American investigators have shown that Type I therapeutic serum has an appreciable effect in reducing mortality from lobar pneumonia; the serums prepared from Types II and III being up to the present far less successful.

In view of this practical aspect of the observations recorded in this report, it was necessary to determine whether the English strains of Type I cocci, identical with the American type on simple agglutination, are also indistinguishable when submitted to what is perhaps the most specific test available, the *absorption of agglutinin*.

The cocci compared in this respect were Type I American, English Type I "A," Type I "B" with Type II "M" as control. The serum used was the Type I "A," prepared as described.

The experimental procedure was as follows:

1 c.cm. of dilution 1 in 5 "A" serum was put up against equal amounts of suspensions containing 4,000 million per c.cm. of each of the above cocci.

Conditions.—Two hours in the water-bath at 37° C. Tubes then centrifuged and the supernatant fluid titrated against the Type I "A" coccus homologous to the serum.

Absorption Experiment.—Type I "A" serum absorbed with Type I "A" coccus, Type I, U.S.A. coccus, Type I "B" coccus, Type II "M" (control) coccus.

Result after Saturation V, Type I Coccus "A."

	Dilutions.			
	1:20	1:40	1:80	1:160
Control saline... ..	++	++	++	(+)
Control Type II "M"	++	++	++	(+)
Serum saturated with Type I "A"	+	(+)	—	—
Type I, U.S.A.	+	(+)	—	—
Type I "B"	+	(+)	—	—

Thus while Type II "M" completely failed to reduce the Type I agglutinin, the Type I cocci all caused its reduction by about three-quarters as shown in the accompanying table. In view of this result, there is no room for doubt that the two specimens of Type I coccus isolated from cases of typical lobar pneumonia in this country are identical with the stock specimen of Type I coccus obtained from America.

With a view to preparing Type I serum for therapeutic use, cultures of the organisms isolated from English cases have been forwarded to Dr. E. G. Murray, who is working at the Field Laboratories, Cambridge, on behalf of the Medical Research Council, at the production of therapeutic serum.

Throughout the inquiry I have been constantly indebted to the active assistance, encouragement, and advice of Dr. Mervyn H. Gordon, bacteriologist to St. Bartholomew's Hospital, and of his assistant, Mr. T. Heggerty, to both of whom I express my grateful thanks.

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EXOMPHALOS, OR HERNIA INTO THE UMBILICAL CORD.

BY

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THE condition of exomphalos, although somewhat rare, is of considerable interest, both from the point of view of origin and that of treatment.

It may present an abnormality of such extreme degree that the greater part of the abdominal organs are contained in a sac at the umbilical attachment of the cord or near that situation; but more commonly it consists of a globular swelling of about the size of a Tangerine orange. The former extreme cases are beyond surgical aid, but the more moderate degrees are eminently suitable for operation.

The literature, although fairly copious, contains few accounts of successful surgical treatment, the reason generally being that the cases were seen, or the operation performed, too late, when either infection or obstruction with gangrene of the contents of the sac had taken place. The appended cases, illustrative of the success of immediate operation, occurred in Mr. MacLennan's wards at the Royal Hospital for Sick Children, Glasgow.

Definition.—Exomphalos has been defined by Ballantyne¹ as a true hernia of abdominal contents into the umbilical cord. It is distinct, he says, from the deformity associated with a greater defect in the abdominal wall than merely in the neighbourhood of the attachment of the cord. To this condition he gives the name *gastroschisis*. A less pronounced form of this abnormality has been described by Nicaise as "amniotic umbilicus," and consists of a deficiency of skin around the umbilicus, the deficient space being covered by amnion from the cord. In a recent article Friend² describes a case of exomphalos and prefers the name of amniotic hernia, quoting Moschcowitz³ in support of the view that the term "hernia into the cord" is a misnomer. The undermentioned cases have all been clearly of the nature of hernia into the substance of the cord, and conform to Ballantyne's definition. Accepting this definition, it might at first appear that all cases of exomphalos would be amenable to early treatment, whereas cases of gastroschisis are beyond relief. This, however, is not so, for some of those hernias, although having but a narrow communication with the abdominal cavity, have nevertheless contained such proportions of the abdominal, and even thoracic, organs as to render replacement impossible.

Frequency.—Exomphalos is estimated by various authors to occur in from 1 in 2,000 births to 1 in 6,000 births.

Clinical Characteristics.—The abnormality usually takes the form of a globular, asymmetrical swelling situated at the abdominal attachment of the cord and extending into its substance. Sometimes there is a constriction between the swelling and the abdomen. In such a case a serious accident might happen, as in the case described by Victor Bonney,⁴ and quoted by Friend,² where the practitioner removed the hernial sac and its intestinal contents, consisting of small intestine, during the process of ligature and division of the cord at birth. In size it varies from a walnut to a large apple, but is commonly of an intermediate size. The coverings of a light grey colour are often quite transparent, and admit of inspection of the contents of the sac. In other cases the colour is darker and the sac opaque. The covering consists of three layers, namely, amnion, Wharton's jelly, and peritoneum, the former two constituents tapering at the summit of the swelling and passing along the cord. Occasionally the skin of the abdominal wall is continued some distance on to the swelling and forms a funnel-like cup into which the swelling fits. The swelling contains usually some part of the intestinal tract and—as would be expected—not infrequently a Meckel's diverticulum. In two of the cases the caecum and appendix were found in the sac, and in both the caecum had a well-marked mesentery. Rarely can the contents be reduced into the abdomen, and more often there is obstruction to the passage of bowel contents or even a complete strangulation of bowel. If treatment is delayed one of two conditions speedily causes the death of the child: It succumbs to intestinal obstruction, or the covering membranes are torn or slough off and peritonitis ends the case.

Treatment.

Operation at the earliest possible moment after birth is the only successful method. This statement is apparently at variance with some textbook teaching on the subject. One author⁵ states:

"Possibly in some of these less pronounced cases a radical operation may with safety be undertaken, especially if the infant has reached a few months of age."

And again:

"In certain favourable cases, where the child attains an age which will render operation justifiable, say six months or more, removal of the sac wall and suture of the edges of the gap may lead to a permanent cure."

Otherwise treatment would consist in the endeavour to prevent sepsis by appropriate dressings. Now, in the presence of the usual thin tissue-paper-like covering this is

an attainment wellnigh impossible, and in addition there is frequently the complication of obstruction. The obvious aim would appear to be the safe return of the contents to the abdomen at once. It is difficult to understand the need for postponement of operation "to a favourable age, six months or more," for all our experience goes to prove that infants stand the operation for this as well as ordinary hernia very well. This view is held by the French surgeons generally. Jaboulay and Patel,¹¹ quoting many authors in support, urge operation at once, the danger of infection being so great. At one time, on account of bad operative results, the Germans⁶ relied on the application of an alcoholic compress bandaged firmly over the umbilicus, but this treatment is now permissible only in deformities too large for operation.

Operation consists in opening the sac, separating it from the contents, and returning the contents if healthy to the abdomen. The vessels of the cord are carefully ligated at the neck of the sac. In late cases gangrenous bowel may be met with and the outlook is hopeless. When a Meckel's diverticulum is encountered it should be removed. Occasionally there is difficulty with adhesions, and when the hernia is very large the replacement of all the contents may be exceedingly difficult. An appendicostomy¹² can with advantage and without difficulty be done. The appendix is brought out at a small stab wound made on a piece of gauze held within the abdomen close to the anterior superior iliac spine. This is of benefit in relieving distension and in the administration of fluid by the colon in after-treatment.

ILLUSTRATIVE CASES.

Case 1.—Baby W., aged 2 days. Admitted with definite signs of intestine obstruction. There was a swelling at the base of the cord about the size of a small orange; its coverings were thin and transparent, and somewhat soiled and septic-looking; the bowel contents were clearly visible through the coverings. On opening the membrane the caecum and appendix and part of the ileum were found in the sac. They were folded over, producing complete obstruction (Fig. 1). They were returned to the abdomen and appendicostomy done as described above. The sac was removed low down, the peritoneal edges and the recti sheaths brought together with sutures and the skin sutured. Salines were given by the appendix opening and the child made a good recovery. The appendicostomy was closed at the end of fourteen days.

FIG. 1.—A, Skin. B, Fused layers of amnion, Wharton's jelly and peritoneum. C, Umbilical cord. D, Parietal peritoneum. E, Rectus abdominis muscle. F, Ileum. Contents: Caecum and appendix twisted on ileum.

Case 2.—Baby McC. Admitted one hour after birth, presented an irreducible swelling of the size of an orange at the base of the cord. The sac was opened and a greatly thickened and distended Meckel's diverticulum was exposed and removed. The operation was completed, as above, without appendicostomy—there being no indication for it—and the recovery was uneventful (Fig. 2).

FIG. 2.—A, Skin forming funnel-like process at base of swelling (Case II). B, Fused layers forming covering of swelling. C, Umbilical cord. D, Parietal peritoneum. E, Rectus abdominis muscle. F, Ileum. Contents: Meckel's diverticulum.

Case 4.—Baby S., aged 2 days. This case illustrates the result of delay. There was a small opening at the umbilicus through which the greater part of the bowels had herniated. The sac, stretched thin, had given way, and coils of bowel were quite exposed and had pieces of cotton-wool dressing adherent when the child was admitted. The possibility is that the sac was

torn at delivery. The exposed intestines were red and inflamed, the peritoneum being obviously infected. A closed Meckel's diverticulum was adherent to the remains of the sac. Operation was undertaken, but, as was expected, death took place later. At necropsy generalized peritonitis, patent ductus arteriosus and patent foramen ovale were found.

FIG. 3.—The "polypus" split in two. A, Skin. B, Wharton's jelly. C, Umbilical polypus. On removing this, a small peritoneal sac was found in the middle of it (Fig. 3). The outer layer of the swelling had become covered with epithelium from skin.

Case 5.—Baby J., aged 4 months' illustrates an almost spontaneous cure of a small exomphalos. The child had a small rounded pedunculated swelling at the umbilicus—the so-called umbilical polypus. On removing this, a small peritoneal sac was found in the middle of it (Fig. 3). The outer layer of the swelling had become covered with epithelium from skin.

Etiology.

It would appear that three main groups of factors require consideration. They are: possible antenatal conditions, developmental causes, and defects in function.

In the first group abnormality in the foetal position was thought to be the cause. Sir James Simpson⁷ stated that such cases were nearly always abdominal presentations. This lends support to another theory, that the position of lordosis in the foetus may be a cause, but the origin of such a lordosis falls into the second developmental group.

Ballantyne states that hydramnios may be a cause, and there is increasing evidence that hydramnios is a common concomitant of other foetal malformations.

Lordosis in the foetus may be caused by a pull on the omphalo-intestinal duct, and Bryce⁸ suggests that a retroflexion of the trunk of the embryo may result from defective development of the allantoic stalk and hind gut interfering with the curling of the tail end of the embryo. This view is favoured by Aschoff.⁹

An unduly short cord of itself might reasonably be a factor by causing stretching, and in extreme cases the effects of some such stretching are evident in the marked involvement and alteration of shape of the chest and solid organs. Similarly a persistent omphalo-vitelline duct may cause stretching, and it is interesting to note that one author¹⁰ states that such tension may be so marked in the embryo as to interfere with the downward growth of the rectum and hence cause imperforate anus. In this connexion it may be noted that the vitelline duct persisted in two of the four cases.

It seems unlikely that a defect in the skin development is a factor, for there was even an excess of skin in some cases. A defect in the development of the mesoblastic layer of the abdominal wall is more likely. A general enlargement of the abdominal viscera might cause a failure in the closure of the abdomen, but in none of the cases could such enlargement be made out. Moreover, a case has been recorded where the abdominal wall closed and nipped off a loop of jejunum (Ahlfeld). This loop would most likely be the normal umbilical loop of intestine, which is present in the commencement of the cord up to the third month of intrauterine life (Bolk).¹¹

This leads to a consideration of possible functional defects. Whilst the cutting off of the umbilical loop may have been due to excessively rapid development of the mesoblastic layer of the abdominal wall, the converse could equally take place. Thus, a defect in the development of mesoblast might result in a patency. Now, a defect in function of the mesoblast—that is, of the recti muscles—could act in the same way. This functional defect could originate in trophic, nerve or toxic irregularities. The condition is distinctly analogous to that of spina bifida, and this was long ago considered due to a dropsical condition in the foetus, producing a hernia of the meninges by interfering especially with the growth of mesoblast. This dropsy might originate in foetal heart disease, and in one of our cases there was a marked foetal heart disease. On the other hand, such cardiac weakness could conceivably arise from toxins received from a diseased maternal uterus. It was suggested in a recent review¹² of the subject of spina bifida that uterine conditions in the mother required closer investigation as possible causes of that malformation. The same applies to exomphalos, but, unfortunately, no details were got with reference to our cases.

Finally, we fall back on the trophic function, irregularity in the controlling mechanism of which may account for

almost any congenital deformity. In this connexion, Hertwig's¹² work is of great interest, for he succeeded, by applying chemical solutions to the ova of fish and amphibians, in producing many deformities, including spina bifida. A purely chemical and metabolic factor may therefore be at work.

There seems little need now for the consideration of the discountenanced amniotic band theory as a cause of any such deformity.

Conclusions.

1. The cause of exomphalos is most likely a defect in the development or function of the mesoblastic layer of the abdominal wall.

2. Treatment, to be successful, must be immediate and consists of open operation.

To my chief, Mr. Alex. MacLennan, I am indebted, not only for permission to publish these cases, but for much valued help and suggestion.

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THE CURE OF HAEMORRHOIDS WITHOUT OPERATION.

BY

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I AM somewhat diffident about placing my views on this subject before the readers of the *BRITISH MEDICAL JOURNAL*; but it is a journal which is read chiefly by general practitioners, and it may be helpful for general practitioners sometimes to read what one of their number thinks, even though it be heresy he preaches.

My text is that operation for haemorrhoids is not always successful, is usually unnecessary, and is rarely justifiable.

I have drawn no distinction between internal and external haemorrhoids, because I think most practitioners will agree with me that such a distinction is purely artificial. Varices exist inside the anus; some are forced down in defaecation, and fail to get back before the mucous membrane covering them is gripped by the sphincter. In the first instance they are internal; after coming down they are external. If they can be returned with the aid of providence and a little coaxing, they become internal again until next time. Finally, they come down for good, and cannot be returned.

Up to a point the presence of piles outside the anus may be taken as an indication of the presence of more piles inside ready to come down. An author recently stated the limit in number of potential piles to be eight, that being the number of venous loops inside the anus. It is certainly a fairly large number, and in practice I suppose none of us have found the whole eight possible piles outside, with consequently no more piles, or possibility of piles, inside.

The critical period is when a pile is changing, or has recently changed, from inside to outside the anus. So long as it is inside and remains always inside (even during defaecation), it does little harm. When it prolapses during defaecation, and when it first comes out for good, it causes all the pain, haemorrhage, and irritation, and is liable to thrombosis and suppuration. Later, after a varying but usually considerable period, it becomes covered with squamous epithelium, and therefore insensitive, and small, and is no more than an inoffensive tag of skin, which, with reasonable cleanliness, need cause no trouble. All this may be rather crude pathology, but it is clinically, I think, a fair summary of the sequence of events.

Operation is not always successful. The usual operation removes the piles which are outside, and perhaps the more prominent of those inside. In regard to this—analogously with those of the leg—it must be remembered how remark-

ably varices may disappear under the conditions of anaesthesia and an alteration in the position of the body. Note, too, what a difference there is between the conditions of straining and prolapse of defaecation and those of the lithotomy position.

The operator at the same time puts the sphincter out of action for the time being, and gives the patient very good advice as to diet, exercise, and aperients. To my mind, if the piles do not "recur"—or, to be more accurate, if more piles do not come down—it is likely to be as much due to the advice of the operator, impressed on the patient's mind by the expense, trouble, and pain of the operation, as to anything done at the operation. The author to whom I have referred admits this, but suggests a very much more radical operation, amounting almost to a resection of the mucous membrane lining the whole canal of the anus and lower rectum. I cannot speak to the results of this, but it is not the operation for piles usually undertaken, and I have seen certainly one case of most troublesome stricture resulting from a much less sweeping operation than this.

The usual operation for piles is not a dangerous one; but it is an operation, and as such, from the point of view of the patient and the conscientious practitioner, to be avoided if possible; it is painful and it is not certain to cure.

Now for the alternative: The usual palliatives—ung. hamamelidis, ung. gallae cum opio, etc.—are no more than palliative. They to some extent relieve pain, but do little to stop the bleeding and nasty mucous discharge. I consider them only fit for use during an attack of thrombosis—after the worst has been got over with fomentations—and also if it is essential that a patient should go about his work after a recent defaecation.

But there is a means of curing piles, in the sense that they can be made entirely innocuous. It is a question of reducing from a year or two to a month or two the period necessary to change a turgid mucus-covered and tender varix into a skin-covered excrescence and preventing the piles still inside the anus from coming out.

I have seen the application of calomel powder recommended and have tried it. It is useful, but calamine powder is much more so. Calomel is a trifle irritating, but calamine is soothing and is astringent as well. But the mere instruction to apply calamine will do little good.

Suppose a bad case, with a ring of prolapsed piles surrounding the anus, some perhaps denuded of epithelium, intensely and agonizingly tender, bleeding on defaecation, and continually discharging blood-stained mucus, which stains the linen and renders the patient's life a burden. The following plan will change the picture:

1. The bowels must be moved the last thing at night before retiring. It may be difficult to alter the usual habit of morning defaecation, but it is essential, and can be contrived by suitable aperients.

2. It is hardly necessary to say the bowels must be moved every night, but a loose action must be avoided. Even a slight degree of constipation so long as a nightly action of the bowels is secured, while not so good as an easy action, is infinitely preferable to the slightest diarrhoea. This means care and discretion in the use of aperients.

3. After the motion, and after gentle sponging with tepid water, calamine powder is to be applied in the following way: it is to be freely and thickly placed (not merely sprinkled) on a sanitary wool and gauze pad. It is cheap enough, but it need not be wastefully used if care be taken that there is a sufficient quantity (say a couple of teaspoonfuls) on the exact part of the pad which will remain in contact with the piles when the tapes are tied round the waist. It is necessary that the pad should be pulled firmly up into position.

If there is much discharge the pad should be changed in the morning and fresh calamine applied. If at first there is too much discomfort during the day, it is permissible to substitute ointment—for example, hamamelis—thickly applied on the pad worn during the day. But it must be explained that this is a step which somewhat retards results and does no permanent good. If the patient has the misfortune to have the bowels moved in the morning or during the day he will almost certainly have to be allowed to use ointment on the pad which he then applies, to be changed for the powder at night.

It will be found that after a time, probably not more than a fortnight or three weeks even in the bad case we