action, which is simple and natural enough out of the body, assumed as taking place, just in the same way, in the mysterious recesses of our capillaries. Sir James Murray regards the human frame as a Leyden jar; Dr. Parkin, as a gasometer; M. Mialhe, as a laboratory! The humorists, solidists, mechanists, and chemists of old were hardly more wedded to peculiar views.—*London Lancet.*

PHYSIOLOGY.

On the Pancreatic Juice; by M. Bernard.—Alimentary substances have been arranged by some recent chemists in four groups:—substances soluble by themselves and consequently absorbed directly by the veins and the digestive tube; amylaceous substances converted into sugar; fibrinous matters requiring a special fermentation in order to become soluble; and fatty substances, evidently designed to pass into the chyle and giving it its most decided characters. The recent researches of MM. Bouchardat and Sandras, Mialhe, Bareswill and Bernard himself, have placed beyond doubt the existence of a ferment fitted to change fecula to sugar in some of the liquids which mixed with the aliment. They have shown that the gastric juice has for its primary object the digestion of azotized substances. It remained still to discover the agent operating in the formation of chyle properly so called. M. Bernard argues on the following grounds, suggested by experiments, that this remarkable function belongs to the pancreatic juice.

(1) The pancreatic juice, when pure and recently formed, emulsionates fats or oils with the greatest facility; the emulsion remains for a long time and the fatty bodies soon undergo a fermentation which separates the acids they contain.

(2.) The chyle begins to be collected in the chyliferous ducts about that part of the intestinal tube where the pancreatic juice is mixed with the alimentary matters.

(3.) When the pancreas are affected, the fatty substances contained in the aliment pass without change into the dejections.

The memoir of M. Bernard has been reported upon favorably by MM. Magendie, Milne Edwards and Dumas, a commission of the Academy of Sciences of Paris. (L'Institut, No. 791, Feb. 28, 1849.)

The Intention of Hiccup.—In the convulsive movement of hiccup, the diaphragm is depressed; the larynx is raised; and the glottis is closed. What would be the effects of these conditions? The depression of the diaphragm would tend to expand the cavity of the chest; but the glottis being closed, no air can enter the lungs. The two ends of the œsophagus are, however, still open, and if the hiccup be strong enough, air will enter the œsophagus at both ends. If a person will make a prolonged voluntary effort of the conditions which occur in hiccup, he will find a portion of air sucked, as it were, into the œsophagus, from the pharynx. Now, spasmodic hiccup is a reflex movement, excited, in general, by gaseous irritation of the stomach; under these conditions the hiccup will suck the air of the stomach into the lower extremity of the œsophagus. This, then, is the intention of hiccup—to pump off the air of the stomach. The movement of the hiccup sucks the gaseous contents of the stomach into the lower extremity of the œsophagus, and an inverted action of the œsophagus propels them upwards, and discharges them at the pharynx.—*Prov. Med. and Surg. Jour.*

Source of Sugar in the Animal Economy.—Sugar is extensively distributed throughout the vegetable kingdom, but it exists also in animals. Vegetables do not find it ready made in the earth, but form it by some power of internal organization. Is it the same with animals? or is the sugar found in their bodies exclusively the product of their vegetable ingesta? This is the important question which it is our intention to submit to the test of experiment.

Sugar enters largely into the composition of the food of animals. The kinds of sugar are—1st, cane sugar, such as is found in the sugar-cane, beet-root, carrots, &c.; 2nd, grape sugar, such as exists in grapes, and other saccharine fruits. Fecula should also be considered as saccharine matter, inasmuch as it is convertible into low sugar during the process of digestion; 3rd, sugar of milk, which is found in the milk of animals.

This is not the place to trace the distinctive characters of these forms of sugar, nor to determine the alternate changes which they undergo in order to become subservient to nutrition. I need only state, that as certain alimentary substances are known to furnish considerable quantities of sugar, we may consider them as the source of the saccharine matter which we discover in the blood or other animal fluids. It is admitted, that sugar is to be found in the healthy blood after the ingestion of sugar, or matters convertible into sugar, but chemical facts teach us, on the one hand, that starch is the only principle which is convertible into sugar; and, on the other hand, in the belief that the animal economy has not the power to originate a principle, but only to transform those which are presented by the vegetable kingdom, it has been denied that the animal organism can form sugar, and the only power recognized is that of destroying and eliminating it. The facts which will be developed in the following essay show us that such an opinion is not warranted by physiology.

First Series of Experiments.—It has been observed, that during the digestion of saccharine or amylaceous matter, the blood contains sugar, and it has thence been concluded that the sugar is furnished by the aliments. This result of experiment taken alone is exact, but the experiment itself is incomplete, and the conclusions therefore false, as will be seen.

1st *Exp.*—I injected thirty grains of starch dissolved in a pint of water, into the stomach of a rabbit which had eaten oats and carrots. Five hours after, the animal was destroyed in the usual way, and thirty grains of blood from the heart collected. After coagulation, sugar was distinctly found in the serum. The stomach and intestines contained sugar arising from the carrots and the transformation of the farina.

2nd *Exp.*—A strong dog was destroyed five hours after eating 300 grains of the jelly of starch. The serum of the blood taken from the heart contained a notable quantity of sugar. The contents of the stomach were acid and contained no sugar; those of the intestines were alkaline and strongly saccharine.

3rd *Exp.*—A dog ate plentifully of sheep's head, and was killed after seven hours. In the serum of the blood sugar was distinctly found. No sugar was found in intestinal canal.

4th *Exp.*—A dog was killed after fasting two days. Sugar was unequivocally found in the serum.

The above experiments were repeated several times, and always with the same results. The general fact established is readily seen,—viz., that sugar is constantly present in the blood of animals, whatever has been the nature of their food.

Second Series.—Whence is the sugar derived in the case of the animals fed on meat, and in that which had not eaten for two days previous to death? This is the question, for the solution of which fresh experiments are required. It may be fairly presumed that the sugar was not formed in the heart, but had been transported thither from some other parts of the body. To determine more exactly the locality of its formation, I performed the following experiments:—

1st *Exp.*—A large strong dog being killed seven hours after a hearty meal of cooked meat and bones, digestion was found to be in full operation, and the gastro-intestinal circulation and chyliferous ducts fully distended with their respective contents. I obtained,—1st, some blood from the junction of the splenic vein, with the vena portæ; 2nd, some chyle from the thoracic duct: 3rd, blood as before from the