

Paterson showed that there is a reduction of the chlorids in the gastric secretion, but the amount is not sufficient to materially disturb digestion. So far as the beneficial effects of the gastroenterostomy on the ulcer are concerned, Dr. Gilbride believes that there is an increase in the rapidity with which the stomach empties itself, together with a lessening of the irritating effect of the gastric contents passing over the surface of the ulcer; and that there is also a reduction in the total acidity of the gastric contents. As to the effect of the short circuiting of the gastric contents on the secretions of the duodenum and pancreas, Dr. Gilbride mentioned that Pawlow is of the opinion that it is necessary to have the acid gastric contents pass over the surface of the duodenum in order to excite this secretion. However, Wertheimer and others have shown that this is not necessary, as was pointed out by Dr. Paterson; that when the gastric contents escape directly from the stomach into the jejunum there is an excitation of the secretions into the duodenum.

DR. WALTER B. CANNON, Cambridge, Mass., did not consider gastroenterostomy a drainage operation. In the stomach there are peristaltic waves going toward the pylorus. There results from these waves increased pressure on the food as the pylorus is approached. If there are two openings for the food to go through, the pyloric opening and the stoma, the food will go out through the pylorus rather than through the stoma. Another result of these waves, he said, is that the peristalsis, as it mixes the food, mixes it in the pyloric end rather than in the cardiac end of the stomach. The food comes out through the pylorus as a thin fluid. It does not go out through the stoma because of the thicker consistence the food has in regions somewhat remote from the pyloric opening. The observations which Dr. Blake and Dr. Cannon made were made with the Roentgen ray, and there has been some question whether the pictures seen were true pictures. However, their results have been recently confirmed by observations made in the College of Physicians and Surgeons of New York City. A string was fed to dogs with a small bag of shot tied to the end of the string. In almost all of the cases it was found that the string passed out through the pylorus and thus into the small intestine. Many other observations were also made. The stomach was connected with the lower ileum and also with the colon, and the animal, for a time, gained in weight, which could not be possible if the food did not go out through the pylorus. Dr. Cannon thinks we are justified in concluding, therefore, that when there is a double way, the natural and artificial, the natural passage will be taken and not the artificial. Dr. Paterson, he said, mentioned one case in which they had a large opening, and stated that the food went out both ways. That was true only when fluid food was given; in this case semisolid food went out only through the pyloric opening and through the stoma.

DR. J. W. DRAPER MAURY, New York, thought that it might be interesting to direct attention to the experiments just referred to by Dr. Cannon. At the Surgical Research Laboratory they took a dog on which a gastro-jejunosotomy had been done. The animal was fed with a piece of meat with a small bag of shot tied to it. After several days the animal was opened and the course taken by the string, which had been tied to the pterygomaxillary ligament, was studied. A number of such experiments were carried out, and in but a single instance had the bag of shot passed out through the stoma. In every other case it passed out through the pylorus. In the one exception the string passed down through the stoma, but instead of going on it came toward the pylorus, entered the stomach again, again passed out through the stoma and back into the stomach through the pylorus, completing two cycles. A second series of experiments was made to show whether the food passed through the pylorus or not. A very low gastro-ileostomy was done. Animals so operated on invariably gained in weight for a short time, about a week; then lost weight very rapidly and died; probably not because of the fact that the stomach was not functioning, but for other reasons. Another series of experiments was done with a piece of string. A gastroenterostomy was done at about the middle of the ileum and allowed to heal thoroughly. Then a piece of string was fed and attached to it a piece of meat of undigestible

type. The free end of the string was tied to the pterygomaxillary ligament and left long enough to come half way down between the pylorus and stomach. A few days later the animal was fed fat. An hour afterward the animal was opened, and the lacteals on the oral side of the meat were gorged; those distal to it, between the meat and the stoma, were empty. The conclusion is either that no fat goes through the stoma, or it may be that no pancreatic juice was able to pass the temporary obstruction.

DR. HERBERT J. PATERSON, London, England, thought that experiments on animals are open to criticism. He said that we are scarcely justified in assuming that the conclusions drawn from observations on animals hold good for human beings. The experiments in which animals were fed on bags of shot are undoubtedly of great interest, but at the same time the interest is an academic one, for he, for one, is not in the habit of feeding his patients on such indigestible food. It does not interest him as a surgeon whether bags of shot pass out through the pylorus or through the anastomotic opening. Such experiments interest us as scientists, not as surgeons. The practical point which Dr. Paterson endeavored to bring out is this: that whether the food passes out of the stomach through the pylorus or through the artificial stoma—whether the pylorus is patent or not—the existence of a short circuit between the stomach and jejunum has for practical purposes no effect on the metabolism of the human body, while we do know that it has a very beneficial effect on gastric ulcer. Therefore, he submits that when the operation of gastro-jejunosotomy is deemed advisable clinically, one need not, on physiologic grounds, hesitate to perform it.

## ANATOMY OF THE PALATE, NORMAL AND CLEFT.\*

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It is not my purpose to describe in detail the anatomy of the palate, normal and cleft, but to point out the deviations from the normal as observed in the cleft. In the human embryo of about the third week, the face is in progress of development. From the front of the cephalic mass five tubercles bud out, of which the middle one passes vertically downward. This tubercle is double, and in it the intermaxillary bones are developed which contain the incisor teeth. Therefore, it bears the name "incisive tubercle."

The rudimentary superior maxillary bones, which are widely separated, are developed at each side of the incisive tubercle, though not united with it. While the fourth and fifth tubercles are separated in front, they subsequently unite in the median line to form the mandible.

Simultaneously the palate begins to be formed by the approach toward the median line of the two horizontal plates, developing from the maxillary processes on either side. If the palatal processes of the superior maxilla unite in the median line and blend also with the incisive bones, and the vomer grows downward to meet the palatal processes in their line of union, the upper jaw and lip will be normal. If, however, the superior maxillary and intermaxillary processes fail to unite with each other, cleft palate and harelip in one of their many forms will result. In the presentation of this subject, I desire to point out the cause of the deformity in question and a method of practice tested by the lapse of many years, by which the defect may be overcome at a time in life when it can be most easily and successfully accomplished.

\* Read in the Section on Surgery and Anatomy of the American Medical Association, at the Fifty eighth Annual Session, held at Atlantic City, June, 1907.

## WHAT IS THE CAUSE OF CLEFT PALATE?

The literature on this subject is voluminous and largely theoretical. In reviewing this literature, we find a great similarity of views expressed by various authors. Heredity, prenatal impressions and imperfect nutrition during the early months of gestation are assigned as causes.

The condition of the mouth of a child who has a congenital cleft palate is described thus: "Want of coaptation, resulting from defective formation in the palatine plates of the maxillary and palate bones, is the cause of congenital deficiencies of the parts in question." Again: "The palate plates are arrested in their growth and permanent fissure of the palate is the result. The principal effects resulting from an absence of a portion of the palatine organs are an impairment of the functions of mastication, deglutition and speech." The definition generally given for cleft palate is: "A congenital deformity characterized by a fissure or fissures of the palate, due to arrested development."

From the foregoing quotations, we find that the opinions expressed are, that congenital cleft palate is the result of incomplete development of the tissue necessary to enter into its complete formation.

The opinions of authors thus expressed have been based, no doubt, on their observations of the open space between the oral and nasal cavities.

The deformity is not the result of "defective formation in the palatine plates," nor "congenital deficiencies of the parts in question," nor "arrested growth of the palate," nor "absence of a portion of the palatine tissue." All children who have congenital cleft palate, with rare exceptions, have in the palate the normal amount of tissue, although it is not united in the median line; it is cleft.

Congenital cleft palate has a predisposing and an exciting cause. The predisposing cause is heredity. The exciting cause is mechanical, the application of force in embryo. I have little faith in the theory that prenatal impressions cause failure of union of the bones in question. In the greater number of cases in which this cause has been given, on inquiring, it has been found that the mental shock occurred subsequent to the time when, if physiologic processes were not interfered with, union of the bones would be complete. It is too apparent to require argument that a mental impression could not separate a suture. Prenatal impressions, possibly, may be a factor in causing failure of union, but we have no authentic evidence to that effect.

I believe, however, that defective nutrition, or general debility of the mother during the early months of gestation from any cause, may delay union of the palatal plates. Nature does not fail to develop the necessary bone and soft parts to form a normal palate. But it does fail to bring the parts into apposition and unite them.

The bones having failed to unite prior to the fifth month of intrauterine life, the mandible, as soon as the muscles of mastication become active, brings pressure on the palatoalveolar inclined planes of the ununited superior maxillary bones, and, acting as a wedge, forces them apart and widens the breach. Moreover, the pressure of the tongue and the flexed position of the head with the symphysis of the mandible resting on the sternum may contribute to some extent to the force which is exerted by the lower jaw on the palatal arch and which forces the bones apart.

Having operated on over 1,300 cleft palate patients,

over 400 of whom were infants under 6 months old, I have found that the breadth of the upper jaw, as compared with the lower, is just as much broader than it should be as the distance between the borders of the fissure. When we bring the borders of the fissure into contact, we have brought the upper jaw back to its normal breadth and to its proper relation with the lower jaw. There are very few exceptions to this statement.

In young infants who have cleft palate, I have always found that by slightly forcing the chin upward the pressure of the lower jaw against the segments of the upper jaw will spring the cleft bones apart.

Writers who have given a great deal of thought to the subject and who have dwelt at great length on its etiology, those who have proposed the more generous use of phosphatic food for the mother during the period of gestation have been unconscious of the fact that the bones are not, as a rule, defective in structure nor incomplete in development. There is failure of union.

## SUMMARY.

The causes of congenital cleft palate are:

1. Heredity.
2. Mechanical force exerted by lower jaw against the upper jaw in embryo.

In congenital cleft palate in young infants, the full amount of tissue is developed to form a normal palate; the defect is due to failure of union. General debility of the mother in early months of gestation may be a factor. Prenatal impressions possibly, but evidence not conclusive.

*Treatment.*—Close the separated bones within three months after birth when the bones are soft and easily bent and moved into correct position. The hard palate should be closed before the lip operation. The lip operation should follow within three months after the bones have been united. The soft palate to be operated on last, preferably when the patient is about 14 to 16 months old.

WHAT SHOULD BE THE ATTITUDE OF THE  
PROFESSION TOWARD THE HYGIENE  
OF SCHOOL LIFE?\*

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In a recent number of the *Medical Record* the statement is made that "a conference of the masters and medical officers of the great schools of England is to be called to consider the subject of the hours of sleep necessary for the scholars: a course fully justified by the importance of the question."

We read in the public prints that the second International Congress on School Hygiene is to be held in London next August under the patronage of the King and the presidency of that eminent physician and philanthropist, Sir Lauder Brunton. I quote from the prospectus:

The marked success of the First International Congress in School Hygiene, held in Nuremberg in 1904, in bringing together workers of all countries, and in giving an impetus to this work, has already been signalized by increased literary activity in nearly every country. . . . One of the happiest results of the Nuremberg Congress was that members of various professions, teachers, medical men, architects, engineers, administrators, officials and manufacturers, appreciated

\* Read in the Section on Hygiene and Sanitary Science of the American Medical Association, at the Fifty-eighth Annual Session, held at Atlantic City, June, 1907.