INQUIRY INTO THE TREATMENT
OF
CONGENITAL IMPERFECTIONS OF THE
RECTUM BY OPERATION,

FOUNDED ON AN ANALYSIS OF ONE HUNDRED CASES, NINE OF
WHICH OCCURRED IN THE PRACTICE OF THE AUTHOR.

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Of the many congenital imperfections and deficiencies to which the human body is liable, there are few more fatal to the life of the infant, or more distressing to the parents, than those of the terminal portion of the alimentary canal. They are not only varied in form, but the opportunities of observing them occur so rarely, that I fear life is sometimes sacrificed for want of the information necessary to guide the practitioner in dealing with them. In a large number of instances, the operations performed to remedy the imperfection have failed in procuring a vent for the fæces. In many others, where a passage has been made, the relief, though immediate, has not been sufficient or permanent, but has only prolonged a miserable existence; whilst in a very

few only has the success been complete, and life been preserved, without risk and serious inconvenience. Indeed, so unsatisfactory have been the results of operative treatment, that some surgeons have objected to interfere at all, and have left the infant to perish. With the view of ascertaining and estimating the results of the operations which have been resorted to in the different forms of these imperfections, either for the preservation of life or its future comfort, and of assisting to establish the best modes of attaining these objects, I have collected and tabulated one hundred cases, in which operations have been performed by myself and other surgeons.

*Table of 100 Cases of Congenital Imperfections of the Rectum subjected to Operation.*¹

No.	Sex.	Operator and References.	Nature of Imperfection.	Treatment and Nature of Operation.	Result and Period.	Remarks.
1	M.	The author	Imperforate anus	Deep incision and punc- ture, but rectum not reached	Fatal	—
2	F.	The author	Anus opening into a cul-de- sac; rectum ending in a blind extremity close to the latter	Deep puncture; and gut reached	Fatal, nine days	Rectum reached, but no meco- nium escaped.
3	M.	The author	Anus opening into a cul-de- sac three quarters of an inch in depth	Incision towards the coccyx, gut reached, drawn down and se- cured to skin at the anus	Successful, six months	No tendency to contraction, but occasional dilatation con- tinued as a precautionary measure.
4	F.	The author	Imperforate anus; rectum opening into the vagina three quarters of an inch from its orifice	Incision at the anus, and gut reached	Unsuccessful	Great tendency to contract; child neglected, and opening allowed to close after some months. Died from infantile disease at the age of eighteen months.

¹ In many of the cases in the Table I have been able to add fuller and more recent information than will be found in the references, chiefly from inquiries made of the operators, to whom I beg to express my obligations for their ready assistance. It must be observed that the fatality after operation is much greater than the table indicates, as cases of success are far more frequently put on record than cases of failure or death. Cases of abnormal contraction of the anus, and of simple closure of the aperture by a membrane, without deficiency of the rectum, are not included, the treatment being obvious, and the result generally satisfactory.

No.	Sex.	Operator and References.	Nature of Imperfection.	Treatment and Nature of Operation.	Result and Period.	Remarks.
5	F.	The author	Imperforate anus; rectum opening in the perineum, close to the vagina, by a narrow outlet	Incision at the anus, and gut reached	Successful, two years	Operated on at the age of three months; child alive and well at two and a half years of age.
6	F.	The author	Anus opening into a cul-de-sac; rectum wanting; the colon terminating in a blind pouch in the left iliac fossa	Deep puncture, but gut not reached; colotomy in the left loin	Fatal, eighteen hours after second operation	An instrument introduced at the anus had penetrated the vagina, passed behind the uterus, and wounded the peritoneum.
7	F.	The author	Anus opening into a cul-de-sac half an inch in depth.	Deep puncture without reaching the bowel; unsuccessful attempt to open colon in left loin	Fatal, nine days after birth	Descending colon contracted, attached by a mesocolon, and loose in the cavity.
8	F.	Wormald, notes of the author	Imperforate anus; rectum opening into the vagina	Incision and gut reached	Successful, five months	Child brought to the author at the age of five months, having been operated on at St. Bartholomew's Hospital. No attempt had been made to close the opening into the vagina.
9	F.	Adams, assisted by the author	Imperforate anus; rectum opening into the vagina	Incision at the anus, and gut reached	Successful	Operated on at four years of age, the artificial anus easily maintained to the period of the child's death from diphtheria, a month after the operation.
10	M.	Duret, quoted by Amussat in his memoir 'Sur la possibilité d'établir un anus artificiel'	Imperforate anus	Incision, but gut not reached; colotomy in the groin	Successful	Reported by Rochard ('Mémoires de l'Acad. Imp. de Médecine, tom. xxiii) to have died at forty-three years of age, of a disease unconnected with his infirmity.

11	M. Desault, <i>ibid.</i>	Imperforate anus; rectum opening into the bladder	Colotomy in the groin	Fatal, four days	—
12	M. Dumas, <i>ibid.</i>	Imperforate anus; rectum opening into the urethra	Incision and puncture, but gut not reached	Fatal, two days	—
13	M. Duret, <i>ibid.</i>	Imperforate anus; rectum terminating in a cul-de-sac an inch from the anus	Incision, but gut not reached; colotomy in the groin	Fatal, four days	—
14	F. Serrand, <i>ibid.</i>	Anus opening into a cul-de-sac an inch and a half in depth	Colotomy in the groin	Successful	Reported by Rochard to be alive and well at forty-six years of age.
15	F. Miriel, <i>ibid.</i>	Anus opening into a cul-de-sac six lines in depth	Colotomy in the groin	Successful	Reported by Rochard to be alive and well at forty-three years of age.
16	M. Miriel, <i>ibid.</i>	Anus opening into a cul-de-sac one and a quarter inch in depth	Colotomy in the groin	Successful	Alive at thirteen years of age.
17	M. Miriel, <i>ibid.</i>	Imperforate anus; rectum terminating in a cul-de-sac some distance from the anus	Incision and puncture, but gut not reached; colotomy in the groin	Successful	Lived twenty-seven months, and died from dentition.
18	M. Bizet, <i>ibid.</i>	Imperforate anus; rectum wanting	Incision, but gut not reached; colotomy in the groin	Successful	Lived one month. Reported to have died of an indigestion caused by the imprudence of the parents.
19	M. Klewig, <i>ibid.</i>	Imperforate anus	Incision and puncture, but gut not reached; colotomy in the groin	Successful	Survived three years.
20	F. Amussat, 'Troisième Mémoire'	Anus opening into the vagina, but not communicating with the rectum, which was entirely deficient; the colon terminating in a blind pouch two inches from the anus	Deep incision behind the anus, cul-de-sac of bowel reached and drawn into the perineum, and artificial anus established behind the natural anus	Successful	Opening enlarged by Sir P. Crampton, at end of two months; in good health, with power of retention, at nine years of age. Engaged to be married at twenty-one years of age.

No.	Sex.	Operator and References.	Nature of Imperfection.	Treatment and Nature of Operation.	Result and Period.	Remarks.
21	M.	Amussat, 'Troisième Mémoire'	Imperforate anus; rectum opening into the bladder between the ureters	Incision in the perineum behind the anus, but gut not reached	Fatal, two days	—
22	M.	Amussat, <i>ibid.</i>	Imperforate anus; rectum terminating in a cul-de-sac an inch from the anus	Incision, and gut reached	Fatal, two days	—
23	F.	Amussat, <i>ibid.</i>	Imperforate anus; rectum terminating in a cul-de-sac	Incision behind the anus, and gut reached and drawn down	Fatal, four days	Death attributed to a prolonged operation.
24	M.	Amussat, <i>ibid.</i>	Anus opening into a cul-de-sac nearly an inch in depth; the rectum terminating in a blind pouch descending behind it	Deep incision behind the anus, and gut reached; septum divided, and communication with natural anus established	Successful	Alive and well at the end of eight weeks.
25	M.	Amussat, <i>ibid.</i>	Anus opening into a cul-de-sac upwards of an inch in depth; rectum wanting	Puncture, but gut not reached; colotomy in the left loin	Successful	Reported by Dr. Alphonse Amussat to have lived to the age of seven years; great difficulty at first in keeping artificial anus patent.
26	M.	Amussat, <i>ibid.</i>	Anus opening into a cul-de-sac upwards of an inch in depth; rectum terminating in a cul-de-sac near the septum	Colotomy in the left loin	Fatal, eight days	—
27	M.	Amussat, <i>ibid.</i>	Imperforate anus	Incision, but gut not reached; colotomy in the left loin	Successful	Alive and well seven weeks afterwards, but known not to have long survived.

28	M. Bougon, quoted by Amussat	Imperforate anus; rectum terminating in a cul-de-sac an inch from the anus	Incision, but gut not reached; colotomy in the left loin	Fatal, one day	Operations not performed until thirteenth day after birth. Peritoneum opened in colotomy.
29	F. Sharpless, 'Lancet,' vols. iii and iv	Imperforate anus; rectum terminating in the vagina	Puncture and incision, and gut reached	Successful, four months	Operated on ten days after birth; recto-vaginal opening closed spontaneously in two months after the operation. Dilatation continued at date of success.
30	M. Edwards, 'Lancet,' vol. i, 1829-30	Anus opening into a cul-de-sac one inch in depth; rectum terminating in a blind pouch	Puncture, but gut not reached	Fatal, twenty-four hours	Died of peritonitis; peritoneum wounded in the operation.
31	F. Thomas, 'Lancet,' vol. ii, 1830-1	Anus opening into a cul-de-sac; rectum terminating in a blind pouch	Puncture, but gut not reached	Fatal, seven days	—
32	M. Lindsay, 'Lancet,' vol. i, 1835-6	Imperforate anus	Incision, and gut reached	Successful, six years	The artificial anus originally made at the side of the coccyx was imperfect, and became obstructed with a plumstone at six years of age, and life was endangered. Another opening was made with success and power of retention.
33	M. Tatham, 'Lancet,' vol. i, 1835-6	Imperforate anus; rectum wanting; colon opening by a narrow canal into the urethra	Incision, and gut reached	Fatal, two months	Unsuccessful in maintaining the opening; meconium continued to pass by the urethra.
34	M. Smyth, 'Lancet,' vol. i, 1846	Imperforate anus; rectum wanting; colon terminating in a blind pouch	Incision; gut reached, and drawn down the day after the incision, but not secured to the skin	Successful, eighteen months	The incision to reach the gut is reported to have been as deep as the brim of the pelvis.
35	F. Pickop, 'Lancet,' vol. i, 1850	Anus opening into a cul-de-sac one and a half inch in depth	Incision, and gut reached	Successful, two weeks	—

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36	M.	Erichsen, 'Lancet,' vol. i, 1851	Imperforate anus; rectum wanting; colon terminating in a blind pouch	Incision and puncture, and gut reached	Fatal, four days	—
37	M.	Clark, Le Gros, 'Lancet,' vol. i, 1851	Anus opening into a cul-de-sac half an inch in depth; rectum wanting	Incision, and gut reached	Successful, nine years	Difficulty in maintaining the opening; constant attacks of constipation. Second operation performed after three weeks, and a third at a later period. Alive and well at nine years of age, but subject to great inconvenience from feculent accumulations.
38	M.	Arnott, 'Lancet,' vol. i, 1855	Imperforate anus; rectum communicating with urethra	Incision, and gut reached	Successful, nine years	Difficulty in maintaining the opening; incision repeated at end of four months. Alive and well, with power of retention, at nine years of age.
39	M.	Pugh, 'Lancet,' vol. i, 1855	Imperforate anus; rectum opening into urethra or bladder	Incision, and gut reached, drawn down, and secured to skin	Successful, five years	Followed by retraction, instruments required for some time to counteract tendency to close. Alive and well at five years of age.
40	M.	Miller, 'Lancet,' vol. i, 1857, and 'Edinb. Med. Journal,' vol. ii, 1856-7	Imperforate anus; rectum opening into urethra or bladder	Incision and puncture, and gut reached	Successful, thirty-six years	Difficulty in maintaining the opening; repunctured ten times in first eight months. Large alvo-urinary calculus extracted from the rectum at seven years of age. Alive and well at thirty-six years of age; power of retention complete.

41	M. Dickinson, 'Lancet,' May, 1859	Imperforate anus; rectum opening into the urethra	Incision and puncture, and gut reached	Successful	Operated on at the age of four months, all the faeces passing per urethram previously; operation had to be repeated owing to closure of the wound. Died of bronchitis some months afterwards.
42	M. Williamson, 'Lond. Med. Gazette,' vol. xxxvii	Imperforate anus; rectum terminating in the prostatic portion of the urethra	Incision, but gut not reached	Fatal, eight months twenty-two days	Faeces passed by the urethra, but obstruction frequently occurred; consent refused to a second operation.
43	M. Fergusson, 'Practical Surgery'	Imperforate anus; rectum opening into membranous portion of the urethra	Incision, and gut reached	Successful	Died at six years of age from disease of the lungs. No incontinency. Inconvenience continued from communication between the two passages remaining unclosed.
44	M. Hutchinson, 'Observations in Surgery'	Imperforate anus; rectum opening into membranous portion of the urethra	Incision and puncture, and gut reached	Fatal, ten months	Success only temporary; child died ten months after the operation; the narrow artificial passage, nearly three inches in length, being insufficient.
45	F. Hutchinson, 'Lond. Med. Gazette,' vol. i	Imperforate anus; rectum terminating in a blind pouch	Puncture, and gut reached	Fatal, five weeks	—
46	M. Parker, 'New York Journal of Medicine,' vol. xiii, 1855	Anus opening into a cul-de-sac half an inch in depth	Puncture, and gut reached	Fatal, twenty-four hours	—
47	M. Parker, <i>ibid.</i>	Anus opening into a cul-de-sac	Puncture, and gut reached	Successful	Died at two years of age from croup.
48	F. Hunter, 'Hunterian Catalogue,' Part V	Anus opening into a cul-de-sac; rectum terminating in a blind pouch	Puncture, and gut reached	Fatal, two days	The barrier was only one twelfth of an inch in thickness.

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49	F.	Dyce, 'Lond. Med. Gazette,' vol. xv	Anus opening into a cul-de-sac one and a half inch in depth	Puncture, and gut reached	Successful, four weeks	—
50	M.	Gorham, 'Lond. Med. Gazette,' vol. xxi	Imperforate anus; rectum terminating in a pouch, but communicating by a narrow canal with the urethra	Incision, but gut not reached	Fatal, a few hours	—
51	M.	Gosse, 'Lond. Med. Gazette,' vol. xli	Imperforate anus	Incision and puncture, and gut reached	Fatal, fourteen days	—
52	M.	Wayte, 'Edin. Med. and Surg. Journal,' vol. xvii	Anus opening into a cul-de-sac an inch deep	Puncture, and gut reached	Fatal, six months	Unsuccessful in maintaining the opening.
53	M.	Redfern Davies, 'Edin. Med. Jour.,' March, 1858	Imperforate anus; rectum terminating in a blind pouch	Incision, and gut reached	Fatal, three days	—
54	M.	Crampton, 'Dub. Med. Press,' vol. xiii, p. 146	Anus opening into a cul-de-sac one and a half inch in depth; rectum terminating in a blind pouch, only a membranous septum intervening.	Puncture, and gut reached	Successful	Dilatation discontinued after six months. Patient alive and well at four years of age, only a slight contraction at the seat of the septum. The functions of the gut quite unimpaired.
55	M.	York, 'Boston Med. and Surg. Journal,' vol. xlii	Imperforate anus; rectum opening into the urethra	Puncture, and gut reached	Unsuccessful	Lived thirteen months, died from a fall. Anus closed, and faeces passed afterwards by the urethra.
56	F.	Higginson, <i>ibid.</i>	Imperforate anus	Puncture and incision, but gut not reached	Fatal, eighteen days	—

57	M. Jones, <i>ibid.</i>	Anus opening into a cul-de-sac one and a half inch in depth; rectum terminating in a pouch; the septum being thin	Incision, and gut reached	Successful, two and a half years	Bougies discontinued after seven weeks.
58	M. Gay, <i>ibid.</i>	Imperforate anus; rectum communicating with the urethra or bladder	Incision, but gut not reached	Fatal, two and a half days	—
59	M. Buckingham, <i>ibid.</i>	Imperforate anus; rectum communicating with the urethra	Incision and puncture, and gut reached	Successful, six years	Great tendency to close for several months, and feces passed by the urethra. Alive and well six years after the operation, but subject to pain in the bladder and difficult micturition. —
60	F. Corse, 'Amer. Jour. of Med. Sciences,' vol. xxxvii	Anus opening into a cul-de-sac half an inch in depth	Incision, but gut not reached	Fatal, four days	—
61	M. Chevers, 'Ind. Ann. of Medicine,' vol. i	Imperforate anus; rectum terminating in the urethra or bladder	Incision and puncture, and gut reached	Fatal, three days	Failure in maintaining the opening.
62	M. Chevers, <i>ibid.</i>	Imperforate anus; rectum terminating in a blind pouch with a narrow canal communicating with the urethra	Incision and puncture, and gut reached	Fatal, thirteen days	Died of peritonitis.
63	F. Green, 'Ind. Ann. of Med. Science,' vol. v	Imperforate anus; rectum opening into the vagina	Incision at the anus, and gut reached	Unsuccessful	Infant twice operated on, once in 1850, by Dr. Wise, and again in 1852, by Mr. Green. Neglected by its parents. Died in 1854, feces passing per vaginam.
64	M. Green, <i>ibid.</i>	Imperforate anus	Incision, but gut not reached; colotomy in groin	Successful	Child well and healthy at age of seventeen months.

No.	Sex.	Operator and References.	Nature of Imperfection.	Treatment and Nature of Operation.	Result and Period.	Remarks.
65	M.	Green, 'Ind. Ann. of Med. Science,' vol. v	Imperforate anus; rectum opening into the urethra	Incision, but gut not reached	Fatal, few hours	—
66	M.	Green, <i>ibid.</i>	Imperforate anus; rectum terminating in the perineum just behind the scrotum	Incision, and gut reached	Uncertain	Child not operated on until age of two years. Final result not ascertained; only seen for six days.
67	F.	Green, <i>ibid.</i>	Imperforate anus; rectum terminating in a cul-de-sac	Incision and puncture, and gut reached	Fatal, seven days	The opening made was too small.
68	F.	Green, <i>ibid.</i>	Imperforate anus; rectum opening into the vagina	Incision, and gut reached	Successful	Operated on at age of six months. Doing well at sixteenth day after.
69	F.	Green, <i>ibid.</i>	Imperforate anus; rectum opening into the vagina	Incision, and gut reached	Successful	Operated on at five years of age. Doing well at the end of five weeks.
70	M.	Roux de Brignoles, 'Gaz. Méd.,' 1834	Imperforate anus; rectum communicating with the urethra	Incision, and gut reached	Successful	Difficulty at first in maintaining the passage. Died of scarlatina at the age of three years.
71	M.	Baraduc, 'Gaz. des Hôp.,' quoted in 'Med. Times,' vol. xii	Imperforate anus	Incision, and gut reached	Successful, six years	Rectum nearly an inch from the anus; difficulty in maintaining the passage, and operation repeated twice. Power of retention wanting for three years, and then gained imperfectly. Alive and well at six years of age.
72	M.	Lenoir, recorded by Godard, 'Gaz. Méd. de Paris,' 1855	Imperforate anus; rectum terminating in the urethra	Incision and puncture, but gut not reached; colotomy in the groin	Fatal, ten days	Died from peritonitis and abscess in the pelvis, consequent on the puncture. No meconium escaped with the urine.

73	M. Guersant, recorded by Godard, <i>ibid.</i>	Imperforate anus; rectum terminating in the prostatic portion of the urethra	Incision and puncture, but gut not reached; loin	Fatal, six days	No meconium escaped with the urine.
74	M. Guersant, <i>ibid.</i>	Imperforate anus; rectum terminating in the membranous part of the urethra	Incision and puncture, and gut reached	Fatal, six days	Wound in the peritoneum, and abscess in the pelvis, consequent on the puncture.
75	M. Désormeaux, 'Gaz. Méd. de Paris,' 1856	Anus opening into a cul-de-sac; rectum terminating in a blind pouch in the pelvis	Puncture, and gut reached	Fatal, nine days	Difficulty in defecation, consequent on the upper portion of the rectum passing behind the anal cul-de-sac.
76	M. Guersant and Guillot, recorded by Godard, 'Gaz. Méd. de Paris,' 1856	Imperforate anus; rectum wanting; colon terminating in a blind extremity at the brim of the pelvis, a small canal being prolonged to the base of the bladder	Incision, but gut not reached	Fatal, eleven days	Two attempts were made to reach the gut by operation.
77	F. Guersant, <i>ibid.</i>	Anus opening into a cul-de-sac; rectum terminating in a blind pouch at the brim of the pelvis	Puncture, but gut not reached	Fatal, two days	—
78	M. Lepestre, Acad. de Méd., <i>ibid.</i>	Imperforate anus; rectum terminating in the pelvis in a blind pouch	Incision, but gut not reached; colotomy in the groin	Successful	Died from cholera at the age of fourteen months.
79	M. Goyrand, "Etudes Pratiques," &c. <i>ibid.</i>	Imperforate anus; rectum opening at the scrotal raphe by a contracted outlet	Aperture enlarged by an incision at the age of six months, and border of intestine secured to the skin	Successful, sixteen years	Difficulty of defecation increased after birth until an operation became necessary. Patient alive at sixteen years of age.
80	F. Goyrand, <i>ibid.</i>	Imperforate anus; rectum opening at the posterior commissure of the vulva by a contracted outlet	Aperture enlarged at the age of eleven months	Successful, six months	Died of a cerebral affection six months after the operation.

No.	Sex.	Operator and References.	Nature of Imperfection.	Treatment and Nature of Operation.	Result and Period.	Remarks.
81	M.	Goyrand, "Études Pratiques," &c., 'Gaz. Méd. de Paris,' 1856	Imperforate anus; rectum terminating in a blind pouch as low as the prostate gland	Incision, and gut reached	Fatal, thirteen days	Defecation free; died after thirteen days of thrush (muguet).
82	M.	Goyrand, <i>ibid.</i>	Imperforate anus; rectum terminating in the prostatic part of the urethra	Colotomy in the groin	Successful	Died of infantile cholera at the age of ten months and a half. Pelvis imperfectly developed.
83	M.	Thiry, 'Presse Médicale Belge,' Mai 8, 1859	Imperforate anus; rectum terminating in the urethra or bladder	Incision, and gut reached	Successful, four years	Tendency to close, and dilatation continued for eight months. Doing well at the end of four years. Fæcal matter occasionally passing by the urethra; no incontinency; anal aperture rounded, and plaited as in natural condition.
84	M.	Friedberg, 'Archives Générales de Méd.,' 5ème série, tom. x	Imperforate anus	Incision, and gut reached, drawn down and secured in anal region	Successful, ten months	Lived ten months, and died from dentition.
85	M.	Friedberg, <i>ibid.</i>	Imperforate anus; the rectum opening in the perineum behind the scrotum by a narrow fistulous channel	Incision, and gut reached, drawn down, and secured in anal region	Successful, three months	Operation performed at the age of two months; died from pneumonia three months afterwards.
86	M.	Nagel, quoted by Friedberg, <i>ibid.</i> , 5ème série, tom. ix	Imperforate anus; rectum communicating with the urethra, which terminated in front of the scrotum	Incision, and gut reached	Successful	Doing well at the end of several months; urine alone passing by the urethra, and fæcal matter by the anus.
87	F.	Nagel, <i>ibid.</i>	Imperforate anus; rectum opening into the vagina	Incision, gut reached and attached to skin at the anus	Successful	Operated on at the age of six months, in consequence of insufficiency of vaginal opening and obstinate constipation.

88	M. Flajani, quoted by Friedberg, <i>ibid.</i>	[Imperforate anus; rectum terminating in membranous part of the urethra]	[Incision at the age of seven months, but gut not reached]	[Fatal at the age of eight months]	[Feces passed by the urethra, but child suffered great distress, and died from a cherry-stone blocking up the opening.]
89	M. Jenner, 'Path. Trans.' vol. i	[Anus opening into a cul-de-sac; rectum wanting]	[Puncture, but gut not reached]	[Fatal, ninth day]	—
90	F. Johnson, <i>ibid.</i> , vol. xi, 1860	[Anus opening into a cul-de-sac; rectum terminating in a blind pouch half an inch from the anus]	[Puncture, but gut not reached; colotomy in the groin]	[Fatal, two days after second operation]	[In the first operation the recto-uterine pouch was opened.]
91	Johnson, 'British Med. Journal,' Jan. 7th, 1860	[Imperforate anus; rectum opening into the vagina]	[Incision, and gut reached]	[Successful, several months]	[When the patient was last seen the passage was free. No attempt had been made to close the recto-vaginal opening, which was very small.]
92	F. Johnson, 'Lancet,' vol. i, 1860	[Anus opening into a cul-de-sac three quarters of an inch in depth; rectum terminating in a blind pouch near the septum]	[Puncture, but gut not reached; colotomy in the groin]	[Fatal, two days]	[Peritoneum wounded by the puncture, and escape of serum from the cavity.]
93	M. South, 'St. Thomas's Hospital Reports,' vol. i	[Imperforate anus; rectum opening in front of the scrotum by a narrow fistulous channel]	[Incision, and gut reached]	[Successful, eighteen years]	[Great difficulty in maintaining the opening, and operation repeated four times. A small quantity of feces passed occasionally by the abnormal channel. Consent refused to an operation for its closure.]
94	M. Pretty, 'Med. Gazette,' vol. xlvii	[Anus opening into a shallow cul-de-sac; colon terminating in a blind pouch at the promontory of the sacrum]	[Puncture, but gut not reached]	[Fatal, twenty-four hours]	[Death caused by over-distension, and rupture of ascending colon. Infant survived its birth eighty-two hours.]

No.	Sex.	Operator and References.	Nature of Imperfection.	Treatment and Nature of Operation.	Result and Period.	Remarks.
95	M.	Leslie and Pennell, 'Med. Times,' vol. xxv	Imperforate anus; rectum wanting; colon terminating in a blind pouch	Deep incision, but gut not reached; colotomy in the left loin.	Fatal, thirteen days.	Died of peritonitis, probably due to unsuccessful attempts to establish a passage at the anus several days after the operation in the loin. _____
96	M.	Mason, <i>ibid.</i> , vol. xxvii	Anus opening into a cul-de-sac; rectum wanting; colon terminating in a pouch	Puncture, and gut reached	Fatal, twenty-four hours	
97	F.	Ashton, 'Diseases of Rectum,' 3d edition	Imperforate anus; rectum terminating in a blind pouch one and a quarter inch from the surface.	Incision, and gut reached	Successful, three months	Two operations performed previously had failed, owing to great tendency to contraction. Operated on for third time at the age of four months. Died suddenly at seven months.
98	F.	Ashton, <i>ibid.</i>	Imperforate anus; rectum opening into the vagina	Incision, and gut reached	Successful, three years	Operation performed at the age of four weeks; great tendency to contraction, and use of bougie continued for two years. The recto-vaginal opening remains unclosed.
99	F.	Lane, 'Brit. Med. Jour.,' 1858	Imperforate anus; rectum opening into the vagina	Incision, and gut reached, and division of the septum between the two openings	Fatal, twenty-three days	Operated on at four and a half years of age. An operation performed at the age of twelve months had failed, and the wound had closed.
100	M.	Shaw, unpublished, communicated by operator	Anus opening into a cul-de-sac an inch in depth	Incision, and gut reached, drawn down and secured on one side of the natural anus	Successful, five years	Difficulty in maintaining the opening. Subject to distension of abdomen from accumulation of feces.

Of these cases, 68 were males, and 32 females.

The congenital malformations of the rectum may be conveniently classed as follows :

1. *Imperforate anus, the rectum being partially or wholly deficient.*—Of this form, the table furnishes 26 instances—21 males and 5 females. Cases 1, 10, 13, 17, 18, 19, 22, 23, 27, 28, 32, 34, 36, 45, 51, 53, 56, 64, 67, 71, 76, 78, 81, 84, 95, 97.

2. *Anus opening into a cul-de-sac, the rectum being partially or wholly deficient.*—Of this, the table includes 31 cases—17 males and 14 females. Cases 2, 3, 6, 7, 14, 15, 16, 20, 24, 25, 26, 30, 31, 35, 37, 46, 47, 48, 49, 52, 54, 57, 60, 75, 77, 89, 90, 92, 94, 96, 100.

3. *Imperforate anus in the male, the rectum being partially or wholly deficient, and communicating with the urethra or neck of the bladder.*—Of this, the table contains 26 cases¹—Cases 11, 12, 21, 33, 38, 39, 40, 41, 42, 43, 44, 50, 55, 58, 59, 61, 62, 65, 70, 72, 73, 74, 82, 83, 86, 88.

4. *Imperforate anus in the female, the rectum being partially deficient and communicating with the vagina.*—Of this, the table furnishes 11 cases—Cases 4, 8, 9, 29, 63, 68, 69, 87, 91, 98, 99.

5. *Imperforate anus, the rectum being partially deficient, and opening externally in an abnormal situation by a narrow outlet.*—Of this form the table contains 6 cases, 4 males and 2 females—Cases 5, 66, 79, 80, 85, 93.

A few other congenital deviations have been observed, but they are of very rare occurrence, and the five forms enumerated above are alone included in the table.

The following case occurred in my own practice: A male child, five weeks old, was brought to me on account of a congenital faecal fistula communicating with the rectum. There was a depression at the back of the sacrum, about an inch and a half from the anus, with a small orifice through which a little feculent matter escaped, when dis-

¹ It is very probable that 26 is less than the actual number, for the communication with the urethra is sometimes so minute as to prevent the escape of meconium during life, and readily to escape detection after death; a fact particularly noticed by M. Godard.

charges occurred from the natural orifice, which was of proper size. The fistula was too small to admit the passage of a common-sized probe.

It will be observed that the classification of these imperfections is founded on states which can generally be recognised during life. Unfortunately the condition of the terminal portion of the intestinal canal, and its relations to the parts around, cannot be predicated with any certainty. In cases of imperforate anus, or of anus opening into a cul-de-sac, the intestinal canal may terminate in a blind pouch at the brim of the pelvis, the rectum being wholly wanting; or an imperfect rectum may form a shut sac, descending to the floor of the pelvis, or as low as the neck of the bladder in the male, or the commencement of the vagina in the female. It is known that the anal portion of the bowel is developed distinctly from the upper portion, and that the two afterwards approximate and unite, the diaphragm or septum disappearing by interstitial absorption. A failure in this process is the cause of the second form of congenital imperfection. The cases of imperforate anus in which the rectum communicates with the urethra or vagina depend on the original existence of a cloaca, the malformation being due to an incomplete separation during foetal life. These conditions are the result of an arrest of development at different stages. The blind pouch, in which the intestinal canal terminates, is sometimes connected to the anal integument, or to the anal cul-de-sac, by a cord prolonged from the bowel above. These cases are not, like the preceding, the result of a non-formation of the rectum, but are produced by an obliteration of the bowel, which was originally well formed; the obliteration being a pathological change, due probably to inflammation which had existed during intra-uterine life. M. Goyrand, who has published some able papers on these malformations in the '*Gazette Médicale de Paris*' (1856), quotes a case communicated by M. Forget to the Société Médicale d'Emulation, of a female infant with an imperforate anus, who died after an operation in the perineum, without the bowel being reached. The intestine terminated at the base of the sacrum in a pouch, from

which proceeded a good-sized cord to be implanted in the skin at the site of the anus. This cord was formed of fibres continuous with the longitudinal fibres of the muscular tunic of the intestine. Friedberg also mentions a case in which the obliteration was less complete than in the preceding, of a female with an anus well formed, but with the rectum closed at a short distance above. At the autopsy the walls of the intestine were found adherent to each other in different places.¹

The relations of the peritoneum to the bowel in the different forms of atresia have an important bearing on the operations performed in the perineal region; for there can be no doubt that in many instances, as in Cases 6, 30, 74, 90, 92, and others in the table, the fatal result was in some measure due to the opening made in the serous sac. When the rectum, being only partially defective, descends into the pelvis, as commonly happens in the third, fourth, and fifth forms, the peritoneum is reflected from the bowel at a distance from the part liable to be opened in the ano-perineal operation. But when the rectum is wholly wanting, the intestine not passing lower than the brim of the pelvis, the peritoneum completely invests the terminal pouch, and must necessarily be wounded before the bowel can be reached from the perineum. In cases of intra-uterine obliteration of the rectum, the peritoneum is also much exposed to injury. In Forget's case, quoted above, the serous membrane extended upon the fibrous cord for three lines, and was strongly adherent to it.

In cases of complete deficiency of the rectum, it has been remarked by Rokitsky, Goyrand, and others, that the pelvis is not well developed, the tuberosities of the ischium being near together, and the antero-posterior diameter abnormally small. A depression in the anal region, and the position of the genitals far back, would also lead us to infer an absence of the rectum. In some instances the pelvis is incomplete, as in Case 82, in which the sacrum was formed of only four false vertebræ, and

¹ 'Archives Générales de Médecine,' v^e série, t. ix, p. 569.

wanted the coccyx. In several of the cases in the table the operators, finding the pelvis small, and other evidence of the rectum being wholly deficient, took the bold course of opening the colon in the abdomen, without adding to the dangers of the case by a deep incision in the ano-perineal region, and a search for the bowel without a reasonable hope of success.

1. In imperforate anus the rectum may, as I have already stated, be entirely wanting, the colon terminating at the brim of the pelvis, or, it may be, only partially defective. It is rarely found at a less distance than an inch from the perineum. The 26 cases in the table furnish the following results :—In 14 cases the gut was opened in the anal region, and in 12 the operator failed to reach it. Of the former, 9 ended fatally¹ and 5 proved successful. Of the 12 cases in which the gut was not reached, 2 ended fatally, without anything further being done. In 7 colotomy was performed in the groin, one of which only proved fatal. In 3 the colon was opened in the lumbar region ; one recovered and 2 died.

Of the 5 cases in which the gut was reached in the perineum, and an early death prevented, the following results were ascertained. In Case 32 the rectum appears to have been only partially defective, and the anus first made at the side of the coccyx being insufficient, and becoming obstructed by a plum stone at six years of age, another was formed in front with success. In Case 71 the rectum descended low in the pelvis, yet after the operation by incision there was great difficulty in maintaining a free passage, and the operation had to be repeated twice ; but the child was alive and well at six years of age. In Case 97 the gut was reached by incision at the age of four months, after the failure from contraction of two previous similar operations ; the child died suddenly three months afterwards. In Case 84, the rectum being partially defective, the rectum was not only incised, but drawn down and secured to the skin in the anal

¹ Case 81 is included in the list of fatal cases, the infant having survived only thirteen days ; but it is reported that defecation was free, and that death was caused by *thrush*.

region. The infant died from the troubles of dentition at the age of ten months, but defecation was perfectly satisfactory up to that period. In Case 34 a similar operation was performed, except that the bowel was drawn down the day after it was punctured, and was not secured by ligatures to the skin. The published report of this case gives no information later than a month, but Dr. Smyth, of Chelsea, who assisted in the operation, has informed me that the result was perfectly successful to the age of eighteen months, when he lost sight of the case. This is the only instance of complete success, in which there is every reason to suppose that the rectum was wholly wanting. In the three cases, 32, 71, and 97, in which the bowel was simply incised, more or less difficulty was experienced afterwards in maintaining a free passage for the fæces ; but in Cases 34 and 84 subsequent contraction was prevented by drawing the bowel down to the anal region.

2. When the anus opens into a cul-de-sac, the pouch varies in depth from half an inch to an inch and a half. Its fundus may be separated from the blind extremity of the rectum by a septum composed only of the two coats of the bowel and a little areolar tissue, or the upper part of the rectum may be wanting altogether or nearly so, a space more or less considerable intervening. The upper and lower portions of the rectum usually meet end to end, but this is not constant ; for in Case 7, observed by myself, in Case 24, described by Amussat, and in Case 75, recorded by Godard, the lower portion ascended in front of the upper, so that for a short distance the two passages ran parallel. In Case 24 this arrangement was favorable to the result of the operation by incision into the bowel above, and division of the septum between it and the anal cul-de-sac. In Case 75 merely a puncture was resorted to ; consequently the collection of fecal matter in the upper or posterior pouch pushed the partition forwards, so that it formed a valve, which prevented the escape of the meconium without the introduction of a tube, a difficulty which led early to a fatal result. Case 20, recorded by Amussat, though included in

this category, does not strictly belong to it. It is remarkable from the circumstance of the natural anus opening into the vagina, both portions of the rectum being deficient. I know of no similar case.

In 16 of the 31 cases of the second form, the gut was reached and opened. In 11 the operator failed in finding it. Of the former, 6 were fatal and 10 recovered. In one of the fatal cases (52) the infant survived six months, but the surgeon was unsuccessful in maintaining the passage. Of the 11 cases in which the gut was not reached, 6 ended fatally without any further operation. In 2 colotomy was performed in the groin, with a fatal result. In 3 instances the colon was opened in the loin; 2 were fatal and one recovered. In 4 cases colotomy was performed without any previous subpubic operation; three times in the groin with successful results, and once in the loin with a fatal termination.

In analysing the 10 cases of success from a subpubic operation, I may dismiss Cases 35 and 49, as the dates of the results (two weeks, and four weeks) are too short to admit of satisfactory conclusions being drawn from them. In case 57 there appears to have been a septum, consisting of the coats of the two portions of the rectum in close apposition. This partition was incised, and a free passage readily established. The use of bougies was continued for seven weeks, and, as might be anticipated in so simple a case, the result was quite satisfactory up to the last report, two and a half years after the operation. In Case 54 the two portions of the bowel were evidently in close contact, and the septum thin. It was punctured by Sir Philip Crampton with a large trocar, and well dilated afterwards. All treatment was discontinued after six months, and at four years of age, when the child was well grown and in excellent health, a commission of eminent Dublin surgeons examined him, and reported that, at a distance of about an inch and a quarter from the anus, the fingers encountered a diaphragm, with an annular perforation, through which its extremity could be passed by a moderate amount of pressure. This remnant

of the septum consisted of a narrow, circular slip of yielding membrane, the central opening occupying four-fifths of the calibre of the gut. The rectum was somewhat contracted at this point, and there seemed to be a slight deviation from its natural direction, the two portions meeting each other so as to form an angle slightly salient posteriorly. The passage of the fæces was unattended with pain or difficulty. In Case 47, also, the septum, so far as we may judge from the brief and imperfect report of it, appears to have been slight, as in the preceding case, and to have been readily perforated with a trocar. The opening was fully stretched with the finger and the passage frequently and thoroughly dilated for several weeks, when, as it showed no tendency to contract, this practice was discontinued. The infant thrived for a time, but died at two years of age, of croup. In Case 24, in which, as I have already stated, the rectal pouch descended behind the anal, Amussat incised the septum freely. I can find no report of the result later than eight weeks, but there is no reason to doubt its complete success. In case 20, in which the anus opened into the vagina, it was an important point, in order to prevent the entry of the fæces into it, to establish a new and distinct passage. Amussat made, therefore, an incision behind the anus, and the rectum being wanting, penetrated deeply (two inches), until he reached the bowel, which he detached, dragged to the perineum, and secured to the skin by sutures. The child subsequently came under the care of Sir Philip Crampton, who had to enlarge the opening at the end of two months. The ultimate result was perfectly satisfactory. The patient grew up and married at the age of twenty-one. Though the operation succeeded and the patient retained the fæces perfectly well, I agree in the opinion since expressed by Amussat, that in a similar case it would be much more satisfactory to unite the extremity of the intestine to the normal anus. Thus, in Case 100, for some brief notes of which I am indebted to Mr. Shaw, he attempted a similar operation to that practised by Amussat. The blunt end of the bowel, an inch deep, was drawn down, opened, and stitched

to each side of the perineal incision. Whether owing to the artificial anus being established at one side of the natural anus, or to the small size of the opening made into the bowel, prolonged treatment was necessary to counteract the tendency to contraction which still existed when the boy was last seen, at the age of four or five years, at which time he was subject to great accumulation of fæces. In Case 3, I also adopted the plan of bringing down the bowel and securing it to the borders of an external incision, with a satisfactory result.—A male infant, five days old, was brought to the London Hospital, April 16th, 1860, in consequence of sickness and inability to pass the fæces. He was weak and emaciated, and had not slept for twenty-four hours. Several doses of castor oil had been given to him. The anus was well formed, but on passing a director and afterwards my finger, I found it to open into a cul-de-sac, three quarters of an inch in depth. A piece of sponge having been inserted and kept in for half an hour, in order to dilate the sac, I enlarged the anus by an incision towards the coccyx, dividing the posterior wall of the anal pouch to the depth of nearly an inch, when the upper portion of the rectum was opened, and meconium escaped. The bowel was seized with the forceps, drawn down, and secured to the wound in the skin on each side by two sutures. After the operation the infant took the breast well, slept, and passed its motions freely. The sutures were removed on the 21st. May 3d, though defecation was unimpeded, a bougie was passed for the first time, and, as a matter of precaution, directed to be introduced every other day, the size being soon increased to a No. 1 rectum-bougie. At the last date, October 4th, the infant, a remarkably fine child, passed its motions freely, a No. 4 rectum-bougie being introduced occasionally.

Case 37 is one of much interest, as illustrating in a striking manner the difficulties of treatment and the serious inconveniences so liable to arise after the formation, simply by incision or puncture, of a communication between the two portions of the rectum, when an interval of any extent exists between them. The cul-de-sac was only half an inch deep,

and in order to reach the upper portion of the bowel, Mr. Le Gros Clark, the operator, had to carry his knife to the depth, including the sac, of two and a half inches before the gut was fairly opened. To preserve the passage, the thickened and contracted tissues required division at the end of three weeks. For several months the infant suffered from constipation and diarrhoea, with great distension of the abdomen, and about ten months after the second operation he again divided an obstructing band with a hernia-knife. Dilatation was afterwards persevered in. The boy is now nine years of age, in tolerable though not robust health, but subject at times to serious troubles in defecation.¹

3. In the third form in which the anus is imperforate, the bowel opening into the urethra or bladder, the rectum is seldom entirely deficient, but the communication with the urinary passage at the neck of the bladder, or more commonly at the anterior part of the prostatic portion of the urethra, is always small and insufficient, and not usually direct, but takes place by a narrow canal. The meconium escapes consequently with more or less difficulty, and retention occurs at an early period. Liquid meconium may pass readily at first, but as the fæces acquire consistency, obstruction arises and life becomes endangered. There are a few cases on record in which, the communication being more free than usual, life has been preserved for many months, the fæces escaping entirely by the urethra, until, the passage becoming at length blocked up, death has ensued. This happened in two of the cases in the table, in which the operator failed in reaching the bowel. In one, Case 42, great distress resulted, but the child survived eight months and twenty-two days, death being partly caused by ulceration of the urethra and infiltration of urine. In the other, Case 88, the infant suffered considerably until the opening into the urethra became blocked up by a cherry stone, and death took place at the age of eight months.

¹ I am indebted for the history of this case, since the report in 'The Lancet' (March, 1851), to the kindness of Mr. Armstrong, of Gravesend, and Mr. Le Gros Clark.

Dr. Steel has recorded a case in which no operation was performed, and the child lived eleven months, when the passage became obstructed by two large apple seeds, which caused death :¹ and Dr. Lyell, of Dundee, met with a case in which the child lived twelve months before fatal obstruction occurred.² The opening into the urethra appears to be usually of a valvular character, so that, although the fæces can pass into the urinary canal, the urine is unable to enter the rectum.

As the rectum is seldom entirely deficient, the bowel is generally reached with greater ease and certainty in this form than in the two preceding, and the results consequently are somewhat less unfavorable. Of the 26 cases in the table, the gut was reached in 15. In 9 the surgeon failed to find it. Of the former, 9 recovered and 6 proved fatal. In one of the latter the fatal result was delayed for ten months ; in a second, thirteen months. In this case (55) the child died from a fall, but it is placed in the fatal list because the artificial opening had closed, and death must ultimately have ensued from the insufficient passage. Of the 9 cases in which the gut was not reached, 7 ended fatally, without any further operation. In one colotomy was performed in the groin, in the other in the loin ; both ended fatally. In 2 cases no attempt was made to reach the bowel from the perineum, but the colon was opened in the loin. One did well, the other died.

In 8 of the 9 successful cases the bowel was opened simply by an incision, the operation having been completed in one of the instances with a trocar. In one, the details of which are only briefly given, the result is reported as satisfactory at the end of several months. In all the other 7 cases more or less difficulty was experienced afterwards in maintaining the passage, and in 3 the contraction was so great as to render a repetition of the operation necessary. In Case 40 the bowel was re-incised ten times before the age of eight months. In Case 39, the only one in which, after

¹ 'American Journal of Medical Sciences,' vol. xv.

² 'Edinb. Monthly Journal,' August, 1847.

incision of the bowel, the walls were drawn down and secured to the skin, though dilatation was required for some time afterwards, no difficulty was experienced, and the patient was well and thriving at five years of age.

After the establishment of a passage at the anus, the escape of fæces by the urethra did not always cease, and in some instances serious inconveniences resulted from non-closure of the abnormal communication. In Case 70 meconium escaped through the urethra only on one or two occasions, when the artificial channel became obstructed; and in Case 38 none passed after the first year. But in Case 83 fæcal matter was discharged occasionally by the urethra, at four years of age; and in Case 59 the patient was subject, at six years of age, to pain in the bladder and difficult micturition. In Case 43, in addition to the occasional escape of liquid fæces by the urethra, and of urine by the anus, on several occasions small, hard concretions were discharged from the bowel, and the operator, Mr. Fergusson, had to extract one about the size of a hazel nut. Small seeds, barley-pickles, and a small portion of bone, which had been swallowed, were also extracted from the urethra. I might have included in the table, had I noticed it in time, a case of the third form, operated on by incision, by M. Willaume, de Nancy. An anus was established with difficulty at the proper site, and dilatation was not abandoned until the age of twenty-eight. The young man, when seen by M. Willaume, at the age of thirty-one, was in good health, and passed his fæces without difficulty. He had suffered from abscesses in the scrotum, one of which had been caused by a plumstone swallowed four months before.¹ In Case 40 the bladder was wounded in the last operation, ever since which the urine was partly discharged by the anus. A very large alvo-urinary calculus gradually formed in the bowel, and was extracted with difficulty, by operation, at seven years of age.²

¹ 'Gazette Médicale de Paris,' 1856, p. 526.

² Dr. Marcet ('Calculus Disorders,' 2d edit., p. 135) has given an account of a calculus the size of a walnut, composed chiefly of the phosphates found in the rectum of an infant born with an imperforate anus, the bowel communicating with the urinary organs.

4. In the fourth form, imperforate anus, with the rectum opening into the vagina, the bowel, after descending well into the pelvis, curves forwards and terminates in an aperture, which is generally pretty free, so that an operation is usually performed to remove a disgusting infirmity, and not for the preservation of life. In several instances, persons born with this imperfection have passed through life, submitting to the annoyances consequent upon it, and have married and borne children. Morgagni mentions the case of a woman who lived to the age of a hundred years, and passed all her fæces by the vagina. The communication, however, is not always sufficient, and the bend in the bowel seems unfavorable to the free escape of its contents. In Case 9, which fell under my own observation, there had been occasional constipation; and on examination of the child, who died at the age of four years, a month only after the operation for an artificial anus, a very dilated and hypertrophied rectum fully proved that an impediment had existed during life. In Cases 68 and 87 operations were resorted to at the age of six months, in consequence of the infants suffering from tenesmus and obstinate constipation; and in Case 99 at a still later period, after great mischief had taken place.

As the rectum descends low in the pelvis in this form, and as a curved probe can readily be passed into it by the vaginal opening, to serve as a guide for the incision, the operation for an artificial anus is attended with very little risk, and the surgeon cannot well fail to reach the bowel. In all the eleven instances the gut was opened, and only one ended fatally. In this case (99) the operation was a second one, and performed at four and a half years of age. The ill result was caused by excessive distension of the rectum previous to the operation, which had been delayed too long by the parents to admit of a favorable termination. Eight of the remaining ten cases are reported as successful, and two as unsuccessful, owing to the tendency to contraction, and the neglect by the parents of the means recommended to maintain the passage. In Case 63 the patient was twice

operated on by incision, but the artificial anus closed after both operations. Case 4 came under my own care, in 1848, and was operated on also by incision, before I was aware of the importance of attaching the bowel to the skin.—A female infant, three weeks old, was brought to me on account of an imperforate anus, and the passage of the fæces by the vagina. There was no trace of anus, only a faint depression in the mesial line. In the posterior wall of the vagina, about three quarters of an inch from the orifice, there was an opening, communicating with the rectum, capable of admitting a No. 8 bougie, through which the fæces were voided without difficulty. At the request of the parents, I made the attempt to establish a passage at the natural site, when the infant was a month old. With a narrow-bladed bistoury I cut down carefully until I reached the rectum, at about three quarters of an inch from the surface. I made a free opening, into which I directed the nurse to pass a good-sized bougie twice a day, retaining it half an hour each time. As the parents lived in the country, the infant was not brought to me so frequently as I wished. At the end of ten days I found that the bougie had not been passed deep enough to enter the bowel, and that contraction had taken place. With some difficulty I re-established the communication, and secured a tube there, but it slipped out during the following night. As I could place no dependence on the nurse passing an instrument properly, I persuaded the parents to send the infant to me daily, in order that I might perform dilatation myself. After a fortnight they allowed three days to pass without bringing the child, thinking that the nurse could manage matters. I now found that great contraction had taken place, and had considerable difficulty in again re-establishing the passage. This was effected by introducing a curved sound through the recto-vaginal opening, to serve as a guide for a bougie. I enjoined perseverance in dilatation, but the mother, getting tired of the constant attention requisite in the treatment, and harassed by the infant's cries, which were incessant during the presence of an instrument, discontinued the

dilatation, and allowed the artificial anus to close. The child died a year afterwards from some disease of infancy.

Of the 8 successful cases, there is no account of Case 68 later than the 16th day, and of Case 69 later than five weeks ; and in Case 9 the infant died of diphtheria in a month. Case 8 came under my notice in July, 1853, five months after the operation.—A healthy female infant, aged five months, was brought to me by the mother, who stated that after birth all the motions passed through the vagina. She took the child to St. Bartholomew's Hospital, where an operation was performed, since which the fæces had passed partly behind and partly in front. I found a slender band of integument across the perineum, behind which was the termination of the rectum. The opening was more forward than the usual situation of the anus, and unclosed by any sphincter, the mucous membrane being protruded. When defecation took place, the evacuation came in contact with the band, escaping partly behind it and partly in front, just at the entrance of the vagina. As this slender band interfered with the passage of the fæces, directing them to the front of the vagina, and as the opening behind was too extensive to admit of any hope of my being able, by an operation, to connect this part with the wall between the vagina and rectum, I divided it with a bistoury, thereby getting rid of a barrier to the free escape of the fæces externally, and leaving the termination of the rectum and of the vagina separated only by a thin partition of double mucous membrane. The subjects of Cases 29, 91, and 98, were operated on simply by incision. In Case 29 dilatation was continued at the last report, four months afterwards. In Case 91 a large bougie was passed without difficulty, when the infant was last seen, at the end of several months. In Case 98 there was great tendency to contraction, and the use of a bougie was continued for two years. In Case 87 Nagel cut upon the bowel, drew it down, and secured it to the skin, with a good result, but the report of the case, as given by Friedberg, is very brief.¹

¹ I have searched the Berlin journals for fuller particulars of this case, but have not succeeded in finding any.

In this malformation the establishment of a new passage at the natural site is not all that is required. We have also to obtain the closure of the abnormal communication with the vagina. In Case 87 the operator, eight days after forming an artificial anus, applied a hot iron to the margin of the recto-vaginal opening, in order to obliterate it, but without success. In Case 29 the opening is reported to have closed spontaneously, two months after the operation in the perineum. So fortunate a result is unlikely, and could occur only when the abnormal aperture is unusually small. In Case 91 the fæces, when liquid, passed occasionally by the vagina. I recently had the opportunity of examining the patient in Case 98, three years after the ano-perineal operation, and found that the fæces continue to escape freely by the vagina. I am not acquainted with any case in which, after the formation of an artificial anus at the proper site, a successful operation has been performed for the closure of the recto-vaginal opening; and Case 29 is the only one in the table of complete success; a new passage being established, and the abnormal opening closed.

5. In the fifth form the anus is imperforate, but the rectum opens externally, in an abnormal situation, by a narrow outlet. Four of the six cases in the table were males, and two females. In the males the opening was in the perineum, just behind the scrotum, in two; in one, in the scrotal raphé; and in one, anterior to the scrotum. In the females the opening occurred in the perineum, close to the vagina, or at the posterior commissure of the vulva. In all of the cases the vent was insufficient, and defecation more or less difficult. In Cases 79 and 85 the symptoms of retention, at the end of two months, became most urgent. The existence of an outlet for the fæces, though small and insufficient, prevents immediate danger to life; but sooner or later serious inconvenience arises. As the fæces acquire consistency, they escape with increasing difficulty. The bowel undergoes excessive dilatation, and constipation and retention at length ensue, and life becomes endangered. In this form, as in the last, the rectum can

generally be opened without much difficulty, for by introducing a director by the abnormal opening, the operator can scarcely fail in reaching the bowel. It was opened, therefore, in all six instances; though in one, Case 85, the communication between the outlet and rectum was a long, fistulous channel, and the bowel was deeply seated, so that the operation was difficult and protracted.

Two different operations have been practised to remedy this imperfection—1, the enlargement of the original outlet, which was done in two instances; and 2, the establishment of a new anus at the natural site, which was performed in the four other cases. In Cases 85 and 93, the latter was the only proceeding practicable. In Case 85 Friedberg cut down upon the bowel, detached and drew it down to the external wound, and confined it to the skin by sutures. The result, so far as could be ascertained at the end of three months, was quite satisfactory. In Case 66 the child was operated on by incision, at the age of two years, but there is no account of the result later than six days. In Case 93, also, merely an incision was made into the bowel, and so great was the tendency to close afterwards that the aperture had to be enlarged by an incision four times, but the ultimate result was successful, though the original passage remained unclosed, and allowed occasionally a feculent discharge, consent having been refused to an operation proposed for its obliteration.

The following are the particulars of Case 5:¹—In November, 1857, I saw, with Mr. Gardner, of Gloucester Terrace, a female infant, a few weeks old. He had noticed at its birth that the anus was remarkably small, and in advance of its usual situation, and he had found it necessary slightly to dilate the orifice. The infant was thin, feeble, and badly nourished, being brought up by hand. The abnormal outlet was small in size and close to the vagina, a slight septum only intervening. The anus was imperforate, but at its site there was a firm, oval elevation, with an indis-

¹ A similar case, in which an artificial anus was established in the anal region, is related by M. Berard, '*Gazette des Hôpitaux*,' 1844, p. 286.

tinct depression in the centre. On examination with a bent probe introduced at the outlet, it seemed that the lower part of the rectum made a bend forwards from the sacrum, the convex part passing close to the integuments where the anus should open. Though the abnormal aperture was obviously insufficient, I did not like to interfere whilst the infant was in such feeble health, but I requested to be sent for in case of any retention taking place. In a few weeks the infant improved in health, but temporary obstructions occurred, and in the beginning of January, 1858, it became evident that the lower bowel was much loaded. There was much straining to pass the motions, and considerable prominence in the perineum; and although there was no actual retention, it was considered undesirable to delay an operation. A narrow, oval portion of skin only was dissected from the site of the anus, and the bowel was reached at the depth of only an eighth of an inch. Directly it was opened, solid evacuations were forced out, and a large quantity escaped. The opening was enlarged so as to admit an elastic-gum tube, cut from a No. 9 catheter, which was secured in the passage by elastic tape. The child went on well after the operation. The tube or a plug was passed daily, and kept in for a short time to prevent contraction. In a month the new anus was quite cicatrized. The motions passed by both apertures, but came away of larger size and more copiously from the artificial one. The child is now, two years and five months since the operation, thriving and well, with power of retention. I have delayed adopting any proceeding for closing the abnormal passage until the new one was thoroughly established, and no longer required dilatation. The parents reside in the country, and propose shortly to bring the child to me for the completion of the treatment. In this case the rectum descended so low in the perineum, that it was unnecessary to draw it down or to attach it by sutures to the skin.

The enlargement of the original outlet was performed in Cases 79 and 80 by M. Goyrand, who strongly advocates this operation in preference to the formation of an artificial

anus at the natural site. In Case 79 the rectum opened in the perineum, behind the scrotum, by a contracted orifice. At six months the operator enlarged the aperture by an incision carried into the perineum, and afterwards secured the borders of the divided intestine to the cut surface of the skin by sutures. At sixteen years of age defecation was free, and power of retention complete, even when the motions were lax. In Case 80, a female, the rectum opened by a narrow orifice at the posterior commissure of the vulva. At the age of eleven months M. Goyrand enlarged the aperture by an incision towards the coccyx, and applied sutures, as in the former operation, with a satisfactory result, but the child died, six months afterwards, of a cerebral affection. The chief advantage of this simple operation is the security against subsequent contraction; for as the upper angle of the opening is untouched, the lower one only has to undergo cicatrization, and, though the aperture does not come within the influence of the sphincter muscle, continency, it is said, is preserved. There is also no necessity for the performance of a second operation to close the abnormal opening, which becomes necessary when a new and distinct outlet is established. Larger experience is necessary to determine which of the two is the better operation. If the rectum were deeply seated in the anal region, there would be much force in the reasoning which induced Goyrand to enlarge the abnormal outlet, but we know, on the contrary, that the bowel is generally near the surface. In Cases 5 and 85 an artificial anus was easily established at the proper site, and, though difficulties occurred in Case 93, it is most probable that they would have been avoided had the bowel been secured to the skin at the time of the operation. Besides, in Goyrand's second case, a female, the anus was left in inconvenient proximity to the vagina, and we may apprehend that in the event of pregnancy taking place, there would be great risk, during labour, of rupture of the frail barrier between the two passages.

In cases of imperforate anus in which a passage is successfully established, the retentive functions of the bowel

generally exist in sufficient force. We have satisfactory evidence on this important point in several of the cases in the table (Cases 5, 32, 37, 38, 40, 43, 83), and the existence of an external sphincter, at the natural site of the anus, has been frequently recognised in dissection (Cases 30, 70, 74, 81) in the form of a band of parallel fibres, situated in the median line, without any central separation. But in Case 82, in which the last bone of the sacrum and the coccyx were wanting, and in another case of absence of the coccyx, referred to by Goyrand, the sphincter was very imperfectly developed, its fibres being few and slender.¹ As in this imperfection the external sphincter consists of a single straight muscle, the surgeon, in operating, should be careful to make his incision exactly in the median line, so that the fibres may be separated equally, and the new anus be brought fully under the influence of the muscle.

In cases of imperforation, unremedied by operation, death is sometimes caused by extreme distension and rupture of the colon, or terminal pouch. In Case 94, in which the operator failed to reach the gut, the infant died in eighty-two hours; and at this early period the colon was found ruptured. My old pupil, Mr. Lys, of Bere Regis, sent me the parts, in a case of imperforate anus, unoperated upon, in which rupture of the pouch, and extravasation into the peritoneal cavity, occurred on the fourth day after birth. The accumulation of meconium, and distension of the colon, vary a good deal in infants, as I have often observed in post-mortem examinations; and operations have been performed, with success, much later than the period of death in the instances just quoted. In Case 3, the infant was five days old, when I opened the rectum, and saved life. There are, indeed, some remarkable cases of vitality under complete obstruction on record. Dr. Lyell, of Dundee, met with a case in which an infant lived upwards of twelve weeks, without any fæcal outlet but the mouth.² Although, there-

¹ In Case 53 in the table, Mr. R. Davies was unable to discover any muscular fibres at the anus after death.

² 'Edinb. Monthly Journal,' 1857.

fore, I have omitted to note in the table the period after birth, at which operations have been performed, there can be no doubt that in many instances they were undertaken at too late a period to obtain success. The second form in which, with a well-formed anus, the rectum is imperforate, is very apt to be overlooked by nurses, and even by medical men, and not to be discovered in time to admit of life being saved by surgical treatment.

The most common causes of death after operation are peritonitis and diffuse inflammation of the areolar tissue. The former is generally produced by a wound of the serous membrane; the latter, in infants enfeebled by want of rest and nourishment, by the passage of faecal matter through the tissues of the pelvis. These ill results are chiefly due to faulty methods of operating. In the cases in the table, mentioned as treated by puncture, a trocar was used, but this is a most unsafe instrument. A thin, bulging septum, at the end of an anal cul-de-sac, with a fluctuating feel, may be perforated in this way without much risk, but even in this case an incision is preferable. An operation for imperforate rectum should be conducted with the same caution and the same care as an operation for strangulated hernia; and the plunging of a trocar or a bistoury into the depths of the pelvis, in the faint hope of its penetrating the rectum, but at the risk of wounding the peritoneum, the bladder, or other important parts, is a rash proceeding, condemned both by reason and experience.

The plan of drawing down the bowel, and securing it by sutures to the margin of the wound made in the skin, was first performed, I believe, by Amussat, in Case 20, in 1835. This mode of proceeding has also been particularly described and recommended by Dieffenbach.¹ In comparing the cases in the table, operated on in this way, with those treated simply by incision, the great superiority of the former is strikingly apparent, especially when the bowel is at any distance from the surface. The important advantage

¹ 'Die Operative Chirurgie,' 1845-8.

obtained by it is the securing a lining of mucous membrane for the passage traversed by the fæces. By this means we not only guard against the tendency to contraction, with its consequent miseries and dangers, but also avoid the early risks of inflammation and fæcal absorption.

In some instances troubles in defecation have continued after a sufficient passage for the fæces has been fully established. This is owing to an organic change in the bowel, consequent upon an obstruction of long continuance, subsisting after the removal of the cause. In imperforation the rectum becomes more or less distended, sometimes in a remarkable degree: yet if an outlet of sufficient size be obtained early, the dilatation subsides, and the bowel recovers its natural size and tone. But when the passage or aperture is too small, or subject to recurring contraction, the bowel undergoes changes analogous to those observed in ordinary stricture of this part. In Case 9 the opening into the vagina was insufficient, and the child died at the age of four years, a month only after the formation of an artificial anus. The rectum was examined for me by Dr. A. Clark. It measured $5\frac{3}{4}$ inches in circumference in its most dilated part. Its longitudinal muscular coat was red, greatly developed, and columnar, like the fleshy columns of a hypertrophied bladder. The circular muscular coat was also red and highly developed. The mucous coat was covered with a thick, tenacious mucus, and studded closely with the openings of enlarged follicular glands. In the museum of St. Bartholomew's Hospital there is a similar specimen taken from a child who lived two years after the puncture of the rectum. The insufficiency of the aperture is proved by the great distension, the thick muscular walls, and the large follicles of the rectum above it. Case 99 furnishes a remarkable example of excessive distension and hypertrophy of the bowel consequent upon long-continued obstruction. The infant was born with an imperforate anus and a small recto-vaginal fistula, through which the fæces passed until the age of four and a half years, when the bowel was opened at the anus, and the septum between the two aper-

tures divided. Death ensued in twenty-three days. It is stated that "the continual strain upon the rectum had distended it to a size of which it is hardly possible to give an adequate description." The rectum and sigmoid flexure of the colon formed an immense reservoir capable of containing five pints of fluid, which occupied the pelvis, the hypogastric, both iliac, and part of the umbilical regions, and pushed the viscera upwards, diminishing the cavity of the thorax.

When the vent for the fæces has long remained insufficient, and the bowel has undergone the changes above described, its expulsive functions become seriously impaired and weakened, and the infant consequently suffers in the same way as adults labouring under stricture of the rectum. The patient is subject, as in Case 100, to great accumulation of fæces, and the fæcal collection often sets up mucous irritation, which ends in diarrhœa. Mr. Le Gros Clark has given me an account of the present state of the patient in Case 37, which well illustrates the symptoms in this condition of the bowel. Great difficulty was experienced for some time in keeping the artificial passage free, and three operations were performed to relieve obstruction; but now, at nine years of age, though this difficulty has ceased, there is a very serious one of a different character. He says, "As far as I can judge by examination with the finger, the cul-de-sac, or sacculated extremity of the bowel above the artificial passage, has become gradually more distended under the pressure to which it has been subjected by the accumulation of feculent matter therein. Long intervals elapse without any attempt at relief; and, finally, a crisis arrives, after a fortnight, or even longer, when purging carries off the contents of the bowel, the quantity, of course, being very considerable."

Having, in the preceding observations, investigated the results of the operations performed in the anal or perineal regions, I have still to inquire more particularly into the degree of success which has followed the operations for opening the colon in the groin and in the loin, to ascertain the

inconveniences consequent upon an anus made in these regions, and to estimate the comparative value of the two operations.

Colotomy was performed in 21 of the cases in the table, in 14 by Littre's, or the inguinal operation, and 7 by Callisen's, or the lumbar operation. Of the 14 cases in which colotomy was performed in the left groin, in 9 an unsuccessful attempt had previously been made to reach the gut from the perineum. Of these 4 proved fatal and 5 recovered. In 2 of the fatal cases (90 and 92) it is stated that the peritoneum was wounded in the first operation; and in a third (72), that the patient died of peritonitis and abscess consequent upon the puncture in the perineum. Of the 5 cases in which no operation had been performed in the ano-perineal region, one only proved fatal, and 4 recovered.

Of the 9 recoveries after the inguinal operation, one (Case 18) survived only a month; 2 died of cholera, one (Case 82) at the age of ten months, and the other (Case 78) at fourteen; a fourth (Case 64) was doing well at seventeen months; a fifth (Case 19) survived three years, and a sixth (Case 16) was doing well at thirteen years of age. Of the remaining three we have an authentic report in an interesting memoir recently communicated to the Imperial Academy of Medicine at Paris, by M. Rochard, a naval surgeon and professor at Brest, where the cases occurred. In Case 10 the patient died at the age of forty-three of a disease unconnected with the infirmity. In Cases 14 and 15, the subjects of the operation were still alive and well, the first at forty-six years of age, and the second at forty-three.

Of the 7 cases in which colotomy was performed in the left loin, an unsuccessful attempt had previously been made to open the bowel from the perineum in 5, of which 3 were fatal; and in one instance (95) a fruitless attempt was made several days after the lumbar operation, and the infant died of peritonitis. In Case 28 colotomy was delayed till the thirteenth day. In another fatal case (73) two unsuccessful operations had been performed in the perineum. In Case

6, which came under my care some years ago, there was an anus opening into a cul-de-sac. As a deep puncture had already been made through the parts at the end of the sac without reaching the bowel, I performed colotomy in the left loin. The kidney interfered; but the colon was reached, and opened without wounding the peritoneum, and a free discharge of meconium followed. The infant died eighteen hours after the operation; and, on examination of the body, I found that the rectum was entirely wanting, and that the colon terminated in a blind pouch in the left iliac fossa. The instrument introduced at the anus had penetrated the vagina, passed behind the uterus, and wounded the peritoneum. In the only case (26) in which colotomy was performed in the loin without a previous operation in the anoperineal region, the infant died in eight days.

The inquiries instituted into the unsuccessful cases of colotomy, both in the loin and in the groin, leave no doubt that the fatal results were due in a great measure to the injuries inflicted in the attempts which had been made to establish an anus in the perineum.

Of the two recoveries after lumbar colotomy, in Case 25 Dr. Alphonse Amussat, the son of the operator, reports that the infant lived to the age of seven;¹ of Case 27, I can obtain no report more recent than seven weeks, and I have been informed that the child did not long survive the operation.

In endeavouring to arrive at a just conclusion as to the value of the two methods of performing colotomy, these operations must be studied and compared in reference chiefly to three questions: 1. The difficulty of the operation. 2. Its dangers. 3. The condition of the artificial anus and the inconveniences attending it.

¹ 'Journal of Practical Medicine and Surgery,' Paris, March, 1859, p. 105 (English edition). Dr. A. Amussat states that his father performed this operation upon a child in May, 1852. The patient is now living at the age of eight years, in good health, and properly performing its digestive functions. This case has not yet been published. It seems that Amussat had only two really successful cases in infants.

1. The operation of making an artificial anus is admitted to be, under ordinary circumstances, one of greater difficulty in the loin than in the groin. This arises from the greater depth at which the colon is situated in the lumbar region, and the hardness of distinguishing the bowel when it is exposed. But there are several circumstances which are liable to add greatly to the operator's difficulties. Some of them are well portrayed in Amussat's description of his first two operations in infants. In a great fat child the depth is so considerable, that a free incision is required to reach the colon. The kidney varies a good deal in size at this period of life, and when large it overlaps and conceals the bowel. Again, the colon, instead of being distended with meconium, as might be expected, is sometimes contracted, and very hard to find. There are, besides, irregularities in the position of the colon which render it impossible to open the bowel in the left loin without wounding the peritoneum; and there are some which also prevent the operator from finding the colon in the left groin. With the view of gaining information on these important points, I practised both these operations on the bodies of 20 infants, 18 still-born, and 2 deceased a few days after birth; and I afterwards examined the position and course of the colon in each subject. In 18 of the 20 subjects, I found colotomy in the left groin, whether the bowel was distended or not, an easy operation. In one of them the ovary and Fallopian tube protruded, but they were readily put aside and the colon reached. In two instances I was unable to find the colon. Both the subjects were well-formed infants, stillborn at the full term, one male, the other female. On opening the bodies I observed that the descending colon before reaching the pelvis made rather a sharp curve, and, passing across the abdomen in front of the fourth lumbar vertebra, formed an ample convolution on the right side before terminating in the rectum. Colotomy in the left groin was impossible, therefore, in these two cases, owing to the unusual course taken by the descending colon; but the bowel was easily opened in the right groin. This disposition of the colon has been observed

in a case of imperforate anus, one already referred to,¹ where death resulted from rupture of the terminal sac. Mr. Lys, who communicated the particulars of the case to me, states that the descending colon, instead of being directed to the left iliac fossa to form the sigmoid flexure, passed transversely across the spine over the fourth lumbar vertebra to the right sacro-iliac symphysis, and, descending into the pelvis, terminated in a cul-de-sac at the base of the bladder.

In 8 of the 20 subjects the colon was readily found, and opened in the loin without wounding the peritoneum. In 6 the operation was more or less difficult, owing in 2 to the great depth of the gut, in 2 to its being empty and contracted as well as deeply seated, and in 2 to a large kidney being in the way and concealing the bowel. Had the subjects been living, I apprehend that the difficulties of the operation would have been increased. In 6 subjects lumbar colotomy was impossible without opening the peritoneum, in consequence of the colon being attached by a distinct mesentery, and being loose in the abdomen. In three of the instances, I measured the meso-colon, and found it an inch in width. This serious impediment once occurred to me in performing the operation of lumbar colotomy in the living subject, in a case of imperforate rectum (Case 7), with the additional difficulty that the colon was empty and contracted, as well as loose in the abdominal cavity. Although deviations from the usual disposition of the colon may prevent or mar the success of colotomy in both regions on the left side, it would appear that this impediment is much more likely to be met with in an operation in the loin than in one in the groin; and if we add to this the other hindrances above mentioned, the difficulties liable to be encountered in the lumbar operation are certainly much greater and more serious than in the inguinal. A surgeon of common skill would find the latter an easy operation.

2. In respect to the dangers of the operation, the cases in the table are perhaps too few in number to enable us to

¹ *Vide* page 305. This case has since been published by Mr. Hodges, of Rochford ('Lancet,' vol. i, 1859, p. 402).

make a satisfactory comparison between the two methods; but, so far as they warrant any conclusion, the results are much in favour of colotomy in the groin. Thus, if we except altogether those cases in which the peritoneum was wounded in an unsuccessful operation in the ano-perineal region, out of 11 cases of the inguinal operation, 2 only ended fatally; or, if we take the 5 cases in which no perineal operation was attempted, one only had a fatal termination, which gives a degree of success most encouraging to the surgeon. On the other hand, if we except 3 fatal cases of lumbar colotomy in which a previous perineal operation and other circumstances rendered recovery unlikely, we have 4 cases, of which 2 recovered and 2 died. In colotomy in the loin, though the abdominal cavity be unopened, the wound required is of greater extent and depth than in inguinal colotomy; and since, as I have already shown, the peritoneum is very liable to be wounded in consequence of the bowel being only loosely attached by meso-colon, or being empty and contracted, we should anticipate quite as much, if not greater, risk to life from this operation than from the inguinal; a conclusion confirmed by the results of the operations in the cases in the table. I believe, however, that the dangers arising from opening the peritoneum in these operations in the new-born infant are less than is commonly supposed.

3. The sufficiency of an anus, made either in the loin or in the groin, for its necessary functions, as well as its condition in relation to the comfort of the patient, are very important considerations, not only as bearing on the comparative value of the lumbar and inguinal operations, but also in reference to the question which parents have to consider, whether life is worth preserving with such an infirmity attaching to it. After the operation for artificial anus in the groin, the outlet seldom evinces any disposition to contract, and proves adequate for the passage of the *fæces*. M. Rochard has given an interesting account of its condition in several patients who had undergone the operation many years previously.

A robust woman employed in hard labour, operated on in 1813 (Case 14 in the table), had excellent digestion, and passed solid stools periodically. When defecation is about to take place, she is warned by a sense of inconvenience and fulness in the left flank. She then withdraws the bandage and compress from her body, and replaces it when the desire is satisfied. No fæcal matter passes in the interval, but a little moisture escapes at times from the upper part of the aperture. It is only when diarrhœa occurs that she is annoyed by the discharge of feculent matter.

A lady, operated on in 1816 (Case 15), constantly enjoys the best health, goes into society, and attends balls, and no one would suspect her to be the subject of any infirmity. She is married, has borne four children, and her pregnancies and labours have been quite normal. She never experiences the least pain in the part. In all the patients observed by M. Rochard, an inversion or prolapsus of the intestine, varying from about one to four inches, had taken place; and what is remarkable, the prolapsus occurred exclusively from the portion of the bowel beyond the artificial opening, owing, probably, to the circumstance that the colon above was fixed in the loin, whilst the part below was free and moveable. The prolapsus did not cause serious inconvenience, and by a well-fitting apparatus, making a certain amount of pressure, might be almost entirely prevented.

Of the condition of the anus in the lumbar region no satisfactory account can be obtained from the reports of the two successful cases in the table, one having died quite early, and the other at the age of seven years. In the latter case (25) it appears that there was difficulty in keeping the anus patent, and that life had twice been in danger from retention. Colotomy in the loin has been successfully performed so often in the adult to relieve obstructions in rectum, that we can form a tolerably correct opinion of the convenience of an anus in this region;¹ and, through the

¹ I have myself performed lumbar colotomy in the adult four times, and in two of the patients who recovered no contraction of the artificial

kindness of Mr. Walter Bryant, I have recently had several opportunities of seeing a boy, eight years of age, born with an imperforate anus, the rectum communicating with the urethra, whose life was saved by this operation. The case is one of much interest.¹

The patient was born in South America in January, 1852. A German surgeon made an incision at the anus to open the bowel, but without success. He consequently performed colotomy in the left loin. The boy thrived, and in the early part of this year was brought to England. Mr. Erichsen was consulted as to the propriety of an attempt being again made to establish an anus at the natural site, the operation having been recommended; but he declined to sanction it. I saw the boy with Mr. Bryant in the month of June. He was healthy, well developed, active, and remarkably intelligent. The site of the anus was almost natural in appearance, presenting the puckering produced by an external sphincter, but it was closed by skin. There was a cicatrix at the side, about two lines from the median line. The father informed us that the fæces escaped freely from the artificial anus, and had always done so since the operation. There had been no tendency to contraction. The boy had no sensation or warning before an action took place, which occurred usually at night. He was seldom inconvenienced by feculent discharges at other times, unless the bowels were relaxed. His chief trouble was painful and difficult micturition. This occurred at uncertain times, but had increased in frequency during the last two years, and he usually suffered from it two or three times during the week. It obliged him to strain violently in passing water, and caused altogether great distress. There was an inguinal rupture on the right side, which seemed to have resulted from the violent straining. The

anus ensued, and defecation took place readily. By drawing the bowel to the surface, making a free opening into it, and attaching it to the outer wound, tendency to contraction is avoided, both in lumbar and inguinal colotomy.

¹ This case came under my notice too late to be included in the table.

admixture of feculent matter with the urine passed on these occasions showed that some portion of the feces escaped occasionally into the colon beyond the artificial anus, and from thence into the urethra, obstructing the passage. He was obliged to be very careful in his diet, and to avoid swallowing currants and other indigestible matters. The anus was of ample size, and oval in shape, with the red mucous membrane constantly protruding in close-set folds. The surface of the membrane was not at all sensitive. The finger passed easily into the bowel, both above and below, and was slightly girt by the actions of the abdominal muscles around the aperture. The surrounding skin was free from irritation. A prolapsus of the bowel readily took place on the slightest straining, and usually occurred when the part was uncovered for the purpose of cleanliness. The protrusion was easily reduced by slight pressure; but on one occasion some months previously, a very considerable inversion occurred, and it was so difficult to replace, that chloroform was administered to effect the reduction.¹ The position of the anus at the outer part of the loin, three inches from the spine, did not render personal attention to it difficult or inconvenient, and the little fellow could easily replace the ordinary protrusion by slight pressure with a napkin or sponge, whilst a bandage giving gentle support was sufficient to restrain it at other times. He ran about and took exercise like other boys, and no one would suppose him to be labouring under any infirmity, until obstruction occurred in micturition. To prevent the occurrence of this very serious evil, two modes of proceeding seemed to offer.

1. The constant wearing of a plug in the lower portion of

¹ M. Larrey showed, at a meeting of the Société de Chirurgie de Paris, an infant seven months and a half old, born with an anal imperforation. M. Maisonneuve, having failed to reach the bowel in an operation in the perineum, performed colotomy in the loin with success. The anus was the seat of an extensive double prolapsus, and had a remarkable appearance, the ends of the inverted bowel diverging in opposite directions. No attempt had been made to reduce it. ('Bulletin de la Société,' t. vi, p. 410.)

the colon to prevent the entry of *faeces* into it. 2. An operation for closing the lower opening into the colon. As the second plan would not be free from some risk, we agreed to make trial of the first; and a piece of sponge, of proper shape, secured with a strong ligature, was lodged in the colon below the outer opening. This seemed partly to answer the purpose, and to save the boy distress in micturition; but it did not entirely prevent the entrance of liquid *faecal* matter, and the plan was not persevered in by the parents. The lower portion of the colon was, however, washed out daily by injections.

In health an artificial anus is productive of much less personal annoyance than is commonly supposed. Some degree of protrusion of the mucous membrane of the colon will always be liable to occur in consequence of the deficiency in the abdominal wall, and the want of support at the part. In a sound condition of the digestive functions, the *faecal* evacuation is regular and periodic, and the part is almost free from discharge at other times, whilst a well-fitting apparatus is sufficient to restrain protrusion, as well as to prevent unpleasant oozing from the part. When diarrhoea occurs, or unhealthy gases are generated, then the annoyances are considerable, and may render the patient unfitted for society. It has been argued that an anus in the loin is much more inconvenient than one situated in the groin, as regards personal attention, whilst one in the groin is likely to be more repulsive in the relations of adult life. I confess that I see very little to justify a preference for either operation, on the ground of the position of the anus; but the greater difficulties and dangers of lumbar colotomy, which I have already pointed out, would certainly induce me, in future, to select the inguinal operation.¹

In a recent discussion at the Imperial Academy of Medicine in Paris,² the question has been raised, whether the left

¹ This recommendation of the inguinal operation in certain cases of congenital imperforation does not apply to cases of adults in which colotomy is required to relieve obstruction from disease in the lower bowel. In these cases I prefer, for other reasons, the lumbar operation.

² 'Bulletin,' t. xxiv, 1858, 1859, p. 445.

side should be selected for the inguinal operation. M. Huguier strongly insisted on the importance of performing colotomy in the right groin. He stated that during intra-uterine life the sigmoid flexure is enormously developed, and finding itself restricted in the left iliac fossa, passes over to the right iliac fossa, and thence dips into the pelvis to join the rectum. This disposition is observed in children up to the age of eighteen months or two years. The opening, therefore, if made in the bowel on the right side, would be nearer its termination, and the infant would be less liable to prolapsus, in consequence of the retraction of the sigmoid flexure, as the infant grows. I practised colotomy on the right side in five infant subjects. In three the colon was easily reached, and, in two of these, the convolution of the colon, from the left groin to the right, measured nine inches in length. In a fourth, when the abdomen was opened, small intestine presented, and no colon could be found; for it appeared that the bowel ascended from the left iliac fossa, and making a considerable convolution in the left groin, five inches in length, terminated in the rectum. In a fifth subject the cæcum appeared, and no colon could be reached. The large intestine, on leaving the left iliac fossa, made a convolution upwards, three inches in length, but did not approach the right groin.

We may infer from these few examinations, that the disposition of the colon in infants, described by Huguier, is not so constant as he states. The colon, at the early period of life, is largely developed, and forms ample convolutions, after reaching the left iliac fossa, varying in extent, however, a good deal in different subjects; and, though its usual course is directed to the right groin, the exceptions are too numerous to render the inguinal operation on the right side as feasible as on the left. But little importance can be attached to the circumstance of an artificial anus on the right side being somewhat nearer the termination of the alimentary canal; and if it seem probable that, after an operation on this side, a prolapsus is less likely to occur from the lower part of the bowel, we might equally expect a greater

liability to inversion in the upper portion, which would be free and loose in the abdomen. At present Huguier's suggestion wants altogether the sanction of experience, for I know of no instance in which inguinal colotomy has been performed on the right side.

The following directions for conducting the operative treatment of imperfections of the rectum are based on the results of the preceding inquiry.

1. In simple imperforate anus, the first form, an early attempt should be made to open the bowel in the ano-perineal region. The surgeon should cut down at the site of the anus, exactly in the median line, extending his incision towards the coccyx, dividing the musculo-aponeurotic floor of the pelvis, and penetrating to the depth of an inch and a quarter, and then, if no bowel be reached, the operation should be suspended or abandoned. If no long period have elapsed since birth, and if the infant be not exhausted by sickness or want of nutriment, the surgeon can wait eight or twelve hours, and again examine the wound; for it may happen that the rectum, forced down by the infant's struggles, and finding no resistance from the floor of the pelvis, will project between the borders of the incision.¹ If then any protrusion, or even bulging, be observed, the swelling may be explored with a grooved needle or the point of a bistoury. After the surgeon has reached the bowel, and opened it freely, its coats should be grasped with the forceps, and gently drawn down to the external wound, to the margins of which they should be attached by two or more

¹ Petit records a case operated on by two surgeons. The first made a conical incision in the perineum, but did not succeed in reaching the rectum. Another surgeon, who saw the infant three hours afterwards, was surprised to find a dark swelling projecting at the wound, and concealing it. This tumour was incised, and meconium escaped. The infant died in seven or eight days, and at the autopsy Petit found that the black tumour was formed by the posterior part of the rectum protruded by the efforts of the infant at the part where the least resistance offered. (*Mémoires de l'Académie Royale de Chirurgie*, t. i, partie ii, p. 240, 1743.)

metallic sutures. The wound must afterwards be poulticed and kept clean, and the sutures may be left in for five days or a week. After a week or ten days a bougie should be passed occasionally, for several weeks at least, even in favorable cases, to obviate any tendency to contraction. When the perineum is rendered convex during the infant's struggles, the operation is pretty sure to be attended with success ; but when this part is depressed, and the pelvis obviously small and narrow, the prospect is so unfavorable, that it is questionable whether any attempt should be made to obtain a passage in the anal region. In this case, or in the event of a failure to reach the bowel, the operator should state the circumstances to the parents, and, with their consent, open the colon in the left groin.

2. In the second form, in which an anus opens into a blind sac, an attempt should at once be made to reach the terminal portion of the intestinal canal. The cul-de-sac might, if the symptoms are not too urgent, be first dilated by a sponge tent for a few hours. If the surgeon should feel the upper part of the distended rectum projecting into the lower, he might explore the swelling with a grooved needle, and if gas or meconium escaped, make a free opening with a bistoury. But if nothing be felt to indicate the near proximity of the bowel, he should enlarge the anus by an incision, carried towards the coccyx, so as to divide the posterior wall of the sac, and should pursue his search in this direction to the depth of an inch and a half or two inches from the anus. If the bowel be not reached, this operation should be abandoned, and colotomy performed in the groin. There is seldom any use in delaying the latter operation, in expectation of the bowel becoming more loaded, and descending into the perineal wound, as this malformation is rarely detected until obstruction has already existed for some days. After an opening has been made, if it be obvious, from the depth of the incision, that an interval of some extent exists between the two ends of the bowel, the upper portion must be drawn down and secured to the wound. When a mere septum intervenes, this is not neces-

sary, but careful and even long-continued dilatation will be required afterwards as a security against contraction.

3. In the third form, in which the rectum opens into the urethra, though meconium may escape by the latter passage, the operation should not be delayed, or serious inconvenience may continue, after the establishment of an artificial anus, from previous over-distension of the bowel. The operation should be performed as in the first form, and especial care should be taken that the new channel is made of ample size, in order to afford every facility for the subsequent closure of the communication with the urethra. If the bowel be deeply seated, so as not to be found at a depth of an inch and a half from the surface of the perineum, the operator should desist, and have recourse to colotomy. The difficulty of obtaining the closure of the communication with the urethra renders the treatment of this imperfection the least satisfactory of any of the forms of atresia. After colotomy the entrance into the lower portion of the bowel should be closed with a plug.

4. In the fourth form, in which the rectum opens into the vagina, an immediate operation is not required, but as the abnormal outlet is often insufficient, longer delay than a month should be avoided. A curved director or sound having been passed through the recto-vaginal opening into the bowel, with its point directed to the site of the anus, the surgeon should cut upon it in the median line, being careful to carry his incision backwards towards the coccyx and away from the perineum, in order to preserve as wide a barrier as possible between the abnormal and artificial apertures. The opening into the bowel should be free, and its coats should be secured by sutures to the borders of the external wound. After the artificial anus has been fully established, and all dilatation has ceased to be necessary, steps may be taken to close the recto-vaginal opening. If the aperture be small, its contraction and closure may be effected by touching the edges with the actual cautery ; but if it be of large size, a plastic operation will be necessary. The edges may be pared and brought together by metal

sutures, the bowels being kept at rest by opiates for several days, until union is secure.

5. In the fifth form, the abnormal vent being insufficient, an operation is required at an early period. If the opening be situated in the perineum, it may be enlarged by an incision towards the coccyx; but if it be placed in the male as far forward as the scrotum, or in the female close to the vagina, a new passage should be formed at the natural site, a curved director being introduced at the abnormal outlet as a guide to the surgeon in the operation. In both modes of proceeding the mucous membrane of the bowel should be attached by sutures to the skin. Precautionary dilatation will be necessary afterwards.

In the operation of colotomy in the groin in infants, the incision should be made higher and nearer the crest of the ileum than in the adult, and the coats of the colon should be attached by sutures to the margins of the external wound before the bowel is opened, in order to prevent the escape of meconium into the abdominal cavity.

Having in mind the unfavorable issue of the operations performed in the majority of cases of imperfection of the rectum, and the opinions expressed by some authorities against making an artificial anus in such cases, I do not hesitate, nevertheless, in concluding this inquiry, to express my conviction that the surgeon should not shrink from the responsibility of these operations, but should apply what knowledge and skill he can command to the preservation of the infant, and to its protection from future suffering. By careful study, by thoughtful application of the resources of our art, and by increased experience, we may hope to improve the treatment, and to obtain far better results than are recorded here. On what terms life is endurable and worth preserving, may be a subject of anxious consideration to the parents of infants so afflicted; but if it can be shown that in some few cases only these imperfections have been remedied or counteracted, and that life thus saved has been enjoyed and valued, it is surely our duty to persevere, and to strive to overcome the difficulties and obstacles to success.