HUNTER

Dental Hygiene

The Care of the Teeth

An address delivered by Mr. T. Hunter, C.B.E., Director Division of Dental Hygiene, Public Health Department, at a meeting of the New Zealand Branch of the British Red Cross Society and Order of St. John, 63 Dixon Street, Wellington, New Zealand, on Tuesday, 11th October, 1921.

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THE CARE OF THE TEETH.

Under the auspices of the New Zealand Branch of the British Red Cross Society and Order of St. John, Mr. T. Hunter, C.B.E., Director, Division of Dental Hygiene, Public Health Department, delivered a lecture on "The Care of the Teeth" at the Red Cross Chambers, 63 Dixon Street, Wellington, New Zealand, on Tuesday, 11th October, 1921.

Mr. E. P. Rishworth, President of the New Zealand Dental Association, presided.

Mr. Hunter said:—

One cannot but be struck with the manner in which, within the last 5 or 10 years, writers of the modern novel portray the heroine as being possessed of a beautiful and even set of teeth and the hero as having a strong, firm jaw and good teeth.

Such references are not new, for did not Sterne's hero, Tristram Shandy, go into ecstasies over "Such a pearly row of teeth that sovereignty would have pawned her jewels for them," and still further back in the hoary past the writer of the Song of Songs says of his beloved: "Thy teeth are like a flock of sheep that are even shorn which comes up from the washing."

Dental matters have of necessity engaged the universal attention of humanity since bipeds first cut their teeth in the Garden of Eden or elsewhere; and of a certainty, teeth will ever excite our admiration if good, and bring us into trouble if bad or defective. Per contra, very bad teeth and oral uncleanliness have always been offensive, not only to persons immediately concerned, but also to all beholders. Did not Coriolanus send a message to the deputation of citizens that would wait on him bidding them "Wash their faces and keep their teeth clean." In fact, from childhood to the time when "grinders cease because they are few," our teeth can never be forgotten, and yet with what little consideration do we treat them in this enlightened age.

The Hon. Dr. Collins has asked me to speak to you to-night on the subject of the Care of the Teeth, and I feel honoured in being asked to do so under the auspices of this association. I will endeavour to avoid statistics and technicalities as far as possible.

However, I consider it necessary before entering into the subject proper to say something about dental disease. There is no doubt that dental disease is far more prevalent in New Zealand today than it was 50 years ago. In varying degrees this may be said of all other civilised countries. It is without exception the most prevalent of all diseases. Taking a general view of the situation we find that it is only within the last century that it has assumed its present alarming proportions, so that broadly speaking it is a modern disease.

As Director of Dental Services to the New Zealand Forces during the war I am in a position to give you some idea of the prevalence of this disease among our troops, and here I would ask you to remember that these were the pick of our young manhood, selected for their physical fitness. In the early days of the war it is estimated that acting under British Army regulations our medical service found it necessary to reject, on account of dental defects, 33 1-3 per cent. of those presenting themselves for examination, but who otherwise were physically fit. This might have continued had it not been for the offer made by the members of the New Zealand Dental Association to treat recruits otherwise medically fit, prior to entering camps, and the formation of the New Zealand Dental Corps to treat the men in camps and abroad.

Examinations showed that the teeth of the men of the 1st Division were in a truly deplorable condition. In one instance where 150 men were carefully examined, it was shown that in each man on the average 16 teeth had been, or were, diseased.

The teeth of the men of the 2nd Division were in a slightly better condition, but even here, of 14,747 men examined in camp, it was shown that each man on the average had 6 defective

teeth, and that 37 men in every 100 required artificial dentures.

Recently, 251 cadets undergoing training in Trentham Camp were examined by the Dental Officer, and the result of this examination disclosed the fact that there were only 15 boys who did not require dental attention, the remainder presenting an average of approximately 12 defective teeth each. Taking into consideration the number of teeth already missing as the result of previous extractions, it might safely be stated that one-half of the teeth in each mouth were either defective or missing. Further examinations have since taken place and there is a wonderful similarity about the figures of each succeeding draft which points to the fact that all are uniformly bad. As these boys represented the youth of the Dominion educated at secondary schools, and were therefore among those probably better cared for than any other class of boys in New Zealand, the condition which presented on examination is a severe commentary upon the extraordinary defective dental condition of the pick of the country's future manhood.

In comparing the dental condition of these lads with that of the 2nd Division men of the N.Z.E.F. it is interesting to note that each cadet has on an average 6.5 more defective teeth than the soldier of the New Zealand Army. Emphasis is undoubtedly given, therefore, by the figures just quoted, to the contention that, unless preventive measures are adopted the incidence to caries of the teeth tends to increase in each succeeding generation.

The State Service for the examination and treatment of school children is yet in its infancy, but the figures in hand indicate that 90 per cent. require treatment.

You will notice I have been confining my remarks to conditions which exist in New Zealand, but the same alarming conditions are exercising the minds of the best thinkers in the medical and dental professions, as well as statesmen in all countries where civilisation has brought about this impasse.

I venture to say that dental disease, both from the individual and public standpoint, is undoubtedly one of the most urgent of all health problems.

THE DANGERS OF DENTAL DISEASE.

It is now being fully realised that the teeth play a very important part in determining general health. Digestion commences in the mouth and is the only part of the process we have under our voluntary control. It is dependent on thorough mastication for its success, and without a sound set of teeth this is impossible, for even one tender tooth will throw out of action the whole masticatory apparatus. It must be specially noted this loss of masticatory power is often out of all proportion to the number of diseased teeth. Thus two badly decayed molars, one on either side, will render the whole masticatory apparatus ineffective, producing a habit of bolting the food, thereby overtaxing the other digestive organs and favouring a sloppy diet which aggravates the trouble. This state of affairs is very common in children, the results being, briefly, malnutrition and general under-development of the body.

The possible effects on the system of swallowing millions of bacteria bred in decaying teeth or inflamed gums, and the poisons they produce, are now well known. The majority of cases of rheumatism, severe anaemia, disease of the alimentary tract, and many other diseases are in many cases recognised as being due to infection from decaying teeth and septic conditions of the mouth. There may be sufficient general vitality to resist this action for many years, but the time will surely come when defences will yield, and result, perhaps as late as middle life, in the physical disabilities that are so common nowadays, or in the failure of vital organs.

Infection from decaying teeth spreads to the throat and to the glands of the neck. Many cases of tuberculosis of these glands are caused by bacteria gaining an entrance to the blood supply through dead and abscessed teeth. Moreover, it is evidence that if the lining membrane of the throat were kept in a healthy state and free from the chronic inflammation due to dental infection the resistive power of the individual to scarlet fever, diphtheria, whooping cough, etc., would be more marked, and many such diseases would become much less frequent than at present.

An unhealthy, septic mouth forms an ideal culture ground in which germs of all sorts may flourish and multiply, and many cases of infectious disease are thereby transmitted from one person to another. In addition to decay of the teeth there are other conditions of the teeth and gums which contribute to the general infection of the system such as alveolar abscess, or gum-boil, and gingivitis or inflammation of the gums, which really is a mild form of scurvy. This latter may be followed by the more serious disease known as pyorrhoea, which attacks the bony sockets of the teeth, and, if allowed to progress, results in the loss of the teeth, and is extremely dangerous to the health of the individual.

Alveolar abscess is a condition caused by (or resulting from) the advance of decay to the pulp (or nerve) which first becomes inflamed, then dies, the resulting decomposition giving rise to infection and formation of pus or matter at the end of the root. This pus or matter, besides being continually swallowed, may be absorbed directly into the blood stream through the lymphatics, and thence to any of the vital organs of the body.

I have here shown some of the actual dangers of dental disease. The pain, suffering, and consequent tax on the system by such are so well known that they need only be mentioned.

To sum up, the diseases of the general economy following upon, or correlated with, local disease of the mouth, may be divided into the following groups:

(a) Diseases of nutrition.

(b) Diseases of the Alimentary Tract.

(c) Diseases of the Respiratory System.

(d) Diseases of the Nervous System.

(e) Diseases caused by Infections.

It may not be out of place, before leaving this part of the subject, to give you some of the opinions of leading medical and dental authorities with regard to this disease.

(1) Dr. Grieves, of Baltimore, states that in an investigation of some four hundred cases of septic anthritis which he and Dr. Bear, of Johns Hopkins University made, it was found that in every case the portal of entry for the infecting germs were blind alveolar abscesses.

(2) Dr. Horder, in a most interesting and suggestive paper laterly read before the Odontological Section of the Royal Society of Medicine, drew attention to cases of disease directly due to infection from the mouth, which had come under his own observation. He showed that among other affections, inflammatory diseases of the eye and skin were due to this cause, as well as cases of joint disease, sciatica and brachial neuritis, endocarditis, anaemia, and general debility.

A very important point insisted on by Dr. Horder is that "Ill effects depend upon the net amount of toxin absorbed by the circulation, and not upon the gross amount of toxin formed at the seat of infection."

(4) Sir Rickman Godlee, Past President of the Royal College of Surgeons, England, says: "I tried to make out how many diseases are supposed to be caused by oral sepsis. The number is appalling, amounting at least to twenty-six."

(5) The late Professor Sir William Ostler has said that if he were asked to say whether more physical deterioration were produced by alcohol or defective teeth he should unhesitatingly say defective teeth.

(6) Dr. Truby King has stated, and in this I fully concur, that "Decay of the teeth is not a mere chance unfortunate disability of the day. It is the most urgent and gravest of all diseases of our time, a more serious national scourge than cancer or consumption, and is the main precursor and cause of unfitness and disease in general."

(7) Dr. Chas. H. Mayo, the eminent surgeon of Rochester, Minn., declared that it is evident that the next great step in medical progress in the line of preventive medicine should be made by the dental profession.

(8) While in the "Parent's Review," Dr. James Wheatley, Medical Officer of Health for Shropshire, says: "We are in the fortunate position to-day of knowing how dental caries is caused and how it can be prevented. I have no hesitation in saying that the discovery of the essential cause of dental caries will rank as one of the greatest advances of modern medical science, and that so far as its effect upon the health of the people is concerned, it will probably be in the first place."

I think, perhaps, I have said enough to show you the very grave attitude to the question of infection of the body from diseased teeth taken by great authorities, and I may, perhaps, refer to matters of common knowledge and every-day observation. When we look round and try to find a set of really perfect natural teeth we are struck by the rarity of such a thing. One is also appalled to think of the amount of suffering, loss of bodily health and vitality that have been caused by the dental state that has led finally to the total loss of the teeth and the substitution of artificial dentures.

Now, there is still another aspect of the matter, and one which is only just beginning to be recognised by the rank and file of the medical and dental professions, and scarcely at all by the general public, and that is, that the same conditions that produce dental disease are predisposing causes to other diseases, and failing any other symptom, dental disease should be regarded as such, a danger signal, a warning—that conditions are unsatisfactory. Is it reasonable to expect that conditions which cause dental disease will leave unscathed other organs of the body?

The comparative indifference on the part of the public to this unsightly and dangerous disease is to me astonishing, and one can only suppose that its extreme prevalence has blunted people's sensibility in regard to it. Do you consider the farmer or the stock breeder would have allowed any such disease to have gained a hold in the same manner among his animals? Would they not have taken steps in the early stages to eradicate the disease, and failing this, arrange to obtain the best scientific knowledge obtainable in an endeavour to combat it? Are our children of less importance than the pig, the ox or the sheep? Are the maternal and paternal instincts becoming dulled, the line of least resistance being followed in the vast majority of cases, or is it due to ignorance of facts? I must leave the public to answer these questions.

Here is another aspect of the case:

New Zealand has a population of about one million and a quarter, approximately the same as that of the town of Glasgow in Scotland.

To deal with the disease and ill-health amongst this number we have, besides a well-equipped Government Health Department, 1016 medical practitioners, 751 dental surgeons, 626 chemists, 3140 fully qualified nurses. Besides medical and dental practitioners we have Christian scientists, osteopaths, chiropractors, faith-healers, metaphysicians, dental mechanics, etc., etc. In the number given of qualified medical and surgical nurses, Plunket and St. Helens nurses are not included. Besides the chemists there are stores all over the Dominion selling proprietary medicines, pills, and other nostrums, with puffs for which the advertising columns of our newspapers overflow.

Is this not a severe commentary, that in a country such as this, blessed as it is in every way as regards conditions which should result in a healthy and virile race, where we grow and rear all that is best and necessary in the way of foodstuffs, with healthy climate, good surroundings, better housing, less congestion, and better conditions generally than in older countries, yet we have all this suffering, disease, and expenditure of money, all non-productive, together with the vast amount of economic waste due to loss of production through illness and unfitness.

I have shown the extent to which dental disease has grown in our midst, and that it is still increasing. I have also shown its direct and indirect evil effects upon the system, lowering the resisting power of the body to all forms of disease, including epidemics. I have shown the tremendous cost in money, economic waste, and general loss in all-round efficiency due to dental and other diseases.

I have drawn a true picture of the present state of affairs, gloomy, no doubt, with skies overcast and threats of coming storm. Is there no break in the clouds, no gleam of sunshine? Yes. It is just that gleam of sunshine which constitutes my message to-night. Dental disease can be prevented, and I make that statement with a full realisation of my responsibilities in doing so. The matter is simple; in fact, so simple that I am afraid, like Naaman of old, disdaining the simple remedy prescribed by the Prophet, crying: "Are not Abana and Pharphar Rivers of Damascus better than all the waters of Jordan?" many people will protest: "Are not porcelain teeth, golden crowns, etc., better than all this worry about prevention?"

Before stating these preventive measures I should like to remove some of the more common misconceptions in the minds of the public regarding dental disease. First, regarding heredity. By many dental disease is regarded in their case as inevitable, their forebears being so afflicted, and therefore they think they cannot hope to escape. This is an utter fallacy. As a matter of fact, heredity is all in our favour, for we inherit a tendency to healthy organs from countless generations of healthy ancestors.

Our more immediate forebears may have been afflicted, but even here again this does not decide the dental efficiency of those coming after.

The mother, by accepting or neglecting her natural duties, may in a measure so decide, but even here much can be done on preventive lines after the birth of the child. Both parents may in themselves be dentally deficient, and yet rear offspring with excellent dental armatures.

All infants properly reared should have perfect teeth to start with, unless some general constitutional taint has rendered the whole economy incapable of perfect assimilation and tissue-formation. No, we cannot blame our poor ancestors for the present state of affairs, but is it not rather due to the stupid mistakes that accompany our much vaunted civilisation.

Another misconception fairly common is that decay of the temporary teeth is the natural process, and necessary for getting rid of these, to make room for the permanent set. This is another popular fallacy fraught with considerable danger to the growing child.

Perhaps this error is due in some measure to the use of, as I think, the unfortunate word "temporary."

The molars of these so-called temporary teeth should last undecayed from the age of two years till 12. Would you suggest for instance that a dress or a suit of clothes lasting 10 years could aptly be spoken of as a temporary garment? Now, the so-called temporary teeth are relatively much more important than is generally supposed, as they are in use during that period of life in which growth is most active, and the constitution of the child is being built up, and when adequate mastication in a clean mouth is essential.

Another common error on the part of many parents—and one of serious consequence—is to regard the first permanent molar teeth as temporary, and to neglect them accordingly. These molars usually erupt at about the age of six years and are termed "six-year molars." They do not replace any of the first set, but appear one on each side behind the first set in each jaw. You can easily remember when these come. At the age of six the front biting teeth are being changed and are to some extent out of use. Just at this time wise Nature arranges to supplement the masticatory apparatus by providing two pairs of large new grinding teeth behind all the others.

PREVENTION OF DENTAL DISEASE.

I now come to the most important part of my subject, namely, The Care of the Teeth. I have just stated urgent reasons for the necessity for such care. I have said my message to-night is that dental disease can be prevented, and the matter is in our own hands. It is a matter almost entirely of the wise selection of foodstuffs which modern science is showing more and more to favour perfect nutrition, healthy growth, and the proper functioning of all the organs of the body. Just as an army is dependent on its commissariat, so is the body dependent on the proper functioning of the organs of mastication and digestion. This is no new idea.

It is many years since it was shown that faulty diet caused rickets. It has long since been known that privation in certain articles of diet caused certain diseases. There have of late years been many discussions on the causation of caries and other diseases of the teeth. These discussions have elicited a great deal of speculation and learned talk, but, strangely enough, have almost entirely left out of consideration the central and very important practical fact that nine-tenths of the diseases of the teeth are due to a faulty system of dieting. I should like here to refer to recent research work carried out by Mrs. May Mellanby at the Physiological Laboratory, King's College, London University, under the auspices of the Medical Research Committee. In an article she says that the work has progressed to the extent that it is possible to state definitely that certain well-defined conditions are necessary for the growth of perfect teeth and jaws in puppies, and that it can be stated as a fact that puppies fed on a diet which produces sound teeth and well-formed jaws are just those which are the most resistant to the diseases common to this type of animal.

"Diet, without doubt," says Dr. Edward Mellanby, "is the key to preventive medicine."

Percy R. Howe, D.D.S., Boston, Assistant Professor of Dental Research, Harvard University, as a result of experiment, says that feeding diets that are deficient in respect to their vitamines do produce decay of the teeth in young animals and in some of the older. It makes no difference whether these disturbances are the result of an irregular calcium metabolism or the result of an infection, the control lies in the diet.

I do not intend to enter into the question of the care and feeding of the mother during the gestation period, nor the feeding of the child for the first few months after birth, except to observe in passing that as the teeth are built out of blood, and that the blood is made from the food taken into the stomach, and the air taken into the lungs, and that the first material used for the child's teeth is drawn from the blood of the mother, and that before birth the whole of the enamel of the temporary teeth has been finished and that the development has begun of all the teeth the child will ever have, it is obvious the mother should have proper diet, fresh air and exercise, especially in view of the fact that any deficiency is always made up at her expense.

I cannot do better than refer mothers and expectant mothers to the splendid work done by Dr. Truby King on this phase of the question, a summary of which has been published in pamphlet form and has been distributed widely throughout the Dominion.

I will take the question up from what might be called the transition period—transition from the toothless infant, to the child with a complete set of so-called temporary teeth, from a purely milk diet to a more solid and varied diet with which Nature obviously intended the teeth to cope, and for which the alimentary canal is so admirably adapted.

There is a false idea that has come to be looked upon as a truth that it is necessary during this transition period to provide a baby with much soft food. As soon as the first teeth begin to appear, however, the body demands a supply of hard food. It is Nature's indication and cannot be disregarded without serious results. The necessity for hard chewable food increases as the teeth are cut, up to the age of two years, at which age a child is better supplied with teeth for its weight and age than at any other period of life. The body is growing very rapidly and demands a good supply of good solid food, and is provided with masticatory appliances to deal with this.

Solid food may be referred to under the following headings:—

(a) Starchy food.

(b) Animal food.

(c) Fruit and vegetable food.

(d) Sugar.

Starchy foods, during the first years of life, as far as it is possible to do so, should be given in a form compelling vigorous mastication. This is essential for the following reasons:—

(1) The formation of the masticatory habit which most children nowadays have never acquired.

(2) The use of the natural organs to induce a proper blood supply for the growth of the jaws, teeth, and muscles.

(3) The avoidance of the "bolting" habit which is so common nowadays, and is so easily formed by the early use of sloppy foods.

(4) The necessity for a proper mixing of the food with the saliva, preparing the starch for further digestive processes.

The first starchy foods to be given should be wholemeal bread crust, or toasted bread with butter or dripping. This should be given when the biting teeth come into place, say, at the age of nine months, and as the other teeth develop it may become a regular article of diet.

Animal Food.—Which includes lean meat, fish, milk, and cheese. A child is just as much carnivorous as vegetarian. On the eruption of the front teeth a baby should be given a chop-bone or chicken-bone to knaw. This may be followed when the teeth indicate its need, say, after the tenth and twelfth months, by a little fish, fowl, or lean meat. This, of course, means a considerable reduction in the milk diet at that particular meal. As regards milk it must be borne in mind that it must be regarded as a food and not a beverage, and as other foods are added to the diet so the consumption of milk should be correspondingly reduced.

Fruit and Vegetables.—A little fruit juice or an orange section to suck may be introduced into a baby's diet, even before the buttered crust, and a piece of apple to gnaw should be given at the end of a meal after the front teeth are in position. Green vegetables, raw or lightly cooked, can be added to the diet when the necessary teeth appear and habits of mastication are established. The need for fruit and green vegetables for the growing child is becoming more and more recognised, as they supply certain vital properties in which many of the present-day foods are deficient. This applies equally to adults. I should like here to refer to the manner in which we as a rule greatly reduce the value of our vegetables as a food by overcooking them in an overplus of water so that most of what is soluble goes down the drain, leaving them practically flavourless and unpalatable. Under the circumstances can we wonder they play such a small part in our diet as compared with that of the French, by whom they are deemed worthy to be served as a course by themselves, or can we wonder why children do not as a rule care for them. Vegetables should be cooked in a minimum of water and what remains of the water after cooking should be utilised for sauce or soup. As vegetables are such a valuable article of diet I would strongly advocate that children should be taught to grow them for their own and parents' use on any spare piece of ground that may be available. I wish such a plan were posible in all schools.

With regard to sugar, but for quite exceptional cases, it is not found in Nature concentrated or en masse, but appears as a flavouring highly diluted and associated with vegetable acids, cellulose, etc. In this form it is altogether desirable in children's diet. In the manufactured concentrated article a child can consume in a few minutes as much pure sugar as is contained in 15 feet of sugar cane. Now, it is this abuse of sugar as an article of diet on which I wish to be very emphatic to-night. As a matter of fact, figures show that in New Zealand we are consuming per head of population more than any other country in the world. Our consumption for the year 1918-19 totalled nearly 160lbs. per head. This gives an average of nearly half-a-pound daily to every man, woman, and child in the Dominion. It is a significant fact that in countries and in cities where the consumption of sugar is high that dental disease has enormously increased. As an article of diet sugar in its concentrated form is not necessary to

human health and nutrition, and taken in more than restricted quantity, which our average much exceeds, it is an ever-increasing menace to the health of the individual and to the well-being of the community. As regards the teeth, there is no question in the mind of dental authorities that it is detrimental, and that sugar and sweet-eating habit is a vice that young children should never be allowed to acquire. Medical authorities add the weight of their warning voice when they assure us that its habitual use causes mucous congestion and catarrh of the stomach, disturbed nutrition and much vague ill-health, besides diminishing a child's appetite for more wholesome and less concentrated foods. I see that there is to be a considerable reduction in the price of sugar in the near future. This reduction, which is considered by housewives a great boon, I view with the greatest apprehension. Personally, I should like to see a heavy Customs duty put upon all sugars and confectionery, so that those who use it in excess may contribute a correspondingly large share through the revenue to the ever-increasing burden which its consumption places upon the shoulders of the general taxpayer for the upkeep of dental services, hospitals, sanatoria, etc., etc.

This principle has been admitted by the heavy taxation of alcohol, and there is no doubt in my mind that sugar and tea, used as they are in this country to excess, apart from the moral aspect of the case, are doing more harm to the health of the community than wine, beer, and spirits.

Sir Frank Colyer, L.D.S., England, says: "The Government has passed a Bill to prevent little boys smoking. If they had brought in one to shut up sweet-shops they would have done more good for the country."

With regard to beverages. The whole object of a beverage is to supply water to the tissues. Those in most common use are water, tea, coffee, and cocoa. As regards tea, coffee, and cocoa, perhaps the last is the least harmful, but as all are stimulants they should never, even diluted, form part of the diet of very young children. Not only is tea a nerve stimulant, but it interferes to some extent with the digestive processes.

It is being stated, and I believe with some truth, that there is a considerable increase in the consumption of alcoholic beverages by our young men and women. May this not be the outcome to some extent of a habit contracted during infancy in being supplied by parents with so much stimulant in the shape of tea? Is there any good reason why children should be given stimulants? Is it not possible that a craving for such in greater quantity and increasing strength will grow as years advance? Is there any excuse for parents taking this risk in view of the fact that tea not only is an unnecessary article of diet for children, but as I have shown is decidedly harmful? Children should not on any account be allowed to take liquid whilst food is in process of mastication, but may after such has been swallowed. It is of course preferable to postpone drinking till the end of the meal. The very prevalent custom of taking a mouthful of food and "washing it down" with some kind of liquid is one that cannot be too strongly condemned, and is a habit that young children should never be allowed to acquire.

Before leaving the subject of food I should like to mention certain elements which are essential to nutrition and health, namely, mineral salts and vitamines.

As regards mineral salts these are present in most articles of a rational mixed diet, but are practically absent in over-refined flours, rice, etc.

I am pleased to be able to say that as a result of efforts put forth by the Health Department, there is a growing enquiry for whole cereal foods, and that both millers and bakers are becoming alive to the necessity for meeting the demand

You have no doubt heard the word "vitamines" a good deal lately, and perhaps some of you were fortunate enough to hear the lecture delivered in this room by Dr. Hardwicke-Smith on the subject; if so, I will ask your indulgence whilst I refer briefly to these, as the name would imply, vital food constituents. I may say that so far there is little knowledge regarding their chemical nature.

At the present time three separate vitamines are known. They are associated with natural foods and can only be recognised by what they do to the animal body, or by what follows when they are specifically absent from the diet.

No. 1—The anti scorbutic factor is that one which, when absent from the diet, gives rise to scurvy.

The antiscorbutic vitamine is fairly readily destroyed by heat, the time factor being as important as that of temperature. It is found in the largest quantities in fresh foods, especially in fresh vegetables and fruit—the orange and lemon being particularly rich in this respect.

No. 2. Water Soluble B—Is largely found in the outer layer and more particularly the germ of cereals. It has a great resistance to heat,

No. 3. Fat Soluble A—This factor is present in most animal fats. From experiments it was found that although puppies grew when Fat Soluble A was deficient in their diet, yet the growth, and more particularly the growth of bone, was not normal, and rickets developed.

Public enlightenment is needed on the deterioration in food value of many foodstuffs by various trade processes. By some of these processes valuable mineral and organic constituents are removed, and the use of these foods, minus some of their natural elements, tends to engender disturbance of nutrition, leads on to more serious disease, and lessens resistence to microbic disease. Within the last few years we have learnt something of "deficiency" diseases, such as beriberi, rickets, etc, which are due to feeding on denatured articles, such as polished rice. A diet of refined denatured foods will certainly lack necesary elements and will give rise to malnutrition and deficiency diseases. Hence the necessity for advocating the use of whole grains, finely ground, containing all their natural salts and vitamines; such as wholemeal bread, oat-cake, oatmeal porridge, etc., for the daily consumption of fruits, vegetables, and and greens—remembering not to discard the water in which the latter are cooked but to utilise it again in the form of soups and sauces—for the use of natural sugars in preference to refined sugars. The removal of one substance essential to a healthy life marks the beginning if disorder, and even were it possible to know the exact element missing it could not be supplied by medicines or other artificial means in the exact organic combination or quantity required. This is quite apart from the obvious foolishnes of removing natural products from foodstuffs and replacing them by less exact pharmaceutical preparations. It is better and cheaper to buy our vitamines from the greengrocer than from the chemist.

The foods already advocated for the young child will not only provide all that is required for nourishment and the building up of strong and healthy bodies, but provide for proper mastication, tending to keep the mouth, teeth and alimentary tract healthy and clean, and eliminating that other modern scourge, habitual constipation,which has made of us a race dependent on purges and pills.

I am of course speaking of healthy bodies, but there are certain cases in which it may be necessary for a medical man to advise a course of more easily digested food when an organ is broken down, but that is no reason for advocating a sick diet for children and healthy adults even if they are not particularly strong.

Our over-refined and concentrated form of foodstuffs have resulted in a sub-normal digestion which has for too long been regarded as the normal, with disastrous results, the strengthening of the digestive apparatus seeming to have been lost sight of altogether. May I quote a passage from Dr. J. Sim Wallace in his work on Modern Dietetics in the Causation of Disease? Dr. Sim Wallace is regarded as one of the world's greatest authorities on this question:—

"I had been struck by the marked superiority of the teeth of those who ate the least soft and refined food, and also saw what appeared to me good evidence that those who had been brought up on, and continued to eat, natural, unrefined food, had a much better digestion than those who ate the most refined and apparently physiologically digestible food. In other words, I came to the conclusion that food which demanded efficient mastication was not only the best for the teeth, but for the stomach and intestines also.

"It is interesting to see how certain experimental procedures have given rise to most disastrous conclusions. Some experiments were made outside the body showing, it was supposed, how gastric digestion went on. Here was apparently unquestionable evidence set before one's eyes showing digestion going on in a glass bottle. It was seen that finely-divided particles were rapidly digested, whereas the process was slower if the pieces were large. Now, nothing could have been more natural than to advocate that the food should be refined, pulverized, or ground, so that the digestive juices would be more able to deal with it. It was not anticipated that this refinement would tend to make children swallow their food with little or no mastication. Nor was it expected that by habituating the child to swallow without mastication it would contract the habit of swallowing even lumps when these at times got into its food. Nor was it imagined that the teeth thus deprived of their natural function would decay and give rise to all the troubles to which we shall refer. It was not expected that this interference with the first stage of digestion would disturb nutrition and consequent healthy development.

"It was not anticipated that this disturbance of the health and nutrition of growing children would lead to a craze for more nutritious food. It was not seen that this craze for nutritious food would lead to a still

further elimination of the innutritious fibre which demands mastication, and is commonly associated with natural and unprepared foods. Nor that this would appear still further to necessitate refinement of the food and make it seem a necessary accompaniment of civilization.

"All these considerations are naturallly intimately associated with the physical development of the body, but they do not end here. The lowered vitality associated with weak digestion leads to susceptibility to other diseases."

Before leaving the question of the relation of diet to dental disease I must emphasise the absolute necessity for never allowing children to acquire the vice of eating between meals. Three good meals a day are quite sufficient for a child after it is weaned, and nothing should be allowed between. With many children and adults the between-meal feeding habit keeps the mouth constantly unclean, the digestive organs without the necessary rest and the stomach loaded with half digested and fermented food which never allows them to know what it is to feel fit and well. Nature has provided a healthy flow of alkaline saliva to remove traces of starchy food from the teeth and to keep them fresh and clean between meals, but how often does this get a chance to do its work properly. Perhaps the morning and afternoon tea habits are particularly to be deprecated. If we have these vices ourselves we must be prepared to pay the penalty for them, but do not let us allow the young children to acquire them if we value their teeth and their health.

A striking piece of evidence is contained in a report by Dr. Wheatley, Medical Officer of Shropshire. The report deals with (1) figures obtained relating to children grouped according to the amount of sweets they are reported to eat, and (2) pre-war compared with post-war figures. For the sake of brevity I quote the latter only:—

"The children aged 5 in 1920, have been subjected to war diet during the whole of their lives. This remarkable increase in the number of children aged 5 free from dental decay from 5 per cent. to 44¼ per cent. suggests that the extreme prevalence of dental decay cannot be due to hereditary influences. If we can get rid of the harmful habits of diet, dental decay can be largely eliminated in a generation.

"Of the dietetic factors it is likely that the wholesale reduction of sugar and almost total elimination of sweets was the chief; next, the larger proportion of grain in bread; the diminished consumption of milk may have been a factor."

In advocating a return to these more simple forms of food-stuffs it may arise in the minds of some people that this is a passing fad, I hope I have made it sufficiently clear that this is not so. We have gained valuable knowledge, both from the successes and failures of "food-fads," in the past, and we have learned most of the utter failure of the food faddists of the last fifty years or so, who have demanded for themselves and taught us to use denatured foods such as white flour necessitating complicated machinery to grind the grain to an impalpable powder more suited for the requirements of the bill-sticker than for food, for polished rice, for pearled barley instead of the whole grain; for other cereals, manufactured, cooked, and served in such a way, that it might be taken through a tube or funnel, and in most cases must be flavoured with a stimulant in the shape of manufactured sugar to suit a vitiated or impaired palate.

DENTAL HYGIENE.

I do not wish to minimise the value of artificial hygienic measures for the cleansing of the mouth and teeth, as under present conditions they are necessary in proportion to the degree to which we depart from Nature's physiological processes in the preparation of the food for the stomach.

If we lived closer to nature, none of these artificial means would be necessary to the maintenance of perfect health. But we do not so live, nor perhaps is it necessary to do so to enjoy a fair measures of good health. We can employ these artificial hygenic measures as adjuncts to Nature's fundamental physiological processes: yet we cannot interfere with those fundamental processes without interfering with development, and therefore health; and of all our organs, we have interfered with the functions of none so much —especially in childhood—as with those of the dental organs, and of them all none are of greater importance to the individual's health.

I have stated that under present conditions artificial measures are necessary for the cleansing of the mouth and teeth. These should be simple, and here let me remove the impression that seems to be prevalent in the minds of the public, due no doubt in a great measure to methods adopted by vendors in advertising their tooth-powders, pastes, etc. I refer to the impression that by any of the so-called antiseptic preparations you

can render the mouth aseptic for more than a few minutes. This is impossible and an utter fallacy. These for the most part do little, if any, good and in some cases are decidedly injurious to the delicate mucous membrane of the mouth. Tooth powders of an abrasive nature should only be used by adults and then but occasionally. To simplify the matter I would recommend as a mouth wash a solution of salt, half a teaspoonful to a tumbler or cup of water, to be used with the brush after meals and more particularly last thing at night, thoroughly rinsing the mouth after brushing.

This simple mouth-wash, whilst avoiding the harmful effects of most of the advertised sweet tooth-pastes and washes, is inexpensive, which is a desideratum in these days. The measures here suggested, should never be allowed to interfere with the natural and physiological means of preventing dental disease which I have stated here to-night. One year of vigorous chewing is worth many tooth brushes.

As you are no doubt aware the Government has instituted and is building up a service in an endeavour to treat the ravages of dental disease among the young in the schools throughout the Dominion. I have no knowledge of their future policy in this respect, but I certainly will not be one to advise them to continue to assume indefinitely such responsibility, if parents, after having such facts as I have placed before you to-night neglect their obvious duty and responsibility towards their offspring.

It may be suggested by some that what I have been advocating may be counsels of perfection, sound in theory but not in practice. In view of such a contingency I have provided myself with concrete evidence in the shape of models which I have here before me of the mouths of children who have been brought up by their parents in the manner indicated with the deliberate intention of testing the efficacy or otherwise of the methods suggested, and I am not surprised at being able to state that in every case the results more than justified the means employed, and that the parents are naturally delighted.

These cases are typical and can be multiplied sufficiently for us to be able to state that similar results will follow in every case. Further, these children have not been allowed to contract bad habits, and consequently are healthier, happier, brighter and more easily disciplined; and the parents have been exempted from an enormous amount ot worry. Then consider the reduction in the cost of living, which is a serious item in these days, for the foods advocated are cheaper and of better value, moreover, the expense of medical and dental treatment has been avoided, to say nothing of chemists' bills for pills and tonics.

I am fully aware of the difficulties in breaking children of habits already formed, but surely such should only be regarded as minor, and it is the parents' bounden duty, in face of these facts, to exercise their authority in the best interests of their children, failing which their conduct can only be regarded as criminally negligent, and on a par with that of parents who otherwise cruelly ill-treat their children.

If time had permitted I should like to have referred to diet as it is affecting children in private boarding schools throughout the Dominion. I can safely say that from observation in their surgeries the dental profession will agree with me that a radical change is called for in the interests of the teeth and general health of the pupils. Of course these errors will only be righted when parents are enlightened enough to demand that their children shall be treated in a rational manner as regards diet. In this I am not in any way suggesting parsimony on the part of the school authorities either as regards the quantity or the cost of the food supplied, but criticising the selection, cooking and sequence of the foodstuffs, which, if more wisely arranged, would also, besides tending to better health, help to reduce the cost of food and labour to the school authorities.

In conclusion I would summarise as follows: (1) Dental disease is increasing under present conditions to an alarming extent; (2) All medical and dental authorities are agreed that dental disease is a distinct menace to the general health and physical welfare of the people; (3) Dental disease can be prevented; (4) The means to be adopted are simple, economical directly, and even more so indirectly; (5) The same food that will build up and keep healthy sound teeth, will tend to build up and keep healthy all the other organs of the body, saving countless pains and penalties in later life.

Finally the people must be taught that the matter is in their own hands.

At the conclusion of his most interesting and instructive address a hearty vote of thanks was awarded the lecturer by acclamation.