

walls of the University, where, in the closing words of the graduates' presentation address, "it will serve as a slight tribute to eminent services, as a testimony of affectionate regard, as a memorial which in the com-

ing years shall portray for our descendants who kneel at the shrine of learning and truth the priest who first kindled its sacred fire."

J. KING, M.A., Berlin.

SCIENCE DEPARTMENT.

[A series of Notes prepared for THE MONTHLY, by Henry Montgomery, M.A., Coll. Inst., Toronto.]

PTYALIN, which is the nitrogenous active principle of the saliva, has, for a considerable length of time, been generally regarded as an important agent in the digestion of starchy foods. Although there has been no doubt about the capability of saliva to convert *cooked* starch into sugar, if the saliva and starch are kept in contact with each other and at the proper temperature for a few minutes, yet many distinguished physiologists, while agreeing that saliva does perform such function in the human economy, have been unable to agree as to the particular portion of the alimentary tract in which this transformation is effected, and a few others have even gone so far as to doubt that such a change does ordinarily take place in any stage of human digestion by means of the action of saliva. The conversion of cooked starchy substances into sugar has been supposed by many to take place in the mouth itself while the food is undergoing mastication. Others, again, have held that the said change takes place in the stomach after the food has been well mixed with saliva and carried into the great digestive cavity where it is mixed with the gastric juice; and a third set of observers have believed the process to go on in both the cavity of the mouth and that of the stomach. Messrs. Flint, Brunton, Schiff, Ranke, and others, have held the last named opinion, *i.e.*, that the change begun in the mouth is, under normal conditions, continued in the stomach in the presence of the gastric secretions. On the other hand, high authorities like Bernard,

Dalton, Colin and Robin, say that gastric juice promptly arrests the action of saliva upon the amylaceous or starchy portions of food; accordingly, if the conversion of starch into sugar is truly a function of human saliva it must be accomplished either in the oral cavity or in the duodenum, or in both, and not in the stomach. Against the belief that much or any of the starch is changed into sugar in the mouth it is argued that it is not retained there for any considerable time, its passage being momentary, and only sufficiently long to admit of mastication of the more or less solid parts. With reference to this it is highly important to remember the fact, recognized by all, that saliva has no action whatever upon *raw* starch. Still, herbivorous animals possess large and highly developed salivary glands, furnishing a plentiful supply of true salivary fluid, notwithstanding the fact that the food of these animals consists almost entirely of uncooked starch, upon which saliva has not the slightest chemical action. It is to the pancreatic juice poured from the pancreas into the duodenum or upper portion of the small intestine that the function of converting raw starch into sugar really belongs. Again, carnivorous animals, such as the cat, dog, wolf and lion, have well-developed salivary glands and an abundant secretion of salivary fluid, although they neither require nor naturally partake of foods of which starch is an ingredient. What then are the functions of saliva in herbivorous and carnivorous animals? In man, and the inferior animals possessed of