

potassium iodide to 16.5 grammes of iodine per 100 Cc. was subject to decomposition. In view of the fact that the U. S. P. tincture of iodine contains 5 grammes of potassium iodide to 7 grammes of iodine per 100 Cc. it was contended that there is insufficient potassium iodide in Churchill's tincture of iodine to prevent decomposition and, therefore, a preparation which had been made for a time, would upon analysis show a shortage of free iodine.

A search of the literature failing to show any data on the subject, I reassayed an old laboratory sample in order to have facts upon which to base an opinion. Recently, I made another analysis of this same sample, the results of all analyses being as follows:

Date of Analysis.	Iodine. Gm. per 100 Cc.	Potassium Iodide. Gm. per 100 Cc.
December 17, 1914.	16.0211	3.9941
April 26, 1919.	16.0198	3.9800
May 18, 1921.	15.9110	3.9940

These results prove that Churchill's tincture of iodine is a stable preparation, there being no loss of free iodine after six and one-half years.

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## FRUIT AND ITS FUNCTION IN THE HUMAN ECONOMY.

BY R. A. KUEVER.

One of the wise provisions of nature is to protect the various parts of the human body in a careful and interesting fashion. The eye, for example, is protected by a bony structure practically surrounding it. The heart is not only protected by bony tissue to ward off blows, but by a set of muscles created largely for that purpose. Men who frequently engage in fistic encounters develop these muscles by exercise to withstand the more vigorous blows. The brain is protected by a veritable strong box of bone. So resistant is this box, commonly known as the skull, that it will withstand some surprisingly vigorous blows. It is not an uncommon occurrence for people to fall great distances, lighting on their heads, and yet sustain no permanent injuries. Only recently an unusual case is reported from Merrimac, Alabama: A man, who is at the hospital recovering, was kicked on the head by a mule. The animal was so seriously crippled by the impact that it was immediately shot. This, no doubt, is an extreme case, but it goes to show how well nature does protect.

The most interesting protection nature provides for the body is the fluids which bathe the various parts—the kidneys, the heart, the lungs, the stomach, the bowels; in fact, every organ. The teeth, the mucous membrane of the throat, the eye, the vocal cords, and the delicate cells of all the tissues are protected by these ever-present fluids.

Ninety-three percent of the body is water of which these protecting fluids are very largely composed. Only traces of proteins and mineral salts are found in them. Nature has provided and arranged this wisely and these fluids contain precisely what the tissues need to protect and, in many cases, nourish them. Without these fluids the various parts of the body would soon cease to function. With one or more of the constituents missing, their protecting power would be greatly impaired, if not entirely destroyed.

The amount of a given substance is no index of its importance. An example is iron. The average adult body contains from 2.5 to 3.5 grammes of iron—a mere trace compared with the entire weight, yet life would soon cease if the daily assimilation of iron, from 5 to 10 milligrammes, should stop. When only a part of this daily iron intake is affected a symptom commonly known as anemia results. Other examples of important substances existing in minute quantities are the hydrochloric acid, 0.3 percent, in the gastric juice, and the sodium carbonate, 0.25 percent, in the intestinal juice. In the absence of the hydrochloric acid, the ferment pepsin, which it activates, ceases to function and gastric digestion stops. In the absence of the sodium carbonate, intestinal digestion will cease since this alkali is necessary to activate the ferments of the pancreatic juice. Without gastric or intestinal digestion food assimilation is impossible and the body will soon starve.

These two very important substances, the hydrochloric acid and the sodium carbonate, are formed from the sodium chloride which is taken with food as a condiment. During the reign of Napoleon it was customary for the French to banish their political prisoners to an island where they were fed foods entirely devoid of salt. It is said that the average length of the life of prisoners so fed was three years.

When these protecting fluids are normal in composition they function as nature intends they shall, but when they become abnormal they may, entirely or in part, cease to perform their duties. Abnormal secretions may even bring about pathological conditions frequently mistaken for disease and treated as such. Nephritis—all acidosis for that matter is an example. The fluids become excessively acidic and set up an irritation. The irritation is not the disease and a treatment for this symptom will avail nothing. The disease is the cause for the change in the fluid and a treatment which will remove the cause for the excessive acidity will also allay the irritation. It is sometimes very difficult, if not impossible, to ascertain the reason for the change in the composition of the fluid. Fundamentally it is a violation of natural laws. This violation may be unconscious. Many of nature's laws are broken by present-day modes of living. Baldness is an example. Not until civilization combined the present head gear with our modern diet and the strain of business worries, did baldness exist. Not a single instance of baldness has been found among the uncivilized. However, races previously free from baldness soon accept the fashion of shiny domes as civilization is thrust upon them.

The fluid which has been affected most by the violation of nature's laws through the process of civilization, is the saliva, and while not generally known, the saliva, next to the blood stream, is the most important fluid. Indirectly more systemic symptoms, commonly called diseases, can be traced to pathological or abnormal saliva than to any other fluid in the body. Dental caries, commonly known as tooth decay, which has increased from 3 to 93 per cent in the past two centuries, is directly traceable to abnormal saliva. Dental caries is a chemico-parasitic phenomenon. Acids formed in the mouth by fermentation attack the inorganic portion of the enamel and destroy it. This inorganic portion is substantially tri-calcium phosphate. The acid formed by fermentation is substantially lactic acid. The lactic acid reacts with the tri-calcium phosphate forming mono- and di-calcium phosphate and calcium lactate. The salts are soluble and this solution, with the

removal of the calcium salt from the enamel, is the first step in dental caries. The organic structure of the enamel is collagen. When the tri-calcium phosphate has been removed by the process just described, the collagen is attacked by a proteolytic ferment, secreted by organisms in the mouth, and is digested and rendered soluble and hence the cavity is formed. These two processes are continuous and simultaneous and extend over varying periods of time. The initial acid attack merely causes a slight roughening on the enamel surface, which makes it easier for subsequent agglutinated food particles to attach themselves. After corrosion once begins, the tooth is soon doomed unless the deposits are constantly wiped off by careful brushing.

If food components are properly proportioned the acid formation is materially reduced and if the oral secretions function as nature intends, these acids will be instantly neutralized and the attack on the enamel prevented. Present-day diet causes not only excessive masses of agglutinated food particles to cling to tooth surface and ferment into acids, but it reduces the flow and increases the viscosity of the saliva to such an extent that it is entirely unable to cope with the acids that form. This condition is usually spoken of as "acid mouth."

Abnormal saliva is largely the cause of deposits on the teeth. These deposits are at first soft and mucilagenous and are known as mucin plaques. They soon gather up inorganic salts precipitated from abnormal saliva and then harden into what is known as tartar. The tartar produces a seat of gum irritation by getting under the margin. This irritated area forms an excellent mobilizing and multiplying field for the organisms in the mouth and soon develops into pyorrhea. With pyorrhea there is recession of the gums, a very rapid multiplication of not only the micro-organisms, but the pus and toxins they produce. Much of this poison is taken into the system by being swallowed and frequently produces infections of the heart, lungs, kidneys, bladder, stomach, blood-stream, etc., etc.

A normal saliva, then, plays a very important part, providing for the welfare of the teeth and mouth, and indirectly, the entire system. Unfortunately, civilization has brought with it a diet which has materially affected the fluids of the mouth—the oral secretions as they are known to the dental profession. The saliva is so changed that it cannot perform the protecting function for which it is intended. Unless a radical change in diet is soon adopted it is reasonable to suppose that the race will be toothless a century or two hence.

Fortunately science is unfolding a simple and pleasant way to overcome this condition and those who heed as they read may yet be spared the disgrace of a toothless progeny. The gospel of this corrective process in many steps, grouped together under the scientific name of oral hygiene, is being disseminated from many sources. Of these the dentist is perhaps the most authentic and efficacious. However, the school nurse, the municipal and industrial clinics, the child welfare stations, the physicians, and the manufacturer of dentifrices are all doing their part to acquaint the public with the principles and necessities of oral hygiene. This propaganda has been going on for less than half a century and extensively and intensively only during the last decade. From twenty-five to thirty million people in the United States adhere to the rules of oral hygiene, leaving seventy-five to

eighty million still to be reached. The pharmacist should take an active part in this campaign by distributing literature pertaining to the various phases of oral hygiene and providing proper and efficacious dentifrices and tooth brushes.

Unfortunately children, during their first dentition as well as the first eight to ten years of their second dentition, are most seriously affected. The present-day diet not only changes the composition of the fluid in the mouth so that its protecting power is impaired, but it brings into the oral cavity a food component which is easily changed into destructive acids. This food component is starch and more particularly the well-cooked or toasted variety, commonly known as prehydrolysed starch. Examples of prehydrolysed starch foods are pastry, pan cakes, toast, etc. Candy and foods rich in sugar fall in the same group. It must not be supposed that this important carbohydrate group can be eliminated from the daily diet, for it is necessary in a properly nourished body.

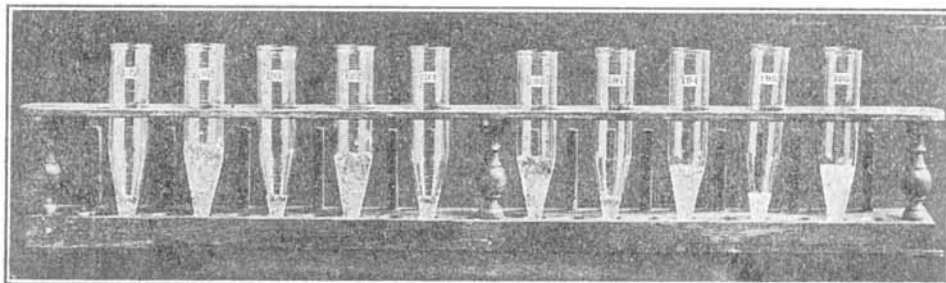
The present problem is to reconstruct our diet so that the saliva may perform its function normally. Some foods, particularly those of the carbohydrate group, have a depressing effect upon the oral secretions, making them more viscous and thus impairing their bathing and protecting power. Evidence of this is found in the desire for a drink of water after several pieces of candy have been eaten. Fruits, on the other hand, have a marked stimulating effect upon the oral secretions, making them more fluid and alkaline and increasing their bathing and protecting power. Evidence of this is the large quantity of fluid, alkaline saliva a taste of orange or lemon produces, and hence the expression, "It makes the mouth water."

A considerable portion of each meal should be fruit, preferably fresh, and if that is not available, preserved fruit. All meals should be opened and likewise closed with tart fruit products. By opening the meal with fruits the saliva functions normally. By closing the meal with fruit the saliva is left in a normal condition to cope with any acidity which may subsequently form. Food products like toast, pastry, etc., should never be eaten unless accompanied by tart preserves. Jam or jelly on bread is an excellent combination. Bread alone produces an abnormal condition in the mouth, while the presence of the jam or jelly overcomes that. The custom of beginning breakfast with a grape fruit or an orange is an excellent one. It should be extended to the other two meals. However, only one-half of the grape fruit or orange should be eaten before and the other half after the meal.

Apples are an excellent article of diet. Their mild acidity causes a salivary stimulation which brings about a normal condition in the mouth made abnormal by civilized diet. Grapes or grape products, such as unfermented grape juice, forms an excellent adjunct to the diet. Coffee, tea and cocoa are salivary depressants and have no place in the daily diet, especially if taken during the meal. Lemonade or buttermilk, on the other hand, will aid materially in bringing about a desired and normal condition.

Some fruits stimulate the oral secretions more than others. All fruits stimulate the saliva more or less and hence all fruit products are valuable additions to the daily diet. The following photographic illustration shows the amount of salivary stimulation the more common fruits produce.

Salads, composed of fruit or vegetables, with tart dressings are a necessary component of the meal. The importance of this has heretofore been entirely under-



The above photographic illustration shows how fruit juices stimulate salivary flow. Tube No. 191 (left) contains the saliva normally produced in one minute in the mouth of Mr. F——. Tube No. 191 (right) contains the amount of saliva secreted in the same mouth in the same length of time after stimulation by means of lemon juice. Tubes No. 192 (left and right) represent the same condition excepting in a different mouth with apple juice as the stimulant. Tubes No. 193–193 represent still another mouth and orange juice, while 194–194 shows the stimulating power of grape juice, and 195–195 that of pineapple.

estimated. The well-known combination of cakes and syrup, so frequently served at breakfast, is a most impossible combination. The very physiology and chemistry of the mouth indicates that nature never intended such a combination to be put into the oral cavity. In many cases titration shows the saliva distinctly acid two hours after such a breakfast has been eaten. Both syrup and cakes depress the oral secretions very noticeably, so much so in fact that a diluent is generally necessary to wash the coagulum down. Cakes, covered with tart preserves, however, produce an entirely different condition, one which is more nearly normal. Roast pork and apple sauce is a well-balanced combination, while thickened gravy on potatoes, and sugar and cream on rice, tapioca or breakfast foods, are distinctly incompatibilities. A good general rule is to accompany each bit of ordinary food with a bit of tart fruit product, masticating the two thoroughly together. The sanest and soundest dessert is of tart fruit with the demi-tasse entirely eliminated from the menu.

Hyperacidity, gastric indigestion and ulceration is so common with the American race that it is being referred to as the "American Stomach." Improperly constructed diet, directly, abnormal conditions of the teeth and oral secretions indirectly, have contributed to this extremely prevalent condition of acidosis. A carefully balanced diet will do a great deal to overcome the difficulty, especially those cases which are in the incipient stage. Experiments have proven that the alkaline indices of the secretions of the body can be increased six to eight times by the proper selection of articles of food.

The care of the mouth, including systematic brushing of the teeth, is very important, but secondary to the composition of the diet. Teeth should be carefully brushed five times daily,—upon arising, after each meal and at bedtime. Before retiring is the most important time to brush the teeth since the interval between this brushing and the one before breakfast is the longest in which any adhering deposits may ferment to form acids. Moreover, during the hours of sleep the flow of saliva is materially diminished and the teeth are deprived of its protecting influence.

The method of brushing is important as well as the selection of a dentifrice. The teeth should be brushed vigorously from the gums to the biting surfaces. The upper teeth, therefore, should be brushed only in a downward direction, while the lower ones are brushed in an upward stroke. In this way gum recession may be prevented. In brushing the upper teeth with an upward stroke and the lower teeth with a downward stroke the gums are brushed away from the enamel margin resulting in recession. Receded gums expose dentin areas which are very susceptible to decay. Under no circumstances should teeth be brushed cross-wise because this type of brushing will produce erosions.

Only dentifrices, either powders or pastes, which are mildly acidic in character, should be used because of the stimulating effect such preparations have on the oral secretions. Tart fruit juice is the most necessary and essential ingredient in a dentifrice. Soaps and other alkalis, so commonly found in the old-time dentifrice, are contra-indicated in the mouth. They found their way into dentifrices purely by accident, as history reveals, several centuries before the beginning of the Christian era. Their extensive use during the last century has contributed materially to the alarming increase in dental decay. Soap and alkalis are excellent detergents for the removal of fats and grease deposits and for this purpose largely employed in the laundry and kitchen. The deposits on teeth are albuminous, containing agglutinated masses of starchy debris and mineral salts. Alkalis will cause these deposits to become more adhesive. Alkalis, moreover, practically inhibit the flow of saliva, at the same time making it very viscous so that its bathing and protecting power is completely lost. Gies, of Columbia, urges the use of vinegar, diluted with water, as a mouth and tooth wash. Pickerill, of Otago, recommends a 1 % solution of potassium bitartrate. The latter would be the equivalent of a bunch or two of grapes, while the diluted vinegar might be compared with an apple so far as the effect on the oral secretions is concerned.

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### A WAR-TIME VISIT WITH A FRENCH PHARMACIST.\*

BY CLYDE L. EDDY.

Finding, as so many others had found before me, that my pharmaceutical qualifications were apparently of little use in the Army, I enlisted as a photographer early in the spring of 1918 and went overseas a few weeks later with the 39th Division—a husky lot of soft singing, hard swearing fellows from somewhere south of the Mason and Dixon Line. My equipment consisted principally of a Graflex camera and a .45 caliber Colt's automatic, a queer outfit, you will admit, for a man of pharmaceutical tendencies and training.

The division survived the trip across and the ordeal which had been prepared for all American troops landing at Brest; and the particular group to which I was attached arrived at length at a little village called St. Florent, where it was intended that we should be finally whipped into shape so that we, in turn, might finally whip certain members of the Potsdam crowd.

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\*Read before section on Historical Pharmacy, A. Ph. A. Washington Meeting, 1920.