

"The means employed until the present for obtaining gastric juice are: (1) killing an animal some time after he has eaten, (2) introducing into the stomach a dry compressed sponge to which is attached a string to enable it to be withdrawn later, (3) utilizing the faculty possessed by some people of vomiting at will, and (4) finally profiting by cases of gastric fistulas which are established spontaneously in man following accidents. As can be readily seen, all these procedures are far from offering an equally satisfactory result."

Blondlot discussed these procedures in detail and pointed out the advantages and disadvantages of each. His description of the technique he employed to make a fistula of the stomach makes interesting reading. It must be borne in mind that at this time anesthesia and aseptic surgery were unknown.

"This procedure suggested itself to me from the preceding one (the case of St. Martin) of which it is only an imitation. I asked myself if it would not be possible to produce artificially in animals gastric fistulas which resemble those that sometimes develop in man after certain accidents. This seemed to me fairly easy to do since there are recorded cases of gastrostomy performed successfully in man, in whom vivisection is always much more dangerous than in animals.

"To execute this experiment I chose a young dog of great size, one not yet fully grown but well behaved. About one-half hour before the operation I fed him a modest meal of meat and bread. With assistants holding the animal I made an incision from the xiphoid process down towards the pubis for a distance of seven or eight centimeters. The peritoneum was cut with care so as not to injure the intestine. The stomach was easily recognized since it was moderately distended with food. The stomach was pulled towards the incision and cut with the point of a knife. I then passed a silver string through the stomach at two points, so that the stomach enclosed between the two sutures was three to four centimeters and lay towards the cardiac extremity of the greater curvature. With assistants holding the two ends of the string, I proceeded to close the wound, after first replacing into the abdomen the intestines which had escaped from it. Several sutures were sufficient. Both ends of the metal strings protruded to the outside and were wrapped about a piece of wood in such a manner as to bring the portion of the stomach enclosed by the string in contact with the inner surface of the wound. Needless to say, this caused the stomach to fit against the abdominal wall so that a fistula was established.

"During the operation the dog vomited some of its food. . . . He later ate what he had vomited but refused all other food. . . . I gave him some milk on the second day which he drank with pleasure. By the

third day he played and ran about just as though he had not had a wound.

"On the week following I tightened the silver ligature daily by twisting it around the wood until, on the 17th day, it came away completely from the stomach. I could now introduce into the stomach a narrow sound through which flowed out various liquids that were fed the animals; this assured me that the instrument really was in the gastric cavity. To enlarge the wound I introduced several fragments of dry sponge which closed the opening and at the same time hindered the escape of food.

"Fifteen days after the first experiment I repeated it on another dog with the same success. I kept both animals in a state of perfect health for three months during which time I used their fistulas not only to obtain gastric juice in abundance but also to carry out experiments on digestion within the stomach. The second dog was sacrificed for a certain purpose. As for the first, he is today still with me and although for two years I have utilized his fistula to collect gastric juice and chyme or to introduce sounds, tubes, thermometers, etc. into the stomach, he is still in good health and is fat, active, alert and enjoys an excellent appetite."

In addition to establishing a gastric fistula, Blondlot was apparently the first to use a metal gastric cannula. He was bothered by the extreme rapidity with which the fistula tended to close. To overcome this he dilated the wound and introduced a flanged silver cannula so that, as he expressed it, "it was fixed in the wound like a boutonniere in a buttonhole."

#### REFERENCES

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3. Beaumont, W. *Experiments and observations on the gastric juice and the physiology of digestion.* 280 pp. Plattsburgh, N. Y., 1833.
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#### ERRATUM

In the comment of Dr. Alice R. Bernheim's article "For Better Nutrition," which appeared in the November issue of this Journal, it stated that "Nowadays, infants are fed every few hours from the very beginning of their lives", whereas it should have read "Nowadays, infants are fed every four hours from the very beginning of their lives."