

ly taught that the tissues lose their power to burn sugar and as a consequence hyperglycemia and glycosuria result. The glycogen of the liver disappears indicating a disturbance of its glycogenic powers. This view that the tissues cannot burn glucose arises chiefly from a study of the respiratory quotient which is generally lowered in pancreatic diabetes indicating a failure of the carbohydrates burning powers. This results in a stimulation of sugar producing metabolism and sugar is derived from protein. As the diabetes is more severe the amount of protein thus contributing to the glycosuria is increased. On this account Lusk proposed the dextrose nitrogen ratio in the urine as an index of the severity of the condition. On a carbohydrate free diet a dextrose nitrogen ratio of 3.6, or in some cases 2.8, indicates a complete loss of ability to use glucose and was designated the fatal ratio. Whether isolated tissues completely lose their power to use sugar is uncertain. At least they seem to store glycogen, and this makes the problem difficult.

The pancreas may be considered as playing its role in carbohydrate metabolism either by taking something from the blood or giving off some enzyme or hormone to it. Although there are many indications that an internal secretion is formed by the pancreas, it cannot be said that conclusive proof has yet been furnished. If a hormone is formed by the pancreas, it is not stored by the gland in any great amount but is given continuously to the blood and is rapidly taken from the blood or destroyed. At present, on the basis of the experi-

mental work being done, there seems to be no hope from glandular therapy. It may be noted in this connection that no drugs, enzymes, or years have been found to restore the lost function or replace it. The only treatment on a scientific basis is the dietetic.

Acidosis is so frequently associated with diabetes that it requires at least a word of explanation. It arises mainly from the incomplete combustion of the fats. Apparently fats may be completely oxidized only when carbohydrate is being simultaneously burned. As one writer has expressed it: "Fat only burns completely in a fire of carbohydrate. If the carbohydrate fire lags or goes out as it does in diabetes then the fat fire smokes. The smoke is oxybutyric acid."

It is not possible at present to state the relations of the endocrine system to carbohydrate metabolism. Removal or hyperfunction of several of these glands has been found to affect carbohydrate tolerance. Injection of extracts of some of them causes glycosuria. How far this is a primary and specific action on carbohydrate metabolism or how far it is secondary or related to a general depression or augmentation of body functions or to impaired absorption, it is impossible to decide. In this connection, Lusk says: "The subject of the correlation between the various glands of internal secretion is evidently one as replete with opportunities for the play of the imagination as it is for enlightening experimental research." It is toward such enlightening research that we must look for the solution of these perplexing but important problems.