

some more still in the intestines. How shall we study it?

S. Begin with mouth.

T. Very well. The mouth, the pharynx of the back of the mouth, and the gullet make up the first *foot* of the twenty-eight. Now, what do you do with the food in your mouth?

S. We chew it up fine with our teeth, mix it with mucus to a paste, press it back to the pharynx in a little lump and then we can't help swallowing it at a gulp.

T. Whenever the bolus of food is pressed back to the base of the tongue against the pharynx, the muscles right above the bolus contract and press it down the gullet; and for nine or ten inches a wave of contraction follows after the bolus until it is pushed into the stomach.

S. Why do the muscles contract in that way?

T. Why do you wink when I pass my hand near your eye? Why do you cough if anything is in your throat which should not be there? Whenever any part of the body feels anything touching it, it commences to act in some way as if it possessed a kind of knowledge that it had a particular duty of its own to perform. Very often we find that the different parts of the body appear to know and to do their duty better than the man himself. You can understand a fuller explanation of these things when you are more advanced.

But there was a mistake in the description of mastication given me. The food is mixed with more than the *mucus* of the mouth. If you only think of it, you can now notice a flow of liquid in your mouth; this flow is increased in the process of mastication, and you know it is called—

S. Saliva.

T. Right below each ear and behind the jaw is a salivary gland—called the *parotid* gland. When you had the “mumps” you could feel this gland swollen up into a great painful lump. Well, this gland makes saliva from the blood and pours it out through a small tube right opposite the second upper back tooth on each side of the mouth. Underneath the corner of each jaw is another pair of salivary glands called the *submaxillary*, and under the tongue we have a third group—the *sublingual* salivary glands.

S. And does the saliva digest any food?

T. The saliva contains a substance called *ptyalin*, which rapidly changes starch, especially if cooked, to sugar—a kind of grape or fruit sugar or glucose.

S. Is this sugar different from what we sweeten our tea with?

T. It is slightly different. It is just the kind of sugar that can be absorbed by the mucus membrane easily. It does not taste so sweet. But cane sugar

itself must be converted into a glucose sugar before it is a food, and the mucus secreted in the alimentary canal very rapidly and easily brings about this change.

S. The digestion in the mouth then, is the change of insoluble starch into soluble sugar.

T. Precisely. Prove it. Take a piece of biscuit or dry bread and chew it for a little time in your mouth. At first it is not sweet; gradually it becomes sweet. Is that not so?

S. Yes, it gets quite sweet. There is starch in potatoes, and they get sweet also when you chew them.

T. You can try another experiment when you go home. Pour some boiling water on a little starch, and when the thick sticky jelly-like paste is cool enough, put a teaspoonful in your mouth. It will be tasteless at first; but by mixing it with the saliva it very rapidly becomes both sweet and liquid. Now, what lesson should we learn from this?

S. That we should chew very well all foods containing starch, such as potatoes, porridge, bread, rice, sago and the like, so as to mix saliva with every particle of the starch in them.

T. Should we “bolt” such food in a hurry?

S. No, we should keep them in the mouth until we produce and can enjoy their sweetness, and then swallow.

T. Can you “bolt” a cracker in a hurry?

S. You might choke, it is so dry, unless you took a sip of tea with it.

T. Which would be the better way to get the nourishment of the bread, to chew it until moistened with saliva or to moisten it with tea?

S. To moisten it with saliva. If you moistened it with a liquid to enable you to swallow, the starch would not be converted to the soluble sugar.

T. See who can make a good rule of diet to prevent this form of indigestion?

S. Eat breads, and all starch-bearing food without mixing with drinks. Take the drinks only after the bolus lubricated with saliva alone has been swallowed.

T. Very good, remember that and grow to be a strong and healthy man.

In our next lesson we shall note what kind of digestion is accomplished in the *second foot's* length of the alimentary canal, the stomach. I may mention however, that in the saliva of most animals there is no *ptyalin*. What do you think of that?

S. I suppose they don't need it—They don't eat biscuit—They may “bolt” their food as fast as they can and it would not make any difference. I suppose their food requires to be ground well for stomach digestion all the same.