

**Errors and omissions
in Fluoridation: Errors and Omissions in Experimental Trials**

Last year the Melbourne University Press of Australia published an 83 page book let by Mr. P. R. N. Sutton entitled *Fluoridation: Errors and Omissions in Experimental Trials*. It is now being circulated to a limited extent in the United States at \$1.75 per copy, largely among members of the small but vocal group of antifuoridationists. To those who are not as informed on the subject of fluoridation as they might be, Mr. Sutton's observations may sound plausible— so plausible in fact as to influence their better judgment regarding the proved merits of this anticariogenic measure.

The following review, prepared by J. Ferris Fuller for the January 1960 issue of *The New Zealand Dental Journal*, is herewith republished in full as it skilfully points out many of the errors and omissions in reporting which Mr. P. R. N. Sutton less skilfully employed in compiling his observations on the errors and omissions in fluoridation.

“Everyone is out of step except our Albert,” or so the author would have us conclude. Altogether an extraordinary book; clever but unfortunate; skilfully contrived and yet— stripped of its finery — rather slender. It could be ignored if the matter rested within the sciences; but since by the very nature of the subject it takes us into the public forum, some of the errors must be stated.

Part 1 of this book is a reprint of a paper by Sutton and Amies that appeared recently in the *Medical Journal of Australia* criticising the Brantford-Sarnia- Stratford study in Canada. But the authors have omitted to read the literature, and their criticisms therefore are not based on the known facts. This is a serious matter especially when the comments come from two critics who exalt themselves above fellow scientists of at least equivalent status in other parts of the world. They accuse the Canadian workers of failing to devise a randomisation procedure that would eliminate bias, of deliberately omitting vital information in some of the tables, and finally of displaying bias in the presentation of results. Their comments are based on a report of the Ontario Department of Health (1956) to the Ontario Minister of Health, a report obviously written in simple abbreviated terms for public consumption. Sutton and Amies failed to read two official publications readily available, namely, a 51-page booklet *A Suggested Methodology for Fluoridation Surveys in Canada* and the 35-page detailed report of the Department of Health and Welfare, of November, 1955. These two booklets together show that great care was taken to introduce a well-designed randomisation procedure, that examiner variability was eliminated as far as humanly possible by the employment of one examiner only throughout the whole period of the study, and that the information alleged to have been omitted is in fact shown in detail in the tables in the 1955 report, together with the standard error for each of the indices used. In short, the more important criticisms that appear so damaging are in fact without foundation. Thus, when the authors say that “what must be eventually a statistical study does not appear to have been designed as such” and “no attempt at statistical evaluation has been considered,” their comments are absurd and, indeed, irresponsible. The full official report on the Brantford study was available in New Zealand, incidentally, when the Commission of Inquiry held its hearings and three of its tables are included in the published report of the Commission.

In Part 2 of the book Sutton continues in the same vein. He complains that misleading comments are made in some reports, yet his own book contains many misleading statements. For example, he claims that a proper evaluation of examination errors at Grand Rapids has not been carried out, and he doubts the accuracy of caries attack rates in test and control areas because x-ray examinations were incomplete or absent. It is significant that he omits to refer to a report by Hayes, McAuley and Arnold published in the U.S. Public Health Reports in December, 1956 which is a key reference in this subject. This report met the specific point that "some observers have suggested that x-rays are essential to determine the efficacy of caries control measures" and an investigation was undertaken "to determine whether or not supplementing direct observation with x-ray examinations would affect the conclusions based on direct observation alone." The conclusion was that supplementary x-ray examinations supported the clinical findings and did not change the basic observation that substantial decreases in dental caries occurred during the test period. The very standard errors that Sutton demands for a proper statistical evaluation were available in this report. He quotes a subsequent (1957) paper by McAuley that suits his book and, in the light of his criticisms and allegations, this makes the omission of any reference to the 1956 report more damaging. To borrow his own phrase, omissions of this nature render his work "open to doubt."

Sutton criticises his overseas colleagues for their inability to examine children in control towns prior to fluoridation. With personal experience of a study of this nature he would appreciate that where on the one hand the interests of a large number of people and their local bodies and institutions are concerned as compared with only one or two examining personnel on the other, it is almost impossible to operate a plan to the exactitude dreamed of at the statistician's desk. In any event, the criticism is rather meaningless as far as the Grand Rapids study is concerned when we realise that the baseline examination in the control city of Muskegon showed that caries prevalence in that city is of the same order as in Grand Rapids.

In attacking the Evanston-Oak Park study, Sutton bemoans the lack of information about the design of the study and phrases such as "It is not clear . . .," "It is not understood . . ." "(It) was not stated . . ." give the lead to questions and speculations that follow. But why not adopt the simple expedient of writing to the workers concerned and so finding out instead of speculating? This attitude is typical of the book. And typical also is the quibbling over details that do not detract one iota from the part that fluoridation has played in these areas in reducing dental decay. "The total tooth surfaces considered . . . should be 58,325, not 58,352" says the author, and also . . . the mean of these values for 1946 . . . is 150.09, not 149.76." Dear me, Dr. Sutton, how dreadful!

And then we come to the Newburgh-Kingston study. Prominence is given to the different composition of the waters at Newburgh as compared with the control city of Kingston, and this is cited as the reason why the latter is unacceptable as a control. But once again Sutton omits any reference to a key report, that by Dean, Arnold, and Elvove of August, 1942, listing caries prevalence rates in communities where the variables in the domestic water mentioned by Sutton varied to a greater degree than between Newburgh and Kingston without caries prevalence being markedly affected.

The author complains of bias in the manner in which some results are presented but, as can be seen, he displays bias himself in the choice of articles he quotes and in his omission to read others. It is not surprising, therefore, to see him fall into the familiar pattern of the anti-fluoridationist. Those who question fluoridation are given the familiar title of "eminent

authorities," a distinction not afforded anyone else. It is surprising, however, to see him serve his ends by quoting Feltman's study on the use of fluoride tablets. This study lacks the very control that one would expect Sutton to consider essential.

As one would expect, there are no bouquets for the New Zealand Commission of Inquiry, one complaint being that "no mention was made of the employment of a statistician to assist its members in evaluating numerical data." Had the author inquired, he would have been told that the Professor of Biochemistry on the Commission was well versed in biometrics, and that scientific witnesses quickly discovered that tables were unacceptable unless they contained complete details including standard errors, so that he could evaluate data statistically for himself and the Commission.

Finally, a warning to those reading this book, lest they be misled by the polemics and the array of figures. Please note that Sutton's conclusions in part 2 (which forms the greater part of the book) are confined to variations in the prevalence of dental decay in control cities and not to the cities where fluoride has been added. What of the places where fluoridation has been adopted? Sutton does not dispute the fact that the prevalence of dental decay has been substantially reduced in the fluoridation cities of Grand Rapids, Newburgh, Brantford, and Evanston, nor does he mention that these good results have been confirmed by several independent studies in the U.S.A., and also in Tasmania, Brazil, Japan, Germany, Sweden, and at Hastings in New Zealand. The validity of the results from Hastings, incidentally, has been checked by the Applied Mathematics Laboratory of the New Zealand Department of Scientific and Industrial Research.

The anti-fluoridationists will rejoice with fresh ammunition to replenish their stocks; but it is unlikely that this work will serve any useful purpose in scientific circles despite the author's rather pretentious hopes. The performance is almost as old as Time: "The mountains are in labour, there will be born a ridiculous mouse," said the ancient poet.