Next to the intestine, the omentum is found most frequently in the hernia. In children the omentum is a very short triangular affair, with the base toward the stomach and the apex toward the left. It does not reach even as far as the umbilicus, while in adults it covers all the intestine and has an irregular free margin below. The lateral margins not infrequently have elongated tabs, and the one on the right side has been called the ligamentum colicum. In umbilical hernias it is uncommon not to find the omentum in the sac, and in inguinal and femoral hernias it is frequently found, although it is changed in consistence and rolled up so that the individual folds have had an opportunity to become adherent (nodular thickening or hypertrophy of the omentum). The mass is not infrequently adherent in the sac, but rarely to the intestine. The fat in the omentum is increased and the vessels are considerably distended, although in some cases all the fat in the omentum disappears, so that all that is left is a connective-tissue strand. Brunner collected 180 cases in which the bladder was found in the hernial sac. Of these, 136 were inguinal hernias, and 122 males. Both sides were about equally affected. In 5 cases the hernia was bilateral. Of the 29 femoral hernias, 27 were in women, and of these 22 were on the right side, only 5 being on the left side. There were 8 cases of perineal hernia and 7 of other varieties. Certain of these hernias consisted of a portion of the bladder-wall not covered by peritoneum, and must therefore be considered to be a prolapse of the bladder. As these ruptures increase in size the portion of the bladder covered by peritoneum distends and the wall of the sac will be made up partly of the bladder, just as in the case of the ascending colon. The hernial cavity proper may contain loops of intestine. Brunner distinguished an intraperitoneal variety where the misplaced portion of the bladder was entirely covered by peritoneum, and an extraperitoneal variety—*i. e.*, prolapse of the bladder—without any peritoneal covering; besides a paraperitoneal kind where there was a distinct hernial sac besides the bladder. This latter variety is more common, and of the 180 cases 5 were intraperitoneal, 18 were extraperitoneal, and 100 were paraperitoneal. It is very common to have a vesical hernia surrounded by a thick layer of fat which is intimately adherent to the bladder, so much so that the bladder-wall has been torn during an attempt to strip off this tissue. Many of the cases of hernia of the bladder reported in literature have been secondary to an operation, for the bladder-wall was pulled down into the hernial opening by excessive traction on the sac. The female genital organs, such as the ovaries, tubes, and uterus, are not infrequently found in hernias. The ovaries are found most commonly, and reach the sac in a similar way as the testicle, so that one might speak of descent of the ovary and a processus vaginalis. The upper portion of an ovarian hernia is probably congenital, is frequently bilateral, and associated with other malformations of the genitals. Puech collected 86 cases of ovarian hernia and found that 54 were congenital, and 33 of these were associated with other malformations. Most congenital

ovarian hernias are irreducible and the ovaries are frequently diseased. Englisch found in his 38 cases that they were inflamed 17 times, cystic 5 times, carcinomatous once, and normal in only 15 cases. Inflammation may readily take place, and hernias that were originally movable become fixed. The processus vaginalis never closes behind the ovaries, although it is uncommon to have other abdominal viscera follow down behind the ovary. In acquired hernias, on the other hand, the ovaries are apt to be followed by the tubes, and even by the uterus. Certain of these ruptures undoubtedly develop by the broad ligament, or part of it, becoming part of the wall of a hernia, and when the uterus is found in the sac this seems to be the only feasible explanation, at least the uterus has never been found without the ovaries and tubes. It is rare to find the tube alone in the sac, although Cruveilhier assumes that in ruptures containing the tube the ovary usually preceded this structure. Of the 13 cases reported, 9 were femoral and 4 inguinal hernias. The author found 17 cases of hernia of the uterus reported, 9 of the ovaries and tubes, 2 with the intestine, 3 had a double uterus, and 2 a uterus unicornis. In L'Allemend's case an entirely normal uterus was found in a femoral hernia, and this particular uterus was pregnant. Other abdominal viscera have occasionally been found in hernias associated with considerable loosening of the connective-tissue base. The liver is found especially in diaphragmatic hernias, although it has been found in congenital umbilical hernias, and is then peculiarly lobulated. Cases have been reported in which the gall-bladder and the spleen were found in inguinal hernias. (Skey, Lanz, Kuysch.) Even the testicle when undescended may be found in a hernia associated with displacement of the corresponding portion of the peritoneum. Guincort reports a case in which a testicle became strangulated in a femoral rupture. Deipser found a strangulated movable kidney, and Reichel a dilated ureter in an inguinal hernia. Rose found the pancreas in a large acquired umbilical hernia. This had gradually been pulled into the sac by the large intestine, which was adherent to the sac-wall.

Fatty Hernias and Cysts.—Fatty hernias are found in the places where rupture is common, and not infrequently they are confounded with a hernia proper or complicate an operation considerably. They have been described by Littré, 1700; Cloquet, 1819; Roser, 1850; Wernher, 1872; Englisch, 1886. There are certain regions of the abdominal wall where considerable subserous fat accumulates. This may at times form tumor-like masses, called subserous lipomata, that vary in size, and may be as large as a hen's egg. These masses of fat are found rather constantly in the linea alba, in the true pelvis, around the bladder and rectum, and in the region of the seminal cord and along the sheath of the femoral vessels. These lipomata are frequently covered with a membrane derived from the fascia, which on operation may be mistaken for a thin hernial sac. These tumors are in no way connected with the peritoneum, although in some cases they

are united by vessels from the first. When one of these subserous fatty tumors increases in size, it remains *in situ*, or it becomes displaced outward through some gap in the fascia, usually at the side of the large vessels. When this takes place, the peritoneum, if adherent, is subjected to considerable traction, and a conical bulging takes place which may form a hernial sac if it increases in size. This lipomatous hernial sac may undergo secondary changes, for the individual lobules of fat may grow in toward the interior of the sac and diminish the lumen. Finally the sac itself becomes completely obliterated, and all that is left is a very minute communication with the peritoneal cavity, or perhaps only a very thin connective-tissue strand, representing the only remnant of the former lumen.

It may also happen that the cavity becomes shut off from the general peritoneal cavity at a time when the hernial sac is still lined with a serous membrane. This is apt to happen when the walls of the sac become adherent around the margins of the opening. Fluid collects in this cavity and cysts develop that are single or multiple, and which may eventually be covered with a new hernia. It is evident that the conditions found may be extremely complicated, and inflammatory processes may appear in these cavities that produce severe symptoms resembling those of a strangulated hernia. One should always bear in mind that there may be a strangulated hernia in a secondary sac behind an inflamed cyst.

Accessory Coverings of the Hernia.—The external coverings of a hernia—*i. e.*, those between the sac and skin—vary considerably. In certain hernias, such as umbilical hernias and femoral hernias, the sac lies immediately beneath the skin, to which it is sometimes adherent. A recent hernia, however, is apt to be covered with fascia, fat, aponeuroses, or muscles. A hernia makes it way through these tissues, and a certain number of these form parts of the external covering. These conditions cannot be carefully sought for at every operation, because the tissues are sometimes thinned, sometimes thickened, sometimes matted together in a firm mass so that they cannot be distinguished. Most ruptures are covered with at least one layer derived from the intra-abdominal fascia, such as the transversalis, the iliac, the sacrolumbar, or the pelvic, etc. The name fascia propria herniæ has been applied to this layer, and may be retained if its origin is borne in mind.

SYMPTOMS AND DIAGNOSIS OF HERNIA.

In the vast majority of cases the diagnosis is easy, although it is not uncommon to find cases in which the condition can be recognized only after a most careful, methodical examination. Generally speaking, a rupture is recognized as such when the contents of some abnormal tumor-like swelling of the abdominal wall can be pushed back, or when it is possible to detect that the contents are some organ which

normally belongs in the abdomen. If it is possible to reduce the hernia, it is usually possible to follow the hernia up with a finger and detect the route that the rupture has taken and determine the length, direction, diameter, and nature of the wall of the canal. If the finger is left in the hernial opening, an impulse will be felt on coughing, and the hernia will reappear when the finger is removed. After replacing the hernia, the sac formed by the peritoneum can generally be recognized by the movableness of the inner surface.

When it is not possible to reduce the swelling, it must be possible to demonstrate some communication with the abdominal cavity provided the condition is to be considered a hernia. A peduncle should be sought for, and the direction, shape, and consistence of this should be investigated as far as conditions allow. The most important point in these uncertain cases is that there may be considerable variation in the volume of the mass. When standing erect, straining, coughing, etc., there will be noticeably increased tension, or some increase in the size of the mass. When lying on the back, the tension diminishes, and the increased tension due to straining associated with an increase in size may usually be overcome by direct pressure upon the tumor. Even when it is impossible to detect any change of size and tension, due to voluntary acts, it may be possible to demonstrate that the volume and tension of the mass change before and after eating. In the evening the rupture is usually larger than in the morning. Sometimes it may be possible to detect the intestine or the omentum in the sac. The intestine appears as a uniformly rounded swelling which is elastic, though not very tense. This latter property differs according to the amount of straining and after a meal. When the hernia is very large, one may sometimes detect waves of peristaltic motion, which may also be produced by pressing upon the tumor or by rubbing it. If the percussion-note is tympanitic, one is fairly sure that the hernial sac is filled with intestine distended with gas. A dull percussion-note does not necessarily exclude the intestine. The intestine may be empty, or the contents may be fluid without any gas, as is frequently observed in irreducible hernias of the sigmoid flexure. The tympanitic note may also be modified by the overlying tissue. The gurgling that is felt and heard during reduction is of especial importance, although one should not confound these noises with similar sounds in the vicinity.

The omentum appears as an irregular, lobulated mass that may be more or less unfolded on palpation, which also has a peculiar granular feeling that is apt to be remembered as something more or less characteristic. The percussion-note is dull provided the sac does not contain intestine at the time. Any effort to replace the hernia should be done very slowly because the omentum goes back little by little and without gurgling. Considerable force is required to push back even the last portion. When both intestine and omentum are contained in the sac, the intestine always goes back first. Omental hernias are sometimes confounded with over-developed appendices epiploicæ, or with a hernial sac that is much thickened, although empty. The characteristic