TABLE V.—Minimum Convulsant Dose for Rabbits.

	Cocaine.	Butyn.	Tutocain.	Novocain.
	mg. per kilo.	mg. per kilo.	mg. per kilo.	mg. per kilo.
Intravenous. Rapid injection of 1 per cent. solution into ear vein (1 c.cm. in 18 secs.)...	4	4	10-15	45
Subcutaneous. 5 per cent. solutions under skin of back ...	30	30	65	120

CONCLUSIONS.

1. These experiments show that the best of the local anaesthetics for the eye are cocaine and butyn. Tutocain may also have a use. Tropicocaine, novocain, and eucaine are less valuable for deep anaesthesia.

2. For the nose, cocaine and tutocain are alone useful.

3. For subcutaneous injection novocain is much the best.

4. Besides cocaine, it is believed that the properties of butyn and tutocain may render them addiction drugs.

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CAESAREAN SECTION.*

BY

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THIS paper records an experience of 116 sections, the majority of which were performed to anticipate or relieve obstructed labour due to pelvic contraction, the others for less common indications.

The Operation.

The abdominal incision is median and subumbilical unless Bandl's ring is present, when it is placed higher. The uterus is opened in the upper segment, and the hand, passed between the placenta and the uterine wall, ruptures the membranes and extracts the child. After removal of the placenta 1 c.cm. of pituitary extract is injected, and the uterus is closed with four to six interrupted catgut sutures, taking up the whole thickness of the wall. A continuous suture or further interrupted sutures adjust the superficial layers and peritoneum, and the abdomen is closed. The operation takes from twelve to twenty minutes. The gaping mouths of sinuses seen while incising the uterus suggested that a safer method of approach must be adopted in septic or suspect cases.

Situation of Placenta.

The placenta in 75 cases was posterior or anterior in position in a proportion of 4 to 3, but in patients who had had previous sections the proportion was 3 to 1, suggesting that the residual scar tissue contributed to this result. It is noteworthy that the placenta was anterior in the only case of rupture of an old scar.

Rupture of Old Scar.

This risk is negligible. In many the uterus showed no trace of a previous incision, but in some there was definite scar tissue, and the wall felt dense when incised. In no case was thinning evident, although in many instances the

patient had been in labour a number of hours, and one at least has since been delivered without resort to section. The case which ruptured had had four previous sections and came in for her fifth. After several hours in labour the pain became very severe and she was operated on shortly after admission. The complete ovum was lying in the abdominal cavity, which contained much blood, and the placenta presented. The uterus, firmly contracted, appeared ready for a resuture, which was done. The mother made a perfect recovery.

Contracted Pelvis.

A large number of the patients were definitely under-sized and rachitic. Three had old hip trouble with, in two cases, the limb ankylosed in such marked adduction as to render delivery difficult if not impossible, but each in addition had marked flattening on the affected side of the pelvis.

The previous obstetric histories were instructive. A 10-para with a conjugata vera of 3 in. reported the survival of one child—the others died at birth following instrumental delivery—while a 6-para and a 4-para recorded a series of stillbirths preceding the successful Caesarean section. In a number of cases when the child survived delivery it died some weeks or months later from "fits." One 7-para reported that her four children delivered alive with forceps died between six weeks and three months from this cause.

Primiparae, having no antecedent obstetric history, are entirely dependent for their safety on a pre-maternity examination. The outstanding impression gained in dealing with these cases was the extremely obvious indication that something was wrong, gained in practically every instance by abdominal examination without resort to either pelvimetry or an internal examination. The problem, viewed purely as one of elementary mechanics, was obvious: the head was above the brim and actually over-riding it; or sitting in the brim and no pressure from above could push it in; or the head was definitely engaged but a large amount was still above the brim. Since in a normal case merely the forehead can be felt above the brim some weeks before term, surely something must be wrong if more of the head is felt. Where there is the least doubt the patient should be anaesthetized, and with fingers—or even the whole hand—in the vagina, the exact relationship of the head (the ball) to the pelvis (the socket) should be decided on a purely mechanical basis. When the patient is in labour and it is believed that the head may come through, a careful watch should be kept on the mother for exhaustion, the child for distress, and the course of labour for the non-descent of the presenting part or the formation of Bandl's ring, with a view to performing an immediate section should occasion arise.

Contraction of the pelvic outlet is less common but more treacherous. In the majority the pelvis was small and the delay was at the brim or high up, but in some cases the abdominal examination suggested that all was well, and the head appeared to be well engaged. In such cases no difficulty was experienced at the operation in extracting the head from the pelvis. A certain number of cases invited the application of forceps, especially when the head was impacted in the mid-cavity in cases of funnel-shaped pelvis, and in two cases where it was actually at the outlet. A thorough examination, however, showed that the lower strait could not possibly allow the passage of a head in a condition consistent with the survival of the child, and without inflicting serious trauma on the mother.

Caesarean section as an operation is often regarded as of sole interest to the specialist, and for use in cases of marked pelvic contraction. It has not yet come into its own in minor degrees of this condition.

Obstructed Labour.

Peritoneum.—The peritoneal fluid was markedly increased in a number, and in one was blood-stained.

Uterus.—The presence of Bandl's ring as a shallow transverse groove was noted in a number, and frequently corresponded to the child's neck. In several cases the incision had to be prolonged into the lower uterine segment

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to divide the ring before the head could be extracted. The level of the ring varied, and in one or two late cases was almost up to the umbilicus. The lower uterine segment was thin in cases of overdistension—sometimes not thicker than wet blotting paper—and in two cases blood was extravasated under the peritoneal coat, indicating that it was on the point of rupture. The upper uterine segment in several very late cases was in a state of tonic contraction, the surface veins and uterine sinuses being flattened and empty, and merely a little dark blood trickled away on section. The trauma to which the lower uterine segment, cervix, and vagina are subjected is recorded, but the damage which results in obstructed labour from natural forces is not sufficiently recognized.

Intact membranes suggest that the child is fairly safe from undue pressure, but this was disproved by finding meconium in the liquor, and marked moulding of the head before rupture of the membranes. The lower uterine segment and cervix was nipped between the head and pelvic brim in most cases, and in one this was so marked that the stillborn child had an area the size of a two-shilling piece on the post-parietal, showing bare bone. The mother died later from general peritonitis following sloughing of the bruised lower uterine segment, which actually had a hole in it. In another fatal case the child's head was bruised and ecchymosed over an area corresponding to the promontory. One other case presented a laceration of the cervix extending to the vault although forceps had not been used.

Placenta and Membranes.—It was very noticeable that in late cases obviously infected the chorion appeared yellow and pultaceous in the lower areas and could not be stripped off, suggesting that infection was tracking up in this layer outside the amnion. In one this change in the chorion was almost universal and the placental site itself appeared septic.

In late cases the liquor amnii was scanty and usually contained meconium. In a number it was definitely offensive.

Diagnosis of Infection.

Many hours in labour, much interference, or the presence of Bandl's ring is strong presumptive evidence of infection; a discharge developing during labour, after rupture of the membranes, with soreness and redness of the vulva, is almost certain proof, and a temperature is more likely due to sepsis than to exhaustion. Offensive liquor found on opening the uterine cavity, or a positive culture from liquor obtained from the abdomen, is proof positive. Cultures were taken in a few cases, and the results are instructive in showing how soon after rupture the liquor may become infected.

Bacteriology.

Membranes.	Liquor.	Result.		Pyrexia (Days).
		Mother.	Child.	
Unruptured ...	No growth	Alive	Alive	0
" ...	No growth	"	"	1
Ruptured : 6½ hours ...	Diphtheroid bacillus	Alive	Alive	0
8 " ...	No growth	"	"	5
11 " ...	B. coli and streptococci	"	"	11
16 " ...	Offensive	Dead	"	—
20 " ...	Streptococci	"	"	—
25 " ...	B. coli and streptococci	Alive	"	5
26 " ...	B. tetanoides	"	Dead	4
36 " ...	Offensive	Dead	"	—
48 " ...	Offensive	"	"	—
48 " ...	Offensive	Alive	"	11

Offensive lochia or the discharge of pus from the wound during convalescence is suspicious of antecedent infection. During convalescence each day on which the temperature was above 100° F. was noted, unless it could be attributed

to some definite cause—the breasts, for instance. The following average duration of pyrexia was met with:

Membranes Unruptured—

Labour under twelve hours (17 cases) ... 2 days
Labour over twelve hours (13 cases) ... 3 "

Membranes Ruptured—

Labour under twelve hours (18 cases) ... 5 "
Labour over twelve hours (5 cases) ... 7 "

Results.

Forty-three cases operated on early in labour with unruptured or recently ruptured membranes showed 100 per cent. maternal and foetal survival. With the exception of two deaths under anaesthesia the cases which died were all very exhausted and definitely infected.

Maternal Deaths.

Case 1.—A 2-para with a true conjugate of 3 in. had been forty-eight hours in labour and the membranes ruptured for sixteen hours. She was very exhausted, the pulse being 132 and the temperature 97.2° F. Attempts at forceps delivery had been made for two and a half hours on a head above the brim: 1 c.cm. of pituitary extract had been injected, and this necessitated almost continuous anaesthesia for several hours until she was brought to the hospital. On opening the uterus the liquor was found to be offensive and the placental site appeared septic. The child survived, but the patient died on the third day. *Post mortem*, septic endometritis, suppurative peritonitis, and toxic changes in the organs were found.

Case 2.—A 1-para with a true conjugate of 2½ in. had been in labour for forty-eight hours and the membranes ruptured for thirty-six hours. She was very exhausted and the pulse was 144. Numerous attempts had been made at delivery with forceps on the head, which was above the brim. Finally the head was perforated. The uterus was in tonic contraction, and, at operation, the lower uterine segment was found to be extravasated with blood. The upper uterine segment was bloodless, and appeared on section like wet leather, and a rapid subtotal hysterectomy was performed. The patient died shortly after the operation was completed. Cultures of the liquor grew streptococci and *B. coli*. *Post mortem* there was no peritonitis, but the vagina was extensively lacerated. Section of the uterine wall showed acute inflammatory oedema and necrosis with streptococci present in the musculature.

Case 3.—A 1-para with a true conjugate of 3½ in. and a funnel-shaped pelvis had been in labour with ruptured membranes for forty-eight hours, and the child was dead. Bandl's ring was present; the head was above the brim and there was an offensive vaginal discharge. At operation the peritoneal cavity contained blood-stained serum and the lower uterine segment was extravasated with blood. The upper uterine segment was in tonic contraction, and the veins were flattened and empty. On opening the uterus the liquor was offensive and the placental site appeared septic. She died on the third day. Cultures of the liquor grew streptococci. *Post mortem*, peritonitis was present and the lower uterine segment was gangrenous and pulpy. The anterior vaginal wall was bruised, lacerated, and surrounded by gangrenous inflammation, and there was a sloughing erosion on the posterior wall of the bladder. An acute haemorrhagic inflammation extended through the left broad ligament up to the lower pole of the kidney. Bronchopneumonia was present in both lungs and the other organs showed toxic changes.

Case 4.—A 4-para with a true conjugate of 3 in. had been in labour for twenty-four hours and the membranes ruptured for twenty hours. She was very exhausted, the pulse was 120 and the temperature 99° F. She had had a discharge for some days and the vulva was sore and excoriated. The chorion appeared sloughy and cultures from the liquor grew streptococci. She died, but the child survived. *Post mortem*, there was no peritonitis, but there was a slight purulent exudate over the uterine incision. Septic endometritis was present, especially about the site of the uterine incision. Both lungs showed commencing bronchopneumonia and pleurisy.

Case 5.—A 1-para suffering from eclampsia with a badly contracted pelvis had been in labour several days. The child was dead, and its scalp had sloughed owing to pressure on the promontory of the sacrum. *Post mortem*, general peritonitis and a hole in the posterior wall of the lower uterine segment were found.

Case 6.—A 2-para with albuminuria had been in labour for three days and the membranes had been ruptured for twenty-one hours. The head was above the brim and markedly moulded. The child survived, but the patient died of septicaemia and (?) peritonitis. Neither cultures nor *post-mortem* examination were obtained.

Case 7.—Death under anaesthesia.

Case 8.—Death under anaesthesia. This patient was very exhausted, and had had several previous anaesthetics and one attempt at forceps delivery.

Case 9.—See placenta praevia.

Case 10.—See occipito-posterior.

Foetal Deaths: Mother Survived.

1. Infected case; eighty-four hours in labour; membranes ruptured forty-eight hours; much moulding.
2. In labour for eleven hours; membranes ruptured six hours; head above brim; vessels in cord thrombosed.
3. Infected case; membranes ruptured twenty-six hours; Bandl's ring; frequent forceps.
4. Labour twenty-four hours; forceps before admission; cord prolapsed.
5. Labour seventeen hours; head above brim; cord prolapsed.

6. Labour twenty hours; head above brim; macerated.
7. Labour twenty-nine hours; membranes ruptured twenty-three hours; child had a spina bifida.
8. Infected case; labour thirty-one hours; membranes ruptured six hours; prolapse of cord.

Foetal Deaths: Mother Died.

1. Child's head perforated before admission.
2. Membranes ruptured thirty-six hours; Bandl's ring; frequent forceps.
3. Obstructed labour and eclampsia; child's scalp necrosed owing to pressure.
4. Central placenta praevia; patient blanched and collapsed.

The deaths of babies could not be attributed to the operation, as, with the sole exception of one or two in the last stages of foetal distress, the others were known to be dead.

The only point for discussion is whether, presuming the death of the child, the mother could have been delivered safely by any other method. Delivery by forceps was out of the question apart from the fact that it had already been tried in a number. Version was also contraindicated, either by the pelvic measurements or by the condition of the uterus, which in some cases was on the point of bursting or tightly gripped the child in a Bandl's ring. Craniotomy is certainly not justifiable if the child is alive, but where the child is dead it might be considered on a head well down in the cavity.

Caesarean Section or Craniotomy.

The case for Caesarean section is as follows: Let it be granted that the twelve babies were known to be dead when the patient was seen. Eight of the mothers left the hospital alive and well; four died—each of the four was profoundly exhausted, and could not have stood an anaesthetic lasting many minutes. Three patients were definitely infected, one of whom had a true conjugate of $2\frac{1}{2}$ in., and one had eclampsia (see maternal deaths 2, 3, 5); the fourth was a case of central placenta praevia—a multipara who was blanched and had chronic nephritis.

Craniotomy on a head above the brim of a contracted pelvis, with an os one-third to half dilated, would in itself tax the skill of an expert obstetrician. Add to this a Bandl's ring gripping the child's neck, the lower uterine segment on the point of bursting, the tissues bruised and highly infected, the mother profoundly exhausted, and the procedure becomes sheer folly. Craniotomy on live children has been recommended in septic cases with a view to avoiding Caesarean section. The criticism of this is the difficulty of proving infection, and its wisdom as a procedure even in the presence of proved infection. The bacteriological table contains nine proved cases of infection; of these, five mothers recovered—the four who died would almost certainly have died in any case; five children have survived who might therefore have been craniotomized had the operation been practicable (see maternal deaths 1, 2, 3, 4).

Hysterectomy in Infected Cases.

A subtotal hysterectomy, presumably to remove the placental site after the risk of infection, is not indicated in suspect cases, and as a procedure in late cases is merely playing with the fringe of the trouble, which by that time is deeply spread in the surrounding tissues. The *post-mortem* reports are amply confirmatory. This applies also to a total hysterectomy.

Technique in Infected Cases.

The patient is put in the lithotomy position, and the vagina is douched out with eusol. The uterus is eventrated and held well forwards, and after being packed round with swabs the edges of the abdominal incision are clipped together over the swabs. Towels are wrapped round the uterus outside the abdomen, and are further protected by a layer of rubber sheeting. The fundus is incised transversely and the child extracted. An assistant holds the anterior and posterior walls apart, and thus prevents separation of the placenta until the muscular funnel lined by the placenta and membranes has been well douched out with eusol, the fluid escaping readily at the vagina. The placenta and membranes are then pressed down into the vagina with swab pressure, and extracted from below. The cavity is flushed again with eusol, and the uterus and

abdomen closed as before. The peritoneal cavity is well protected, and the uterine incision avoids the very vascular placental site, which is protected from infection until the membranes have been well flushed. Extraction of the placenta from below prevents the more highly infected membranes in the lower pole from being dragged over the placental site and wound edges. This is only possible if the os is half or more dilated.

This technique has been adopted in five cases, but in one the placenta had to be extracted through the abdominal incision owing to insufficient dilatation of the os. One very late case died (see maternal deaths, 4). All the cases were believed to be infected, although only proved by cultures in two, both of whom survived. Four live children resulted, the fifth being dead at the time of operation. One of the mothers has since had a Caesarean section at the time of election, with no evidence of thinning of the old scar.

Certain Special Conditions.

Placenta Praevia.—Section was performed on four occasions. Three primiparae with placenta over the os were successfully delivered of live children ($7\frac{1}{2}$, $7\frac{1}{2}$, $6\frac{1}{2}$ lb.). Two of them had been plugged before operation. One, a 6-para, with chronic nephritis and general oedema, and blanched from loss of blood due to central placenta praevia, died shortly after the operation. The child was stillborn. The placenta in the former cases was definitely elongated, and suggested that it had undergone stretching in the long axis of the uterus during the development of the lower uterine segment. The course of the operation gave rise to no anxiety from bleeding. The operation should always be considered in the child's interests if the patient is near term, especially in primiparae and where the placenta is partially or wholly over the os.

Prolapse of Cord.—If this is associated with pelvic contraction, and there is the least doubt about the safety of version, in the mother's interests, lest her uterus rupture, or the child's interests as its head comes through the brim, the wisest course is to leave the condition alone and make immediate arrangements for a section. In the majority of cases the child is dead, and the sole concern is to arrange for the safe delivery of the mother.

Occipito-posterior Presentation.—Obstructed labour resulted from this on three occasions, the head in each case being above the brim. All were multiparae, and two gave a history of normal deliveries. Bandl's ring was present in both and rendered a version impossible. Live children resulted in each case, but one mother, with a badly bruised lower uterine segment, died of septicaemia and peritonitis. The liquor was offensive, but no culture was taken or *post-mortem* examination performed.

Pendulous Abdomen.—A woman with marked Pott's curvature was delivered through a fundal incision. Her chest rested on her pelvis and compelled the uterus to grow horizontally forwards. In labour the direction of force would have driven the child's head against the spine. Undue importance is attached to pendulous abdomen as a sign of contracted pelvis.

Tumours.—Five cases of obstruction were due to tumours (fibroids in three cases, ovarian tumours in two); some of the patients were seen late in labour after many examinations and attempts at forceps delivery. In two cases the pelvic fibroid simulated the foetal head, and this caused delay in diagnosis. The diagnosis in labour between an impacted ovarian and posterior fibroid is difficult. The three fibroid cases were as follows:

1. Elderly primipara with large multiple fibroids. Caesarean section, followed by a subtotal hysterectomy.
2. Large cervical fibroid. Caesarean section; fibroid to be removed later.
3. Large cervical fibroid; liquor offensive; uterus and abdomen closed. Patient developed a large abscess which burst through the wound, and later required a secondary suture. Six months later the abdomen was opened, and merely a few peritoneal adhesions indicated the previous infection. The fibroid was enucleated; the patient is now seven months pregnant.

In dealing with fibroids where it is hoped to conserve the uterus, the question of accessibility and vascularity will decide whether to attempt removal at the time of section or postpone till involution is complete. In infected cases the latter course is certainly the wiser one to adopt. Both

cases of ovarian tumour required section before the ovarian cyst could be disimpacted and removed. Tapping such a tumour by the vagina does not commend itself owing to doubt as to its exact nature. It was quite out of the question to push the tumour past the presenting part.

Cervical and Vaginal Stenosis.—A patient with cervical stenosis showed signs of obstructed labour, the os was closed, rigid, and difficult to reach. She had been twice curetted. A number of these cases met with have responded to incision of the fibrous ring, but this was not possible here. The vaginal stenosis could not be explained. An elderly multipara with a ring of contraction below the cervix was watched carefully in the later months of pregnancy and early in labour, but as the ring showed no relaxation a Caesarean section was performed.

Eclampsia (two cases).—Both cases had in addition marked pelvic contraction, and obstructed labour. One died later from sloughing of the lower uterine segment; the baby was dead. The other had a fit on the table and was operated on while unconscious; an anaesthetic was given when stitching up. Both she and the baby survived.

THE BACTERIOPHAGE IN THE TREATMENT OF TYPHOID FEVER.

BY

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THE value of the administration of bacteriophage in the treatment of organismal infections in man has not yet been definitely established. *In vitro* the bacteriolytic principle, whether it be due to an ultramicroscopic living virus or some other property associated with organismal life, has a very marked effect on susceptible bacteria.

The extensive work of d'Herelle (1922)¹ has shown that the spread of avian typhoid and paratyphoid can be controlled and actual cases may, in some instances, be cured by the subcutaneous injection of a small dose of bacteriophage active for *B. gallinarum* and *B. pullorum*. In human beings affected with typhoid and dysentery d'Herelle (1922)² has demonstrated repeatedly that a very active bacteriophage can be isolated from the faeces when convalescence commences. He has also treated seven cases of dysentery by giving 2 c.cm. of bacteriophage by mouth, and apparently obtained good results. Bruynoghe and Maisin (1921)³ have treated with success infections due to the staphylococcus and *B. anthracis* by subcutaneous injection of suitable bacteriophage. Beckerich and Hauduroy (1922)⁴ have treated seven cases of typhoid fever and two cases infected with *B. paratyphosus* B by giving 1 c.cm. of a culture of active bacteriophage subcutaneously and 2 to 5 c.cm. by mouth. From all these cases the infecting organisms were isolated from the blood forty-eight hours previous to the administration of bacteriophage. In every case defervescence took place within forty-eight hours.

Methods.

The bacteriophage employed in the treatment of cases of typhoid fever was isolated from the faeces of a normal individual who never had an intestinal infection. It was obtained by the technique devised by d'Herelle.

Five grams of faeces were added to 50 c.cm. of broth (pH 8.0) and incubated overnight. The broth was centrifuged to remove all coarse material, and the supernatant fluid was afterwards passed through an L₁ Chamberland candle; 2 c.cm. of the filtrate were then added to tubes containing 10 c.cm. of broth. Young agar cultures of strains of the coli-typhoid-dysentery group were now suspended in broth. Sufficient of each suspension was added to the broth tubes to give a turbidity corresponding to that in a standard tube containing 250 million bacilli per cubic centimetre. After a further period of incubation various degrees of turbidity were noted in the tubes. The broth tubes were now subcultured on to agar slopes, and after incubation the presence of plaques definitely indicated the activity of the bacteriophage culture for a particular strain.

A bacteriophage showing some power to cause lysis of *B. typhosus* having been obtained, its virulence was enhanced by filtering the broth culture through a bacterial filter and adding five drops of the filtrate to another broth tube along with a suspension of *B. typhosus*. The second

broth culture was then incubated and afterwards filtered. By repeating this process fifteen times a bacteriophage of such virulence was obtained that it produced lysis in a broth culture of *B. typhosus* in from three to four hours.

In investigating the following cases, the faeces of the patient were examined for bacteriophage previous to the administration of the bacteriophage culture, and again twenty-four hours after administration. Thereafter the faeces were examined every second day, so far as was possible, for bacteriophage. The activity of the bacteriophage isolated from the cases was tested against the stock strain, and in the charts the degrees of virulence are thus expressed:

- 0 = No bacteriophage obtained.
- + = Bacteriophage of slight virulence as shown by a few plaques on the agar slope.
- ++ = More numerous plaques.
- +++ = Still more numerous plaques of bacteriophage.
- ++++ = No growth on agar slope or only a few discrete colonies of *B. typhosus*.

CASE I.

A female, aged 58 years, was admitted to hospital eighteen days after falling ill. On admission she had no acute symptoms. The bacteriological examination showed that the blood serum agglutinated *B. typhosus* in a dilution of 1 in 240. No typhoid bacilli were obtained from the blood and urine, but the faeces contained

FIG. 1.—Case I.

B. typhosus. No bacteriophage was found in the faeces active for the stock strain or the patient's own strain. Six days after admission the patient was given 0.5 c.cm. of bacteriophage culture subcutaneously and 2 c.cm. by mouth. The temperature then subsided, and twelve further examinations of the faeces and urine were made, with negative results for *B. typhosus*.

CASE II.

A. W., a male aged 38 years, was admitted after being ill for three weeks. *B. typhosus* was not obtained from the blood or urine, but the faeces showed numerous colonies on McConkey plates. The blood serum agglutinated *B. typhosus* in a dilution of 1 in 120. There was no bacteriophage in the faeces active for the stock strain

FIG. 2.—Case II.

or the patient's own strain of *B. typhosus*. On the day after admission 2 c.cm. of bacteriophage culture were given subcutaneously and 15 c.cm. by mouth. Thereafter the temperature became normal, and nine further examinations of the faeces and urine did not show *B. typhosus*.