

flexure, and it should be held there by a glass rod, through the meso-colon as advised by Maydl, or by a silkworm-gut suture as advised by Kelsey.

The skin, the peritoneum of the parietes, and the wall of the intestine should be united by eight or ten sutures of catgut or silk, thus closing the peritoneal cavity from chance of infection when the intestine is opened. Before these sutures are inserted, one or two silkworm-gut stitches should be passed through skin, muscles, and fascia at the upper and lower angles of the incision to bring the tissues snugly about the bowel. The wound can be hermetically sealed by a thin layer of sterilized cotton and collodion, leaving the intestine exposed for immediate opening if desired. When the wall of the intestine is pared away some hemorrhage may require attention. In cases in which the symptoms of obstruction are not urgent it is quite proper to wait three or four days before incising the intestine, as the mortality heretofore has been greatly decreased by such delay. General anæsthesia is usually unnecessary for opening the intestine after such postponement.

Lumbar Colostomy.—This, often known as Amussat's operation, can be more readily performed if the colon is distended as in stricture with obstruction. Under anæsthesia the patient should be placed on his right side upon a firm pillow to arch the left loin as much as possible. A perpendicular line drawn from the middle of the crest of the ilium, or, according to Allingham, from a point a half-inch behind the middle, will mark the situation of the colon. An incision four inches long should be made parallel to the last rib and half-way between it and the crest of the ilium with its centre in the line just mentioned. The muscular tissue and fascia for the whole length of the wound must be carefully divided until the transversalis fascia and the edge of the quadratus lumborum are exposed. When this fascia is cut through, the colon will present itself. Unless it is collapsed it can easily be recognized by its color, by the thickness of its walls, and by the scybalous masses which it usually contains. Care should be exercised to avoid opening the peritoneum. The colon should be drawn into the wound and sutured to each margin. The wound should be closed with silk-worm gut, an opening being left at one point for drainage; and when obstructive symptoms are not urgent several days may elapse before the intestine is opened.

Colectomy.—Excision of part of the colon has been performed with considerable frequency during the past ten years. The ileo-cæcal coil appears from the reported cases to be the part most often removed (ileo-colectomy). Magill in 1894⁶ collected one hundred and four cases of resection of this portion of the bowel, with a mortality of thirty per cent. The first resection of the ileo-cæcal fold was performed by Krausshold, 1879, with a fatal result. Maydl, in 1882, operated successfully. Since that time the operation has become a recognized surgical procedure. The following conditions may demand resection of the colon: 1, malignant disease (carcinoma and sarcoma); 2, tuberculosis; 3, invagination, acute and chronic; 4, faecal fistula; 5, gangrene from volvulus or bands; 6, gangrene from hernia; 7, wounds with considerable loss of substance; 8, inflammatory strictures; 9, irreducible cæcum in hernia.⁷

The feasibility of resection can be determined only after exploration and inspection of the diseased intestine. The most frequent indication for the operation will be a removable malignant growth; the other conditions mentioned are also frequently best treated by colectomy. The larger number of fatalities appear to be due to faulty technique, and improvement along this line will materially lessen the death rate. The mortality differs materially in the different conditions that call for the operation, being 16.6 per cent. in tuberculous disease and as high as 40 per cent. in invagination. Cancerous cases show a mortality of 33½ per cent. This appears to show that the peritoneum will prove more resistant to infection in tuberculous cases than in any others, and can then be handled with a greater degree of safety.

The preparation of the patient should be the same as that carried out for any abdominal operation and should receive the most careful attention. In cases of obstruction purgatives cannot be used, but in other instances the canal should be thoroughly emptied of its contents. The line of incision will depend upon the part of the colon involved. Any portion can be reached by a median incision, but the operations upon the cæcum or sigmoid flexure will prove very difficult through such an incision. One case is recorded in which an incision from the ensiform to the pubes was found necessary in order to complete the operation. For the two regions mentioned an incision in the respective iliac region four inches long, parallel with and about one inch and a half internal to Poupart's ligament, with its centre on a level with the iliac spine, will prove satisfactory. This can be extended directly upward if desired after digital exploration of the region. All bleeding from the wound should be arrested before the peritoneum is opened. The diseased portion of the intestine should be well isolated by gauze pads to prevent contamination of the peritoneal cavity. The mesentery of the segment to be removed should be tied off in sections or clamped and ligatured after the bowel is removed. The first is perhaps the better method. These ligatures should be of strong catgut and the included mesentery should not extend beyond the point at which the intestine is to be divided. The bowel above and below the portion to be removed is emptied as nearly as possible of its contents, and held firmly closed by the fingers of an assistant, by rubber-covered clamps, or by gauze tapes. In competent hands the first plan is the best, as there is less danger from pressure exerted in this manner. The intestine is then divided by sharp scissors and dissected carefully away from the surrounding parts. Watch must be kept for the ureter, which may be wounded in resection of either end of the colon. The continuity of the intestine can then be restored (1) by end-to-end sutures, (2) by lateral anastomosis accomplished by means of absorbable plates, (3) by lateral or end-to-end anastomosis with the aid of Murphy's but-

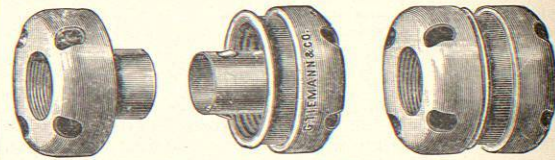


FIG. 1468.—Murphy's Buttons.

tons, (4) by lateral implantation in ileo-colectomy, or (5) by lateral anastomosis with the aid of clamps of H. H. Grant or La Place. In cases in which the patient's condition will not permit the completion of any of these steps a faecal fistula can be formed. It should be remembered, however, that this entails the danger of a later operation and therefore should be avoided if possible. The end-to-end suture may be accomplished by the method of Czerny-Lembert (modified by Woelffler), which calls for two rows of sutures, the first penetrating the mucous and muscular coats, but not the serous. Avoid infection of the peritoneum, which is inverted by the second row of sutures inserted after the method of Lembert. The following method is more often employed: The cut ends of the intestine are held together by an assistant while four or six interrupted Lembert sutures are inserted at intervals around the bowel to approximate the segments. These sutures should invert less than one-eighth of an inch of the open wall of the intestine, thus bringing the serous surfaces into apposition. Another row of Lembert sutures, interrupted or continued, should be applied over the approximation sutures to render the closure efficient. The greatest difficulty in preventing leakage will be experienced at the mesenteric border; therefore especial care must be given to suturing at that point. Too great inversion of the cut edges may produce

obstruction when repair is accomplished. The operator should be perfectly sure that the walls of the intestine are impervious and that its lumen has been restored before he completes the other steps of the operation. This can be determined by forcing the contents from above through the point of anastomosis, while the intestine is occluded below by pressure of the hand. The exposed parts should be thoroughly flushed, the redundant mesentery folded and sutured in such a manner that it cannot possibly produce strangulation, and the intestine dropped into the abdomen. When the suturing is perfect there need be no fear of extravasation, and gauze wicks are therefore unnecessary and often productive of harm. The omentum is drawn down in front of the intestines and the abdomen closed without any provision being made for drainage. It has been claimed that anastomosis by suturing, either end-to-end or laterally, requires considerably more time than when absorbable plates or buttons are employed, that leakage is more likely, and therefore that it is not as useful as one of the latter methods. The same amount of preparation for this operation in the dead-house or upon animals will make an operator about equally expert in the use of either plan. Leakage is no more likely from direct suturing than when some appliance is used, and perhaps less so, owing to the sloughing which sometimes follows the use of either the button or the absorbable plate. The Murphy button will undoubtedly prove the most rapid method for anastomosis, and in the colon will cause little inconvenience from its presence as a foreign body. The different forms of clamps proposed for anastomosis require more skill in manipulation than the other methods, save nothing in time, and will scarcely be generally adopted. The Murphy button is the best of the mechanical aids to intestinal suturing, and is equally suitable for end-to-end or lateral anastomosis. One section of the button is held in the open intestine by a running stitch, known as a purse-string suture, which is pulled tightly around the button as it is tied. The sections of the button are then pushed together and locked. A few stitches can be inserted to reinforce the line of coaptation. The mesentery should be cared for as in the direct suture and the operation completed in the same way.

LATERAL ANASTOMOSIS BY PLATES.—The open ends of the intestine should be closed by two layers of fine silk sutures passing deeply enough to catch the submucosa, then an incision is made in each bowel opposite its mesentery about one inch and a half from the closed end and long enough to admit the narrow diameter of the absorbable plate. The plates proposed by Senn are made of compact tissue of a large beef bone which has been decalcified by immersion in ten-per-cent. solution of hydrochloric acid. Oval plates, 7 cm. long, 3 cm. wide, and 5 mm. thick, are then cut out of the bone. An elliptical opening is made in the centre of the plate 3 cm. long and 7.5 mm. wide. At each end and at the middle of each side a hole is punched in the bone near the margin of the opening. Through these holes double threads are carried, leaving a needle at each lateral hole and a knotted thread at each end. When the plates are placed longitudinally in the intestine the needles penetrate its wall and the corresponding threads are tied snugly to those of the opposite plate. In this way the two intestines are approximated. A continuous Lembert suture completes the anastomosis. The only objection to this method is the danger of infection through the stitch wounds in the intestinal wall. Von Baracz' vegetable plates are cut of the same size and shape as Senn's bone plates and the operation is performed in the same manner. Many other mechanical appliances have been proposed, but the ones mentioned are the best.

LATERAL IMPLANTATION is the method of suturing the cut end of the small bowel into an incision in the colon. The incision in the colon is made longitudinally and is not quite so long as the diameter of the ileum. The end of the ileum is fastened into the side of the colon by four sutures, one at each end of the longitudinal incision and one at either side. As each knot is tied the suture is car-

ried inside the colon and is left long enough to draw the line of suture out at the open extremity. The suturing is then completed inside the gut. After replacement, the serous surfaces are sutured together outside the intestine for reinforcement. The end of the colon is then closed by interrupted Lembert sutures.

After excision of the intestine the patient should have no solid food for about four days. The diet should consist of liquid easily assimilable food. On the third day a laxative can be administered, and, after the bowels move, feeding can be commenced. *J. Garland Sherrill.*

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- ⁷ One case, Clarke, 1893.

COLONIAL SPRINGS.—Suffolk County, New York. Post-Office.—West Deer Park. Hotel (Colonial House) new.

ACCESS.—Via Long Island Railroad, 34 miles east of New York.

These springs are situated near the base of a bluff that stands about one hundred feet above the great plain of Long Island, the water rising up through a large deposit of clay in which are found considerable quantities of iron and other minerals. The location is about two hundred feet above the sea level and near the middle of the island, being 5 miles from Babylon, on the Great South Bay, and 7 miles from Huntington, on the Sound. It is said that the atmospheric temperature during the winter months will average four degrees warmer than at Lake-wood, N. J. There are two springs in use, known as the "Colonial" and the "Mo-Mo-ne" Spring. The former has been known and used for many years by people in the vicinity suffering from kidney troubles. While excavating to make a reservoir for the "Mo-Mo-ne" several years since, four Indian wells were discovered two or three feet below the present surface. These were made from the trunks of the swamp aspen, or poplar—a tree of the Southern States. The trunks had been burnt out in the centre with hot stones, in the same way that the Indians employed in constructing their canoes. The smallest of the wells was left in position, while the others are on exhibition at the Colonial House. This discovery seems to prove beyond a doubt that the waters here were known to and used by the aborigines before the advent of Europeans.

The waters of the two springs were analyzed in 1894 by Professors Chandler and Pellew, of Columbia College, New York:

ONE UNITED STATES GALLON CONTAINS:		
Solids.	Colonial Spring, Grains.	Mo-Mo-ne Spring, Grains.
Potassium sulphate	0.19	0.12
Potassium chloride.....	.43	.06
Sodium chloride.....	.80	.48
Sodium carbonate.....06
Calcium carbonate.....	.36	.09
Magnesium carbonate.....	.17	.13
Oxide of iron and aluminum.....	.02	.02
Silica.....	.44	.47
Organic and volatile matter.....	.09	.19
Total.....	2.50	1.62

These waters are very pure, the analysis showing but a minute proportion of organic matter. They are well qualified for domestic use. The Colonial Spring is similar to the Poland Spring of Maine. The water has a mild diuretic and tonic action. It has been found useful in kidney and bladder troubles, and may be taken in large quantities. *James K. Crook.*

COLOPHONY. See *Rosin.*