

refer more particularly to the tincture of ferric chloride, the immediate effect being a predisposition to disturb the glass-like finish on the surface of the enamel, which in turn will favor the formation of bacterial plagues. Other acid preparations taken in excess into the mouth without any effort to neutralize would of course have the same effect to some extent.

It will be observed that I have made no suggestions or recommendations in regard to what drugs to employ in dealing with the various mouth-conditions, preferring to leave this to those whose line of thought is more in this direction. If I were to make any suggestions, it would be in favor of the only good mouth wash that I know of, and I do not hesitate to speak of it here. It is not often that I give a public testimonial, because this would be regarded as unethical and unwise, but I am going to disregard this unwritten rule, and testify to the merits of one particular mouth wash, because it is better than any other on the market today. I have no shares of stock in this to influence my boosting it, neither do I distribute it to my patients in the form of attractive samples, so you can see that my recommendation is made solely on the merits of the product.

I shall recommend this first, because I know it to be an antiseptic, a germicide, an alkali, an aid to digestion, and it is even reputed to prevent or retard caries of the teeth. It combines all these good features without containing one ingredient that is in the least harmful to the delicate structure of the mouth. Its action is both physiological and chemical. There are, however, one or two drawbacks to this mouth-wash; it is not always the same. While it is mostly alkaline, it sometimes changes and becomes strongly acid, and frequently the receptacle in which it is kept is at fault, being unclean both inside and out, thus changing its good qualities. These two faults may, however, be overcome with a little care on the part of the producer, whose attention has been repeatedly called to it.

Knowing all this to be true, I do not hesitate to indorse this product, which, however, is not in the public market as yet; it is nature's mouth-wash—the human saliva. My remarks are therefore in the nature of a plea for normal conditions in the mouth, and if these normal conditions cannot be brought about physiologically or by instrumentation, then medicinal agents must be resorted to, and as before stated these should be compounded to suit each individual case.

DENTIFRICES AND THEIR INGREDIENTS.*

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The question, what ingredients should make up an antiseptic dentifrice, is by no means simple. Chemicals may destroy the acid forming germs but at the same time so lower the natural resistive action of the tissues that the final condition of the mouth after treatment may be worse rather than better.

Clinical experience proves conclusively that unclean mouths exist where there is practically neither tooth decay nor tissue infection, and likewise shows that

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uncared for mouths exist where there are no bacterial deposits to speak of. This resisting tendency against the forces of infection may lie within the tissues of the mouth, but since the saliva seems unquestionably to possess, outside of mere alkalinity, a power to restrain enamel decalcification, it is easily possible that it may also exert some similar restraint on the infection of the remainder of the oral tissues as well.

The problem before us is as follows: The mouth contains certain self-protecting elements and tendencies against infection. When these are overthrown by a virulent bacterial invasion, infection results. In restoring health all bacterial deposits that can be readily reached should be removed mechanically, and the antiseptic washes to be used to assist in overcoming the remaining infection should supplant, not oppose the natural health-restoring processes of the mouth. That there are at least two classes of such health-restoring processes in the mouth seems indisputable: First, a substance or enzyme that is present for a specific purpose of special protection which is illustrated by the saliva's property of retarding enamel decalcification. The other class consists of an automatic power of resistance and self-repair which is illustrated by the power possessed by tooth enamel to reharden under partial decalcification, as well as its power to harden the surface when its softer under-substance is exposed by grinding to the saliva or air.

That saliva does possess the power of restraining enamel from acid decalcification is shown by the following test: A sound extracted tooth was placed in a sparklet or automatic soda-water-former in which the liquid could be charged from a carbon dioxid cartridge. Thirty cubic centimeters of saliva, which had been obtained by chewing rubber, were added. The saliva was then charged with carbon dioxid and the syphon placed in a culture oven for thirty days. At the end of that time the tooth was taken out. It appeared unharmed. The tooth was then wiped with a little ether to remove any grease, and replaced in the syphon with distilled water. This water was charged with carbon dioxid and the flask replaced in the culture oven for twenty-four hours. At the end of that time the enamel showed a chalky, rough decalcification that could be scaled off with the finger nail. The relative protective power, thus demonstrated, is exerted against lactic acid and various vegetable acids such as lemon, orange, grape, strawberry, rhubarb and cherry, the action of which formed the subject of a paper written by the author in March, 1908. Other tests reported before the New York State Dental Society meeting seemed to prove that enamel partly whitened and softened within a limited scope, might reharden automatically.

For instance, 1:1000 lactic acid and water at mouth temperature will cut tooth enamel in thirty minutes with a rough, white surface. A tooth placed in 1:500 lactic acid and some salivas will be unharmed. In this solution made with other salivas, after three or four days the enamel of a tooth, though perfectly smooth and to all appearances normal, can readily be pared to a slight distance with a lancet, and yet a 1:500 saliva and lactic acid solution has an extremely acid taste and instantly turns litmus brilliantly red.

Further tests and tables presented before the American Medical Association in June, 1912, and which will shortly appear in the American Medical Journal,

seem to prove with a fair degree of credibility that enamel rehardens from a partial softening due to the attack of an acid.

Thus, we see that the action of dentifrices and mouth antiseptics may have a very different action in different mouths. Salivas have different protective properties, and the same saliva in a mouth will show a great variation in its preservative power during various conditions of the system. It is possible that gout, diabetes, tuberculosis, arteriosclerosis, or even a bad attack of grip may reduce the vitality of the resisting agencies against deterioration and so make the use of a gritty powder much more destructive.

Experimental means of determining the strength of mouth antiseptics in vitro are subject to many fallacies. In the year 1904 I performed the following experiment: An old bridge, covered with bacterial deposits freshly removed from the mouth, was cut into small pieces, so that the bacterial deposits were undisturbed. These bacterial deposits were then submerged in various antiseptic solutions at mouth temperature for various intervals of time, at the end of which time the deposits were washed in sterilized water and test cultures made from them on blood serum. Peroxide of hydrogen made the best record of the antiseptics tested. But even with a 3 per cent. solution of peroxide of hydrogen and a submersion of five minutes, growths were nevertheless obtained on the blood serum. This test is significant inasmuch as it proves that to be effective, peroxide or in fact any antiseptic, must be applied in sufficient concentration for a sufficient time.

Clinically, peroxide of hydrogen gives excellent results in reducing oral infections. According to the experiments of Paul Bert and Reynard, it was found that all fermentations caused by bacteria were at once stopped by peroxide of hydrogen and the ferment was killed, while no effect was produced on enzymes and physiological ferments such as are found in the gastric juice and pancreas, so that it would practically have no effect on digestion, and yet it would inhibit the interfering action of micro-organisms.

Recent experiments in the Mulford laboratories under the supervision of Dr. A. P. Hitchens, indicate that a one per cent. peroxide solution has the same strength in inhibiting the growth of typhoid bacilli as a one per cent. carbolic acid solution. This is particularly interesting in reference to the antiseptic action of certain oxygen liberating dentifrices which claim to cleanse the mouth by the development of hydrogen peroxide. The idea is so excellent that it should be given encouragement by both pharmacists and the public at large, but none of the peroxide forming dentifrices according to the analyses that have come to my notice, have ever been able to develop more than .5 per cent. of free oxygen. This, as can be shown mathematically, cannot form more than 35 minims of the standard 3 per cent. peroxide solution for each hundred grains of dentifrice. Now, the amount of tooth powder capable of being put on an average tooth brush is seldom as much as ten grains, which ten grains or less of powder would have to be depended upon to deliver the antiseptic action to the mouth. These ten grains of tooth powder under the most favorable conditions would then deliver 3 1/3 drops of the official peroxide solution, no more. Three and a third drops, or even five drops, would be palpably inadequate to have any effect on the

bacterial masses of the mouth. Some of these preparations that claimed the power of sterilization by free oxygen, at times did not show the presence of free oxygen at all under analysis. This was due to some error in the manufacture, no doubt, but for practical antisepsis in the mouth it really made little difference, as three drops of peroxide of hydrogen would be so rapidly diluted and broken up by the oral tissues, that its antiseptic value in the course of half a minute could be hardly much more effective than so much distilled water.

Peroxide of calcium and peroxide of strontium, as recommended by many writers, are entirely too caustic to be used pure in the mouth. When placed in any quantity on the tongue they make a bad burn that lasts for days. However, the commercial preparation of peroxide of magnesium is bland, and, in my opinion, more useful. It comes diluted with magnesium hydroxide and carbonate, so that it yields from four to seven per cent. free oxygen, and is only soluble in about 15,000 parts of water (practically insoluble). This powder can be freely taken into the mouth in any quantity, liberating for every hundred grains enough oxygen to make 280 to 500 drops of a 3 per cent. alkaline peroxide solution. The commercial powder has just about the cutting grit of precipitated chalk, and when finely powdered, practically none at all. When the mouth is evacuated large quantities adhere to the interstices and necks of the teeth. This tendency may be turned to great advantage by the patient, for, while this powder is practically insoluble in water, it is readily converted into a soluble magnesium salt by any acid that may chance to be present.

But now let us discuss another phase of dentifrices that is even of greater importance than their carbolic acid coefficient. All thoughtful dentists must have noticed that there is a terrible disease that affects the mouths of those who are particularly careful of their teeth, and this shows generally between the ages of forty and fifty by the complete disappearance of the enamel in ever-spreading foci on the anterior surfaces of the front teeth. This has been explained by many as arising from an acid diathesis of the system—gout, rheumatism, indican, and the absence of the sulphocyanates, not to speak of the acid calcium phosphates. Now, no one would deny that there may be a systemic cause for this disease, but not to my knowledge has there been reported one such case in the mouth of a patient who did not carefully use tooth powder and brush, and as the loss of enamel is confined almost entirely to incisors, canines, bicuspid and first molars, it would seem strange that a systematic disease would not attack all of the teeth of the mouth with a certain amount of impartiality. Therefore, I felt that, while the disease might be partly systemic, it did not have, of necessity, to be so.

In 1908 I published in the "Dental Brief" experiments showing the effect of grits on the teeth, proving conclusively that tooth powders even of chalk were largely instrumental in cutting the well-known smooth grooves in the necks of teeth that so frequently appear from second molar to second molar. Although these tests were judged only from their macroscopic effect and no measuring instrument of precision was used, and although they were faulty inasmuch as they did not reveal the full extent and significance of the destructive action of pumice, chalk, etc., they were the beginning of a long series of experiments of which this paper is a partial summary. I, therefore, undertook a rather voluminous series

of experiments to determine just what would happen to the enamel and cementum of a tooth when brushed with an ordinary tooth brush and saliva, when brushed with certain mouth washes, when brushed with certain standard proprietary dentifrices, and finally what happened when brushed with plain precipitated chalk.

The first test was made to determine what was the effect of brushing the enamel and cementum for ten minutes with a new brush and saliva alone. No enamel loss was discovered but a loss of $1/10,000$ of an inch of cementum was noted. But, as many other tests with plain saliva discovered only a polishing effect on the cementum, it was finally decided that the first test was an accident, and that the plain brush and saliva seemed to have no harmful effect on cementum or enamel that ten or twenty minutes brushing could determine. Six of the most prominent and best advertised dentifrices were tested in the same manner, a new brush being used with saliva and dentifrice for each test, the brushing being continued for ten minutes.

Dentifrice No. 1, in ten minutes test, cut off $1/10,000$ of an inch of enamel and from 23 to 83 ten thousandths of an inch of cementum.

Dentifrice No. 2, under similar conditions, gave a loss of $1/10,000$ of an inch of enamel and $26/10,000$ of an inch of cementum.

Dentifrice No. 3, gave no loss of enamel and a loss of $66/10,000$ of an inch of cementum.

Dentifrice No. 4, gave a barely measurable loss of enamel and $121/10,000$ of an inch of cementum.

Dentifrice No. 5, caused no loss of enamel and $73/10,000$ of an inch of cementum.

Dentifrice No. 6, caused no loss of enamel and $7/10,000$ of an inch of cementum.

The only reason the powders with grit are so popular, in my opinion, is because they make the front teeth presentable with a minimum amount of labor. In brushing their teeth some patients wash for high neck, not for low neck, and, while this is partly due to laziness, it is also due to the inefficient unscientific teaching on the part of the profession who recommend methods of tooth brushing that a simple inspection of the mouth will show do not cleanse the teeth.

Having investigated some of the prominent proprietary dentifrices, I next applied the same tests to the standard chemical substances that might prove of value in mouth prophylaxis. I found, as would be expected, that ordinary precipitated chalk would cut the cementum and enamel. Thinking there might be an excess of silica in it, I procured precipitated chalk from a standard chemical company, guaranteed to be free from silica. It seemed to cut more than the others. I next tried the peroxide of magnesium in reference to its grit, and found in its coarse state that it had a friction grit on the enamel and cementum somewhat less active than precipitated chalk, but nevertheless a decided grit. When, however, the peroxide of magnesium was ground in an agate mortar to impalpability, no such erosion was attained, thus showing that in peroxide of magnesium we can have a grit slightly less than chalk down to almost no grit at

all, and also a tooth powder that will give abundant oxygen, so as to have a real antiseptic action on the mouth. I next tried the frictional action of perborate of soda, mixed with saliva, on a tooth and was not able to note that the Brown & Sharpe micrometer showed any erosive action. This was particularly gratifying as perborate of sodium is a bland salt that can freely be placed in the mouth without caustic action, and liberates 9 to 10 per cent. of oxygen, and in the presence of any acid that may be present forms a strong alkaline peroxide solution.

When patients come to me with spots of dentin showing underneath the enamel of the front teeth, I prohibit them from using grit dentifrices of all sorts and recommend that they brush their teeth with perborate of soda alone. And when these patients have been carefully instructed in the proper act of brushing their teeth, perborate of soda seems quite able to keep the teeth clean without the aid of grits.

For patients that have healthy gums with no tendency to gum recession or thinning of the enamel, I use the following formula:

Peroxide of Magnesium (No. 200 inch sieve).....	60 parts
Perborate of Sodium.....	30 parts
Pulv. Saponis	10 parts
Flavoring to suit.	

Tested with the latest method of brushing for ten minutes, this powder gave no loss of enamel and from 3/10,000 to 9/10,000 of an inch of cementum. It will be noted from the beginning of these tests that where erosion was demonstrated the demonstration was beyond question; but sometimes the presence of erosion was not noted owing to the absence of proper measuring instruments or incomplete technique.

Mr. Heidelberg of Mulford's laboratory has furnished me with three specimens of chalk. No. 1 sample was made by precipitation in 50 litres of water with very slow precipitation. No. 2 was made in 1½ litres and was so concentrated a solution that in precipitating them slowly the drops of calcium chloride did not mix with the soda solution, both solutions being poured together quickly in order to produce a precipitate. The slow precipitate, as was expected, gave a larger crystal than the quick precipitate. The larger crystals of specimen No. 1 varied from 17 to 5.6 microns in diameter. The smaller crystals of specimen No. 2 measured 4 to 2 microns in diameter. Mr. Heidelberg sent me also a purchased specimen of precipitated chalk that had been ground much finer than the precipitated crystals, and yet these three specimens seemed about equally destructive of enamel and cementum. This would indicate that it is the chalk, not the preparation that is responsible for its gritty destructive action.

Mr. Beringer also supplied me with some specimens of precipitated chalk, silicious earth, precipitated phosphate of calcium, precipitated carbonate of calcium, and some calcined magnesium (light) that I might test them for their erosive action, hoping that they might be less harmful as the table of all the tests will show.

Erosion tests with a tooth brush on a natural tooth, brushed for ten minutes with saliva solution and various grits.

	Saliva Sol.	Number of Minutes	Loss of Enamel in 1/10,000	Loss of Cementum in 1/10,000
Dentifrice 1.....	Joseph Head	10	1	26
Dentifrice 2.....	Joseph Head	10	1	83
Dentifrice 3.....	Joseph Head	10	0	66
Dentifrice 4.....	Joseph Head	10	a trace	121
Dentifrice 5.....	Joseph Head	10	0	73
Dentifrice 6.....	Joseph Head	10	0	7
Dentifrice Dr. X.....	Joseph Head	10	1	33
Dentifrice Dr. Head (old formula).....	Joseph Head	10	1	20
Dentifrice Dr. Head.....	Joseph Head	30	3	126
Various kinds of precip. chalk	Joseph Head	10	1-3	8-18-28
Magnes. Carbonate (precip.)..	Joseph Head	10	0	19
Precipitated Calcium Phosphate.....	Joseph Head	10	1	36
Tooth brushed with Saliva alone 8 times.....	Joseph Head	10	0	1 time-1 7 times-0
Magnesia Calcined.....	Joseph Head	10	1-3	27
Perborate of Soda.....	Joseph Head	10	0	0
Dr. Head's New Formula....	Joseph Head	10	0	3-9
Very fine Peroxide of Magnesia.....	Joseph Head	10	0	0
Saturated Solution Sodium Silicofluoride.....	Joseph Head	10	0	0
Hexamethylenamine.....	Joseph Head	10	1	1

Before closing, I should like to speak of some other mouth antiseptics that cooperate with the mouth enzymes rather than hinder them, although they do not (properly speaking) pertain to dentifrices.

Along these lines lies an interesting field for future investigation, but until the perfect enzyme is discovered, we should not fail to take advantage of the peroxide and fluoride antiseptics, since while they destroy bacteria chemically, they do not destroy the enzymes and ferments either of the mouth or of the stomach. And the fact that they do not destroy the enzymes, but seem to have a selective tendency for the pathogenic germs, may be one of the reasons they so rapidly restore inflamed oral tissues to a state of health, since instead of fighting the enzymes, they may assist them by reducing the number of bacteria against which the enzymes must contend.

In closing, let me briefly go over some of the points that might properly be emphasized. Tooth powders containing grits are harmful to both enamel and cementum and the patients should be taught to brush and cleanse the teeth without their aid. All stains that cannot be removed without the aid of tooth-cutting grit should be removed only by the dentist. Very finely powdered peroxide of magnesium, with 10 per cent. of soap and a suitable flavoring agent, will make a valuable antiseptic peroxide powder, and when left around the teeth at night will prove an invaluable antacid. For those who do not wish a semblance of grit in their powder, flavored perborate of soda can be used, both on the brush and in ten-grain tablet form as valuable mouth-wash tablets.

But I cannot bring this paper to a close without emphasizing the value of a saturated solution, in water, of sodium silicofluoride. It forms a 0.61 per cent.

solution. This may be held in the mouth for from two to five minutes, three times a day, by patients under treatment for pyorrhea. And while in some cases it does not retard the progress of tartar on the teeth, in many cases it most emphatically does, and as a supplement to scaling of the teeth, its healing effect on the inflamed gums is so satisfactory as to be little less than marvelous. It is non-poisonous and cheap, being readily purchased C. P. at 75 cents a pound, which is enough to make one-half to two-thirds of a barrel of mouth wash. And, above all, being a fluoride, it has the fluoride antiseptic qualities without affecting the porcelain fillings.

In recommending these new antiseptics for the mouth I wish to emphasize the fact that my observations as to their effect on the teeth and gums have been largely clinical and macroscopic. I believe that a close study of the first stages of enamel decalcification, such as occur before the enamel is roughened or whitened, will prove that many foodstuffs and ordinary therapeutic remedies are directly responsible for much of the general tooth deterioration of the present day. These new antiseptics of which I have spoken, I believe, are therapeutically valuable as an aid in treating the oral tissues, but whether in time they may prove to have undesirable action of a less harmful nature than the grit of chalk or the acid of lemon and carbon dioxide, no one is in a position to say. Nevertheless, as my next scientific work lies along this line, I hope to give more data on this important subject in the future.

DISCUSSION.

Dr. F. E. Stewart, Philadelphia: As you know, medicine is assuming a strong tendency towards the prevention rather than cure of disease, and dentistry is rapidly advancing in the same direction. The human mouth is a fertile field for the growth of bacteria unless it be kept in a cleanly condition. It is probable that the lodgement of infectious germs in the mouth and the favorable soil there for their growth is an important factor in the production and communication of infectious diseases. Though difficult to prove, nevertheless it is perfectly reasonable to believe that the germs of diphtheria, scarlet fever, measles and tuberculosis find the mouth an excellent place for continued existence. This has indeed been demonstrated in the case of diphtheria carriers, who, themselves immune to the germs, spread them broadcast as they travel about. Another important point is the influence of the condition of the mouth on the general health. The lowered resistance to disease from disturbances of nutrition, due to oral defects, and the pernicious physical state it causes are factors which must be taken into consideration. It is believed that enlarged tonsils are a predisposing cause of diphtheria, and it is well known that tonsillar enlargement is often concurrent with defective teeth.

Cavities in the teeth are culture fields for disease-producing microbes. In the mouth there is warmth and darkness, and these, together with decomposing food and decayed teeth, are most excellent conditions for germ life. Children and young adults are peculiarly susceptible to infectious diseases, and these are the persons in whom the teeth are most neglected. Dr. Jessens, of Strasburg, has revealed the startling fact that in his own state of the German Empire about 90 per cent. of the school children have defective teeth. An examination of 187,000 children in the public schools of New York shows that defective teeth more than double all other physical defects. There are at least 600,000 children in the schools, and in these statistics the physicians making the examination recognized only gross dental conditions. In the public schools of Boston the nurses find about 75 per cent. of the cases. Examination of the teeth of the children in Brooklyn develops the surprising fact that it is an exception to find a child with sound, normal teeth. These children are dental cripples. They are unable to properly masticate their food, which interferes with digestion, and, consequently, with full nourishment and proper growth and development.

On the other hand, it is a physiological fact that the teeth are integral portions of the body, and, as such, influenced by the state of the general health. Dr. A. Stayt Dutton in a naval paper on "The Cause and Prevention of Dental Decay," published in the Medical Press, London, England, June 7, 1911, states that from the result of his observations in England and Wales, he formed the opinion that the main cause of such a physical deterioration and decay of the teeth, as is present in British people, is due to the blood being defective in quality. He says that the likelihood of the correctness of this view is indicated by the results of the estimation of haemoglobin in the blood of the inhabitants in different urban and rural centers, which showed that the great majority of those from whom the specimens were taken had a percentage below 90, while in a large proportion it was below 80, and in many below 70.

Moreover, the effect of constitutional factors is a causative factor of decayed teeth. Tom's Dental Surgery states that almost every tooth was attacked during a case of rheumatic fever,—a complaint which quickly reduces the quality of the blood. This is said to be due to the secondary anemia which rheumatic fever occasions. Dutton believes that anemia is mainly responsible for the prevalence of caries. He also believes that unless the teeth have their normal share in the work for which they are made, they tend to atrophy or undergo degeneration, as in the case of other organs from disease. Therefore the condition of the food we eat plays an important part in the preservation of the teeth.

In this symposium we are endeavoring to place before you the subject of dentifrices and the proper care of the teeth and mouth. The exciting cause of caries is considered to be acids that are formed in the mouth by fermentation and putrefaction. These acids dissolve the enamel of the teeth, thus allowing the entrance of micro-organisms which cause disintegration. It is, therefore, assumed that the proper dentifrices should be alkaline in reaction to neutralize these acids, and also contain materials capable of scouring from the surface of the teeth the detritus from the food remaining on or between the teeth after meals. In addition to the food detritus, there is the peculiar formation known as tartar, even small deposits of which are difficult to remove from the teeth. It is believed by many that a tooth-powder containing such substances as pumice, for example, should be used, at least occasionally for removing the tartar.

You have listened to two notable papers this evening, one of which clearly proves that we are not right in our ideas regarding the scouring of teeth. That it is easy to destroy the enamel by keeping it clean, and, therefore, free from decay, has been thought of by some of us a long time ago, but we have not been in position to protest. Dr. Head seems to have proved beyond all question that certain dentifrices believed to be not only harmless but beneficent, are, in fact, very deleterious. We find ourselves in the position of the Turkish brigade who mistook another brigade of the same army for the foe and made a desperate and disastrous attack upon it. In our attack upon disease-producing bacteria in the mouth, let us not make the mistake of attacking the teeth themselves. Here is an excellent field for a pharmacist to do some original work. Dr. Head outlined a plan for making tests of substances used for toothpowder that any pharmacist can employ and know that what he dispenses for cleaning the teeth will not injure them.

We have listened to Professor Broomell's paper and learned that the pharmacist has a serious responsibility in his relations to the public and the dental profession in such matters. We have learned the reason why the pharmaceutical profession should cooperate with the dental profession in the onslaught against causes of disease. When the enormous importance of the teeth as a factor in preserving the health is considered, what excuse is there left for physicians, pharmacists, and dentists to neglect their responsibilities in this matter?

It is very desirable that we should have a free discussion of this important subject of dentifrices and the proper care of the teeth and mouth from the point of view of the physician, the dentist, and the pharmacist. We speak here to an audience far greater than that actually present. Our papers and discussions are published in the JOURNAL of the American Pharmaceutical Association. Our official organ not only has a large circulation, but exercises an influence far in excess of the size of its circulation list, and in no better way can we protect the public in relation to the care of the teeth than by discussing the subject at this meeting,

and thus placing before the pharmacists of this country the important data we have now under consideration.

There are in the United States about 35,000 practising dentists, about 40,000 retail druggists, and about 150,000 physicians. In spite of this army of practitioners there yet remains the fact that the masses are still woefully wanting in proper appreciation of the value of the teeth, and the majority (a very large majority) is ignorant of the dangers incident to their neglect.

SNAKE BITES.

One thousand two hundred and forty-four human beings died of snake bites in the Central Provinces of India last year (says the *Standard*). It is seldom that a European is hurt by a poisonous snake, because he wears boots and trousers; but the native, with his naked limbs, is always subject to the attacks of a hurt or frightened reptile. The most ready method of treatment has hitherto been the application of potassium permanganate, but it is now very doubtful whether this has been of any value. Colonel Dennys, Inspector-General of Civil Hospitals, has made a report on the history of the treatment, and has found that very few so-called snake bites can be properly certified. The patients have no doubt been bitten, but there is seldom any evidence showing that the snake has been a venomous one. A harmless snake may have inflicted the wound, and some special "cure" may get the credit of having saved a life that was never in danger.—*Pharmaceutical Journal & Pharmacist*.

DOES IT PAY TO ATTEND ASSOCIATION MEETINGS?

Does it pay the druggist for the time, trouble and expense involved to attend the meetings of his State or national association? The question might just as well be asked if it pays to eat, drink and sleep and keep on living; the answer depends upon what one gets out of life and what is considered satisfactory payment for the trouble of keeping alive; so it is with attendance at association meetings. As a people we Americans are too much inclined to estimate the value of efforts and things by a money standard; that is, if asked if a certain thing "pays" we base our answer on the return in dollars and cents. Of course dollars and cents are very useful and absolutely necessary in this present state of civilization, but they are only a convenient means of exchanging work and ideas for food, clothing, etc., they are not a measure of value for the real things that make life worth living, and the saddest mistake a man can make is to set up money as a standard by which to measure the value of his work and of himself. But, if there are any pharmacists who are so bound by circumstances that they must measure every act by the return in dollars and cents, no better investment can be made than that involved in attending association meetings. The man who cannot get new ideas and learn better ways of doing things by associating with the men who are doing things, in the informal ways of association meetings, is hopeless.—*American Druggist*.