

no matter what their nutriment value may be, which irritate the bowel, will be expelled too quickly to permit absorption to occur, and will probably add to the danger and sufferings of the patient by provoking diarrhoea.

Various observers have investigated the subject of absorption from the large intestine. Among the most recent observations are those of Eichhorst.^a He states that the secretion of the large intestine acts only mechanically in the direction of facilitating the onward progress of the intestinal contents. Some digestive efficacy had been attributed by several previous authors to the secretion of this part of the bowel. Eichhorst states, however, that without their having been necessarily subjected to any previous digestive process in the intestine certain substances are more or less absorbed. Among these are some of the peptones, the expressed juice of raw meat, the albumen of milk, egg-albumen when mixed with salt, and Liebig's extract of meat. On the other hand, unsalted egg-albumen, the albumen of blood-serum, fibrin, syntonin, and myosin are not at all absorbed.

The subject has been also investigated by Leube, who has given a careful and judicious appreciation of what is necessary for a clinically useful nutrient fluid. Egg-albumen with salt is, he points out, liable to two objections—firstly, it is liable to cause diarrhoea; and secondly, its injection into the rectum is commonly followed by the appearance of albumen in the urine. This latter circumstance had been previously noticed by Eichhorst, and although it probably is not attended with much risk to the kidney, still it cannot be regarded as a matter of indifference. With respect to milk, Leube points out that this fluid very often returns quite unaltered, and that its use is in many instances followed by the appearance of sugar in the urine. Still it is regarded as being more valuable than eggs. Peptone solutions had been strongly advocated by Meissner and by Voit, and Bauer. The directions given by Meissner for the preparation of a solution for this purpose are, to digest from half a pound to a pound of meat with a gastric juice, containing certain proportions of hydrochlorine and pepsine for twelve hours, at a temperature of 104° F. (40 C.). The solution is then filtered, and parapeptone is precipitated by cautiously neutralizing the acid solution. It is evident that however theoretically perfect the solution might be, and however fitted for easy absorption, the great care and skill requisite for its preparation makes it altogether unsuited for the necessities of medical practice. The expressed juice of meat is open to the objection that it is apt to cause diarrhoea, and in addition, so small a portion of juice is got from meat that its price comes to form a serious drawback to its general employment.

As a better nutritive injection than any of these, Leube recommends a mixture of very finely-minced raw meat with about one third of its weight of the pancreas of an animal—either that of an ox or that of a pig. To this lukewarm water is added in sufficient quantity to make the whole into a pulpy

consistence. This latter part of the process requires some time and attention, inasmuch as the material to be used must pass through an injection apparatus. The addition of fat in the preparation of about one-sixth of the meat is in some cases an advantage. A larger proportion of fat than this has a tendency to cause too early evacuation of the contents of the intestine. A mixture of this kind is, according to Leube, in a great degree digested in the intestine, and by means of it a considerable amount of nitrogenous material is introduced into the system. If starchy substances are added to the mixture they are changed so quickly into sugar by the action of the pancreas that slight diarrhoea is brought about. He found that after the employment of these injections more nitrogen was excreted by an animal deprived of nitrogenous food than had been excreted previous to their use. He found also, that injections such as we have mentioned preserved the equilibrium between the consumption and the excretion of nitrogen, when an animal was deprived of a portion of the nitrogenous food which it had been accustomed to receive by the mouth; and, finally, a quantitative examination of the feces, supplied direct evidence of the absorption, by showing that the amount of nitrogen in them was less than what had been introduced into the intestine. From the facts Leube considers himself entitled to state that a real digestion of meat takes place in the rectum and colon by the aid of the pancreatic juice furnished by the substance of the pancreas, and that the products of this digestive process are absorbed in considerable quantity into the blood. This mode of nutrition has been employed in three cases with apparently great benefit. Of these one was a case of catarrh of the stomach, with severe vomiting and cancer of the peritoneum; another was a case of cancer of the stomach; and the third was a severe case of accidental poisoning by tincture of iodine with great corrosion of the stomach. In the last case, which is one of great interest, there could be no doubt of the nutritive value of the injections, the patient having been in May of this year, about six months after the poisoning, able to be up during the whole day although still requiring the use of the injections recommended by Leube.

The general conclusions at which Leube arrives are, that the injection into the rectum of finely chopped meat mixed with the finely chopped substance of the pancreas, hardly ever produces diarrhoea. The injection is retained commonly for from 12 to 36 hours. An enema of water must be always given before the nutritive one. This precaution ought to be taken even if the bowels had been spontaneously moved soon before the time for the administration of the enema. It is better to allow an interval of a day to elapse before repeating the injection, if, after having been for a period well borne, evacuations of the bowels begin to occur soon after its administration. The patient, after this species of injection, is said to experience no uncomfortable feeling, no weight or pain in the abdomen; on the contrary, the sensation of emptiness diminishes, hunger becomes less urgent, and the pulse becomes fuller.