diesendorf, 1979; Walker, 1979) emotional, unscientific and misinformed. Indeed, many attempts have been made through the media to assure the public that such a link does not exist, by citing out-of-date articles which have been proved to be based on incomplete and faulty data.

For instance, in the House of Representatives the Acting Minister for Health (Hon. W.C. Fife, 1979) said:

'The claim of recent evidence suggesting a link between fluoridation and cancer has been rejected categorically by the United States Cancer Institute and other international authorities.'

(d) The U.S. Court Hearings and Decision. In 1978, senior representatives of the U.S. National Cancer Institute and of the 'other international authorities' mentioned by the Acting Minister for Health, gave evidence, under oath, in a U.S. court. They included Dr L. Kinlen (1978) of the Royal College of Physicians and Dr D.J. Newell (1978) of the Royal Statistical Society. Both of those witnesses were forced to admit that the data in their papers 'refuting' the findings of Drs Burk and Yiamouyiannis were incomplete and faulty, and were not obtained from original sources but from the U.S. National Cancer Institute. Indeed, Dr R. Hoover the Director of that Institute wrote to Dr Kinlen on Sept. 26, 1977, saying (in part):

'I am sorry for this error, particularly since it seems to have been perpetuated by yourselves and the Royal Statistical Society. I am a bit distressed also that neither you nor the Society checked some of the original numbers.' (United States Congress, 1977).

Some of these original figures are readily available.

(Several years ago I personally checked the original Burk-Yiamouyiannis claims by obtaining the data from the Melbourne Public Library.)

During that court case the Burk-Yiamouyiannis data were open to examination by critics who were exceptionally well qualified to locate and point out any errors. Mr J.R. Graham, counsel for the plaintiffs (who opposed fluoridation), gave his final summation on September 25, 1978. He said:

'We commend the defendants and their counsel in this respect: their presentation has been the best possible. They have called witnesses from high places in the scientific world both here and abroad. They have cross-examined vigorously, and offered every objection known in biology, medicine, and epidemiology to the thesis advanced by the distinguished doctors who have testified on behalf of the plaintiffs.'

Despite this, the claim that there is a link between fluoridation and cancer mortality was not refuted.

In his summing up the Hon. Judge J. Flaherty (who has recently been appointed to the Supreme Court) said (in part):

'Point by point, every criticism defendants made of the B-Y Study was met and explained by the plaintiffs [who opposed fluoridation]. Often, the point was turned round against the defendants. In short, this court was compellingly convinced of the evidence in favour of plaintiffs. It is significant that Dr. Daniel Taves, a witness called on behalf of defendants, acknowledged certain unresolved doubts concerning the safety of fluoridation, and was then asked.

"Shifting your roles from scientist to doctor of medicine following the Hippocratic Oath ... would you as a doctor of medicine recommend that fluoride be dumped into the public water supply?" A colloquy followed,
'The climax was,

"Q. Is your testimony that you recommend fluoridation in public water supplies?

A. I don't want to state on that."

The Judge then said:

'Whenever the public health may be threatened, a court of equity has a duty to act. Therefore, a preliminary injunction prohibiting the addition of fluoride to the water supply... shall issue.' (Flaherty, 1978)

Dated November, 16, 1978.

*

(e) The Visit of Dr Yiamouyiannis to Australia. In June, 1979, Dr Yiamouyiannis visited Australia. This provided an opportunity for his data and findings to be discussed and, if faulty, discredited. Despite the fact that his visit was well publicized, and that many personal invitations were issued in an attempt to engender discussion, none of those who had criticized his findings in the newspapers was prepared to discuss them with him. At a meeting in Nowra, Dr Joyce Ford, the Director of the Central Cancer Registry, N.S.W., mentioned unpublished data being collected in some towns in N.S.W., but did not comment on the data of Dr Yiamouyiannis. During the whole of his visit, medical comment on his data was notably lacking.

I was present at a meeting at the Australian National University which was arranged so that Dr Yiamouyiannis could present his case. Surprisingly, half of the one-hour lecture time was, with little notice to Dr Yiamouyiannis, allotted to a retired professor of pharmacy who admitted that he knew little about cancer and spent most of his

* See appendix 7a, p. 265.

lecture time discussing dental aspects of fluoridation and dose/response rates.

During question time Dr Yiamouyiannis was again attacked — that is the appropriate word — because of his association with the National Health Federation which is a non-profit consumer-oriented organization devoted exclusively to health matters. According to the U.S. 'Consumer Report' of July, 1978 (Anonymous, 1978), several of the officials of the National Health Federation 'were convicted of misbranding dietary products with false medical claims.' The last time that these events were said to have occurred was in 1963, that is eleven years before Dr Yiamouyiannis became Scientific Director — his first association with the Federation.

In the U.S. court case in 1978, when the defense attorney attempted to attack Dr Yiamouyiannis because of his association with that Federation, the Judge asked counsel whether he could show any evidence that Dr Yiamouyiannis was connected with 'these alleged frauds'. Defense counsel: 'No, I can't.' The Judge then said:

'Then, my goodness, why would you be here impugning the reputation of this individual due to some other individuals' alleged fraudulent activities? That flouts in the face of due process of law and everything we stand for in this Court.' (Flaherty, 1978).

(f) 1979 Publications Relating to this Subject. In a paper published in January, 1979, Drs M.A. Strassburg and S. Greenland criticized early material obtained by Dr J.A.

Yiamouyiannis, which they said was 'not published in a scientific journal' but was 'popularly circulated'. It would appear that the manuscript of their paper was 'lost' for upwards of two years. The latest reference which they cite was dated 1975. They do not mention the correct reference for the work of Dr Yiamouyiannis, which is the paper which he and Dr Dean Burk published in 1977 in the journal Fluoride, eighteen months before Drs Strassburg and Greenland published their critique. That paper in Fluoride includes data from the cities of Boston, Cincinnati and New Orleans which the critique said 'were excluded from Dr Yiamouyiannis' study.' One wonders why this out-of-date criticism was published.

In January, 1979, Dr Dean Burk considered the data obtained by Dr L.J. Kinlen regarding the incidence of cancer, in six parts of the body, in Anglesey, Watford and Birmingham (fluoridated in 1955, 1956 and 1964 respectively). Dr Kinlen (1975) had concluded that there was no increase over the cancer incidence up to 1969, as compared with 'matched' control areas with low fluoride levels in their water supplies. Dr Burk stated:

'As evident in Table 1, Kinlen's conclusion appears to be untenable, and England is now faced with a demonstration of the existence within its own borders of a fluoridation-cancer incidence link that is readily derivable from Kinlen's own data. Whether the data are adjusted for age and sex, in the manner carried out by Kinlen, or left unadjusted, the fluoridated populations show cancer incidence increases for the six organs of respectively 8 and 13%. These are very large increases for the time

periods involved, and are even greater than corresponding increases in cancer mortality such as reported in the United States, for even longer periods of observation, and for approximately ten-fold greater populations. Cancer incidence is, of course, greater than cancer mortality in a given population, and this appears to be true for cancer increases associated with fluoridation.'

As Dr M. Diesendorf (1979), who was present at the meeting at the Australian National University in June, 1979, said:

'... a correlation between fluoridation and cancer death rate ... has not been convincingly refuted in the two years since its publication.' (Diesendorf, 1979).

In a reply to the Chairman of a U.S. Congressional Inquiry in 1977, Dr H.A. Arnold of the Department of Mathematics, University of California, said:

'There are some who argue that causal relationships are not provable by statistical studies in the large, but only by controlled laboratory or clinical experiments in which cause and effect can be observed in individuals and groups of individuals. On the basis of published research and the Burk-Yiamouyiannis study, it is now unquestionably time to perform these experiments and to suspend all mechanical fluoridation of public waters until definitive results have been obtained. The experiments should be funded and performed by, and under the supervision of agencies in no way connected with any agencies that may have committed themselves to previous opinions or stances, negative or positive.'

That is so. While this fluoridation/ cancer link remains unrefuted it is folly to continue fluoridation.

* See appendix 18, p. 280.

THE INFLUENCE OF FLUORIDE INGESTION ON GENETIC CHANGES —
MONGOLISM.

Recent findings that low concentrations of fluorides in the drinking water can produce genetic changes, support the observations of Dr I. Rapaport (1956, 1959, 1961) that:

'... a parallelism has been observed between the incidence of this disease [mongolism] and the fluorine content of drinking water.'

In 1976, Professor A.H. Mohammed reported that:

'As little as 1 p.p.m. of sodium fluoride in drinking water can produce permanent genetic damage in mice. The chromosomal damage and breakdown observed in the study is believed to be the direct result of fluoride acting on the D.N.A. structure.'

*

The mutagenic activity of inorganic fluoride compounds was studied by Dr E.A. Guleva et al. (1972) who concluded that fluoride stimulates the formation of mutagenic metabolites in the organism of rats. In 1973, Drs B. Mitchell and R.A. Gerdes said: 'These data demonstrate that under the test conditions sodium and stannus fluorides are mutagenic to *Drosophila melanogaster*.'

Dr Alan Stoller of Melbourne has done considerable work on the etiology of mongolism. In 1963 he said that there are:

'... two separate aetiological processes — one affecting younger mothers and independent of maternal age and the other, a more frequent phenomenon, affecting older mothers.'

* See appendix 4e, p. 261.

Dr Stoller mentioned that Myers (1938) found that where there was a high incidence of maternal thyroid disease there was a high incidence of mongolism. (Moderate concentrations of fluoride in drinking water can block iodine absorption. Crawford, 1972.)

Dr Stoller said in 1963:

'The ageing oocyte is the most constant factor in the primary production of mongolism. Such an oocyte would, in some way, appear to be vulnerable to attack by virus, with a resultant mutation leading to a mongoloid child.'

Two years later, with Dr R.D. Collman, he said:

'... we are in no doubt that there is an environmental factor operative in a high proportion of these congenital abnormalities.' (Stoller and Collman, 1965).

Dr I. Rapaport's first study (1956) revealed a relationship between the incidence of mongolism and the amount of fluoride in the drinking water. Certain aspects of that study were criticized, therefore he completed a second study which was designed to meet those criticisms, and he acknowledged the advice of Dr A.L. Russel, Chief of the Department of Epidemiology and Biometry of the U.S. National Institute of Dental Research. In this study he found that, as the fluoride content of the drinking waters used by the mothers increased from 0.0-0.2, to 0.3-0.7 to 1.0-2.6, the number of cases of mongolism per 100,000 recorded in the official records, increased from 34.15 to 47.07 to 71.59 ($P < 0.001$). He said:

'The role of the advanced age of the mother, in the etiology of mongolism, would seem to reflect a slow and progressive accumulation of fluorine in the mother's body.' (Rapaport, 1959).

Two years later (1961) Dr Rapaport said:

'These facts have led us to put forward the hypothesis that fluorine plays a part in the pathogenesis of this disease by bringing about a metabolic change similar to the innate fault in the metabolism which recent research is now revealing.'

He was referring to his finding that:

'Sodium fluoride, incorporated in the diet, produces in drosophilae melanic tumors. This shows a change in the metabolism of tryptophane. This change in metabolism is similar to that shown in children suffering from mongolism.' (Rapaport, 1961).

Following Dr Rapaport's first publication, a study was completed in England by Dr W.T.C. Berry (1958) which showed only slight differences in the prevalence of mongolism in the fluoridated and non-fluoridated areas.

Professor Hugh Sinclair, in 1973, said that he had had two discussions in the U.S. with Dr Rapaport about his work on fluoride and Down's syndrome and that he had 'read the less extensive work in this country of my friend Dr Berry.' 'I believe further studies are required before Rapaport's work and conclusions are dismissed.'

Dr Berry's work was also criticized, on several grounds, by Dr H.L. Needleman (1974) and his co-workers. Their main objection being 'the sparcity of data'. They also criticized Dr Rapaport's work, mainly on the ground that the number of mongoloid births was too small. However, his study was essentially a mathematical one, using official data. He did not determine either the total number of births nor the number of mongols. No suggestion has been made that the official records were biased.

Needleman et al. (1974) studied the prevalence of Down's syndrome in Massachusetts between 1950 and 1966. They concluded that:

'.. the data provide strong evidence that fluoridation does not cause any important elevation in risk for Down's syndrome, at least not for several years after its introduction.'

Commenting on that paper, Dr J.R. Lee said:

'I found most interesting the authors' attempts to disparage their own results with assumptions about admittedly "unknown compounding factors".' 'I believe that the authors' data provide suggestive evidence that fluoride may cause an elevation in the risk of Down's syndrome and that they reach an unwarranted conclusion when they state, in the abstract, that their data provide "strong evidence" against this relation.' (Lee, 1975).

The Hon. Dr D. Everingham, when he was Australian Minister for Health between 1972 and 1975, asked his Departmental advisors to provide him with the scientific evidence which would refute the suggestion that there was an increase in Down's syndrome (mongolism) with increase in the fluoride content of drinking water. Several years later, in 1977, he said: 'I am still waiting to see such refutation.'

As Dr Lee said in 1975: 'Thus, the question of Down's syndrome remains a question.'

OTHER MEDICAL ASPECTS OF FLUORIDATION.

When artificial fluoridation was first commenced in 1945 by the U.S. Public Health Service, almost the whole concern was for its effect on the teeth — the retardation of dental caries and the ill effect of the production of dental fluorosis, known to be due to chronic fluoride poisoning. There was little concern for, even speculation about, the possible effects on the rest of the body. Animal experiments to test its effects on the other organs were almost totally lacking.

It is now known that fluoride, even in low concentrations, has a widespread effect on the body, a few aspects of which will be mentioned briefly.

(1) Fluoridation and the Thyroid.

The anonymous author of a paper in the WHO Chronicle (1970a) said that fluoride has no specific toxic effects on the thyroid gland. 'Fluorine neither accumulates in the thyroid nor interferes with the uptake of iodine from normal dietary sources.'

However many others hold opposing views:

Professors T. Gordonoff and W. Minder stated, in 1960:

'There is a true antagonism between fluorine and the amounts of iodine taken up by the thyroid. This may result in an approximately 20 to 30 per cent reduction in function.'

Professor N.P. Buu-Hoi (1962) stated that 'fluoride ions are known to interfere in the production of thyroid hormones.'

Professor Douw Steyn (1964a) said: 'The result of this experiment indicates that there is a fluorine-iodine antagonism.'

In 1972, an article in the Lancet (T.K. Day and P.R. Powell-Jackson) reported the results of a study of the prevalence of goitre in 17 Himalayan villages. The wide variations were not due to differences in iodine intake but 'variations in goitre prevalence were found to correlate closely with the fluoride content ($\rho = 0.74$; $P < 0.01$) and with hardness ($\rho = 0.77$; $P < 0.01$) of the water in each village.' The prevalence of goitre was higher in the harder waters and in those with more fluorides. The fluoride contents of the waters ranged from 0.1 p.p.m. to 0.34 p.p.m.

In view of the exceptional softness of Melbourne's water supplies (Sylvan has a total hardness of only 10; M.M.B.W., 1978) the comments of Dr Margaret Crawford, an authority on biological effects of soft water, are of particular interest. She said, in 1972:

'Mr Day and Mr Powell-Jackson demonstrate a close association between hardness and fluoride concentrations in drinking water and the prevalence of goitre in hill villages in Nepal. These results raise a problem concerning fluoridation of water supplies in this country [U.K.] which has not received sufficient attention — that is, the relationship between fluoride and other ions present in drinking-water, in particular iodine.'

'Naturally soft waters, however, have little or no fluoride and the iodine is therefore all available for absorption. If fluoride is added to soft waters this will not be so and a proportion of the population may come to have suboptimum iodine uptake. The effects

might be subtle and slow to develop and would certainly not be picked up by the crude screening used at present.'

It is not known whether this possibility is being examined here.

Dr J.R. McLaren (1976) has made 'A review of the voluminous literature on the relationship of fluorides and the thyroid gland'. A photocopy is appended because this is not available in Melbourne.

(2) The Aorta.

In 1967, Dr F.B. Exner cited an investigation by Drs Call, Greenwood et al. (1965, Pub. Hlth. Rep. 80: 529) saying:

'They found that fluorine accumulates in all soft tissues; and that the levels in different tissues are not consistently high or low in different individuals. For example, the person with the highest level in one tissue might have one of the lowest in another. Consequently, tissue retention cannot be governed solely and directly by fluorine intake, much less by the concentration in the water supply.

But by far the highest levels in any soft tissue (up to 258 ppm) were found in the walls of the aorta, the main artery leading from the heart.'

That high level of fluoride in the aorta was eclipsed in a more recent report. Dr G.L. Waldbott (1974a) said:

'Recent data concerned with fluoride in water portend serious damage to human health: A PHS [U.S. Public Health Service] report (Geever et al., 1971) disclosed at autopsy 8,400 ppm of fluoride in the aorta (the large artery of the heart) of two persons who had been residing in Grand Rapids, Michigan (fluoridated since 1945), for less than twenty years and 2,340 ppm in another less

than twenty years old from a New York State non-fluoridated community.'

'These levels are higher than those in bones of cases of advanced crippling skeletal fluorosis. No clinical data on these cases were reported to establish whether and to what extent such extraordinarily high levels of fluoride had damaged the vascular system.'

Dr Waldbott had reported other cases in 1962, saying:

'These observations raise the question whether or not F⁻ might contribute materially to sclerosis of arteries.'

(3) The Kidneys.

It has been said that Australians have the highest prevalence of kidney disease to be found anywhere.

'In the human body, the kidneys are probably the most crucial organ during the course of low-dose long-term exposure to fluoride.' (Rose and Marier, 1977).

The same authors had previously reported that: 'Healthy kidneys excrete 50 to 60% of the ingested dose.' (Marier and Rose, 1971).

On the other hand, the International Society for Research on Civilization^{Diseases} and Vital Substances (1969) said:

'... persons suffering from kidney trouble are less able to excrete fluoride and more liable to injuries from it.'

Of particular interest, is the question of poisoning from fluoride during dialysis of kidney patients, due to the very large volumes of water used during this process. Dr W.J. Johnson (1973) of the Artificial Kidney Center, Mayo Clinic, Minnesota, in 1973 said: 'We are currently using non-fluoridated water for all patients under our care.'

He mentioned that 11 out of 12 patients exposed to fluoride for two years or more had developed 'symptomatic bone disease, rib fractures and severe bone pain'. 'In addition, two patients experienced extreme wasting, suggesting other toxic effects of fluoride.'

Dr D.R. Taves, and his co-workers (1965) were among the first to investigate this problem and, after finding an increased concentration of fluoride in the blood serum during dialysis, said that 'it would seem prudent to use nonfluoridated dialysate baths for long-term hemodialysis.' In 1974,

Dr J. Jankauskas said:

'Although no definite conclusions can be drawn at this time, several investigators have advised the use of non-fluoridated dialysate baths for long-term hemodialysis.'

The Australian Kidney Foundation, in 1974, said that the question whether fluoride should be removed from the water used for dialysis 'is a matter for the individual doctor and we would not contemplate getting involved in a question such as this which has generated so much controversy.' Two years later the Foundation said they had 'no specific statement to make regarding the fluoridation of water in relation to patients with kidney disease.' (Kincaid-Smith, 1976).

From recent inquiries from the dialysis centre at the Prince Henry's Hospital, it appears that in the dialysis treatments carried out in most, if not all, hospitals, fluoride-free water is used, but that almost all of the

home dialysis machines obtain their water directly from the domestic tap. In Melbourne this water is fluoridated.

Apart from avoiding possible damage from the long-term use of large volumes of fluoridated water, it would appear that the use of deionized water has other advantages. In an editorial article which appeared last year in the Journal of the American Medical Association (JAMA), Dr S. Vaisrub (1978) said:

'Impressive evidence has accumulated to incriminate aluminium in the causation of dialysis encephalopathy with dementia (dialysis dementia, dementia dialytica) as the striking manifestation.' 'No further cases of encephalopathy were noted among 29 patients after the subsequent reduction of the aluminium content of the dialysis water with the use of a deionizer.' This related to 'an outbreak of encephalopathy that affected eight of 34 patients in a small dialysis unit.'

Dr Vaisrub concluded:

'With the bulk of evidence incriminating aluminium, the door is left open to effective prevention of the dreaded dementia dialytica.'

(4) Other conditions.

Ingested fluoride reaches all the organs of the body through the blood. Many effects have been reported but they will not be considered here.

One subject which has engendered conflicting reports is that of the use of fluoride to treat osteoporosis. This use of fluoride is not approved by the U.S. Food and Drug Administration. In an editorial article in JAMA in 1978, Dr S.J. Marx said that, outside of an investigational setting

* See appendix 10b, p. 270.

'...fluorides should not be prescribed for generalized or localized osteopenia until investigations have documented the efficacy of high doses without unacceptable toxicity.'

Some idea of the range of organs which may be affected by fluoride ingestion can be gained from recent issues of Fluoride. They include: Heart (Jansen and Thomson, 1974); Kidney, (Jankauskas, 1974); Hair (Krechniak, 1975); Thyroid, (McLaren, 1976); Blood, (Mürer, 1976); Skin, (Editorial, 1977a); Bones, (Editorial, 1977b); Stomach, (Editorial, 1977c); and Periodontal disease (Domzalska, 1978).

With the emphasis of the effect of fluoridation on dental caries in children — a promised study on adults who drink artificially fluoridated water has not been published (Ast, 1944; London, 1967) — little attention has been paid to the influence of fluoridation on periodontal disease in adults.

* See appendix 17e, p. 279.

INTOLERANCE TO FLUORIDATED WATER.

There are many reports of intolerance to fluoride at a level produced when the amount ingested is increased by the fluoridation of drinking water.

(1) The Denial by the American Academy of Allergy.

Those promoting fluoridation deny that cases of allergy and sensitivity to fluoridated water occur and cite the statement on this subject by the American Academy of Allergy. However, Dr G.L. Waldbott stated that:

'The widely circulated statement by the eleven-member Executive Board of the American Academy of Allergy asserted that "there is no evidence of allergy or intolerance to fluorides as used in the fluoridation of communal water supplies" does not constitute scientific evidence.' He said that 'this statement was requested by the U.S. Public Health Service, the same organization which is not only promoting fluoridation but has also been financing the research of the eleven scientists.' (Waldbott, 1974a).

He later wrote that two sentences had been omitted when that letter of his was published. One of them said:

'In 1971, for instance, four of the eleven received \$ 780,621 dollars in research grants from the P.H.S.'

(2) Pre-fluoridation evidence of intolerance to fluoride.

Even before artificial fluoridation was commenced, cases of intolerance to fluoride were pointed out by Dr H. Trendley Dean (often called the 'father of fluoridation') and Dr F.A. Arnold Jr. Both these men were members of the team

which set up the first fluoridation trial in Grand Rapids. Speaking of observations in naturally fluoridated areas, in 1942 Dr Dean said:

'Among individuals of even an apparently homogeneous group there are natural differences in sensitivity (or resistance)' [to fluoride in water]. He also said that there are 'marked variations within the group.'

The following year, with Dr Arnold (1943), he stated:

'Another important factor in this relationship of concentration and effect is the tolerance of the individual. The same amount of fluorine that causes a mild toxic reaction in one individual may cause a severe reaction in another. In other words, we are dealing with a low-grade chronic poisoning of the formative dental organ, in which case some individuals may show a more severe reaction than others having a comparable fluoride intake',... 'prognosis with respect to one individual is obviously unwarranted.'

This intolerance may be due to a reduced ability to excrete fluoride. Resolution No. VIII of the 15th International Convention on Civilization Diseases, Vital Substances and Nutrition said (in part):

'Some individuals are more sensitive to fluoride than others, for example persons suffering from kidney trouble are less able to excrete fluoride and more liable to injuries from it.' (International Society for Research, 1969).

(3) Intolerance to Artificially Fluoridated Water.

Dr G.L. Waldbott (1974a) stated that he knew more than twenty highly competent physicians who had either diagnosed or confirmed the diagnosis of serious illness from fluoridated water, but did not wish to become involved in

the fluoridation controversy. Dr Waldbott's observations have been attacked for many years, although he is a very well qualified specialist allergist. He said:

'By far the majority of my cases had no bearing on allergy (hives, asthma, allergic nasal and sinus disease, and so on). They pertained to intolerance to fluoride, that is, true poisoning.' (Waldbott, 1974a).

The medical publishing company C.V. Mosby, in 1973, published his book on Health Effects of Environmental Pollutants which refers to the publications of some 1,000 authors. Fluoride is one of the pollutants mentioned and the book contains numerous references to damage and illnesses from its ingestion.

It is of significance that in the 1978 case in the Court of Common Pleas of Allegheny County, Pennsylvania, Dr Waldbott's evidence of allergy and intolerance to water fluoridated to 1 p.p.m. was 'uncontested and unrefuted', no witness being called to attempt to rebut his statements. (Winner et al., 1978).

(4) Confirmation of Intolerance by Double-Blind Tests.

The charge has been made that Dr Waldbott is the only person to observe the symptoms which he describes. However, in 1974(b) he said that he had received personal communications from sixteen clinicians each of whom had diagnosed poisoning from fluoridated water, and that Dr H.P. of Aitkin, Minnesota, had just reported 27 cases. Dr P.E. Zanfagna (1976) has also observed cases and has reviewed the subject.

* See appendix 9a, p. 267.

A very carefully conducted study was completed in Holland by Dr H.C. Moolenburgh and his co-workers, using a double-blind technique with the key data deposited with a notary. (Moolenburgh, 1974, 1977; Grimbergen, 1974). They found that, contrary to their expectation, the side effects from drinking fluoridated water were not due to allergy but to low grade poisoning. Dr Moolenburgh (1977) said:

'It appeared that some individuals showed the effects of this poisoning earlier than the rest of the population, but as more and more fluoride was put in the water or ingested from other sources, more and more people would show side effects until at last all of them might have had complaints. The first 1% of people with side effects were just the forerunners in the so called curve of Gauss.'

'It also appeared that the side effects in our patients flickered on and off.' 'Apparently fluoridation as a form of low grade poisoning lowers the general adaptation to attacks from noxious influences in the environment.'

(5) Recent Complaints in Victoria from Fluoridated Water.

It is understood that a large number of Statutory Declarations is to be presented to the Committee which describe ill-effects experienced after drinking, and cooking food in, fluoridated water, ill-effects which disappeared when distilled water was substituted for tap water.

Unfortunately an even greater number of individuals may be suffering in this way, but the association with fluoridated water has not yet been realized. A typical case is that

of Diana Martin, who recently (1979) stated:

'.. after the water was fluoridated I started having health problems.' 'It took me two years and five specialists before I eventually found out that it was the fluoride that caused my problems. I now have to buy my water at \$ 7 for a 20-litre container to remain healthy. Why do I, and others like me, have to go to all this trouble, when the children could be given a tablet at school like they used to be given milk?'

*

It is not to be expected that more than a small number of such people will attend an individual general practitioner.

Dr Norman Long, in the Medical Journal of Australia, said:

'I know of only one case of total body rash and vomiting in an infant following — and due to — drinking fluoridated water; but then, I am a radiologist, and this is not my sphere.' (Long, 1970).

(6) The Difficulty in Diagnosing Intolerance to Fluoride.

Dr H.C. Moolenburgh (1977) said:

'One of the most difficult things in diagnosis of low grade fluoride poisoning is the general character of the complaints. Low grade poisoning is seldom detected when you are not looking for it.'

Sir Arthur Amies said, in 1975:

'It is vain to state that doctors in Australia and other countries have often failed to observe fluoride toxicity in their areas. The directives which they have received from public health authorities have all too often indicated that no untoward side effects can occur. Medical practitioners can hardly be blamed, therefore, if they fail to link certain symptoms and signs with fluoridation.'

* See appendix 8, p. 266.

Lord Douglas of Barloch said, in 1972, that health authorities rely on the assertion that:

'.. doctors in fluoridated areas have not reported any ill effects of fluoride. This statement does not carry conviction, for these same authorities advise doctors ['who generally do not know the symptoms of chronic fluoride poisoning'] that there cannot possibly be any ill-effects.'

He recalled the long time it took after cigarette smoking became common to establish that it was a principal cause of lung cancer.

The side effects reported by Dr Moolenburgh (1977):

'Babies screaming with inflated tummies, lots of people with painful sores in their mouths, people with loose stools, urinary troubles, headaches, dizziness, and quite a lot of people with recurrence of allergic troubles like asthma and skin rash that had not troubled them for years.'

(7) Intolerance to Fluoridated Toothpaste.

Mention of 'sores in the mouths' recalls the fact that there have been many reports of reactions to fluoridated toothpaste which cleared up when it was no longer used.

More than twenty years ago Dr T.E. Douglas (1956) reported cases of stomatitis, related to the use of fluoridated toothpaste or tooth powder. These occurred in 133 patients of all ages from three years to more than ninety years of age. Thirty-two patients cooperated by undergoing repeated courses. After the symptoms had cleared up completely, each course 'consisted of use for three weeks of the dentifrice containing fluorides followed

* See appendix 5b, p. 264.

by use of non-fluoride dentifrice until normalcy had been maintained three weeks.' Two patients endured six courses and five saw the effects of five courses. It was noticed that, in several patients, 'symptomatology was increased by as much as four fold after two or three courses — both in severity and time required for completely clearing of the lesions.'

Two recent reports: 'Fluoridated toothpaste: A cause of perioral dermatitis' by Dr J.R. Mellette et al. (1976) and a paper by Dr M.A. Saunders (1976) who said that Dr Emery Kocsard of Sydney had told him that he had treated 50 patients with fluoride-related perioral dermatitis all of which responded favourably after the cessation of fluoride toothpaste.

(8) The Problem of Intolerance to Fluoride will Grow.

There can be no doubt that some individuals are intolerant to fluoride at the increased level produced by the use of fluoridated water. Their problems will grow. Although they may, at considerable expense and inconvenience, obtain distilled water or install an ion exchange fluoride 'filter', the evidence already available indicates that, as a result of fluoridation, the fluoride content will increase in the vegetables and canned foods which they purchase.

Dr Moolenburgh (1977) suggested that those who are at present intolerant to fluoridated water represent one 'tail' of a Gaussian curve. If that is so, the number of people showing side effects may be expected to increase

rapidly as the total intake of fluorides from all sources, including water, food and air, increases.

The International Society for Research on Nutrition and Vital Substances (1967) pointed out that:

'The fluoridation of drinking water releases a fluorine circuit which includes vegetables, fruit and other horticultural products as well as milk, and has an uncontrollable effect on the human organism.'

(9) The Great Difficulty in Obtaining Compensation for Illness Caused by Fluoridation.

In Victoria, those unfortunate people who are obviously affected by ingesting fluoridated water, if they wish to obtain compensation for their disabilities are faced with a great, and unusual, difficulty. This is due to the repressive paragraph 4 of the Health (Fluoridation) Act which states:

'No person shall have any right of action against any water supply authority or any member of such authority in respect of anything done in regard to the fluoridation of a public water supply in accordance with the provisions of this Act.' (Victorian Government, 1973).

A barrister has stated that, because of that paragraph of the Act, even a person who has been proved, by the most rigorous medical tests, to have become ill due to drinking fluoridated water supplied through their domestic taps, would have no practical way of seeking compensation. Their only course would be to sue the Victorian Government, a course which would prove to be so expensive as to be prohibitive for the average citizen.

The situation is different in England. A 1977 memorandum by Paul M. McCormick, Research Fellow, Nuffield College, Oxford, stated:

'When one arm of the Executive offers (as has been done) an indemnity to the water authorities to cover successful legal claims against them arising out of fluoridation, the Law is mocked. The water authorities are freed from the legal consequences of their actions and thereby encouraged to break the Law. Law is one of the first casualties in the battle for fluoridation.'

THERE IS NO MARGIN OF SAFETY WITH ARTIFICIAL FLUORIDATION.

The important question of the margin of safety of artificial fluoridation has received little consideration. This may be due to the widely held impression that there is a wide margin of safety when water is fluoridated at 1 p.p.m.

(1) The Need for a Wide Margin of Safety for Substances Added to the Water Supplies.

Speaking on the general subject of the management of water quality, the Director of the Division of Sanitary Engineering, Pennsylvania Department of Health, said that the 'lack of precision and reliability makes it essential that adequate factors of safety be employed.' (Lyon, 1968).

Dr C.G. Dobbs (1957) pointed out that:

'There is no level of intake at which fluoride changes from a toxic to a purely "beneficial" substance; and since it is the total intake which matters, the question at issue is not the safety of fluorides at 1 p.p.m. but the safety of any permanent addition to the general intake of fluoride, especially by those whose intake is already high.'

In regard to fluoridation, in 1950 Drs G.J. Cox and H.C. Hodge (two of the main early proponents of fluoridation) said that, with the increased use of fluoride in water, toothpastes, topical applications and mouthwashes, vitamin tablets and chewing gum:

'.. it is proper to insist that due attention be paid to the possible hazards and to insist that there be a large factor of safety. Fluorine and its compounds have long been known as poisons.'

* See appendix 3, p. 258.

** See appendix 10c, p. 271.

Professors T. Gordonoff and W. Minder (1960) said:

'All authorities agree that fluorine is in no way an innocuous substance; moreover, since its therapeutic range is so very small, it easily lends itself to overdosage.'

This was well known even in 1940, for Drs Margaret C. Smith and H.V. Smith said:

'The range between toxic and non-toxic levels of fluorine ingestion is very small. Any procedure for increasing fluorine consumption to the so-called upper limit of non-toxicity would be hazardous. This would be especially true in the case of the addition of fluorine to public food or water supplies where uncontrollable individual fluctuations in intake would be encountered.'

(2) The Recent Marked Decreases in the Recommended Dose of Fluoride.

This narrow therapeutic range is well illustrated by the marked decreases in the recommended levels of fluoride ingestion from tablets, which have been forced by the increasing evidence of dental fluorosis in children given the previously recommended dose. In a study using the old levels of 0.5 mg F up to the age of three years and thence 1.0 mg F daily, it was found that 67% of the children included in the study since birth had dental fluorosis. The group fluorosis index was 0.88, which is well above the level of 0.6 which constitutes a public health problem. (Aasenden and Peebles, 1974).

Originally one tablet of sodium fluoride per day (1 mg F) was recommended for all ages. In 1963 this was changed, the American Medical Association then saying that

the usual fluoride supplement is 0.5 mg per day for children up to the age of three years, and 1.0 mg per day from 3-14 years. Supplements should not exceed those amounts 'in order to insure that mottling of the teeth does not occur.'

Recently the recommended daily dose for children less than two years of age has again been halved, to 0.25 mg, (Council on Dental Therapeutics, 1977; Editorial, 1978; Driscoll and Horowitz, 1978). Therefore the newly recommended dose is only one quarter of the dose originally prescribed. That statement must be qualified by the recent warning of the American Dental Association's Council on Dental Therapeutics:

'Before a fluoride supplement is prescribed, the fluoride concentration of a child's drinking water must be determined to avoid the possibility of the child developing dental fluorosis from excessive intake of fluoride during the crucial periods of tooth calcification. For areas that have natural fluorides at a concentration of 0.2 ppm or greater in the supply of drinking water, appropriate downward adjustments must be made in the dosage schedule. The Council on Dental Therapeutics of the American Dental Association has suggested that fluoride supplements should not be prescribed when the concentration of natural fluoride exceeds 60% of the concentration recommended for community water fluoridation in a geographic region.' (Driscoll and Horowitz, 1978).

Therefore, the present common practice, in fluoridated Melbourne, of providing young children with fluoride tablets is a dangerous one, particularly in regard to the likelihood of the development of dental fluorosis. It is clearly contrary to that recent recommendation by the Council on Dental Therapeutics of the American Dental Association.

The subject of the fluoride ingestion by young children obviously is in a state of confusion. The Council on Dental Therapeutics pointed out that:

'In addition to the dosage schedule recommended by the Council, various [eight] other schedules have been used or proposed. In some instances, these schedules are more conservative than that of the Council for the early years of a child's life; in others, a higher dosage is used or suggested.' (Driscoll and Horowitz, 1978).

(3) False Claims that there is a Wide Margin of Safety with Fluoridation.

The claim is often made that with fluoridated water (at approximately 1 p.p.m. fluoride) there is a large margin of safety. Two papers are typical of the claims made:

A paper which is repeatedly cited is one in the Journal of the American Dental Association by Dr A.P. Black (1955).

He said:

'A wide margin of safety is thus provided, inasmuch as intakes of fluorine about fifty per cent above the ideal dose produce very mild evidences in the appearance of the teeth of such excess.'

An article, by an anonymous author, in the WHO Chronicle said that 'there is a very wide safety margin between the optimum level and the lowest level at which harmful effects have been detected.' The article admitted that mottling can occur, 'but only when the level of fluoride is at least 4-6 times greater than the optimum level.' The 'optimum level' was said to range from 0.6 to 1.2 p.p.m., depending on the climate. (WHO, 1969b).

However, the following year, Professor A.H. Siddiqui, in another WHO publication, the book Fluorides and Human Health, stated that: 'At 6 ppm the incidence of mottling is 100%.' (Siddiqui, 1970). This has been known for many years. Drs H.C. Hodge and F.A. Smith (1954) in Fluoridation as a Public Health Measure, stated that at 4 p.p.m. less than 5% of the teeth are normal, almost half have moderate or severe fluorosis, and at 6 p.p.m. no teeth are normal.

Notwithstanding those well-known facts (to those who read the literature) incorrect statements are still being made here. In 1977 the Chairman of the Fluoridation Sub-committee of the Victorian Branch of the Australian Dental Association said:

'There is an extremely wide tolerance, and the taking of tablets after the introduction of fluoride into the water supplies is not dangerous.' (Levant, 1977).

In contrast, the German Federal Republic Department of Health said, in 1976:

'It is of the utmost importance to make sure that a simultaneous additive intake of fluoride from fluoride tablets, fluoridated tooth-paste and fluoridated salt does not take place.' (Department of Health, 1976).

Regrettably, fluoride tablets are still readily available in Melbourne —and are used — despite the fluoridation of our water supplies, and nearly all toothpaste on sale contains considerable concentrations of fluoride. It is now known (as has already been mentioned) that children, in particular, may swallow significant doses of fluoride from toothpastes.

* See appendix 2a, p. 255.

(4) Misplaced Confidence in Claims Regarding a Safety Margin with Fluoridation.

Confidence is still being shown in the claims that there is a wide safety margin with fluoridation, even by government advisors. For instance Mr K.D. Green, Secretary to the Premier of Victoria, in a letter written in 1974 to reassure a woman who was worried by the prospect of having to be forced to drink fluoridated water, said:

'The concentration of fluoride proposed for fluoridation is but 1 part per million. At that level, no matter how much water you drink, no harm from fluoride should occur.'

Clearly, whoever briefed Mr Green was unaware of the situation. In a letter to me on November 5, 1973(b) — and an identically worded one to Sir Arthur Amies, Jan 7, 1974 — Mr Green said that the 'decision to proceed with fluoridation was only reached after long and exhaustive investigation of all available material.'

That term 'exhaustive' recalls the statement by the Hon. D.J. Killen in the House of Representatives in 1964. He said that the fountain-head leading to the fluoridation of Canberra's water supply was a report of a sub-committee of the Territory Advisory Council. He commented:

'That report has been described variously as being critical, exhaustive, and extensive and as appraising every known facet of fluoridation.' 'But this sub-committee of the Advisory Council dealt with this great issue in five paragraphs, or 124 words. Each of the paragraphs represented a proposition not supported by one skerrick of evidence.'

(5) Claims for a Safety Margin with Fluoridation are
'Patently Naïve'.

For more than thirty years the claim that there is a wide margin of safety with artificially fluoridated water has been known to be false.

The Director of Laboratories, Department of Water Supply, Gas and Electricity, City of New York (B.C. Nesin, 1956) said:

'The proponents of fluoridation have tried to demonstrate various factors of safety which are patently naïve. They speak of factors of safety of 2, or 8 etc. with little comprehension of the meaning of this term as used in water supply practice. A factor of safety of 2 or 8 on their terms is no factor of safety at all. It has been customary to consider a minimal factor of safety of not less than 10 for substances which may be admitted to water supplies. This would mean that ten times the amount of the proposed substance when present in the water supply would be definitely without harm to human or beast. It is obvious from the knowledge of fluoride toxicity that such a factor of safety cannot be established when fluoride is added to the water supply at the level recommended by the proponents of fluoridation. In view of the fact that the range of water consumption may vary over a ratio of 20 to 1 the insistence upon a factor of safety of 10 is exceedingly moderate.'

He then said:

'It must be concluded that the fluoridation of public water supplies is a hazardous procedure, people are bound to get hurt, it remains to find out how many and when.'

THE INFLUENCE OF FLUORIDATION ON MAN'S ENVIRONMENT.

Discussions on the effects of fluoridation have, until recently, been concerned with the effects on the teeth and, to a much lesser extent, on the rest of the body. The effect on man's environment has been overlooked or ignored. The International Society for Research on Nutrition and Vital Substances (1967) said that:

'The fluoridation of drinking water releases a fluoride circuit which includes vegetables, fruit, and other horticultural products and consumables, and has an uncontrollable effect on the human organism.'

Man is unquestionably influenced by his environment, therefore, although the Terms of Reference for the Committee refer to 'the effects on humans of fluoridation of water supplies', some consideration should be given to the question of the effects of fluoridation on man's environment.

(1) The 'Fluoride Circuit' Arising from Fluoridation.

The fact that only a small proportion of the water fluoridated is consumed by the population has been recognized and criticized by many people on economic grounds. Little consideration has been given to the effects on man's environment of the 'wasted' water. Part of this is used for washing and other domestic purposes and, with much of the portion consumed by the population, is gathered up in the sewerage system. The remainder is spread on the ground partly by the watering of plants and vegetables. It has

been found, for instance in Japan (Okamura and Matsuhisa, 1965b, 1967) that in some districts there has been a marked increase in the fluoride content of crops. Much of this is a result of using superphosphate fertilizers which contain fluoride. 'What happens when fluorine is added to the soil depends on such factors as the form in which it is applied, the amount of fluorine, how much lime and phosphate are present, the species of plants grown, and the soil type and geology.' (Schatz and Schatz, 1972). Watering with fluoridated water will also have an effect.

Recently Dr B.S. Walker (1979) said that much more water is used to irrigate home vegetable gardens than reaches the mouths of children. He said:

'Fluorine is one of the most chemically-active of all the elements, reacting readily with organic matter to form fluorocarbons, already strongly suspect for their possible effect on the environment;

Soluble fluorides are admittedly poisonous;

Chemicals applied to the soil in even very small concentrations may build up, over time, to quite surprising amounts;

Vegetation absorbs fluorine from the soil.'

He added:

'In the light of the above, can anyone, "expert" or not, give me an absolute assurance that the lettuce grown in my backyard will never become toxic through excess fluorine. As an ex-agronomist, and keen gardener, I should like to hear argument on that point.'

At present there does not appear to be an answer to that query.

(2) Fluoride Damage to Trees, Plants and Cut Flowers.

Apart from the effect on man and animals, fluoride in the atmosphere and in water has been shown, in numerous studies, to affect trees and plants and also some cut flowers.

These articles usually appear in agricultural and horticultural journals and were little known in 1973 when the Act was passed.

Drs R.D. Gabovich and G.D. Ovrutskiy (1977) found that the accumulation of fluorine in plants is affected by factors other than the amount of fluorine in the soil, for example, by the plant nourishment. They found dissimilar accumulation of fluorine in different plants. There are plants which are 'fluorine accumulators' such as spinach (28.3 ppm) and, to a lesser extent, lettuce and parsley (both 11.3 ppm). (Schatz and Schatz, 1972).

Exposing Valencia orange trees to hydrogen fluoride gas, with a fluoride concentration of 1 p.p.b., that is 1: 1,000,000,000, was found to produce 'fluoride damage in the form of reduced leaf size, reduced total leaf area and reduced top weight [which] remained proportional to total fluoride accumulation.' (Brewer et al., 1969).

An important question is (even without considering the effect of atmospheric pollution with fluoride) whether watering trees with water containing 1 p.p.m. fluoride, which is a thousand times the above-mentioned concentration, will produce a similar type of damage.

Not only the trees are affected by atmospheric fluorides but also the insects associated with them. An important observation reported by Gabovich and Ovrutskiy

(1977) was that of G. Bredemann (Akademie-Verlag, 1956, Berlin) who found that the accumulation of fluorine in flowering plants, polluted with fluorine-containing emissions, causes massive death of bees. In the bodies of dead bees there were from 50 to 11,700 mg of fluorine per kg dry weight, as against 0.5 mg/kg in the control. Could a similar effect result from watering flowering plants with fluoridated water? No studies to determine this point have been found.

The subject of the effects of airborne fluoride and its effects on vegetation has already been mentioned briefly and is also mentioned in the book Health Effects of Environmental Pollutants (Waldbott, 1973). One unusual fact is that vegetation tends to impede or intercept fluoride in air that is moving through the foliage, thus creating an adjacent down-wind area of lower airborne fluoride concentration. (Rose and Marier, 1977).

It is now well documented that fluoridated water (1 p.p.m. fluoride) has a detrimental effect on the keeping quality of some cut flowers. Higher concentrations produce more marked effects.

Dr W.E. Waters (1968a) reported that 'the keeping quality of rose cut-flowers' 'decreased greatly as the dissolved F level increased in the holding solutions.' The decrease in the flower quality index after four days was 8% at 0.67 ppm F, 21% at 1.20 ppm F and 45% with 3.33 ppm F, compared with the controls. That is: 'One ppm F induced moderate toxicity symptoms and 3 ppm F induced severe toxicity symptoms.'

Dr F. Spierings (1969) observed damage to gladiolus florets in fluoridated water. Fluoride was shown to be the main factor in producing deterioration and was the only specific ion that was toxic at very low concentrations. 'Petal deterioration increased in a highly linear or quadratic manner as the fluoride content increased.' (Waters, 1968b). The quality rating decreased by 26% with 1.17 ppm F. Dr Waters said that 'Woltz demonstrated that gladiolus foliage is extremely susceptible to fluorides acquired through the leaves or roots.' (Woltz et al., 1953; Woltz, 1964). At 1.17 ppm F the number of days that chrysanthemum foliage lasted was decreased by 13%, but this regression was not sufficiently high to be significant. (Waters, 1968b). In 1976 it was found that the use of superphosphate containing 1.0% F produced leaf scorch in lilies and gladiolus. (Woltz and Marousky, 1976).

(3) The Synthesis of Organic Fluoride Compounds.

A possible hazard of fluoridation, which does not appear to have been taken into consideration, was mentioned by Professor Hugh Sinclair (1963), now Director of the International Institute of Human Nutrition, Oxford. He said that probably the greatest authority on organic fluoride compounds is Dr B.C. Saunders of Cambridge, who stated:

'I, too, am very worried about the fluoridation of public water supplies.' 'I am particularly worried about the possibility of a build-up of F- into organic compounds containing the C-F link when all said and done the plant "gifblaar" is able to do precisely this. Are we sure

that there are no other plants or bacteria which can bring about this lethal synthesis?'

Professor Sinclair explained that by 'lethal synthesis' Dr Saunders was referring to the fact that 'gifblaar' makes fluoroacetic acid which is synthesized in the body into fluorocitric acid, and this poisons respiration in cells. Sir Rudolph Peters (1964) pointed out that fluorocitric acid is a very potent poison, because minute amounts of it block the normal metabolism of citric acid, 0.1 mg per kg body-weight can kill a dog. There are variations in the toxic doses. The monkey is less sensitive than many other animals, and this appears to be true for man. Sir Rudolph Peters said that at comparatively low concentrations, broad beans and cabbages become very poisonous to aphids, and that those who worked on this problem 'were worried by the danger implicit in the persistence of the compounds in the soil.'

In Queensland and the Northern Territory 'Georgina poisoning' has seriously affected cattle, sheep and goat production since late last century due to eating Acacia georginae. (Barnes, 1958). The plants in different areas exhibit a wide range of toxicity to cattle, and there may also be a seasonal variation of toxicity in individual trees. (Murray et al., 1961). It has been found that this plant can synthesize fluoroacetic acid as does the South African 'gifblaar' mentioned above. (Oelrichs and McEwan, 1961).

In 1975 Dr A.L. Knight said that fluoroacetate is found in certain plants in Australia, Brazil and South Africa. He said: 'There is no antidote. A couple of drops

by any route is likely to be fatal.' In Israel 'Approximately 36 species of plants which belong to various botanical families are known to contain fluoroacetate.' (Egyed, 1973).

Is it possible that such a 'lethal synthesis' could be made by a Victorian plant when watered with fluoridated water (which it has not encountered in its evolution) instead of with rainwater or water having its normal, pre-fluoridation, very low level of fluoride?

(4) Will Fluoridation Affect Marine Life in Port Phillip Bay?

Another uninvestigated, or at least unreported, aspect of fluoridation of Melbourne's water, is the question of the effect of the discharge of fluoridated water into Port Phillip Bay. Owing to its shape, there is comparatively little interchange between its water and the ocean, and most of this will affect, primarily, the bay water near the Heads. Evaporation will increase the salinity of the water, including the fluoride concentration, and rainfall will decrease it. A former Minister of Health (Scanlan, 1973) stated that the fluoride level was 1.4 ppm, a concentration which closely approaches 1.5 ppm F, which is the U.S. maximum tolerance limit for marine life in oceans and estuaries. (U.S. Environmental Protection Agency, 1976).

In 1974, the German Association of Gas and Water Experts expressed 'its decisive rejection of fluoridation' because it produces:

'... an unjustifiable encroachment on the environment of a toxic substance which would find its way back into our food through waste waters and water courses in an uncontrollable fashion.'

In Melbourne, much of that waste water will ultimately reach the Bay.

The Department of Health of the German Federal Republic said, in 1976, that:

'Where fluoridation of drinking water has been introduced, it will be necessary to also supervise and study the possible ecological side-effects and possible hydro-geochemical impact on the areas into which the fluoridated water is discharged. This will be necessary to detect such influences and take counter-measures before irreparable damage can occur.'

Bishop Harbor in Tampa Bay, Florida, has become a marine graveyard due to fluoride waste from a chemical company (St.Petersburg Times, Mar. 14, 1970). (It has since been reported that in May, 1976, Captain Jaques Cousteau confirmed that finding.)

The question is: Will the additional fluoride content of the rivers and drains, resulting from fluoridation of our water supplies, be sufficient in the future to enable the 1973 level of 1.4 p.p.m. fluoride to approach a level which is critical for marine life? The possibility should be studied.

* See appendix 5a, p. 263.

** See appendix 4a, p. 259.

CONCLUSION.

Just before the Health (Fluoridation) Act was passed in 1973, the President of the Victorian Branch of the Australian Dental Association said that fluoridation 'is absolutely safe from the medical viewpoint' and that the dental advantages are well proven. (Dooley, 1973). Similar claims were made on behalf of other endorsing bodies. It is clear that those assurances were accepted by the members of Parliament, otherwise the Act would not have been passed.

Those claims are now untenable.

The German Association of Gas and Water Experts (1975) said:

'If there is a potential danger that a certain substance may cause chronic disease in man, then its use for human consumption should be banned even if there is no patent evidence that it will do so.'

Similarly, Sir Arthur Amies (1975) said:

'The case against fluoridation medically requires only such evidence as is necessary to support a reasonable doubt. Where the public's health is concerned no reasonable doubt can be ignored.'

He considered that the doubt about fluoridation was 'more than reasonable, it is considerable.'

A recent editorial article (1979b) in the 'Geelong Advertiser' demanded a more stringent standard:

'In health terms, the question we have to ask ourselves is whether it has been proved beyond all doubt — not beyond reasonable doubt — that the fluoridation of water supplies is safe. If there is doubt, then compulsory fluoridation of our water supply systems should not proceed.'

* See appendix 4g, p. 262.

In the four years since Sir Arthur Amies said that the doubt about the safety of fluoridation was 'considerable', the evidence against its safety has greatly increased. There is now no doubt that some people are intolerant to fluoridated water and become obviously ill when they drink their domestic water. Almost certainly far more people are less affected, the side effects being attributed to the stress of life or to other causes, the last factor to be suspected being the water in their home taps.

Of particular importance is the finding of Drs Yiamouyiannis and Burk (1977) that there is a correlation between the use of artificial fluoridation and an increase in cancer mortality. Intensive and expert criticisms of that finding (mentioned in section XXII) failed to fault either the data or the statistical methods used. Therefore
 * this correlation 'has not been convincingly refuted in the
 ** two years since its publication.' (Diesendorf, 1979).

During the past year the public has become aware of the disastrous effects of some of the drugs which have been prescribed, and in some cases obtained readily without prescription, for up to thirty years before being banned. Many papers have been published recently which deal with the ill-effects of fluoride on the total environment. It would now seem prudent to investigate ways of decreasing, not increasing, the total amount of fluoride to which people are exposed. One consideration is the cost of health
 *** services to the affected people and the loss of production due to undiagnosed illness from fluoride intolerance.

* See appendix 11, p. 273. ** See appendix 18, p. 280.
 *** See appendix 4d, p. 261.

The dangers of artificial fluoridation are literally inescapable. Unless, of course, we have the sense to acknowledge this fact and to discontinue now, as European countries have done already, a project which was set up with good intentions on what was then considered to be the best advice available.

August 20, 1979.

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A number of the following references refer to newspaper reports, for the great majority of letters regarding fluoridation were not sent to scientific journals.

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APPENDIX

Since this submission was completed in August, 1979, a number of important reports have come to hand which support or supplement the points mentioned in the submission.

This recent material appears below:

- 1a. (See p. 28). The Melbourne 'Truth' of October 20, 1979, mentioned the case of Dr Geoffrey Smith, formerly the dentist at the hospital in Proserpine, Queensland, where the water supply is artificially fluoridated to 0.7 p.p.m. The article stated that Dr Smith had said that the Queensland health authorities had forced him to resign because of his highly controversial investigation.

This found that 32 of the 150 children (21%) attending the primary school had dental fluorosis. The details of his examination and his conclusions were sent to the Queensland health authorities. Dr Smith later ('Truth', November 24, 1979) stated that no moves to check his findings had been instituted 'until Truth put the pressure on'. Two days later an investigation was commenced by Health Department dentists: Videroni, W.T., and McEniery, T.M., October 30, 1979. An Investigation of Children under Treatment at the Proserpine State School Dental Clinic with Particular Reference to Fluorosis.

This investigation confirmed the finding of Dr Smith that there was a high prevalence of dental fluorosis in Proserpine children. In 339 children examined at the State

School Dental Clinic, this Health Department report said that:

'... excluding "questionable" fluorosis, there were a total of 55 cases in "very mild" category or above. This gives a general prevalence rate of 16.2%.'

It is apparent that the authors included all the "questionable" cases with the "normal" ones, thus minimizing the prevalence of fluorosis.

Their report does not state the sex or ages of the children, nor how many of them were in each of the three groups of children: (i) 'Exclusively Proserpine Town Water', (ii) 'Fluoride Tablets during the first four years' and (iii) Children who had not lived in Proserpine for the whole of their first four years nor taken fluoride tablets at any time during that period. Calculation, using the published fluorosis indices, suggests that these groups contained 84, 56 and 199 subjects.

The authors mentioned 34 cases of "questionable" in the (84 + 56?) children in the first two groups, but omitted the fluorosis data for the remaining (199?) children. Calculation suggests that there were approximately 32 "questionable" cases in those (199?) children. If, as is usual, these approximately 66 (34 + 32) cases of "questionable" had been included in the fluorosis group, the prevalence in the 339 children attending the whole State School would have been in the region of 36%, instead of the 16.2% given in this Health Department report.

Dr Smith's finding was the presence of dental fluorosis in 21% of the 150 children in the primary school.

1b. (See p. 120). This Queensland Health Department report by Videroni and McEniery indicated the danger of ingesting fluoride tablets in fluoridated areas. They found that in 84 children 'who had taken fluoride tablets during any of their First Four Years', the index of dental fluorosis was 0.53, obtained from 12 "mild" cases, 9 "very mild" and 23 "questionable" ones. The prevalence of fluorosis was stated to be 24% — "questionable" cases obviously were considered to be "normal" for this calculation of prevalence.

1c. (See p. 122). The Queensland Health Minister, Sir William Knox, was reported in the 'Brisbane Courier Mail' of November 2, 1979, as saying:

'... among 84 children who had been given fluoride tablets or drops during any of their first four years, the fluorosis index was .53. This was only slightly below the index of .6 at which fluorosis could be described a public health problem.' 'I believe it warrants a strong health education programme aimed at ensuring that parents do not over-fluoridate their children.'

The main lesson to be learned from these Proserpine data is that the much publicized wide margin of safety when drinking fluoridated water, exists only in the minds of fluoridation promoters.

2a. (See pp. 121, 211). An exactly opposite statement to that made in 1977 by Dr Levant, was made two years later by Dr Gavan Oakley the chairman of the A.D.A.'s Fluoridation Committee. The Medical Reporter of the Melbourne 'Age' of

December 5, 1979, said that Dr Oakley had stated that fluoride supplements should not be taken without a prescription where the water is fluoridated and that, in addition to increasing the chances of mottling, fluoride tablets presented a health risk from overdosing, especially when the tablets were flavoured.

The Fluoridation Committee was forced to make this tardy warning by disclosures in the Melbourne 'Truth', commencing October 20, 1979, that a boy aged two years had died after swallowing four flavoured fluoride tablets, that there was a high prevalence of dental fluorosis in children ingesting fluoride tablets in Proserpine, Queensland, and also in a private dental practice in Melbourne. This warning was issued 17 years after a similar one was given by the U.S. Public Health Service (see p. 120), so it would appear that the Fluoridation Committee has tried to hide from the Victorian public the fact that it is not difficult for children, in particular, to ingest toxic doses of fluoride.

The 'Truth' report of December 8 says that when Dr Oakley was asked why the Australian Dental Association had not previously warned strongly about fluoride tablets, he said:

'I'm pretty sure that it got covered (in the media) but it may not have got wide cover. We tended to bow out of the event after the towns became fluoridated because it was a pretty controversial issue and we had won the fight. I'm not saying we acted irresponsibly.'

Others consider it was irresponsible for the members of the

Fluoridation Committee, who knew the dangers, not to make sure that the public, and pharmacists in particular, were not warned. Dr Oakley attempted to place the blame on the drug manufacturers and pharmacists ('Truth', December 8) by saying:

'All chemists should know that particular kind of drug shouldn't be sold to people. Drug manufacturers should — if they're going to put fluoride tablets on the shelves — have a big notice saying: "Not to be taken in fluoride areas".'

This failure by all the authoritative health bodies to publicize adequately the danger of consuming fluoride tablets in areas with fluoridated water, has made many Australian children unwitting experimental subjects for a study of effects of fluoride overdosage. The Melbourne 'Truth' of December 8, 1979, reported that Dr Herschel Horowitz, of the U.S. National Institute of Dental Research, said that Australia was the only country which had double fluoridation. He said:

'We're aware of the recommended regimen in some areas in Australia. From the epidemic standpoint it's very interesting because we know of no other country in which this practice is being done.' Australian children were being given 'additional amounts of fluoride beyond what is considered optimal in most countries of the world.' 'It is of interest to see what these kids look like.'

The report said that Dr Horowitz will be one of a four-man WHO team which is to visit Australia next June to examine hundreds of children.

It is an indication of the rigid pro-fluoridation stance of Australian health authorities that they have done nothing to investigate this problem, obvious to anyone who knows the dangers of fluoride ingestion, which the WHO team

expects to complete in a period of only three weeks.

- 2b. (See p. 93). Dr Oakley was reported in the Melbourne 'Age' of December 5, 1979, to have made the remarkable claim that:
'Very mild mottling of teeth in fluoridated areas is a sign of sound teeth.'

3. (See p. 207). Mention of precision and reliability recalls the description of the fluoridation plant at Proserpine, given by the special investigator of the 'Truth' newspaper, October 20, 1979. He said:

'...fluoride was added to the city's water supply in a crudely constructed shed on the banks of a dry river bed, Stacked in one corner was a pallet of fluoride bags, each labelled with the word "Poison". Opposite this were two large metal vats in which council workmen said the fluoride was mixed. A few feet away was a simple pump used to inject the fluoride into the water supply.'

This appears to be a very primitive system, judged by the very stringent regulation of complex machinery laid down by Gabovich and Ovrutskiy (1977).

One wonders what happened when, soon afterwards, severe flooding inundated this area of Queensland, Proserpine being particularly seriously affected.

4. On August 30, 1979, Dr J. -Benoit Bundock, Senior Adviser to the Minister of Environment for Quebec, Canada, said:

'On the basis of preliminary scientific evidence the actual government, which took office in November 1976 decided to make a thorough review of the whole problem before implementing that measure.'

(He was referring to bill "88" which requested fluoridation throughout the province.)

This decision resulted in an important study, which included several little-investigated aspects of fluoridation, by a committee of ten (Lamontagne et al.). Their full report is not yet available to the public. The following material is taken from the Abstract of the Departmental Committee Report on the Quality of the Environment and the Fluoridation of Drinking Waters. Environment Protection Services for Quebec (mimeo., undated).

- 4a. (See p. 221). That abstract makes some important observations regarding the effects of fluoride on aquatic life. It stated:

'Recent studies have shown that the exposure of living organisms to concentration of fluorides above certain limits in the water environment produces cumulative effects of fluorides. Biochemical and morphological changes may occur in these organisms. Directly or indirectly these changes may restrict the capacity of these organisms to maintain their ecological position within the overall natural ecosystem.

The accumulation of fluorides in aquatic plants and fauna is a very important phenomenon because of its potential impact on all animals consuming these organisms. Recent studies suggest that the concentration of fluorides along the food chain is certainly not less than 10 to one.'

'It is also known that several aquatic plants can easily accumulate fluorides at levels which exceed by far the level reached by their environment.'

Lamontagne et al. continued:

'Fishes and other aquatic species tend to accumulate fluorides in their body mainly within the skeleton and the

exoskeleton. These accumulations may be very important according to different species. Furthermore, in the case of certain organisms (for example the crab) this accumulation may be responsible for lowering the rate of growth with a corresponding loss of weight and reduction of size of the individual.

In other cases, such as the frog, the embryonic development of their eggs is delayed when they are submitted to a concentration of 1 p.p.m. of fluorides. Similar effects are observed when tadpoles (larva of the frog) are exposed.'

'More specifically, the eggs of trout do not hatch when they are exposed to concentrations [of] 1.5 p.p. million of fluorides.'

The conclusion of the committee was:

'... there is enough evidence to conclude that the actual presence of fluorides above certain levels in the aquatic environment is causing important biological damage to both plant and animal systems.'

4b. (See p. 69). This committee appointed by the Government of Quebec referred to:

'.. the mediocrity of the literature demonstrating its efficiency in the prevention of dental caries.'

After mentioning laboratory experiments which demonstrated that excess fluoride can produce intoxication of cells forming the teeth, the committee said:

'On the other hand, it is much more difficult to accept arguments to the effect that water fluoridation at the proposed 1.2 ppm level is highly efficient in the prevention of dental decay. This level of administration appears to be a compromise between "an acceptable level of dental fluorosis" and some possible reduction in dental decay.'

4c. (See p. 92). Lamontagne et al., referring to the experimental study of the efficacy of fluoridation, said:

'It must be realized, however, that what appears a simple routine experiment is really a challenging problem which to this day has not been solved satisfactorily. It must be realized that the processes implicated in dental caries are estimated to be under the influence of a large number of variables.'

They listed more than fifteen of these and said:

'Multivariate analyses cannot cope with more than three or four variables and still retain some credibility. On the other hand longitudinal studies lasting for some twenty-five years are impossible to carry out. One must then turn to animal experimentation under controlled conditions.'

After mentioning the 'major difficulties' of such experiments they said, regarding the efficacy of fluoridation:

'Under those conditions, it is not surprising to find that there is no consensus within the scientific community.'

4d. (See p. 223). This Quebec Government committee made a similar remark:

'It would seem therefore that our preoccupations for the present should center on fluoride intoxication rather than deficiency.'

4e. (See p. 187). Referring to Dr Rapaport's work, Lamontagne et al. said:

'Because of the inherent limitations of such a study it would not have received a great deal of importance in the context of fluoride toxicity had it not been confirmed indirectly by studies carried out on other living systems. These other studies have now shown quite convincingly

that fluorides, by some unknown mechanism, seem to produce chromosome breaks and/or aberrations. These reports of unsuspected cellular damage are highly disturbing and merit all the attention of the scientific community.'

4f. (See p. 174). The committee continued:

'The second disturbing study is that of Yiamouyiannis and Burk which showed a higher cancer death rate in fluoridated cities than in comparable non-fluoridated ones. When first published, this study was ridiculed by Public Health Officials. More recently, however, it has been recredited before a court of law as a scientific study done according to the state of the art. It is rather amusing to find that courts of law are doing the work that Public Health Officials should have been concerned with.'

4g. (See p. 222). As a result of the recommendations of the committee:

'The Quebec Government declared a moratorium on compulsory water fluoridation starting August 1977. It is still enforced today.'

4h. (See p. 130). In addition, this abstract states:

'Fluoride is monitored by the Environmental Protection Services of the Quebec Government.'

4i. (See p. 60). Lamontagne et al. said:

'Distribution systems made of cement and asbestos or those made of cast iron coated with concrete linings tend to precipitate fluorides with a corresponding decrease in the level of fluorides when the water reaches the tap.'

(A spokesman for the water authority, the M.M.B.W., in January,

1980, said that, except for the smallest copper mains, the Board's policy was to line all mains with cement. Practically all this work had been completed and the remaining pipes would be lined as soon as money was available. The fact that we have pipes lined with cement may partially account for the failure of the Board to deliver fluoridated water at the specified concentration at domestic taps, as mentioned on page 61 and in Appendix 16.

4j. (See p. 61). Referring to technical problems regarding the maintenance of 'optimum' levels of fluoride, this Quebec committee cite an American study, based on 620 local fluoridation systems distributed throughout 12 southern states. This showed that 290 of these systems (46.8%) 'were distributing fluoridated waters whose concentrations were outside the prescribed limits, i.e. from 0.7 to 1.2 p.p.m.'

5a. (See p. 221). The fact that chemical levels can build up in the Bay was recently mentioned in the Melbourne 'Age' of November 21, 1979. Its Science Reporter (P. Roberts) said that Professor John Waid and Bruce Richardson, of LaTrobe University, had found that the level of highly toxic PCB chemicals (polychlorinated biphenyls) in Port Phillip Bay is as high as that found in the industrial regions of the United States. Mr Richardson is quoted as saying:

'PCBs are an incredibly long-lived chemical. Once they get into the environment they persist for a long time, more than 50 years. At this stage we know very little about the long-term effects on human beings of very low doses.'

5b. (See p. 203). This 'Age' report furnishes another illustration of the time it may take before the toxicity of a substance is recognized. It said that the safety of PCBs, which are related chemically to DDT, was first questioned in 1966 after it had been in common use for 37 years.

6a. (See p. 30). The campaign for fluoridation by the U.K. Department of Health has now been officially questioned. The London 'Daily Express' of October, 1979, reported that the British Government had begun to show doubt over the question: Is fluoride in drinking water safe? The Health Minister, Dr Gerard Vaughan, after meeting Dr Dean Burk, said:

'I regard Dr Burke's [Burk] evidence as too important to ignore and I have asked my officials to go into it thoroughly and report to me.'

The newspaper said that Tory MP Mr Ivan Lawrence introduced Dr Burk to the Minister, and had said that:

'Very serious questions are raised about the effect on community health.'

6b. (See p. 56). This article provides an up-to-date estimate of the number of people in the U.K. who drink fluoridated water. It stated:

'There is an official fund to help introduce the chemical, and the Department of Health under successive Governments has encouraged it.' Despite this encouragement: 'So far only a limited number of health authorities, like Birmingham and West Midlands, have gone in for fluoride, involving 4,500,000 people.'

7. On July 31, 1979, Justice John P. Flaherty wrote to the Lord Mayor of Auckland, N.Z., Sir Dove-Myer Robinson, from the Supreme Court of the Commonwealth of Pennsylvania, U.S.A. The following quotes are from that letter:

- 7a. (See p. 183). Early in 1979 a rumour was circulated in Australia and New Zealand that the Decision of Judge Flaherty, mentioned on page 183, had been overruled. Justice Flaherty wrote:

'You are correct that I entered an injunction against the fluoridation of the public water supply for a large portion of Allegheny County, Pennsylvania. I did this after a very lengthy series of hearings on the issue.'

'Contrary to your information, my decree has not been set aside by a higher court. Presently, the issue is on appeal to the Commonwealth Court of Pennsylvania, but the appeal involves merely the jurisdiction of the court — it does not involve the substantive merits of the case.'

- 7b. (See p. 157). Justice Flaherty said:

'The trial brought into my court experts on the subject of fluoridation, and I meticulously considered the objective evidence. In my view, the evidence is quite convincing that the addition of sodium fluoride to the public water supply at one part per million is extremely deleterious to the human body, and, a review of the evidence will disclose that there was no convincing evidence to the contrary.'

- 7c. (See p. 20). In his letter, Justice Flaherty revealed that:

'Since my decision [against fluoridation], I have received hundreds of letters, quite a few of which have been sent by physicians and dentists, all concurring with my decision.'

- 7d. (See p. 26). Justice Flaherty said that during the Allegheny County court case he had found that:

'.. the proponents of fluoridation do nothing more than try to impune the objectivity of those who oppose fluoridation.'

- 7e. (See p. 19). Comments by many proponents of fluoridation demonstrate that they have not carefully studied the original data. Justice Flaherty observed this during the court hearings and wrote:

'I seriously believe that few responsible people have objectively reviewed the evidence.'

In some instances the evidence is voluminous. In his court case there were twenty-eight hundred pages of testimony and many lengthy exhibits.

8. (See p. 202). The Wellington, N.Z. 'Evening Post' of October 27, 1979, published the following remarkable story, written by its columnist David McGill:

'At the age of 12, Helen Murray began fainting. Doctors diagnosed epilepsy, then rheumatoid arthritis, finally a killer arthritis. For seven years Helen was bedridden, her pain relieved with cortisone.' She read a book on nutrition by Dr Eva Hill and then visited her.

'Dr Hill took one look at the huge rotten peach bruises on parts of Helen's body and diagnosed fluoride poisoning. Helen is now on the raw fruit diet and non-fluoridated water from a spring. She is up and about, skipping and dancing.'

9a. (See p. 200). The Melbourne 'Truth' of November 3, 1979, reported that a two-year-old boy, who had been given one fluoride tablet a day since his first birthday, had died in Brisbane five days after becoming ill after taking four additional flavoured fluoride tablets. The death certificate gave the cause of death as : 'Fluoride poisoning'.

Immediately after swallowing the tablets the boy was taken to a physician who pumped out his stomach and recovered four tablets, but he became unconscious and was taken to hospital. Unfortunately the hospital staff did not know that fluoride is a severe poison. The senior registrar is quoted as saying:

'We wern't even aware it had a possible lethal dose level.

I don't think it was even listed in the poisons book.'

She said that the mother's explanation that the child had taken fluoride tablets had been ruled out because:

'.. there was no recorded case (of fluoride poisoning) in Australia that we knew of.'

Dr Hans Moolenburgh of Amsterdam, Holland, (see pp. 201-204) was reported in that article to have said, over the telephone, that:

'Fluoride is a poison that accumulates in the body. Obviously this child was very sensitive to fluoride but the diagnosis [of fluoride poisoning] is clear because everything happened so soon after ingestion.' 'When the body is saturated with fluoride, it takes only a small additional dose to push him over the limit. With this history, I think the extra tablets killed him.'

- 9b. (See p. 137). The Melbourne 'Truth' of December 8, 1979, pointed out that, despite the fact that Melbourne's water is fluoridated, fluoride tablets are still on sale.

In August, 1978, the Chief Pharmacist of the U.K. Department of Health and Social Security issued a directive to all 'General Practice Pharmacist Contractors' regarding the supply of sodium fluoride tablets, saying that they would be required to comply with certain conditions. This letter followed the publication in Accepted Dental Therapeutics, 37 ed., of the recommendations of the Council for Dental Therapeutics (1977) of the American Dental Association. (See pp. 120 and 209).

However, at least six manufacturers still (January, 1980) sell fluoride tablets in Victoria, the packages of which do not comply with those U.K. regulations, nor with the doses and usage laid down by that Council, in the following ways:

(1) In five the label did not give 'advice to consult a dental or medical practitioner or a pharmacist before administering the preparations.' (2) The necessity to alter the dosage in fluoridated areas was not mentioned by three manufacturers, one stated that the dose should be halved and one said to take only as directed if the water supply contained 0.7 p.p.m. fluoride. Only one package said that the dosage should be modified if the water contained more than 0.3 p.p.m. fluoride. (The Council on Dental Therapeutics recommended downward adjustment of the dose if the water contains 0.2 p.p.m. fluoride or more, and cessation of medication when the water contains 60 per cent of the 'optimum' for the geographic area.)

(3) All six brands sold packages with more than 100 tablets, but only one complied with the U.K. directive by using a child-proof container. (4) One brand did not specify any dose below the age of two years, but in the five remaining ones the suggested doses were twice that recommended by the Council for children less than twelve month old, four times the recommended dose for those aged 1 to 2 years, and in all six brands the suggested dose for children aged 2-3 years was twice that recommended by the Council. (5) Five brands suggested that pregnant women (in one case from the 4th to the 9th month) should consume 1½ tablets (1.5 mg fluoride) daily.

The 'Canberra Times' of December 6, 1979, said that a spokesman for the N.H. & M.R.C. had said that there was no evidence to show that pre-natal fluoride supplements (to women living in areas with fluoridated water) might benefit the unborn child and the council did not recommend the prescription of such supplements.

Of course fluoride supplements to pregnant women, whether they drink fluoridated water or not, were banned many years ago by the U.S. Food and Drug Administration. On December 19, 1978, the Chancellor of Fairleigh Dickinson University, New Jersey, referred to that ban, saying:

'The strange part of it all is that the Department of Agriculture tells farmers not to use fluoridated water, and of course, the F.D.A. forbade the manufacture of pre-natal fluoride tablets.'

One wonders how long it will be before the dangers of fluoride overdosage are recognized by our health authorities and for our regulations to fall in line with current practice overseas.

- 10a. (See p. 149). A recent case of failure to control the addition of fluoride at the water works had tragic results for the patients on kidney machines in one clinic in Annapolis, U.S.A. The various stages of the investigation into this incident were reported between November 20 and 29, 1979, in at least five newspapers: (i) The 'Washington Post', (ii) the 'Washington Star', (iii) Baltimore 'Sun', (iv) San Jose 'Mercury' and (v) the Annapolis 'Evening Capital'. However, this very newsworthy item apparently was not mentioned in any Australian newspaper.

The accident involved the discharge of 1000 excess gallons of fluoride solution, due to a worker leaving a valve of a chemical storage tank open during a period of 16-18 hours. This caused the fluoride concentration to rise to 15 times its normal level (ii).

- 10b. (See p. 196). This recent incident in Annapolis is a dramatic illustration of the danger of using fluoridated water for dialysis, not only for long-term treatment but also, if an accident occurs in the addition of fluoride, for very short treatment periods. The physician in charge of the clinic, Dr G. Mitchell, said:

'... eight patients began to suffer nausea, vomiting, weakness and burning sensations in the chest after an hour or so of treatment. All were taken off the machines.' (i).

Despite this, one patient died that evening. An assistant medical examiner said:

'There is no question that the fluoride caused the death.'

'The man had a bad heart, but the fluoride overdose added

an extra stress his system couldn't handle.' (ii). 'There was 30 times the normal amount of fluoride in (his body) tissues.' (iv).

Another patient suffered a heart attack, but recovered. State tests confirmed that there were high levels of fluoride in the seven surviving patients (iii).

The 'Washington Star' said that:

'While the federal government strongly recommends extensive purification for water used in dialysis, neither state nor federal law requires such cleansing procedures.'

It stated that:

'The Bio-Medical Applications dialysis center was using tap water filtered through a water-softening machine which is incapable of removing fluoride.' (ii).

After the patients became ill the clinic was closed, but planned to open soon after the 'installation of new filters' (i).

Presumably, the 'new filters' were capable of removing fluoride.

10c. (See p. 207). The truth of that statement, that adequate safety factors should be employed because of the lack of precision and reliability, is established by the Annapolis accident. The report in the Annapolis 'Evening Capital' of November 29, 1979, commented:

'State authorities said yesterday that the accidental spill of 1,000 gallons of fluoride into the city's drinking water supply probably would have gone undetected if kidney patients had not become ill.' 'The effects of the fluoride overdose is unprecedented because spills have never occurred in a city where a dialysis center is located.' (v).

It is clear that the plant operators did not realize

the danger. The spill occurred on November 11 and was discovered the next day, but the state authorities were not notified. The Baltimore 'Sun' reported that:

'Under the federal Safe Drinking Water Act, the spill should have been reported immediately after it occurred, health officials said. City officials said water department officials aware of the leak did not know the federal law and did not think the leak posed any health problem.' (iv).

(The patients did not undergo dialysis until a day after the spill was discovered.) Samples taken three days after the spill showed a level of 23 p.p.m. (iii).

It is uncertain whether any action would have been taken, for the chief of Maryland's Department of Communicable Diseases was reported to have said that:

'.. he did not believe the water posed a health hazard' (iv)
'.. a healthy person would have had to consume 50 to 100 gallons of the contaminated water to be in danger.' (ii).

Nevertheless, the Department of Health and Mental Hygiene ordered Pepsi to destroy 25,000 cases of soda and Coca-Cola 'an undetermined amount' of that product (iii, v).

The Baltimore 'Sun' of November 29, 1979, made the remarkable statement that:

'State officials said they simply do not know the effects of the higher concentrations, although they stressed that water with fluoride as high as 80 parts per million is used regularly in other parts of the world with no more ill effects than mottled or brittle teeth.' (iii).

If that statement correctly reports the remarks of the 'State officials', it is obvious that they were dangerously ill-informed, even if 80 p.p.m. was intended to be 8.0 p.p.m.

10d. (See p. 64). The addition of lime to fluoridated water, to reduce the acidity produced by the fluoride, is common practice.

The Annapolis 'Evening Capital' of November 29, 1979, reported:

'When public works personnel first noticed an increase in acid level of the water after the spill, lime was dumped into the system to neutralize the water as prescribed by normal procedures. Public Works Director Joseph Axelrod said that lime was introduced to combat the high acidic levels caused by the high amounts of fluoride while plant personnel were tracking down the cause of the problem.'

He was unable to say how much lime was put into the water (v).

11. (See p. 223). On July 9, 1979, the Senior Advisor the the Environment Minister for Quebec, Canada, Dr J. -Benoît Bundock, wrote to Judge Flaherty acknowledging receipt of his Opinion (November, 1978) in the Allegheny County court case. Referring to the finding of the inquiry into fluoridation set up by the Government of Quebec, Dr Bundock said:

'.. in so far as the carcinogenic effects of fluorides are concerned our Review Committee reached the same conclusions as you did in your Opinion.'

Judge Flaherty's Opinion (see p. 182) stated that he was 'compellingly convinced' by the evidence presented in his court regarding the study that was conducted by Drs Yiamouyiannis and Burk (1977), which found that cancer mortality rates were higher in fluoridated than in non-fluoridated cities in the U.S.A.

12a. (See p. 124). The Melbourne 'Age' of December 11, 1979, reported that the European uranium organization Urenco-Centic wants to build a \$500,000,000 uranium enrichment plant in South Australia. The technical director of Urenco-Centic, Mr J.

Parry, said:

'We are dealing with a safe, clean process which has no effluent. In Europe and the UK, our plants are situated close to centres of very high population. This is the safest industry we know.'

Despite Mr Parry's claim that there is 'no effluent' he is reported to have said that the only hazard from an enrichment plant was hexafluoride gas, but that very stringent precautions were taken to prevent gas leakages. He did not state how effective these 'stringent precautions' were in preventing the release of this highly toxic gas from established plants.

- 12b. (See p. 130). The Melbourne 'Age' of January 23, 1980, said that three new aluminium groups have begun talks aimed at setting up smelters in Victoria. The State Electricity Commission's chairman said that there were six or seven potential applicants for smelters. He revealed that the new Alcoa Portland smelter would have a 132,000 tonne capacity in the first stage, and this could be expanded to a 528,000 tonne capacity. (This would be more than five times the output of the present large Alcoa smelter near Geelong.)
13. (See p. 78). Those who are not satisfied with secondhand opinions and wish to examine the original data from the Grand Rapids, Newburgh, Evanston and the two Brantford trials, will find the full references in Sutton (1959, 1960), which comment on the controls used in those trials. Because of the many instances in which different reports from the same trial are not in agreement, it is essential to read, and compare, all the

reports from each trial rather than relying on the data and statements made in the final report.

The reports of those fluoridation trials were published in the following journals:

Amer. J. Publ. Hlth., 1950; Canad. J. Publ. Hlth., 1951, 1954, 1956; J. Amer. Dent. Ass., 1951, 1954-1958; J. Canad. Dent. Ass., 1951-1954; J. Dent. Res., 1948, 1950-55, 1957; Oral Surg., 1953; Publ. Hlth. Rep. (Wash.), 1950, 1953, 1956.

14. (See p. 126). The spread of fluoride contamination was mentioned recently by Professor Godfrey Tanner of Newcastle University, N.S.W. He was commenting on the proposal to establish aluminium smelters at Tomago and Farley, near Newcastle. The Sydney 'Daily Telegraph' of December 19, 1979, reported him as saying:

'Engineers are anticipating one kilogram of solid fluoride produced for every tonne of refined aluminium produced. Within a 5 km radius of the Alcan smelter at Kurri Kurri there is evidence of plant damage. If they don't improve the pollution control above the present level, there is certainly going to be damage to peach trees and other plants within a 5 to 10 km radius of Tomago and Farley.

This damage is not, therefore, going to be in just a small area. It will affect the western suburbs of Newcastle.'

On the A.B.C. television programme 'Work that was: Futures' on January 24, 1980, Dr Keith Windschuttle pointed out that fluoride fumes severely affect the development of grapes. Therefore the establishment of these proposed smelters in the Hunter Valley may menace this very important wine producing area and its large tourist industry.

15. (See p. 119). It is of interest that, according to 'The Australian' of December 10, 1979:

'The biggest toothpaste maker in Japan has stopped adding fluoride to dentifrice.'

'The Lion Dentifrice Company, of Osaka, has quietly switched to non-fluoridated paste, though it says it does not believe fluoride causes any ill effects on teeth. The switch was discovered after a town council in Hyogo Prefecture sample-tested all available brands of toothpaste.'

16. (See p. 62). Another instance of the lack of control of the fluoride concentration in the Melbourne supplies was cited in the 'Sun Easterly Supplement' of December 13, 1979. It stated that the Waverley Council had found that the fluoride levels at taps at seven infant welfare centres varied between 0.41 and 1.08 mg/l. The lowest and the highest values were obtained from samples taken from taps at the Wellington centre in August and October.

Early in December the council asked the Board of Works for an explanation for these variations, but no reply had been received.

(Subsequent inquiry on January 21, 1980, from the chief health surveyor elicited the fact that, seven weeks after their request, the Waverley Council still had not received a reply from the Board.)

- 17a. (See p. 125). A recent paper reported that the emission of fluoride into the atmosphere from one aluminium plant was 139 kg per hour between 1959 and 1968, and about 51 kg per hour

from 1968 to 1973. At that time the emission was decreased to the 1977 rate of 34 kg of fluoride per hour, which is '0.816 metric ton per day.'

Those data were obtained from a special 70-page supplement entitled Industrial Fluoride Pollution, Chronic Fluoride Poisoning in Cornwall Island Cattle, by L. Krook and G.A. Maylin, contained in the April, 1979, issue of The Cornell Veterinarian (Cornell University, Ithaca, N.Y.). This important paper should be read by those interested in fluorosis. The authors stated that:

'The object of the present study is to record yet another man-made pollution disaster and to interpret the pathogenesis of the osseous changes in view of recent advances in the understanding of bone metabolism.'

The source of the fluoride pollution was an aluminium smelter erected in 1959 by the Reynolds Metals Company on the south bank of the St. Lawrence River, State of New York, close to Cornwall Island, Canada, the population of which is exclusively Mohawk Indian.

17b. (See p. 126). The Cornwall Island farms surveyed were between 1.6 and 6.2 km from the aluminium plant. The authors stated:

'Chronic fluoride poisoning in Cornwall island cattle was manifested clinically by stunted growth and dental fluorosis to a degree of severe interference with drinking and mastication. Cows died at or were slaughtered after the third pregnancy. The deterioration of cows did not allow further pregnancies.'

- 17c. (See p. 81). An important observation in this study is the fact that there was a marked delay in the eruption of teeth.

It was found that:

'Delay in eruption of I_1 exceeds 1.5 years, of I_2 3 years, of I_3 3 years and of I_4 2.5 years.' 'The cause of delay in tooth eruption was shown in the present material.

Fluoride arrests resorption of deciduous teeth roots and of the supporting bone. By inducing one disease, fluoride delays the manifestations of another.'

That comment is of the utmost importance when considering whether fluoridation is efficacious.

- 17d. (See p. 93). Although the work was done on cattle, this paper gives a considerable insight into the development of 'mottled' teeth as a result of fluoride ingestion.

Krook and Maylin reported that:

'Mottling was not seen in the deciduous teeth but the incidence was great in permanent teeth. The incidence decreased with age, which, again, indicated that the more severely affected cattle had died.'

It is well known that the ameloblasts (which form tooth enamel) are readily affected by small overdoses of fluoride, producing faulty enamel, termed dental fluorosis, which has long been known to be 'the first objective indication of chronic fluorine poisoning.' (Ast, 1943). It is often assumed that the ameloblasts are the only cells affected. However in this study it was found that:

'The target cells for fluoride in chronic fluorosis were shown to be the ameloblasts, the dental pulp cells and the odontoblasts [which form dentine], and, in bone, primarily the resorbing osteocytes and also the osteoblasts.'

The original paper should be consulted to study the micro-photographs and other evidence which support that statement.

As a result of the poor quality of the enamel and dentine in fluorosed teeth, excessive attrition (wearing away of the biting surfaces) results.

'The incidence was great in permanent teeth. The attrition was very often so severe that the pulp was exposed. The edges of the teeth became very sharp. Attrition therefore interfered severely with mastication and this was, no doubt, a contributing factor to emaciation in ageing cattle.'

- 17e. (See p. 197). This paper reported the effects of fluoride on the periodontal tissues of 176 cattle. They were divided into three groups. Bulging of the gingiva (gums) occurred in 79.6% of a group of 98 cattle with deciduous teeth only, in 88.6% of 44 cattle which had both deciduous and permanent teeth and in 91.4% of 34 cattle with permanent teeth only.

The authors found that:

'Bulging of the gingiva occurred because of recession of alveolar bone with or without gingivitis from excessive mobility of teeth.'

Four cases were submitted for necropsy: (1) a 4-month-old male, (2) a 1-year-old male, (3) a 3-year-old female and (4) a 4- to 5-year-old female. In case (4) there was a mild degree of loss of the alveolar bone surrounding the teeth and in case (3) this loss was pronounced, the mandible was much enlarged in the molar region and the bone was brittle and shattered easily. The authors said that the cause of this alveolar recession was necrosis of the bone.

- 17f. (See p. 166). The data obtained from cattle on Cornwall Island show that fluorosis can arise not only from ingesting fluoride from water, but also that the fluoride content of food and of industrial atmospheric pollution may be important factors. In this study stunted growth was the most obvious clinical sign and laboratory tests 'provided conclusive evidence that the stunted growth was the result of chronic fluorosis.' It was found that the target cells in bone for fluoride were 'primarily the resorbing osteocytes and also the osteoblasts.'
- 17g. (See p. 134). The fact that fluoride is transmitted trans-placentally in cattle was demonstrated by finding the 'remarkable' level of 450 p.p.m. fluoride in a 7-month-old fetus.

Finally, one very important observation by Krook and Maylin regarding fluoridation, already mentioned in appendix 17c, should be repeated. They said:

'The delay in eruption of permanent teeth has also been reported in children in fluoridated communities.'

'The cause of delay in tooth eruption was shown in the present material. Fluoride arrests resorption of deciduous teeth roots and of the supporting bone. By inducing one disease [fluorosis], fluoride delays the manifestations of another [dental caries].

18. (See pp. 186 and 223). Late in December, 1979, Dr Dean Burk issued a news release. It was based on the summary of a paper which he is to present to the 4th International Symposium on the Prevention and Detection of Cancer, to be held in London-

Wembley, July 26-31, 1980. It stated that, according to studies made by the Dean Burk Foundation, Birmingham has now been found to have one of the highest, documented, increasing cancer death rate of any large city in the world. The basic population-mortality data for this study were obtained from the Office of Population Censuses and Surveys (OPCS) in London, through the courtesy of Sir Emmanuel Kaye.

The graphical data issued by Dr Burk on December 14, 1979, show that in Birmingham, for ten years prior to the introduction of artificial fluoridation in 1964, the cancer death rate per 100,000 people fluctuated from year to year, as is usual, due to various factors. The mean level was approximately 212, with a range of between 204.5 and 222.5, but it did not show any upward trend. However there was a marked rise in cancer death rates, recorded in these official figures, after the introduction of artificial fluoridation in 1964. By 1967, three years after fluoridation, the rate was higher than at any time in the preceding twelve years and it continued to rise rapidly (with the normal annual fluctuations) until by 1976-1977 it approximated 290 cancer deaths per 100,000 people (that is, approximately 2900 for Birmingham) — far higher than the figure of 222.5 which was the highest rate recorded in any pre-fluoridation year.

The news release said that:

'Fluoridated Birmingham has now been compared with non-fluoridated Manchester over the years 1971-1977, adequate OPCS data for which are available. After simultaneous standardization of all data for different age and sex population distributions in these two cities, with one of a variety of appropriate standardizing populations examined,

it was found that over 1000 standardized excess deaths per year are now linked with fluoridated drinking water in Birmingham as compared to nonfluoridated Manchester, and this standardized differential is increasing at a rate of over 100 per year.'

The release stated that all supporting tabular and graphic details of the foregoing analyses had been deposited for review with the Department of Health and Social Security (DHSS) in London, and with other organizations and parties in Britain and elsewhere.

- 19a. (See p. 124). An important recent discovery regarding pollution in Melbourne and Geelong, is that a giant vortex of wind over Port Phillip Bay is ensuring that Melbourne 'gets its own pollution back'. That statement was made by the Science Reporter of the Melbourne 'Age' of December 13, 1979, when reporting recent discoveries by researchers at the CSIRO division of atmospheric physics. Dr Kevin Spillane said that the vortex was the wake eddy caused by winds hitting the Alps. He said that the 100-kilometer wide eddy was present on two out of three of Melbourne's high-pollution days. This article stated that the level of photochemical smog, especially ozone, is already high in Melbourne. The ozone level exceeds the World Health Organization standard one day in five, and reached 25 parts per hundred million in 1976.

- 19b. (See p. 125). Most of Victoria's electricity is generated in the Latrobe Valley by burning brown coal. Dässler et al. (1973) reported that there is a massive escape of fluoride gas from European brown coal electrical power plants. If our

generators, also, produce fluoride pollution, a part of it may be reaching Melbourne and Geelong, for Dr Spillane is reported to have said that pollution from the northern Latrobe Valley could reach this Port Phillip eddy, which covers both these cities.

The 'Age' reporter said that the CSIRO finding could have implications for the siting of industry near Geelong and in the Latrobe Valley.

- 19c. (See p. 125). Dr Spillane said that pollution from Geelong would take about 40 hours of stable weather to reach Melbourne. (This pollution may include fluoride from the large aluminium smelter near Geelong.)

Conclusion

This appendix contains reports which reinforce the previous conclusions — that to ingest or inhale fluoride is dangerous to animals, as well as to man.

When the Health (Fluoridation) Act was passed by the Victorian Government in 1973, little mention was made of what is now known to be a very important factor — the absorption of fluoride from sources other than water, including atmospheric pollution. Our parliamentarians were assured that fluoridation was safe. However this new evidence makes it increasingly clear that those assurances were not justified.

The Quebec Government committee (Lamontagne et al., see p. 259) said:

'It would seem therefore that our preoccupations for the present should center on fluoride intoxication rather than deficiency.'

The first step in preventing fluoride intoxication in the population, and the pollution of our environment by fluoride, is to halt the intentional spreading of this toxic substance. This has been done by countries in Western Europe which, after many years of experience, have banned fluoridation. We must follow their lead and discontinue forthwith the practice of adding fluoride to our water supplies.