101

EXTRA-UTERINE PREGNANCY.

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EXTRA-UTERINE

PREGNANCY

ITS

CAUSES, SPECIES, PATHOLOGICAL ANATOMY,

CLINICAL HISTORY,

DIAGNOSIS, PROGNOSIS, AND TREATMENT.

BY

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1876.

TO

ALFRED STILLÉ, M.D.,

PROFESSOR OF THE THEORY AND PRACTICE OF MEDICINE IN THE UNIVERSITY OF PENNSYLVANIA,

IN RECOGNITION OF HIS EMINENT POSITION

AS AN

AUTHOR AND TEACHER,

AND OF

HIS SCHOLARLY ATTAINMENTS, AND HIS SOCIAL VIRTUES,

This Volume

IS RESPECTFULLY DEDICATED

BY HIS

GRATEFUL FRIEND,

THE AUTHOR.

PREFACE.

Although extra-uterine pregnancy has attracted a great deal of attention, and the serial literature of our profession is rich in the records of individual experience, the natural history of the accident is not generally understood, while there is much difference of opinion in regard to methods of treatment. The personal experience of the author having taught him these facts, it occurred to him that the examination of a large number of recorded cases of misplaced pregnancy might lead to valuable results. He accordingly collected five hundred cases from various sources, and this work is based upon an analysis of these. The results of this investigation are now presented to the profession with the hope that they may lead to more certainty in the diagnosis and treatment of this accident.

The author cannot close without acknowledging his indebtedness to his friend Dr. Edward W. Watson, for aid in correcting the proof-sheets of his work, and for numerous valuable suggestions received during its preparation.

J. S. P.

1513 Arch Street, Philadelphia,
December, 1875.

CONTENTS.

CHAPTER VIII.

DIAGNOSIS.

CHAPTER IX.

THE PROGNOSIS.

CHAPTER X.

TREATMENT.

CHAPTER XI.

TREATMENT—CONTINUED.

CHAPTER XII.

TREATMENT—CONTINUED.

CHAPTER XIII.

TREATMENT—CONTINUED.

ERRATA.

Page 23, 16th line, *for* "singular" *read* similar.
" 23, 17th and 24th lines, *for* "Koeberlé" *read* Kœberlé.
" 88, foot-note, 1st line, *for* "Courday" *read* Courdray.
" 110, next to last line, and p. 124, 1st line, *for* "Prefect" *read* Perfect.

EXTRA-UTERINE

PREGNANCY.

CHAPTER I.

THE CAUSES OF EXTRA-UTERINE PREGNANCY.

In many cases cannot be determined—Influence of pelvic inflammation—Inaptitude for conception frequently precedes a misplaced pregnancy—Hernia of the internal genital organs—Displacements and tumors of the uterus—Operations on the uterus—Moral and emotional causes—Twin conceptions—Diseases and deranged physiological action of the Fallopian tubes—Age—Number of the pregnancy.

In many instances the cause of extra-uterine fœtation cannot be determined. A young woman becoming pregnant for the first time, immediately after marriage, or a matron already blessed with a numerous family, may be the victim of this distressing accident, without our being able to discover any reason for it. In many other cases, however, the study of the past history of the patient may throw some light upon the subject.

Pelvic inflammations, peri- and parametritis frequently cause extra-uterine pregnancy by producing constriction and displacement of the uterine appendages. Virchow has directed attention to this fact. In examining the specimens removed from a patient in 1873,[1] such distinct evidences of previous pelvic peritonitis were discovered, the adhesions in which it had resulted were evidently of so long standing, that at the time the post-mortem was made they were deemed sufficient by the author to account for the aberrant gestation. Oldham[2]

[1] Cathcart, Phila. Med. Times, Dec. 27, 1873, p. 96, and Trans. Patholog. Soc. of Phila., vol. iv., 1874, p. 182.

[2] Guy's Hosp. Reps., 1845, p. 277.

attaches great importance to this cause. In his first case,[1] the gravid sac was found at the distal extremity of the tube, while close to the proximal end of the sac, the oviduct was constricted by an inflammatory band, which was wound round it like a ligature. Many other authorities have recognized inflammatory adhesions as a cause. Among them are Hecker,[2] Tilt,[3] Hicks,[4] and Barnes.[5] Siredey's[6] patient who perished in her third pregnancy, had pelvic peritonitis after her second confinement. Hooper's[7] became pregnant after having had a pelvic abscess which discharged through the vagina; and Worship's,[8] had an abscess to open into the rectum ten years before. Stutter[9] and Roberts[10] both note the fact that in their patients, peritonitis followed the confinement immediately preceding the extra-uterine pregnancy, and in Turner's case evidences of old adhesive inflammation were found at the autopsy. The examples cited are sufficiently numerous to show that considerable importance is to be attached to this cause. No doubt the history of many an attack of pelvic inflammation escaped notice in the examination of the patient, while the well-known tendency of this disease to be latent constantly prevents its recognition. In other cases, in which the gestation has progressed to term, the evidences of pelvic inflammation if they had existed previous to conception, would of course be destroyed or be merged among the great mass of adhesions, which surround the extra-uterine cyst.

Women who have become pregnant, with a child outside of the uterine cavity, frequently show a previous inaptitude

[1] Guy's Hosp. Reps., 1845, p. 271.

[2] Monats. für Geburts., 1859, quoted by Barnes, Diseases of Women, 8vo., Phila. 1874, p. 366.

[3] Trans. Obstet. Soc. London, 1874, vol. xv. p. 155.

[4] Ibid., 1866, vol. vii. p. 169.

[5] Diseases of Women, 8vo., Phila., 1874, pp. 366-7.

[6] Thèse Inaugurale, Paris, 1860, p. 98.

[7] Trans. of Med. Soc. of Virginia, 1872, p. 124.

[8] Trans. Obstet. Soc. of London, 1870, vol. xi. p. 211.

[9] Med. Times and Gazette, July 21, 1860, p. 55. After the labor preceding the extra-uterine pregnancy, peritoneal inflammation confined her to bed for three months, after which she remained sterile for ten years.

[10] Trans. St. Andrew's Med. Grad. Assoc, 1868, vol. i. p. 170. This patient had a bad "getting up" after her previous labor. She was leeched and bled from the arm three times, and after this she was sterile for seven years.

for conception. The interval between marriage and the first impregnation is frequently long. If the woman have borne children, a period of sterility frequently precedes the extra-uterine pregnancy. St. Morressy,[1] Lobstein,[2] Hughes,[3] and Sager,[4] have each observed an interval of five years between marriage and conception. Ramsbotham's and Adams's[5] patient was married eight years, Grossi's[6] nine, Putnam's[7] ten, and Mr. F. Hutchinson's[8] and Perry's[9] patients each eleven years without conceiving. Bamberger's[10] patient had been twice married, and in all had passed between thirteen and fourteen years of matrimonial life without becoming pregnant. Jewett's[11] was sixteen, Poteau's[12] and Perry's[13] each eighteen, and Allport's,[14] Painter's,[15] and Fothergill's[16] each many years married before they conceived. In these instances the extra-uterine was the primary conception.

Among women who had previously borne children, Sinclair,[17] Tuffnell,[18] and Roberts[19] observed intervals of seven years between the last normal and the extra-uterine conception. Tait[20] records a case of eight years; Fleuriot[21] and Barclay,[22] each one

[1] Quoted by Duverney—Œuvres Anatomiques, Paris, 1761, t. ii. p. 350.
[2] Med. and Phys. Journ. London, 1817, vol. xxxvii. p. 196.
[3] London Med. Gaz., 1850, p. 539.
[4] Detroit Rev. of Med. and Phar., Aug. 1868.
[5] Med. Times and Gazette, July 21, 1860, p. 57, and Mr. Adams, Trans. Med.-Chir. Soc. London, 1861, vol. xliv. p. 1.
[6] Gaz. Médicale, January 17, 1846.
[7] Amer. Journ. Med. Sci., Oct. 1853, p. 348.
[8] London Med. Gaz., Nov. 7, 1835, and Lancet, Oct. 31, 1835.
[9] Nashville Journ. of Med. and Surgery, Feb. 1860, p. 159, from Boston Med. and Surg. Journ.
[10] Brit. and For. Med.-Chir. Rev., April, 1839, p. 562.
[11] Trans. New York State Med. Soc. 1872, p. 103.
[12] Mélanges de Chirurgie, p. 383.
[13] Journ. of Gynæcolog. Soc. of Boston, Sept. 1869, p. 140.
[14] Lancet, 1845, part ii. p. 430.
[15] Med. Repos., London, 1823, vol. xix. p. 461.
[16] Mem. Med. Soc. London, 1805, vol. vi. p. 107.
[17] Dublin Quart. Journ. of Med. Sci., Feb. 1853, p. 211.
[18] Ibid. May, 1862, p. 462.
[19] Trans. St. And. Med. Grad. Assoc. 1868, vol. i. p. 170.
[20] Med. Times and Gaz., Aug. 2, 1873, p. 119.
[21] Bull. de la Société Anatomique de Paris, 1855.
[22] Med. Gazette, London, Sept. 13, 1850, p. 465.

of nine; Filliter,[1] Thompson,[2] and Stiles,[3] each one of ten; Ruge,[4] of eleven; Prof. A. Simpson,[5] twelve years; Blache,[6] Drejer,[7] and Janvrin,[8] each one of an interval of thirteen years; Goodsir[9] and Martin,[10] each one of fifteen; Marvin[11] and Hemard,[12] each one of sixteen years, and Johnson[13] one of twenty years. Finally Boehmerus[14] has recorded the history of a prostitute who pursued her calling for the same period, without becoming pregnant, and then conceived, the child being extra-uterine.

A sufficient number of examples have been cited to show, that erratic pregnancy is apt to occur in women who have become pregnant after having manifested an inaptitude for conception, either primarily or after they have borne one or more children. This fact does not appear to have attracted general attention, though in the analysis of a large number of cases it becomes very impressive. Barnes[15] directs attention to the fact, that the interval between marriage and extra-uterine pregnancy in primiparous females is frequently long, in the following language: "It has been remarked that in many instances the subjects of tubal gestation had up to the time of such gestation been sterile." Schrœder, however, is the only authority, so far as the author is informed, who is acquainted with the whole truth. After speaking of perimetritis as a frequent cause of sterility, he says: "A great number of extra-uterine pregnancies occurred in primiparæ, who had lived for

[1] Med. Times, London, Sept. 10, 1853, p. 262.
[2] Lancet, Nov. 28, 1863.
[3] Phila. Med. Times, April 4, 1874, p. 419.
[4] Berlin. Klin. Woch., April 7, 1873; London Med. Record, May 7, 1873.
[5] Edinburgh Med. Journ., Sept. 1863, p. 270.
[6] Provincial Med. and Surg. Journ., May 28, 1842.
[7] Medico-Chir. Rev., Jan. 1837.
[8] Amer. Journ. Obstet., Nov. 1874, p. 428.
[9] Duncan's Annals of Med., 1802, vol. vii. p. 412.
[10] Revue Médicale, 1856, tome ii. p. 673.
[11] New York Med. Journ., Jan. 1849, p. 110.
[12] Lancet, 1844, vol. ii. p. 74.
[13] Phila. Journ. of Med. and Phys. Sci., 1825, vol. xi. p. 120.
[14] Observat. Anatom. Rar., fascic. i. 1752—Campbell, Mem. on Extra-uterine Gestation, Edinburgh, 1842, p. 27.
[15] Diseases of Women, 8vo., Phila. 1874, p. 366.

some years in sterile marriage; and also in very many pluriparæ, whose extra-uterine pregnancies had been preceded by a long pause in conception."[1]

In some cases, which have been described as tubal pregnancies, the passage of the ovum to the uterus would appear to have been impeded, by malformations of the internal genital organs—the gravid tube entering the womb at some point on the body, or even the cervix, of the organ. Selwyn[2] and Ingleby[3] describe and figure examples of gestation in which the gravid tube entered the cervix uteri. Day[4] saw the embryiferous organ join the womb at the lower portion of its body.

There is much doubt about the propriety of including these cases among those which are strictly extra-uterine, since they may have been instances of pregnancy in an undeveloped uterine horn. Kussmaul is of this opinion, and in his work on absence, malformation, and duplicity of the uterus, published at Wurtzburg in 1859, he cites Ingleby's case as one of pregnancy in the "super-horn" of a *uterus unicornis*, mistaken for a tubal gestation.

Hernia of some portion of the internal genital organs may sometimes cause extra-uterine gestation. Among five hundred cases, four examples of conception in hernial sacs have been recorded; one each by Skirvani,[5] Genth,[6] Müller,[7] and Gouey.[8] Another example of this occurred in the practice of Rektorzik,[9] but there is some doubt whether it was extra-uterine or not. Rektorzik himself believed that the child was in an

[1] A Manual of Midwifery, 8vo., N. Y., 1873, p. 130.

[2] Trans. Provincial Med. and Surg. Assoc., 1834, vol. iii. p. 232.

[3] Edinburgh Med. Journ., 1834, vol. xlii. p. 356.

[4] Trans. Obstet. Soc. London, 1865, vol. vi. p. 5.

[5] Nouvelle Encyclograph. des Sciences Méd., Oct. 1852.

[6] Verhandl. der ges. für Geburtsk., Berlin, 1855, and Brit. and For. Medico-Chir. Rev., Jan. 1857, p. 278.

[7] Allgem. Wien. Med. Zeitung, 1862, and Amer. Journ. Med. Sci., Jan. 1863, p. 252.

[8] Obstet. Journ. of Great Britain and Ireland, July, 1873, p. 241. Copied from the Sloane MSS. This case, though mentioned last, occurred first, the woman being pregnant in 1706.

[9] Œsterr. Zt. 18—, 1860, New Syd. Soc. Year Book, 1861, p. 334, and Cincinnati Lancet and Observ., April, 1861, p. 228. Translated by Dr. D. S. Guns.

undeveloped uterine horn. The subject of hernial gestation will be more fully discussed in the sequel, and need not claim further attention at present.

It seems not improbable that some of the ordinary uterine displacements may occasionally produce extra-uterine conception by preventing the migration of the ovum along the Fallopian tubes. Meadows[1] relates a case in point. A short time before the commencement of the gestation "the uterus was rather low in the pelvis, the cervix being near the vulvar orifice, whilst the fundus was directed to the sacral cavity: there was slight retroflexion." It is easy to imagine that in certain displacements, and especially in prolapsus, the calibre of the Fallopian tubes may be so much diminished as to impede the descent of the ovum.

Tumors of the uterus and surrounding organs sometimes produce this accident by obstructing the Fallopian tubes. In a case of tubal pregnancy on the right side, Allport[2] discovered a small fibroid tumor the size of a horse bean, at the junction of the tube and the sac, while a similar growth the size of a nutmeg was attached to the latter. Magrath[3] describes a number of fibroid tumors which were found in the uterus at the autopsy of his patient, and though the statements in the text hardly lead to the inference, the accompanying plate seems to warrant the conclusion that one of these tumours interfered with the descent of the ovum. Sinclair,[4] who believed he was describing an ovarian gestation, found a fibroid tumor close to the gravid cyst, and Breslau[5] has recorded an example of tubo-uterine pregnancy, in which the uterine extremity of the tube was obstructed by an oval "mucous polypus the size of an orange pip," which that author believes prevented the escape of the ovum into the uterus. The case of Turnbull[6] is the only other of the five hundred upon which these remarks are based in which tumors of the uterus, tubes, ovaries, and other pelvic

[1] Trans. Obstet. Soc. London, 1873, vol. xiv. p. 310.

[2] Lancet, 1845, vol. ii. p. 430.

[3] Trans. Obstet. Soc. London, 1860, vol. i. p. 101.
Dublin Quart. Journ. of Med. Sci., Feb. 1853, p. 211.

[5] Monats. für Geb., 1863, and Brit. and For. Med.-Chir. Rev., April, 1864, p. 551.

[6] Mem. Med. Soc. London, 1792, pp. 195–6.

organs would appear to have given rise to extra-uterine fœtation, and therefore it must be concluded that this is a rare cause of this accident.

An unhealed section of the uterus, made in the operation of gastro-hysterotomy, has caused extra-uterine gestation. The single example of this occurred to Lecluyse.[1] It was the second pregnancy of the woman. In her first she was delivered by the Cæsarean section. In her second the child died in the eighth month, and four days later gastrotomy was performed. The patient died on the tenth day after the operation, and at the post-mortem examination, an oblong opening was found upon the anterior surface of the uterus—the unclosed incision of the previous Cæsarean operation, through which the fertilized ovum is supposed to have escaped into the abdominal cavity.

A somewhat singular, and not less remarkable fact has been witnessed by M. Koeberlé.[2] This surgeon removed all the body and a part of the neck of the uterus on account of a fibroid tumor. The appendages of the organ were left because their extraction would have compromised the success of the operation. The patient recovered, but with a fistule through the cicatrix of the neck, by which the woman became pregnant. She went to term, and died undelivered. As far as we know, the observations of Lecluyse and Koeberlé are without parallel in the history of misplaced gestation.

Many have asserted that moral and mental influences may cause this accident. Astruc[3] appears to have been the first to direct attention to this subject. He believed extra-uterine pregnancy to be more frequent among widows and young girls, indulging in hymeneal pleasures but who pretend to be chaste, than it is among married women. Among the recent authorities who have supported this opinion are Burdach,[4] Ramsbotham,[5] and Chavasse.[6] The latter says: "It is a singular fact that more single women labor under erratic gestation

[1] Bull. de l'Acad. de Méd. de Belgique, 1869.

[2] Keller, Des Grossesses Extra-utérines et plus spécialement de leur traitment par la Gastrotomie, 8vo., Paris, 1872, p. 23.

[3] Traité des Maladies des Femmes, Paris, 1765, tome iv. p. 69.

[4] Traité de Physiologie, 8vo., Paris, 1838, tome ii. p. 355.

[5] London Med. Gaz., 1849, N. S. vol. viii. p. 651.

[6] Asso. Med. Journ., Nov. 30, 1855, p. 1072.

than married." The facts upon which these assertions are based are not given, and we are aware of none which warrant them. The examination of a large number of cases will soon convince an impartial investigator, that Campbell is correct when he states[1] that "misplaced gestations have been most frequent not among the youngest class of individuals, but in those somewhat in advance of this stage of life, as also in women who have borne several children."

If it were possible to compare a large number of pregnancies in unmarried females with the same number occurring under the same circumstances as regards age, and other conditions in married women, it is quite possible that erratic gestation would be found to be more frequent among the former than among the latter class, but this is by no means proved. During the past ten years several thousand women have become the mothers of illegitimate children in the wards of the Philadelphia Hospital, and not a single case of misplaced gestation has occurred among them.

Allied to the influence of fear of discovery in the practice of illicit intercourse, to which Astruc directed attention, is the effect of emotional disturbances at or near the time of sexual congress. Some authors attach considerable importance to the influence of fright experienced during or immediately after the sexual act. Cases in which terror would appear to have produced extra-uterine gestation have been related by Marc,[2] Guillemot,[3] Godefroy and Everard,[4] Lallemand,[5] Breyra,[6] Baudelocque,[7] Vieweg,[8] Beclard,[9] and Belliver.[10]

[1] A Memoir on Extra-uterine Gestation, 8vo., Edinburgh, 1842, p. 118.

[2] Dictionnaire des Sciences Médicales, 8vo., Paris, 1817, tome xix. p. 399. This patient heard the key of her door turn while in the arms of her lover.

[3] Revue Médicale, tome i. 1832, p. 453. A stone was thrown through the window during intercourse.

[4] Annales de la Méd. Physiologique, 1827, vol. xii. p. 42.

[5] Observations Pathologiques, 8vo., Paris, 1825, p. 18. A stranger entered the woman's room immediately after coitus.

[6] Arch. Générales de Méd., tome xxviii. p. 208.

[7] Dict. des Sciences Méd., tome xix. p. 399.

[8] Keller, Des Grossesses Extra-utérines, 8vo., Paris, 1872, p. 22.

[9] Archives Générales de Méd., tome xxviii. p. 208.

[10] Ibid., 2d Série, tome v. p. 652. A case is referred to in the *Revue Médicale*, 1834, tome i. p. 430, in which the woman experienced a great fright during coitus, on the occasion of a fire in the neighborhood.

In addition to these authorities who have made personal observations, the influence of fright and strong passion at or near the time of coitus, is admitted as a cause by Bonnie,[1] Burdach,[2] Chaussier,[3] Brachet,[4] Pouchet,[5] Grimaud de Caux and Martin St. Ange,[6] Armour,[7] Kruger,[8] and Dezeimeris.[9] Some importance has been attached to this cause by Velpeau,[10] Keller,[11] and Depaul,[12] while its influence is denied emphatically by Longet,[13] Chailly-Honoré,[14] Gardien,[15] and Cazeaux.[16] It will be seen therefore that in point of numbers the weight of authority is in favor of the influence of emotional causes. When we add to those already mentioned, the strong names of those who, however erroneously, believe that from moral causes extra-uterine conception is more frequent among single than married women, the array of authorities becomes very strong.

Though not of much practical importance, this matter is one of great interest, and hence we were induced to study the subject with some care. At first no importance was attached to the matter, but closer study led to the conclusion that we cannot deny the influence of strong emotions, occurring during or shortly after intercourse, as a cause of extra-uterine pregnancy. The exact relation which emotional disturbances bear to the production of misplaced gestation is not determined, but the observations of Lallemand, Marc, and others are too remarkable for us to avoid attributing some importance to fright, terror, and passion.

Pouchet[17] attributes the freedom of the lower animals from

[1] Thèse à Paris, No. 181, 1822, p. 29.
[2] Traité de Physiologie, 8vo., Paris, 1838, tome ii. pp. 211, 355.
[3] Leçons Orales de Physiologie.
[4] Physiologie, p. 354. Quoted by Pouchet.
[5] Théorie Positive de l'Ovulation Spontanée, 8vo., Paris, 1847, p. 427.
[6] Histoire de la Génération de l'Homme, 4to., Paris 1847, p. 251.
[7] Glasgow Med. Journ., 1830, vol. iii. p. 160.
[8] Dict. de Médecine, 8vo., Paris, 1836, tome xiv. p. 410.
[9] Quoted by Grimaud de Caux and St. Ange, loc. citat. p. 252.
[10] Dict. de Méd., 8vo., Paris, 1836, tome xiv. p. 410. [11] Loc. citat. p. 22.
[12] Archives de Tocologie, 1874, tome i. p. 258.
[13] Traité de Physiologie, 8vo., Paris, 1850, tome ii. part iii. p. 179.
[14] Traité Pratique de l'Art des Accouchements, 8vo., Paris, 1867, p. 132.
[15] Traité Complet d'Accouchemens, Paris, 1824, vol. i. p. 527.
[16] Theoret. and Pract. Midwifery, 8vo., Phila., 1869, p. 598.
[17] Loc. citat. p. 427.

extra-uterine pregnancy to the fact that they do not become a prey to emotional disturbances. There is no doubt that dislocation of the ovum is much more frequent in the human female than it is among the females of the lower animals. In fact, it is in some way inherent to our species, though Coste[1] was in error when he declared it to be peculiar to woman.[2]

It may be concluded, therefore, that mental and moral causes are not without their influence, but it is to be remembered that this terrible accident is much more frequently due to pathological changes in the internal sexual apparatus, than it is to emotional disturbances experienced at or near the time of coitus.

Some writers upon this subject, and among them Coste, have advanced the opinion that not only mental and moral impressions received about the time of conception, but injuries, such as blows in the pelvic region inflicted about the same time, may prevent the germ from reaching the uterus. Gordon Jackson[3] has reported a case, in which the autopsy was made by Montgomery, who believed that the ovum was arrested in the tube by peritonitis, induced by a blow received one week after intercourse; and Chavasse[4] believes that he has seen traumatic peritonitis produce a like result. He states that the patient fainted when she received the injury, and that she continued very ill from this time until her death. It

[1] Embryogénee Comparée, vol. i. p. 383.

[2] Pouchet states that he was familiar with but four examples of extra-uterine gestation in the lower animals. These cases were recorded by Grasmeyer (*De Fecundat. et Concept., etc.*, Gottinga,.1789); Cloquet (*Bulletin de la Faculté de Méd.*, tome vii. p. 23); Mollard (*Comptes Rendus de l'École Vétérinaire*, Lyons, 1837); and Michon (*Archives Générales de Méd.*, tome iii.). Previous to this time it had been observed in the cow, sheep, hare, and dog. (See *Campbell's Memoir*, p. 3.) Nuck has produced tubal pregnancy artificially in bitches by applying a ligature on the tube three days after copulation (*Daynac, Thèse à Paris*, No. 71, 1825, p. 8); and more recently Adams has met with extra-uterine conception in a deer (*Boston Med. and Surg. Journ.*, 1873). It is, therefore, evident that this condition is more frequent among the lower animals (see also discussion, *Séance Acad. de Méd. Paris*, Sept. 1833) than Pouchet supposed; but we see no reason to change the opinion advanced in the body of this work.

[3] Dublin Med. Journ., 1833.

[4] Assoc. Med. Journ., Nov. 30, 1855, p. 1072.

is not probable that direct injury is a frequent cause of extra-uterine conception, but there is no doubt much truth in the statement made by Barnes,[1] that this abnormal gestation is more frequent among women who labor hard, than among those whose means will allow them to avoid excessive physical exertion. It is a striking fact, that the most remarkable examples of this accident, which have occurred in this country, have been met with among the negro women of our Southern States, while they were in a state of slavery. This fact is probably to be explained by supposing that severe exertion, during the first few days after conception, may alter the relation of the tubes, ovaries, and uterus in such a manner as to prevent the descent of the ovum.

Among five hundred cases of extra-uterine conception, collected without any selection, there were twenty-two cases of combined intra- and extra-uterine pregnancy. In other words, in round numbers, two ova were fertilized, at the same time, in one out of every twenty-three gestations. In addition to this, there were probably two cases, in which two germs were fecundated, and both remained outside of the uterus; but as these are somewhat doubtful, they are not included in the calculation, and it may be assumed that twin extra-uterine pregnancy, both germs being developed outside of the uterine cavity, is certainly very rare. Churchill, the highest statistical authority upon obstetrics who has written in our language, says[2] that there is one twin in every seventy-five conceptions among British matrons; one in one hundred and eight among French; and one in every eighty-seven among German, or an average of one in ninety among the mothers of the three countries. From these data it would follow that twin conceptions are about four times as frequent in extra-uterine as they are in normal fœtations. The frequency of combined intra- and extra-uterine pregnancy has attracted the attention of Barnes,[3] and he suggests that the two ova may obstruct each other in their descent to the uterus. The above facts seem to

[1] Diseases of Women, 8vo., Phila. 1874, p. 367.
[2] Theory and Practice of Midwifery, 8vo., Phila. 1862, p 430.
[3] Diseases of Women, 8vo., Phila. 1874, p. 367.

warrant the conclusion that there is some truth in the suggestion.

Besides these causes there are others. These are various diseases of the Fallopian tube which may impede the descent of the ovum. Hodge supposes that mucous and lymphatic accumulations in the tube may give rise to the accident. It has been produced artificially in bitches by Nuck,[1] who ligated the Fallopian tube three days after copulation, and destroyed the animals on the twenty-first day, when he found that two ova had been arrested by the ligature. Barnes[2] believes that temporary flexion may sometimes obstruct the oviduct, and thus lead to the arrest of the germ.

Deranged physiological action of the tubes has been invoked to explain why the germ is unable to reach the uterus.[3] Leishman[4] supposes that it may be due to spasm of the muscular coat of the tubes. Desormeaux[5] believed the spasm to be due at times, to the violence of the voluptuous sensation during the coitus. Bianchi[6] thought that the accident resulted from the spasm and movement produced by a new coitus after the fertile one. Bonnie[7] also alludes to the abuse of coitus during the second and third week after conception. Paralysis, too great relaxation, and inaction of the muscular fibres of the canal have likewise been supposed to cause it. Congenital narrowness of the oviduct would have the same effect.

Kiwisch[8] has directed attention to the fact that the eggs which escape from the ovary cannot all reach the oviduct with equal facility. The ovules which are liberated from the upper portion and near the centre of the ovary, reach the tube more easily than those produced in Graafian vesicles developed on

[1] Lallemand, Observations Pathologiques, 8vo., Paris, 1825, p. 25, from Adenographiæ Curiosorum, cap. 7, p. 69.

[2] Diseases of Women, 8vo., Phila., 1874, p. 369.

[3] Hodge, loc. citat. p. 528. Desormeaux (Dict. des Sciences Méd., 8vo., Paris, 1829, tome vii. p. 269) believed that the descent of the ovum was sometimes arrested by antiperistaltic action of the tubes.

[4] Syst. of Midwif., p. 209. Ramsbotham holds the same opinions (System of Obstetrics, p. 567).

[5] Dict. des Sciences Méd., tome vii. p. 269. [6] Ibid., p. 269.

[7] Thèse à Paris, No. 181, 1822, p. 27.

[8] Klinische Vortrage, ii. 227, quoted by Depaul, Arch. de Tocologie, 1874, p. 258.

the margins of the organ, and especially upon its posterior inferior portion.

It is unnecessary to speak of the influence of malformations of the internal genital organs as a cause. This has already been alluded to when speaking of the fact that the Fallopian tubes have sometimes been thought to enter the womb at a point much lower than normal, even on the cervix of the organ. It is easy to understand the effect of this upon the migration of the ovule, but these cases are not examples of extra-uterine conceptions. They are pregnancies of an undeveloped uterine horn.

Age.—Extra-uterine pregnancy may occur at any time during the child-bearing period, but it is not probable that the age of the woman exerts much influence in causing the accident. Of the five hundred women whose histories have been made the subject of investigation, the youngest was aged fourteen, and the eldest forty-seven years at the time conception occurred. After the age of twenty the liability to the accident steadily increases until the thirtieth year. Forty-four of 362 women whose ages are stated were thirty years old. The next highest number, 29, occurred in persons 35 years old. Twenty-two of the victims of the disaster were 40 years old. After reaching this period of life the liability to extra-uterine gestation suddenly diminishes. The statement of the ages of 500 patients illustrates these assertions.

14 to 20 years	13
20 to 30 "	158
30 to 40 "	166
40 to 47 "	25
Not stated	138

The infrequency of extra-uterine fœtation before the twentieth, and after the fortieth year, is to be accounted for by the fact that in the one case the reproductive functions have not been called into operation, and in the other, the woman is approaching the period of life when their actions will be suspended.

Number of the pregnancy.—In 500 cases examined, the number of the pregnancy is mentioned in 328, and not mentioned

in 172. It is stated, however, that among the latter number there were 23 multiparæ. Among these 351 women there were 279 multiparæ and only 72 primiparæ. These results support the statement of Campbell[1] that extra-uterine pregnancy is most frequent in women who have borne several children, and it likewise confirms the opinion of M. Depaul[2] that anterior accouchments, that is to say, long-continued functional activity of the genital organs, and the diseases produced thereby, are not without influence on the production of extra-uterine pregnancy. Of the 279 multiparous women 81 were pregnant for the second, 52 for the third, 38 for the fourth, 28 for the fifth, 21 for the sixth, 12 for the seventh, 7 for the eighth, 7 for the ninth, 3 for the tenth, 2 for the eleventh, 3 for the twelfth, and 2 for the thirteenth time, while the number of their pregnancy is not mentioned in 23 instances.

[1] Loc. citat. p. 118.

[2] Arch. de Tocologie, 1874, tome i. p. 258.

CHAPTER II.

THE CLASSIFICATION OF MISPLACED CONCEPTIONS.

Often impossible to determine the species—Classifications of Dezeimeris, and Mr. Tait. —Tubal pregnancy—Its varieties—Ovarian pregnancy—Its existence denied by Velpeau—Abdominal pregnancy, primary and secondary—The fertilization of ova, escaped into the peritoneal cavity—Vaginal pregnancy—Cases reported as such—Its existence not proved—The author's classification—Relative frequency of different species.

In the study of a case of extra-uterine pregnancy, one of the most perplexing questions which may come up for decision is the determination of the class to which it belongs. This is true not only during the life of the patient, but even after death has ended the stormy scene and an examination of the cadaver is being made with all the care that skill and time can secure; and with all the aid that the various instruments of modern science can furnish. Notwithstanding these common and almost insuperable difficulties which the pathological anatomist may encounter, even under the most favorable circumstances, a large number of physicians do not hesitate to classify their cases, even when their patients have been carrying the products of a misplaced gestation for years; when portions of a decaying, decomposing fœtus are being discharged through ulcerated openings in the abdominal wall, rectum, or vagina; or, even during the painful excitement and anxiety of the operation of gastrotomy. These remarks apply not only to the statements made by physicians who have observed but one case, but to those made by accoucheurs who have seen many. The result is that special treatises on obstetrics, as well as periodical medical literature, teem with statements which are utterly unreliable, and which are calculated to mislead investigators of this subject. It is entirely impossible to classify the various examples of this interesting condition which have been recorded, and we are not even now in possession of the data which will enable us to determine the relative frequency

of the various species of extra-uterine gestation. It is to be hoped that those who may meet with examples of it in the future will not be satisfied with recording their opinion—often entirely without value—that it belongs to a particular variety, but that they will publish a careful statement of the facts upon which their conclusions are based.

We are now possibly in a position to determine the localities in which an extra-uterine child may be developed, but even about this the opinions of various authors are of the most diverse character. Until the year 1824, three species—the tubal, ovarian, and abdominal, were generally admitted to occur. In this year Breschet added, what he supposed to be a new one, that which was afterwards known as interstitial pregnancy. In 1837 Dezeimeris[1] made a new arrangement, and described no less than ten species, viz.:—

1st. Ovarian pregnancy.
2d. Subperitoneo-pelvic pregnancy.
3d. Tubo-ovarian pregnancy.
4th. Tubo-abdominal pregnancy.
5th. Tubal pregnancy.
6th. Interstitial tubo-uterine pregnancy (Grossesse tubo-uterine-interstitielle).
7th. Utero-interstitial pregnancy.
8th. Utero-tubal pregnancy.
9th. Utero-tubo abdominal pregnancy.
10th. Abdominal pregnancy.

This classification is adopted by Moreau[2] without any alteration, and by Chailly-Honoré[3] with but little. The location of the ovum is sufficiently explained by the names, in the first, third, fourth, fifth, and tenth so-called species. The others may need a passing word in explanation of their supposed peculiarities.

By subperitoneo-pelvic (*sous-péritoné-pelvienne*) pregnancy, Dezeimeris intended to designate a variety in which the ovum, after quitting the ovarian vesicle, did not enter the Fallopian

[1] Journ. des Connaissances Méd. Chir., Janv. 1837.
[2] Des Grossesses Extra-utérines, 12mo., Paris, 1853, p. 5.
[3] Traité Pratique de l'Art des Accouchements, 8vo., Paris, 1867, p. 131.

tube, nor fall into the peritoneal cavity, but, on the contrary, passed between the two folds of the broad ligament, and there developed. According to this view the product of conception is situated outside of the cavity of the peritoneum. That the ovum has been found in this location cannot be doubted, but when such is the case, there is every reason to believe, that it reaches this peculiar situation, through rupture of a tubal cyst, in which the integrity of the peritoneum was not destroyed, so that the ovum escaped between the two layers of the broad ligament, where it continued to develop. It is, therefore, one of the terminations of an ordinary tubal gestation, and is unworthy of being elevated into a distinct species.

Interstitial tubo-uterine (*tubo-uterine interstitielle*) pregnancy is the name used to designate a gestation in that portion of the tube which traverses the uterus, and is what in the sequel is called tubo-uterine. In this class Dezeimeris includes the cases of Schmidt of Vienna,[1] and Albers of France.[2] It is but a variety of tubal pregnancy, and should not be called a distinct species.

Utero-interstitial was used by Dezeimeris to designate the variety described by Breschet in 1824, and since called interstitial, intramural, or parietal pregnancy, under the impression that, in this case, the ovum is developed in the midst of the tissues of the uterus itself. To explain the presence of the fœtus in this singular situation, various theories have been propounded. The occurrence of such cases can hardly be doubted, but they are easily explained without the necessity of invoking the ingenious but baseless hypotheses of various writers on the subject. That the development of the ovum in a cavity formed in the uterine wall is primary, may be considered as decided in the negative, but that the product of conception may sometimes be found in the tissues of the uterus, as the result of a rupture of a pregnancy of that portion of the tube which traverses the organ, can hardly be doubted. It is, therefore, only a termination of this subdivision of tubal conception, and is not a distinct species.

[1] Mém. et Observat. de l'Acad. Médico-Chir., Vienne, 1801.

[2] Moreau, loc. cit. p. 22.

By utero-tubal pregnancies, the same author meant those in which the ovum is developed partly in the uterine portion of the tube and partly in the cavity of the uterus itself, as was noticed by Feilitz, Bell, and Widney. This is, therefore, but an accidental variation of the tubo-uterine pregnancy. The same is true of the utero-tubo-abdominal species, which is the name applied to that variety in which the child is found free in the abdominal cavity, while the cord enters the tube, traverses it, and thus reaches the placenta, which is attached to the interior of the uterus, as has been observed by Patuna, Hey, and Hofmeister. This is only one of the terminations of that form of tubo-uterine gestation in which the ovum is developed partly in the cavity of the womb, and partly in the uterine portion of the oviduct. The sac in the latter ruptures some time during the evolution of the child, and allows it to escape into the peritoneal cavity, where its development is continued.

In opposition to this minute anatomico-pathological classification of Dezeimeris, we have the simple one of Mr. Lawson Tait of London,[1] who asserts that there are only two forms of misplaced conception. In truth when the opinions of this authority are analyzed, we find that he only admits the occurrence of tubal pregnancy, and his other species are simply differences in the manner, in which a gestation in the tube may terminate. In one the oviduct bursts, the peritoneum remaining uninjured, after which the ovum escapes into the broad ligament, between the folds of which its development continues. In the other instance the peritoneum is lacerated, as well as the walls of the cyst, and the ovum finds its way into the cavity of the abdomen. The first is the subperitoneo-pelvic pregnancy of the French authors, and the latter is the secondary abdominal pregnancy of Boehmer.

Prof. T. G. Thomas, of New York, has recently promulgated opinions in support of those of Mr. Tait. He writes:[2] "I feel inclined to believe that, in the commencement of its development, the impregnated ovum never attaches itself to or draws

[1] Trans. Obstet. Soc. London, vol. xv. p. 156.

[2] New York Med. Journ., June, 1875, p. 562.

its nourishment from any other parts than those lined by the mucous membrane of the uterus or tubes. Knowing, as we do, the delicate and subtile connection which the chorion establishes with the maternal tissues, it is certainly difficult to believe that an impregnated ovum falling free into the peritoneal cavity, or detained within the Graafian vesicle, can, with parts so unlike the lining of the uterus, establish relations almost identical with those which are normal."

Tubal pregnancy is the only species about which authors agree. This is, doubtless, because it so often terminates in rupture of the cyst during the early months of gestation. The existence of ovarian and ventral gestations is admitted by good authorities, and denied by others equally reliable. It now remains for us to study the varieties of tubal conceptions, and to examine the possibility of the occurrence of ovarian, abdominal, and vaginal pregnancy.

Tubal Pregnancy.—The ovum may be arrested and go on developing in any portion of the oviduct. The existence of this form of pregnancy was first recognized by Riolanus, the younger, who described it in his *Anthropographia*, which was published in 1649. He says, that in the year 1640, he recognized a tubal gestation in the body of a washerwoman in the service of Anne of Austria. If the progress of the ovum is checked in the pavilion of the tube, the cyst may contract adhesions with the ovary, and thus form the tubo-ovarian variety. At other times the ovum projects from the fimbriated extremity—the chorion being partially uncovered. This is the so-called tubo-abdominal pregnancy of systematic authors. It is to be noticed that in both instances the egg was originally arrested in a portion of the tube, and that, therefore, they may be fairly considered as varieties of tubal pregnancy.

The descent of a fertilized germ may be stopped anywhere between the pavilion and the point at which the oviduct enters the uterine wall. This is generally recognized as the type of the species, and is better understood than any of its varieties. It is probable that this is the locality in which extra-uterine ova are most frequently arrested.

The ovum may be likewise developed in that portion of the

tube which traverses the uterine wall. This has been described as a distinct species, and has been dignified with the name of "*graviditas in uteri substantia*" by Breschet,[1] who described it in 1824. Meyer[2] afterward styled it "*graviditas interstitialis;*" and still later Dr. Blundell[3] applied to it the much more appropriate term of "utero-tubular" gestation. Breschet's observations were the first which directed general attention to this subject, though cases of so-called interstitial pregnancy had previously been described by Schmidt,[4] Albers,[5] and Heidrich.[6] The ovum in these cases was supposed to have been developed, as the names proposed by Breschet and Meyer would indicate, in the substance of the uterus itself—in a cyst formed in its walls. Breschet supposed that the ovum found its way into this abnormal position by a venous sinus; and Hodge,[7] who adopted the idea that the fœtus was really developed *in uteri substantia*, believed that in these cases some preternatural formation of this organ existed, or else that the mucous membrane had been destroyed by ulceration, or an abscess, and that the fertilized germ passed into a cavity formed by one or the other of these processes, that it was retained there, and the cyst walls completed by the healing of the injury. Cazeaux suggested that this dislocation of the ovum was due to its arrest in a diverticulum of the canal of that portion of the tube which traverses the uterus. Mauriceau and Baudelocque are said to have seen these diverticula. At other times, Cazeaux appears to have believed, that the accident might be explained, by the existence in the human female of a canal analogous to that which Gärtner, of Copenhagen, states he discovered in some of the lower animals.

In discussing Dezeimeris's varieties of extra-uterine pregnancy, it has been stated that the presence of the fœtus in the tissues of the walls of the uterus cannot be denied, but it is

[1] Trans. Medico-Chir. Soc. London, 1827, vol. xiii. p. 33.
[2] Répert. Général de Anat. et de Physiologie, etc., vol. i.
[3] Lancet, vol. xiv. p. 611.
[4] Mém. et Observat. de l'Acad. Méd.-Chir. Vienne, 1801.
[5] Quoted by Breschet, loc. citat.
[6] Arch. de Horn., Sept. and Oct. 1817. Quoted by Breschet, loc. citat.
[7] Prin. and Pract. of Obstet., 4to., Phila. 1866, p. 529.

not necessary to resort to the theoretical explanations of Breschet, Cazeaux, Hodge, and others to explain this phenomenon. Various authors recognize the fact, that in the so-called interstitial pregnancy, the ovum is arrested in that portion of the tube which traverses the uterine wall, and Schrœder[1] states, that when the fœtus is found lodged in the tissues of the uterus, it reaches this abnormal position by rupture of its sac. This is, therefore, as has been previously remarked, merely a termination of a gestation in the uterine portion of the oviduct. It is, therefore, robbed of its mystery, and ceases to excite more wonder than conceptions in that portion of the tube which is outside of the uterus. This conception may be called tubo-uterine. This name fairly indicates the locality in which the germ is arrested. It is to be remarked here, that in this variety of tubal pregnancy, the author includes all examples of misplaced gestation, in which the product of conception is developed in the uterine portion of the tube alone, or in that and in the uterine cavity together. In the latter class are the cases of Feilitz and Widney, as well as those of Hey, Patuna, and Hofmeister to which allusion has previously been made.

After what has been said, it is to be hoped that the high sounding names given by Breschet, Meyer, Ramsbotham, Hicks, and others, to this variety of tubal pregnancy, will soon cease to burden medical literature. They have too long impeded the advance of knowledge, by implying that there is something mysterious and doubtful, about this class of cases. Had Breschet never prepared his paper, the literature of our profession would not have sustained any injury, and probably long ere this, the more correct name of tubo-uterine pregnancy, would have been generally accepted as being in accordance with anatomical facts.

Ovarian Pregnancy.—The possibility of the development of the ovum, in the ovary, was generally admitted until 1825, when Velpeau,[2] after examining four specimens of alleged ovarian pregnancy, asserted that in three of the cases the ovum

[1] A Manual of Midwifery, 8vo., New York, 1863, p. 132.

[2] Dictionnaire de Médecine, 8vo., Paris, 1836, tome xiv. p. 399. Traité Élément. de l'Art des Accouch., tome i. p. 196.

was not situated within, but on the surface of the ovary. Farre and Thompson, in England, Geoffroy St. Hilaire and Pouchet,[1] in France, and Williglk[2] and Hecker,[3] in Germany, all support Velpeau's position. The same views are sustained by Beclard,[4] Valentin,[5] and quite recently by Prof. Thomas[6] of New York. This opinion is based upon the belief, that the fecundation of the ovule is impossible, unless it has escaped from the ovary, and that there is no proof that the fœtus or fœtal membranes have ever been found in the tissue of the organ itself. The idea seems to have been that to fertilize an ovule in the ovary, the spermatozoa have to perforate the external coats of the organ, an inference which is without facts to support it. It is not difficult to conceive that the Graafian follicle might rupture, and the germ not escape. This, however, opens a channel by which the spermatozoa can reach the contents of the follicle and fecundate the ovule. When we remember the processes by which the escape of the ovule from the ovarian follicle is secured, it need occasion no surprise, that it should sometimes be retained, even after rupture of the vesicle of De Graaf has occurred.

The weight of authority is in favor of the possibility of ovarian pregnancy. Unless it is concluded that M. de St. Maurice, who observed the first authentic case[7] in 1682, was guilty of telling an absolute falsehood, or that he was not sufficiently informed to make his statements reliable, we must admit that he is describing a case of ovarian fœtation. Whatever doubts had previously existed, they were settled by Granville's description[8] of an example of this form of aberrant gestation.

This description and the illustration of the case appear to leave nothing to be desired to establish the existence of this

[1] Théorie positive de l'Ovulation Spontanée, 8vo., Paris, 1847, p. 421.

[2] Prag. Vjhrtschr. lxviii., quoted by Barnes, Diseases of Women, p. 375.

[3] Monats. für Geb., Feb. 1859, and New Syd. Soc. Year Book, 1860, p. 340.

[4] Traité Élémentaire de Physiologie, 8vo., Paris, 1856, p. 1052.

[5] A Text-book of Physiology, 8vo., London, 1853, p. 643.

[6] New York Med. Journ., June, 1875.

[7] Phil. Trans., abridged edit., 4to., London, 1716, vol. iii. p. 214.

[8] Philosoph. Trans., vol. cxi. p. 107, and Graphic Illustrations of Abortion, etc., 4to., London, 1834, pl. viii. p. 27.

species of misplaced pregnancy. Marinus[1] has more recently investigated the subject; and has examined three preparations in the pathological museum of Wurzburg, which he believed are all indubitable examples of gravid ovaries. Just before this investigation was made public, Kammerer[2] exhibited a specimen of ovarian pregnancy to the Pathological Society of New York. The true nature of this case is beyond dispute. Still earlier than this, in 1853, another American, Dr. I. G. Porter, reported[3] another case which appears without doubt to have been ovarian. A woman, aged twenty-eight years, died from rupture when between six and seven weeks gone in her fourth gestation. At the autopsy the left tube was floating free and pervious, but the left ovary, which contained the gravid sac, was as large as a hen's egg. It cannot, therefore, be denied that ovarian gestation may occur, but there is reason to believe that it is comparatively rare. It is certainly much less frequent than tubal pregnancy.

Abdominal Pregnancy.—The most serious problem in connection with this subject, is to decide the vexed question, whether a fœtus can or cannot be developed in the peritoneal cavity, without having any connection with the mucous tract of the uterus or its tubes. The occurrence of ventral gestation is denied by Merriman,[4] Rokitansky,[5] Campbell,[6] Pyan,[7] Churchill,[8] Rogers,[9] Tanner,[10] Tait,[11] and Barnes.[12] On

[1] Journ. de Méd. de Bruxelles, 1866, vol. xlii. p. 430.
[2] New York Med. Journ., 1865, p. 141.
[3] Amer. Journ. Medical Sciences, Jan. 1853.
[4] A Dissertatation on Retroversion of the Womb, 8vo., Phila., 1817, p. 67.
[5] Patholog. Anat., 8vo., Phila., 1855, vol. ii. p. 256.
[6] A Memoir on Extra-uterine Gestation, 8vo., Edinburgh, 1842, p. 22.
[7] Mém. de l'Acad. de Méd., 1845; Revue Méd., 1847.
[8] Theory and Pract. of Mid., 8vo., Phila., 1862, p. 181.
[9] Extra-uterine Fœtation and Gestation, 8vo., Phila., 1867, p. 10.
[10] Signs and Diseases of Pregnancy, 8vo., Phila., 1868, p. 291.
[11] Trans. Obstet. Soc. of London, vol. xv. p. 156.
[12] Diseases of Women, 8vo., Phila., 1874, p. 376. "It appears to me doubtful whether abdominal gestation is ever primary, that is, whether the impregnated ovum ever attaches itself *ab initio* to some part of the peritoneum. . . . Probably abdominal gestation is always secondary upon tubal or ovarian gestation," through rupture of the sac.

the other hand, it is admitted to occur by most of the recent authors of text-books on midwifery, and by Dezemeris,[1] Hecker,[2] and Behier,[3] who have published original memoirs upon extra-uterine gestation. Velpeau asserts that he has seen two cases in which the fœtuses had no connection whatever with either the ovary, the Fallopian tubes, or uterus. Hecker[4] believes that it is the most frequent of all the varieties. Columbat[5] does not think it very common, and M. Deneux[6] would seem to entertain the same opinion, since he believes that abdominal gestations are always fatal, and that all those extra-uterine pregnancies which go beyond the normal period are tubal.

Dezeimeris,[7] in imitation of authorities who preceded him, divides ventral pregnancies into two classes, the primary and secondary. By primary is meant that class in which the fœtus is developed at once in the peritoneal cavity, while in the second class, he includes all those cases in which the cyst, originally located in the tube or ovary, has ruptured, and the escaped fœtus goes on developing in the abdomen. That this may occur cannot be doubted, though it has been denied by Rogers[8] that a woman ever survives rupture of the cyst. As this form of ventral pregnancy must claim further attention in the sequel, its consideration may be postponed for the present. The question now is, Can primary abdominal pregnancy possibly occur? It must be acknowledged that the known established cases are not numerous. Unless it be concluded, as some assert, that tubal gestations never reach term, and that those women who carry extra-uterine children beyond nine months, and finally get rid of them by the cyst opening into the bowels, vagina, or bladder, or through the abdominal walls, are examples of ventral conceptions, it must be admitted

[1] Journ. des Connaissances Méd.-Chir., Janv. 1837.

[2] Monat. für Geb., Feb. 1859; New Syd. Soc. Year Book, 1860, p. 340.

[3] Gazet. Hebdom., No. 36, 1873.

[4] Loc. cit. Of 222 cases collected by this author he states that 64 were tubal, 26 interstitial, and 132 abdominal pregnancies.

[5] Diseases of Females, Meigs' ed., 8vo., Phila., 1845, p. 576.

[6] Béhier, Gaz. Hebdom., No. 36, 1873.

[7] Loc. citat.

[8] Extra-uterine Fœtation and Gestation, 8vo., Phila. 1867, p. 41.

that these are rare. Mention has already been made of the difficulty of determining the true nature of the case, even when every facility is afforded in making the *post-mortem* examination.[1] The writer had ample opportunity to learn this, at the *post-mortem* of the patient of his friend, Dr. W. C. Perkins,[2] with whom he had previously seen the woman in consultation. The sac was composed of the proper fœtal membranes alone at its upper anterior portion. The lower part was made up of the enlarged uterus in the middle line, and the broad ligaments and adjacent parts upon either side, while the attachments of the placenta were entirely outside of the pelvis, in the right and left lumbar regions and to the dorsal vertebræ. Careful examination of the specimen failed to reveal the situation of either of the Fallopian tubes or ovaries, and hence it is utterly impossible to determine whether these were involved primarily or secondarily.

Dr. Bedford[3] says that the attachment of the placenta is the most certain guide to the variety of the pregnancy; Courtail has found it inserted[4] on the omentum and stomach, and we have the authority of Dionis[5] for saying that Joury found it attached between the mesentery and colon in a case called ventral fœtation. Hughes[6] found the placenta attached to the omentum, and Matecki[7] has observed another case in which it had no connection with either the uterus or its appendages, all of which could be traced. The attachment of the placenta to a portion of the peritoneum, however remote from the uterus, tubes, and ovaries, does not prove the existence of pri-

[1] "On dissection even, the original organic relations of an extra-uterine ovum cannot in very many instances be unfolded, especially in cases of protracted retention of the fœtus, where, from pressure and chronic inflammation, parts have united with the fœtal cyst, which at one period had no connection with it."—Campbell, *Mem. on Extra-uterine Gestation*, 8vo., Edinburgh, 1842, p. 19.

[2] Phila. Med. Times, 1872, and Amer. Journ. of Obstet., May, 1872.

[3] Prin. and Pract. of Obstet., 8vo., N. Y., 1861, p. 205.

[4] Nouvelles Observ. sur les Os, obs. x.

[5] Anatomie de l'Homme, p. 223.

[6] London Med. Gaz., 1850, p. 539.

[7] Monats. für Geb., May, 1866, and Brit. and For. Med.-Chir. Rev., Oct. 1868, p. 525.

mary ventral pregnancy, though future observations may show that the greatest portion of the development of the fœtus, in such cases, takes place after all connection with the proper generative tract has been severed. This assertion is proved by an observation reported by Dr. J. Braxton Hicks.[1] His patient died when four months gone, and after an attempt had been made to destroy the life of the fœtus, by puncturing the cyst with a trocar. Some time before, she had recovered from symptoms of rupture. At the autopsy, the ovum was found in the retro-uterine pouch. On the left side of the uterus was a ruptured cyst, which contained purulent serum retained by pressure of the ovum. A committee of the Obstetrical Society of London, of which Barnes and Hicks were members, carefully examined the specimen, and reported that they believed that the ovum had originally been contained in this cyst, that the latter had ruptured, that the ovum had escaped either suddenly or gradually, without rupture of any bloodvessels, and consequently without any hemorrhage. The placenta was formed upon that portion of the membranes furthest from the cyst.

The positive evidence of the occurrence of primary abdominal fœtation may be summed up by reference to a few cases. Turnbull[2] has carefully recorded and illustrated the conditions observed at the autopsy of a woman, who had gone to full term. No proper placenta was found, but the anterior wall of the cyst was very vascular though only one-tenth of an inch thick, the fœtus being nourished by blood derived from the vessels of the mesocolon. The corpus luteum was in the left ovary, and the corresponding tube was obstructed by a pelvic tumor behind which it ran. Mitivié,[3] Collins,[4] Denny,[5] and Johnson,[6] have each met with an example of extra-uterine fœtation

[1] Trans. Obstet. Soc. London, 1866, p. 95.

[2] Mem. of Med. Soc. of London, 1792, p. 192.

[3] Med. and Phys. Journ. of London, 1829, p. 275. The woman carried the child many years and died, æt. 77. The cyst, which was free from the uterus and appendages, was attached to the mesentery and a loop of small intestine by bands of cellular tissue.

[4] Dublin Med. Trans., 1830, vol. i. part i. p. 118.

[5] Amer. Journ. Med. Sci., July, 1850, p 49.

[6] Med. Exam. (Phila.), Sept. 1850, p. 511.

in which the gravid cyst had no connection with the pelvis or any of its organs. Peters[1] found the ovum adherent to the upper and anterior surface of the bladder, without any connection with the uterus and its appendages. The patient had died at the end of the third month, from hemorrhage due to separation of the placenta. Leigh's[2] patient died after having carried the child for four years. The cyst was found attached to the omentum, while the internal genital organs were not involved. There is likewise reason to believe, that, though the cyst was connected with the uterus, Rupin's[3] case of twin pregnancy was abdominal. The placenta was situated at the fundus, the tumor being in the retro-uterine pouch, and so low down, that an attempt was made to deliver the woman, by incising the posterior walls of the vagina in the sixth month of pregnancy. After death nothing unusual was found about the Fallopian tubes or the broad ligaments. The right ovary was normal and contained a corpus luteum, while the left was somewhat atrophied. These cases, though they are but few of the whole number of five hundred, afford strong evidence of the existence of ventral fœtation. They even fulfil all the requirements of Campbell, one of the strongest opponents of the opinion that peritoneal pregnancy is possible. He says,[4] "Until a case can be produced in which neither an ovary nor a tube is involved in the adventitious cyst, we are justified in withholding our belief in the existence of ventral extra-uterine gestation." Even Hicks' case[5] may be said to meet all these requirements. Though it belongs fairly to Dezeimeris' second class of ventral fœtation, if the report of the London Obstetrical Society's Committee be accepted as authoritative, it fully establishes the fact that the ovum may, after having undergone a certain amount of development, attach itself to the peritoneum and go on developing without any connection with the genital tract. If there were any further doubt about this matter, it is

[1] Med. Exam. (Phila.), May, 1848, p. 283. This case appears to have been twice reported by the same author—the second time in The Amer. Journ. of Med. Sciences, April, 1853, p. 550.

[2] Virginia Med. Journ., July, 1857, p. 30.

[3] Gaz. des Hôp., No. 13, 1860, and Monats. für Geb., Oct. 1860.

[4] Loc. citat. p. 138.

[5] Loc. citat.

settled by Lecluyse's[1] case of extra-uterine pregnancy, caused by a fistulous opening on the anterior surface of the uterus, the result of a previous Cæsarean section, and through which the ovum escaped into the peritoneal cavity, where the child continued to develop for seven or eight months, the placenta being attached to the anterior surface of the small intestines. In this case the ovule was fecundated in the usual manner, and it descended by the Fallopian tube to the uterus, from which it escaped, but it establishes beyond possibility of doubt, that the germ may attach itself and live till it has completed the usual period of intra-uterine existence, without having any connection with the womb, tubes, or ovaries. This being proved, there is no difficulty in going a step further, and concluding, that, if the ovum is fecundated in the ovary and fails to enter the Fallopian tube, it may fall into the peritoneal cavity and there attach itself to the peritoneum, and continue its development until it is completed. The fact that ovarian pregnancy is possible, justifies the conclusion that the oviduct of the human female, unlike that of some of the lower animals, does not furnish the ovum, during its transit from the ovary to the uterus, with any elements which are necessary for its subsequent development.

Though of little practical importance, it would be interesting to determine whether an ovule which had escaped from the ovary into the peritoneal cavity could be there fecundated. If this is possible, there is no reason why it should not attach itself to the peritoneum, and there grow and develop. At first sight such a view appears utterly unphysiological. It must be remembered that the elements of the future individual, furnished by both the male and female organs of generation, are but masses of germinal matter, or bioplasm, as it is styled by Beale. In this instance the bioplasm is endowed with the largest amount of formative and developmental force, but otherwise it is subject to the same laws which govern bioplasm found under other circumstances, and destined for less elevated purposes. Prof. Beale has also shown that this matter is capable of maintaining its vital properties for considerable and

[1] Bull. de l'Acad. de Méd. de Belgique, 1869.

even long periods if favorably situated. Heat and moisture are the essential elements for the preservation of its life, and these certainly exist in the peritoneal cavity, as well as in the canal of the oviduct and the cavity of the uterus. There is conclusive evidence that the spermatozoa may live for some time after ejaculation. Sims found them alive and "very active"[1] in the cervical mucus forty hours after intercourse, and Percy[2] discovered living spermatozoa issuing from the os uteri eight and a half days after the last sexual connection.

Dr. J. R. Beck[3] has recently attempted to show, that a peculiar rhythmical contraction and relaxation of the cervix and os uteri, which set in when the orgasm occurs, is an important factor in generation, by causing the semen to enter the uterus at once. Without denying the existence or the importance of this force, something must yet be attributed to the power of the spermatozoa to traverse the genital passages of the female by the forces inherent to them. The orgasm is not essential to conception, which may occur during sleep, as in the celebrated cases of Gooch and Cusack. The medico-legal fact that a woman may conceive without penetration, as in the example recorded by Tardieu[4] in which conception followed lascivious titillations, the semen being habitually lost at the ostium vaginæ, fully establishes the ability of the spermatozoa to travel long distances. The occurrence of ovarian pregnancy likewise demonstrates the same thing. That this transit may be quite rapid is proved by Sims's[5] observation, in which the spermatozoa had travelled three and one-half inches, in the space of four hours. In the year 1838, Bischoff and Barry discovered[6] spermatozoa on the surface of the ovaries of bitches some time after copulation. Professor Austin Flint, Jr., says[7] we know "that spermatozoids reach the ovaries and that they have been seen in motion on their surface, seven or eight days after

[1] Uterine Surgery, 8vo., N. Y., 1866, p. 374.

[2] Amer. Med. Times, March 9, 1861.

[3] St. Louis Med. Journ., Sept. 1872, and Amer. Journ. of Obstet., Nov. 1874.

[4] Étude Médico-Légale sur les Attentats aux Mœurs, Paris, 1859.

[5] Uterine Surgery, 8vo., N. Y., 1866, p. 361.

[6] Wagner, Elements of Physiology, 8vo., London, 1844, p. 66.

[7] The Physiology of Man, 8vo., New York, 1874, vol. v. p. 342.

connection." It therefore appears probable that the male element in reproduction may live for some time upon the surface of the peritoneum. If the secretion of this membrane was destructive to the life of the spermatozoa they would not be found in a condition of activity on the surface of the ovary seven or eight days after intercourse. Though Waldeyer has shown that this organ is devoid of a serous coat, no one will deny that the secretion of the peritoneum constantly bathes its surface, and even that of the interior of the pavilion. These facts, while they do not prove that fecundation can occur in the peritoneal cavity, make it extremely probable that it does sometimes happen.

Vaginal Pregnancy.—It has been asserted that the ovum may attach itself to the mucous membrane of the vagina, and thus grow and develop, practically, it may be said, outside of the body of the mother. This would appear to be too unreasonable to be believed for a single instant, yet Plenck[1] included this among the species of misplaced pregnancy. Duges[2] was in doubt about the matter. Rokitansky[3] mentions it, but states that its existence is problematical.

The first notice of vaginal pregnancy is that of M. Noel,[4] who, in the month of July, 1765, was called to see a woman, named Girardat, in labor in the village of Villacourt, in Lorraine. Labor had been in progress for some hours, the waters had been discharged, and the umbilical cord was prolapsed. The child was found presenting by the back, and was at the inferior strait of the pelvis, while the head and feet were doubled up and were above the pelvic brim. A hard spherical tumor could be felt in the neighborhood of the mother's umbilicus. The child was withdrawn by the feet; it was dead and at term. The placenta was delivered, but the hardness near the umbilicus continued and led to the suspicion that the abdomen contained a second infant. Upon introducing the hand it was impossible to find the uterus. The woman died the next day. At the autopsy it was found that the

[1] Élémens de l'Art des Accouchemens, 8vo., Lyons, 1792, p. 201.
[2] Dictionnaire de Médecine et Chirurg., 8vo., Paris, 1833, tome ix. p. 317.
[3] Manual of Patholog. Anatomy, 8vo., Phila., 1855, pp. 256-7.
[4] Journ. de Médecine, Chirurgie, Pharmacie, etc., 1779, tome i. p. 55.

abdominal tumor, discovered during life, was the uterus, which had undergone calcareous degeneration, and which was the size and nearly of the figure of the head of a young infant. The tubes were equally hard, and no trace of *a rupture could be discovered.* The upper part of the vagina is described as having been distended into a large pouch, the walls of which were ragged and gangrenous. In this the child was found.

In the year 1839, Mackeprang[1] was called to a primipara, who had been in bed during the past four months. He found her greatly exhausted. In the fourth month of pregnancy she was attacked with pains, and "a strong pressure downwards," which was relieved by a sedative mixture. At this time a tumor appeared in the vagina, and continued to increase in size. "On examination this tumor was found about the size of the crown of a hat (hattepuls), protruding upon the middle of the woman's thigh, and strongly pressing upon the *intestinum rectum.*" One arm protruded from an opening behind and well down in the vagina. It was twisted off, and the child was withdrawn with the help of a hook. It was of seven or eight months' development. The placenta was allowed to remain for fear of hemorrhage. The woman died two days later.

In the third case (it is impossible to state who is the reporter),[2] the woman was four months pregnant. A circumscribed enlargement was discovered between the navel and pubes. The bowels and bladder were emptied with much difficulty. The fœtus was found to be in a transverse position, and was delivered by the feet. The shoulders were brought through the vulva with much difficulty, and the forceps were applied to deliver the head. The circumscribed tumor still remained after the birth of the child, and on examination this was found to be the uterus. The organ was retroverted, the os pointing towards the "abdominal integuments," and closely embracing the cord. The accoucheur introduced some of his fingers into the os tincæ and removed the placenta, which was adherent

[1] London and Edinburgh Med. Journ., April, 1845, p. 324, from Bibliothek for Laerger, No. 1, 1844.

[2] Lancet, Nov. 11, 1843, p. 198, from Œst. Wochensch. and Med. Zeitung, No. 18, 1843.

to the neck, and all the rest of the internal surface of the uterus. The patient recovered.

So far as the author is aware, this constitutes the sum of our knowledge in regard to this alleged species of erratic gestation. It may at once be concluded that, in the cases reported by Noel and Mackeprang, the fœtus was developed outside of the uterus, but it does not, therefore, follow that the pregnancy was vaginal. It is to be noticed that in both instances the anterior history is defective. Neither woman was seen by her medical attendant until immediately before her delivery. We therefore have no account of the development of this tumor in the vagina. Neither are we put in possession of any facts which will enable us to determine by what the product of conception was covered. If an ovum is developed in the vagina, it would, as in peritoneal pregnancy, be destitute of any coverings excepting its own membranes, the amnion and chorion. This would seem to be impossible in the vagina. If the tumors were found covered with mucous membrane, the difficulty is at once solved, and the cases could be placed with certainty in that class of extra-uterine pregnancy, which Dezeimeris has called subperitoneo-pelvic, and which is nothing more than one of the terminations of tubal conception. This would appear to be the correct explanation of these two interesting observations.

The third case cannot be disposed of so easily. In this the development of the placenta in the uterus insured the normal nutrition of the fœtus. The results of secondary peritoneal pregnancies have demonstrated the fact, that the presence of heat and moisture, and a continuous regular supply of nutriment through the placenta, are all that is needful to insure the complete development of the child. It is proved beyond doubt, that the presence of the liquor amnii is not necessary to preserve its life and to insure its growth. Nor is it necessary that the membranes should preserve their integrity for its protection. It has been proved beyond possibility of doubt, that at an early stage in the pregnancy, the sac may rupture and allow the embryo to escape into the peritoneal cavity, where it is perfectly free excepting its attachment with the umbilical cord. If, under these circumstances, the connec-

tions of the placenta remain undisturbed, the development may continue, and in the end, be as perfect as in uterine pregnancy. The placenta may be attached in the uterus, and the child escape into the abdominal cavity, and there continue to live and grow, as has been already stated.

These facts would lead us to conclude, that, if the child could be expelled from the uterus into the vagina, without disturbing the attachments of the placenta or rupturing the membranes, its life might be maintained for an indefinite period. The perils to which it would be subjected arise more from the exposed position, than from any difference between the functions of the uterine and vaginal mucous membranes.

It is very difficult to believe that the product of conception could be retained in this locality for any length of time, when the woman is in the upright position. The phenomena, observed in this case, find a more reasonable explanation in the conclusion that the ovum was in reality developed within the retroverted uterus, that the fœtal portion of it had been expelled in the usual manner, but, owing to the narrowness of the vagina, it had been retained in the upper portion of that canal. In the mean time the uterus contracted tightly upon the placental portion of the ovum, leading to its retention.

It may, therefore, be concluded, that we have no reliable clinical evidence, that vaginal pregnancy is possible, and that there are good reasons for believing that it cannot occur.

Author's Classification.—From what has been stated, it may be concluded that there are three species of extra-uterine pregnancy. These may each be divided into several varieties, as expressed in the following schedule:—

SPECIES.	VARIETIES.
Tubal pregnancy.	*Tubo-ovarian* (the germ being arrested in the pavilion, which contracts adhesions with the ovary).
	Tubo-abdominal (germ arrested in the same locality. The tube may contract adhesions with neighboring organs. If it does not, the chorion may project into the abdominal cavity, with a part of its surface bare).
	Tubal proper (germ arrested between the pavilion and that portion of the oviduct which traverses the uterine wall).
	Tubo-uterine (germ arrested in that portion of the tube which passes through the uterus).

Ovarian pregnancy.	*Ovarian proper* (germ contained in the ovary, that organ remaining free from adhesions). *Ovario-tubal* (germ contained in the ovary, which contracts adhesions with the pavilion of the tube).[1]
Ventral or abdominal pregnancy.	*Primary* (ovum developed from the outset in the peritoneal cavity). *Secondary* (development commences in the tube or ovary, the cyst ruptures, ovum escapes, and continues to live and develop in the peritoneal cavity).

This division of the species into varieties is not without its practical bearings upon the prognosis and treatment of misplaced gestations, as will appear in the sequel.

Comparative frequency of the different species and varieties.—It is an exceedingly difficult matter to determine the relative frequency of the different species and varieties of extra-uterine fœtation. Hecker,[2] the author of one of the most important statistical papers upon this subject, states that of the 222 cases which he analyzed, 64 were tubal, 26 interstitial, and 132 abdominal. This, as well as the statements of other investigators, based upon researches of the same kind, must not be accepted as conclusive. In the present state of our knowledge, it is generally quite impossible to determine the portion of the genital tract in which the ovum is being developed, during the life of the patient. This statement applies almost without exception to that large class of cases, in which recovery takes place, either through encysting of the fœtus, its conversion into adipocere or calcareous matter, or its discharge through the abdominal wall, the alimentary canal, the vagina, or the bladder. Of Hecker's 64 cases of tubal pregnancy, only one is said to have lived; while of his 132 examples of abdominal gestation, 76 survived. With our present facilities for arriving at the truth in regard to the location of the ovum, it is believed that we are not warranted, excepting in rare instances,[3] in asserting that the ovum is de-

[1] This is the counterpart of tubo-ovarian pregnancy, and after the death of the patient it is often, indeed generally, impossible to determine whether the germ was arrested in the ovary or in the pavilion of the tube.

[2] Monat. für Geb., Feb. 1859.

[3] De la Faille (*Monat. für Geb.*, June, 1868, and *Brit. and For. Med. Chir.-Rev.*, Oct. 1868) diagnosticated interstitial pregnancy in a woman under his

veloped in any particular portion of the genital canal, unless we have the opportunity of making a post-mortem examination. Even when this sad privilege is afforded, the records of many interesting observations bear witness to the fact, that, aside from the inherent difficulties of the subject, they have been conducted with so little care, that the results obtained are utterly unreliable. In the recorded histories of the various cases of extra-uterine pregnancy, the reader is often able to distinctly detect the coloring, which the teaching or preconceived opinions of the narrator have given to the facts. After excluding all cases of recovery by discharge through the abdominal wall, the alimentary canal, or genito-urinary tract, many cases of recovery after gastrotomy, in which the variety of the gestation was supposed to have been determined, during the hurry and dread of a critical operation, all cases of vaginal section which were not fatal, and all cases in which the appearances discovered at the autopsy were not described with sufficient care to warrant the deduction of correct conclusions, we have the following as the result of an attempt to classify 500 cases of extra-uterine pregnancy:—

Tubal	The ovum being developed in the tube proper . .	149	214
	The ovum being developed in the pavilion: the tubo-ovarian, and tubo-abdominal varieties . . .	34	
	The ovum developed in uterine portion of tube: "interstitial" or tubo-uterine pregnancy	31	
Ovarian			27
Abdominal[1]			29
Doubtful			230

The above statement is of little value, but it is probably as nearly correct as any which has yet been made. The truth is,

care, because he found that slight pressure on the uterus occasioned intense pain. The patient died when she was three months gone, and the diagnosis was verified by an autopsy. At a recent meeting of the Pathological Society of Philadelphia (*Phila. Med. Times*, 1874), Dr. Hodge related the history of a lady under his care, in which he and his father, the late Professor Hodge, diagnosticated tubo-uterine pregnancy. The uterus was dilated, and the child delivered *per vias naturales* by rupturing the wall of the cyst felt through the uterus. This case is related in full in the chapter on treatment.

[1] Under this head are included only those cases which are believed to have been primary abdominal gestations. Secondary ventral pregnancies are included among those of the organ in which conception occurred.

that the profession is not in possession of any data, which will enable it to determine the relative frequency of the various forms of extra-uterine fœtation. It is to be hoped that those, who have the care of patients suffering from this terrible accident, will hereafter record their observations, especially those made post-mortem, in such a manner as to enable future workers in this fertile field, to gather a harvest, which will pay for the gathering.

The above classification gives undue prominence to tubal pregnancy (considered as a whole). This is owing to the fact, that when the ovum has been arrested in the tube proper, (the portion of it between the pavilion and the uterus,) it is apt to terminate in death by rupture of the cyst at an early stage of gestation; and that at this time the locality of the gravid cyst is easily determined at the autopsy. It is probable, however, that pregnancy of this portion of the tube goes to term, much more frequently than is generally supposed—a subject which will be more fully discussed in the sequel.

On the other hand, the tubo-ovarian and tubo-abdominal pregnancies of authors, and abdominal fœtation, doubtless occur much oftener than 34 or 29 times in 500 extra-uterine conceptions. The same may also be true of ovarian gestation.

CHAPTER III.

PATHOLOGICAL ANATOMY.

First Stages of Pregnancy—Appearances when rupture of cyst has not occurred—Appearances after rupture—Quantity of blood effused—It bears no proportion to the extent of the rupture—Appearances of the fœtal sac and adjoining parts—Mode of union between the ovum and the surface on which it develops—Changes in the uterus—The development of the decidua—The corpus luteum—Transmigration of the ovum.

The appearances found after death vary greatly with the period of gestation at which the post-mortem examination is made. It is very rarely, indeed, that an opportunity is obtained to examine an unruptured cyst in the early stages of its development. Bussiere,[1] Ollivier (d'Angers),[2] and Stanley,[3] however, have been fortunate enough to be able to make such observations.

The first of the cases occurred in France, in 1693. The woman had been condemned to death, and while awaiting execution had intercourse with one of her fellow prisoners and became pregnant. At the post-mortem, the fimbriated extremity of the left Fallopian tube was found to be dilated into a cyst more than one inch in diameter. The dilated portion embraced the ovary so firmly, that the two structures could not be separated without injury to the tissues. The ovum was about the size of a hazel-nut. Ollivier's patient died from rupture of some ovarian varices, while Stanley's committed suicide by taking opium. The former was a right tubal conception, which occurred between five and six weeks before death.

Stanley's observation is of great interest, though it may be fairly asked, if the woman was really *enceinte* at the time of her death. There is no history of the pregnancy. The woman

[1] Philosoph. Trans., ab. ed., vol. iii. p. 605.
[2] Archives Générales de Méd., 2d sér., tome v. p. 403.
[3] Trans. College of Physicians, London, vol. vi. p. 414.

was found insensible. No motive for suicide was known, except impregnation from illicit intercourse. At the autopsy, the uterus was found to be increased in size, and its cavity was lined by a soft, pulpy decidua, which *was nearly half an inch in thickness.*

The cervix was filled with gelatinous matter. The appendages were found to be unusually vascular. The bloodvessels of the broad ligament were greatly distended, and the Fallopian tubes were enlarged and very tortuous, from the pavilion until near their uterine termination. The lining mucous membrane was thrown into numerous loose folds.

The pregnancy was supposed to be ovarian, and on the left side. Upon opening this organ a cyst was found. This is said to have contained an ovum, which was simply in contact with the cyst wall, throughout two-thirds of its extent, and strongly adherent to it over all the remaining one-third of its surface. The chorion, amnion, and amniotic fluid are said to have been discovered, *but no embryo could be found.*

It is greatly to be regretted that the last statement is true, since some may call in question the existence of pregnancy. Had the embryo been found, the case would have been one of peculiar value, since the condition of the uterus and appendages, in a woman who perished in the early stages of a misplaced conception without rupture, is accurately described. The abridged account of Bussiere's observation does not furnish the desired information, while Ollivier's patient having been destroyed by hemorrhage from rupture of ovarian varices, the organs presented the same anæmic appearance which is found after rupture of the cyst.

It is first necessary to decide whether or not the woman examined by Stanley was really pregnant. The great vascularity of the broad ligaments and Fallopian tubes, the increase in the size of the uterus, and above all, the existence of a decidua nearly half an inch thick in the interior of the organ, all strongly support the opinion that this was the case. The discovery of a cyst containing a sac consisting of two membranes, and which was adherent throughout one-third of its circumference, is strong corroborative testimony. The only thing that is needed to make this evidence complete, is, un-

fortunately, precisely what is wanting, the discovery of the embryo. However, the absence of this important structure among the contents of the ovular membranes, is not incompatible with pregnancy. It is by no means impossible for the membranes to survive, and continue a certain form of development after the death of the germ. The frequent occurrence of hydatidiform degeneration of the chorion proves this fact.

The phenomenon here described by Stanley, has likewise been seen in uterine pregnancy. During the past year, the products of several abortions, which occurred during the first few weeks after conception, have been exhibited to the Obstetrical Society of Philadelphia, in which the ovum, though otherwise perfect, contained no embryo. Dr. William Savery, of Bryn Mawr, presented two such specimens in a single evening. The presence of the decidua seems likewise to be conclusive evidence that impregnation had taken place in Stanley's case. It is well known that a perfect cast forms in the interior of the uterus in certain forms of dysmenorrhœa, but in that case the history is entirely different from this. The coexistence of all the signs of impregnation, except the presence of the embryo, leads to the conclusion that, though the discovery of the latter is the crucial test, the woman had conceived, but the germ had died a short time afterwards, and that the development of the ovular membranes had not yet been arrested.

This being granted, this case is the solitary example, among the five hundred that have been examined in the preparation of this work, which has been described with sufficient accuracy to give a correct idea of the appearances of the genital apparatus in women, who die in the early stages of pregnancy, without rupture of the cyst. The duration of the gestation in this instance appears to have been uncertain, but it could not have been long, since the gravid ovary was not greatly enlarged. The most striking appearance presented by the organs concerned in reproduction was their extreme vascularity. This is analogous to what occurs after conception within the uterus, but it is reasonable to expect that when the ovum is arrested in its transit to the womb, and the nutritive irritation is removed from its normal seat to an abnormal one in the tube or ovary, the vascularity of the latter organs

would be found to be greater than when the ovum reaches the uterus. This fact is important in its bearings upon the occurrence of rupture, and the hemorrhage that follows as a consequence of it.

After Rupture.—Before the period of quickening, death almost always results from rupture of the gravid sac. In consequence of the hemorrhage resulting from this accident, the cadaver is found to be pale and exsanguined. Upon opening the abdomen, the first thing which attracts attention, is the blood which has been effused. This may be either fluid or partly coagulated, and should always be removed with great care, so as to insure the recovery of the ovum if it has escaped from the fœtal sac, and is free in the abdominal cavity. The blood is so very rarely found encysted, that this condition need never be expected to exist. The peritoneum is almost always found to be healthy. It is rarely inflamed, even if life has been prolonged for several days.

The amount of blood poured out after rupture varies much in different cases. The quantity is sometimes very large. Watkins[1] and Finnel[2] found five pounds. Laidlaw wrote to Campbell,[3] that he had seen between eight and ten pounds. Blizard,[4] Ramsbotham,[5] and Shurtleff,[6] each found two quarts in the abdominal and pelvic cavities; Gavin,[7] Flint,[8] Fisher,[9] and McBride,[10] each three. Hancox[11] has seen four or five, Oaks,[12] seven, and Finnel,[13] ten quarts. In the last instance it was poured out in a few minutes. Dr. Clarke[14] asserts that he found nearly a gallon in the abdominal cavity; while

[1] Buffalo Med. Journ., March, 1851.
[2] Med. Record (N. Y.), 1868, p. 76.
[3] Loc. citat. p. 90.
[4] Trans. of Royal Soc. of Edinburgh, vol. v.
[5] Med. Gazette, 1849, N. S., vol. viii. p. 650.
[6] Nashville Journ. of Med. and Surg., Feb. 1860, p. 158.
[7] Lancet, 1840–41, vol. i. p. 135.
[8] Nashville Journ. of Med. and Surg., Feb. 1860, p. 158.
[9] Ibid., p. 159.
[10] Buffalo Med. Journ., Jan. 1850, p. 467.
[11] Brit. Med. Journ., Dec. 17, 1859.
[12] Nashville Journ. of Med. and Surg., Feb. 1860, p. 160.
[13] New York Med. Journ., March, 1857, p. 237.
[14] Trans. of a Society for the Promotion of Medico-Chir. Knowledge, 8vo., London, 1793.

Harris,[1] and Cathcart,[2] tell us that they respectively removed a half gallon and a gallon, at the autopsies of their patients. Even these enormous quantities are said to have been exceeded. Hunt[3] asserts that he has removed two and a half gallons from the abdomen of a woman, who died after rupture of a right tubal pregnancy of three months' duration. The loss of blood may be so great as to necessarily result in death, but the shock resulting primarily from rupture of the cyst, and that which afterwards follows as the result of pressure from the effused blood, are no doubt important factors in bringing on the fatal issue.

One of the most interesting facts in connection with this loss of blood, is that the amount discharged into the peritoneal cavity bears no proportion to the extent of the rupture. Some of the most severe hemorrhages occur when the orifices are very small. Bernutz and Goupil[4] were aware of this fact. In Watkins' case the rupture was only two lines in diameter. Clement records[5] another in which the lesion was of the same size, though the abdominal cavity contained three litres of fluid blood and a large clot. In cases observed by Buck[6] and Pierson,[7] five pints and six pounds of blood flowed from orifices of the same length. Harris and Cathcart found the orifices but a trifle larger than this, and yet the one found a half gallon and the other a gallon of blood in the peritoneal cavity. The author very distinctly remembers the impression produced by the examination of the gravid cyst, removed from Dr. Cathcart's patient. He had an opportunity of studying this carefully, and was very much impressed by the fact, that such a large quantity of blood could be discharged from such a small rent in a short time. It seems almost incredible that such a frightful hemorrhage could result from an injury so small in its extent. It is not without parallel however.

[1] Amer. Journ. of Med. Sci., Jan. 1858.
[2] Phila. Med. Times, Dec. 27, 1873.
[3] Chicago Med. Examiner, 1870.
[4] Clin. Memoirs on Diseases of Women, N. S. Soc. Ed., 8vo., London, 1860.
[5] Gaz. des Hôpitaux, 1834, p. 245.
[6] Nashville Journ. of Med. and Surg., Feb. 1860, p. 159.
[7] New York Med. Journ., July, 1859, p. 141.

Trousseau has directed attention to the fact, that in epistaxis, large quantities of blood may come from very small areas of mucous membrane. The author has seen the stomach distended to its utmost capacity by a hemorrhage due to cirrhosis of the liver, and yet, has been unable to discover any orifice from which blood was discharged, in any portion of the mucous lining of the alimentary canal.

As examples of more extensive ruptures, in which smaller quantities of blood were poured out, we may cite the cases of Blizard, two quarts from an orifice the size of a small quill; Thomas,[1] six pints from a rupture one inch and a half long; Gavin, three quarts from an orifice the size of a split pea; Lyman,[2] two quarts from a rent one inch and a half long; Storer,[3] three pints from an irregular rupture one-third of an inch in length; McBride,[4] three quarts from a wound that admitted the finger; and Prof. Gibbes,[5] one quart of blood from a lesion two and a half inches in length.

It is a very interesting fact, that the hemorrhage from rupture of an extra-uterine fœtal cyst is much greater than that which follows rupture of the uterus. It has been our bad fortune to meet with a number of examples of this melancholy accident, and in no instance was the quantity of blood effused surprisingly large, by no means so great as frequently follows the rupture of the cyst of an extra-uterine pregnancy. In Prof. Gibbes' patient, the pregnancy was tubo-uterine. A careful examination of the specimen, which he kindly permitted the author to make when at Columbia, S. C., in 1873, showed that the rent, which was a lacerated wound with irregular edges, was identical in nature with that which occurs in rupture of the uterus. In many instances the lesions of the cyst of an extra-uterine fœtation have all the characteristics of an incised wound. At the autopsy of Dr. Cathcart's patient, we were impressed not only by the amount of the hemorrhage, but also by the character of the laceration, which was an oval orifice about two lines in its greatest diameter, with sharply defined edges, as if a

[1] Med. Times, London, May 12, 1849, p. 570.
[2] Nashville Journ. of Med. and Surg., Feb. 1860, p. 161.
[3] Ibid., p. 162.
[4] Buffalo Med. Journ., 1850, p. 467.
[5] Trans. Med. Soc. of South Carolina, 1872.

portion of the peritoneal surface of the Fallopian tube had been removed with a punch. The hemorrhage resulting from such injuries as this one was, is likely to be much greater than that due to lacerated wounds of the cyst. The amount of the hemorrhage does not depend upon separation of the placenta. Some of the largest of these upon record have followed small injuries of the cyst with sharply defined edges, without material separation of the ovum, and without any disturbance at all of its placental portion. On the other hand, the cyst may rupture and the ovum or portions of it may escape without the loss of the excessive quantity of blood which has been observed in many cases.

The partial or complete escape of the ovum through the rent does not increase the loss of blood, but, on the contrary, some of the most severe hemorrhages have followed minute ruptures of the cyst with complete retention of the product of conception. Indeed it seems that complete discharge of the ovum is more favorable than its entire or partial retention.

Rupture of the sac, during the first months after conception, has been supposed by many to be due to softening and sloughing from inflammation of its walls, but the results of numerous post-mortem examinations, prove that there is no solid foundation for this opinion. It is generally the result of distension produced by the growing ovum in an organ not adapted for its development, and which, unlike the uterus, is not enlarged by vital changes, in proportion to the increase in the size of the product of conception. In other cases the autopsy shows, that the immediate cause of the accident is separation of the placenta, and hemorrhage into the cavity of the cyst, which gives way from internal pressure.

After rupture in the early stages, the fœtal sac presents appearances which differ somewhat according to its location. Wherever it is situated the vascularity of the tissues involved is increased. Under the abnormal stimulus the bloodvessels of the part are increased, both in number and size, but this may not be very apparent at the post-mortem examination, on account of the profound anæmia which results from the hemorrhage, and which the internal organs share in common with all the tissues of the body.

The ovum, if arrested in that portion of the Fallopian tube, which is between the uterus and pavilion, has for its coverings the peritoneal, muscular, and mucous coats of that organ. If its progress is stopped in the uterine portion of the tube, the walls are additionally strengthened by a thicker layer of muscular tissue belonging to the uterus. If the pavilion alone is involved, only one portion of the ovum may be covered while the remainder may project into the peritoneal cavity, the chorion being entirely unprotected by any other tissues. At other times, as was observed by Bussiere, the fimbriated extremity contracts adhesions with adjoining organs, thus completing the cyst wall.

It is the rule for pregnancy of the tube, or at least that portion of it which is between the uterine orifice and the pavilion of the organ, to terminate in rupture during the first period of the evolution of the ovum, or before the occurrence of quickening. Under these circumstances the cyst is nearly always found to be free from adhesions, and its various coats can generally be demonstrated. The peritoneum rarely undergoes much change in this stage of the pregnancy. The muscular coat may be greatly thinned and atrophied, so that the retention of the ovum in its cavity is due almost entirely to the support of the peritoneum. As a rule, however, the muscular layer of the tube is found hypertrophied. Under the influence of the stimulus imparted by the presence of a vitalized germ in the cavity of the organ, the muscular fibres undergo hypertrophy, much as those of the gravid uterus do after a normal conception. This process, however, is less rapid and energetic, than it is in the organ which was specially intended for the reception and development of the product of conception. It cannot therefore keep pace with the increase in the size of the ovum, in consequence of which the muscular coat may present the appearance of being thinned and atrophied, even though the whole amount of muscular tissue may be increased.

Dr. J. B. Hicks[1] reports that he found the outer layers of the tube contained some peculiar bands of connective tissue mixed with the muscular elements, in a woman who perished during the second month of gestation.

[1] Guy's Hosp. Reports, 1860, 3d series, vol. i. p. 274.

One of the most interesting questions in connection with the pathological appearances of extra-uterine fœtations in this stage of their development, is the determination of the nature of the connections which exist between the ovular and maternal tissues. It will be shown in the sequel that the villi of the chorion have to make their connections with the maternal tissues without the intervention of any deciduous membrane. Kussmaul[1] even asserts that the mucous membrane of the tube which is beneath the placental portion of the ovum may become completely atrophied. Dr. Hicks[2] thus describes the microscopical appearances, presented upon the examination of specimens removed from a patient, who died of rupture of the cyst, under the care of Dr. Roper. The woman had menstruated for the last time on February 26th and the five succeeding days. She died on the 8th of the following April. Speaking of the sac which contained the fœtus, he says: "The inner surface of this cavity was covered with the ciliated columnar epithelium proper to the mucous membrane of the Fallopian tube (and which it originally lined), and upon this surface the terminal tufts of the villi spread out, the epithelium remaining upon the parts not occupied by them. These terminations of the villi do not enter the substance of the tube wall, which was apparently too solid and dense, but seemed merely adherent to it, a very minute portion of plastic matter seeming to assist at the points of contact. The coats of the villi were single as far as could be detected, so that the placenta was purely ovular. That there was no maternal structure entering into the composition of the placenta could be further proved by close examination. The maternal vessels ramified beneath the epithelium-covered surface, where they could be seen in some places only slightly raised above the level. These capillaries were evidently enlarged and numerous, but not so much as the uterine decidual membrane."

In another case[3] of tubo-uterine pregnancy in which the gestation was rather further advanced, not a trace of a decidual membrane could be found surrounding the chorion.[4]

[1] Quoted by Keller, loc. citat. p. 26.

[2] Loc. citat. p. 274.

[3] Ibid., p. 276.

[4] The uteri of both of these women were lined by a decidua which had all the microscopical characters of that membrane in normal pregnancy.

The villi, as in the preceding case, "possessed only a single coat and spread *over*, *but did not enter*, the uterine tissue to which they were affixed. No membrane at that part was to be detected. Beneath the inner surface, immediately in contact with the villi, the uterine vessels spread themselves out, flattened, and so numerous that the whole substance must have been almost as one bloodvessel, only the delicate membrane of the vessels, separating the maternal blood from the villi where they are in contact." From these statements it appears, that, at least in this early stage of misplaced pregnancy, the maternal portion of the placenta is absent, and that there is no direct union between the fœtal and maternal tissues. The villi of the chorion are applied to the mucous membrane of the tube, with which they contract adhesions, and the ovum is nourished by endosmotic action.

A comparison of these conditions with those to be met with during the same stages of uterine gestation, reveals both important differences and likenesses. Dr. George J. Englemann, of St. Louis, has recently investigated[1] the changes which take place in the uterine mucous membrane after conception. After describing the process of cell-proliferation which results in the formation of the membrana decidua, he states that Prof. Reichert examined a uterine ovum, twelve or thirteen days after impregnation, and found that no connection existed between the serotina and the ovum.

Dr. Englemann himself found the union between the chorion and the hypertrophied mucous membrane to be very superficial in the second month of pregnancy. The connection which existed was, however, twofold in its origin. It was partly "owing to an agglutination of villi," to slight depressions and projections on the decidua serotina, "the parts being simply superimposed and cemented by a connecting medium of tenacious mucus and detached epithelium; the continuity of the lining epithelium had been destroyed, and thus a more

[1] The Mucous Membrane of the Uterus, with special reference to the development and structure of the deciduæ, 8vo., New York, 1875, and Amer. Journ. of Obstetrics, May, 1875.

favorable surface was presented for an agglutination of the approximating elements." The second element in establishing the connection between the ovum and the mother is the active proliferation of the cells of the decidua serotina, which envelops the delicate villi of the chorion in its growth.

These very interesting observations of Englemann have additional interest from the fact, that they confirm those of Dr. J. Braxton Hicks, who has carefully described the connections by which the ovum is attached to the interior of the uterus at this early period of its normal development. The latter author has likewise clearly called attention to the two forces which are concerned in establishing this union. Both agree that the uterine follicles play no part in this important process, and that the villi of the chorion, if they enter these glands at all, do so very rarely, and then only for a very short distance.

It appears, therefore, that in extra-uterine pregnancy but one force is concerned in establishing the connection between the ovum and the surface upon which it is engrafted. This is a vital adhesion between the villi of the chorion, and the tissue with which they come in contact, aided by the presence of more or less plastic material. It differs from the same process in the uterus in the absence of the decidua, the subovular portion of which—called the serotina—plays an important part in establishing a connection between the ovular and maternal tissues by means of the active proliferation of its cells.

In pregnancy of the portion of the tube which is outside of the body of the uterus, the canal of the organ is generally found occluded, on both the proximal and distal side of the cyst after death from rupture. The contrary has been asserted by Gardien,[1] who says that a communication is constantly formed between the cavity of the cyst and the uterus in these cases. Desormeaux[2] almost repeats Gardien's statements, and adds that the communication is sometimes very small, while at others the opening is notably dilated. Such a condition must be very rare, or, if common, it has escaped the notice of

[1] Traité Complet d'Accouchemens, 8vo., Paris, 1824, tome i. p. 523.
[2] Dict. des Sciences Médicales, Paris, 1829, tome vii. p. 270.

reporters of cases of rupture.[1] It is rare even to find the tube recorded as patulous as far as the cyst, though Hun[2] has noticed this in a woman who was three and a half months gone when she died.

This is a matter of some consequence, for the occlusion of the tube, discovered after death, has been erroneously looked upon as a cause of extra-uterine pregnancy, when it is only an effect. As a result of the irritative vital changes going on in the organ from retention of a fertilized germ, plastic matter is poured out into the tissues, and the canal of the oviduct is obliterated.

There is one matter in relation to conceptions of that portion of the oviduct which is between the pavilion and the exterior of the uterus which demands a brief notice. Kussmaul, in his work upon malformations of the uterus, already alluded to, asserts that the pathological appearances are often misinterpreted under these circumstances, and that pregnancies in the undeveloped horn of a unicorn uterus have often been mistaken for those of the tube proper. Indeed, Kussmaul expresses[3] the belief that "a very large proportion" of the cases, which have been described in medical literature as gestations of the tube, are nothing more than examples of conceptions in an undeveloped uterine horn.

Pregnancies of the latter class run very much the same course as that pursued by those of the tube. They generally terminate in rupture, and the death of the woman shortly after the middle of gestation.[4] Under these circumstances it

[1] It is an interesting fact, that in most cases of pregnancy in the rudimentary horn of a unicorn uterus, the fruit-sac is shut off from the Fallopian tube on one side, and the developed half of the uterus on the other. At the same time the corpus luteum and the ovum are found on the same side, leading to the conclusion that the canal of the "super-horn" becomes occluded after impregnation has taken place.

[2] New York Med. Journ., Oct. 1869, p. 40.

[3] Review of Kussmaul's Work, *Edinburgh Med. Journ.*, July, 1860, p. 59.

[4] Kussmaul has collected thirteen cases, all of which terminated in death by rupture between the fourth and sixth months. The largest number gave way in the fifth month—a later period than that at which tubal gestations generally burst. Luschka has reported a case in which rupture occurred as early as the tenth week. Fritze met with another in which, contrary to the

is not generally a difficult matter to determine the true nature of the condition. If the gravid cyst is tubular, the oviducts on the two sides will be found entering the womb at opposite points, and at the usual position on the right and left halves of the organ. The uterus itself will be found symmetrical and normal in its development.

The *uterus unicornis*, or one in which only one of its primordial divisions has undergone complete development, is of a conical or cylindrical outline, and occupies an oblique position in the pelvis. One side, that furthest from the middle of the body, presents the concave outline of the developed uterus, but the opposite margin is convex. The rudimentary horn joins the developed portion of the organ somewhere on this convex side, it may be but a short distance below the tube of the opposite side in cases where the development of the "super-horn" is moderately complete; or, where the fœtal condition is preserved, the junction may occur in the region of the cervix.[1]

Ingleby, Selwyn, Day, and a number of others, have recorded cases of death from rupture of the embryiferous sac, in which the pathological appearances just mentioned were found after death, and which were supposed by those describing them to be examples of tubal gestations. The author has examined the records of the post-mortem appearances in a large number of cases of rupture in the early stage of pregnancy of the tube, and he is unable to confirm the observation of Kussmaul, "that a very large proportion of the cases" described as tubal fœtations are, in reality, pregnancies in the undeveloped horn of a unicorn uterus. The appearances of this malformation are so striking, that it is not likely they would habitually escape observation. They are certainly

usual rule, the fruit-sac did not rupture. The embryo died at the end of the fifth month, and was carried for thirty-one years, when suppuration occurred. (Barnes, *Diseases of Women*, 8vo., Phila. 1874, pp. 391–2.)

[1] It is even stated that the rudimentary horn may open into vagina, near the cervix of the developed half. Canestrini, *Historia de Utero Duplici, Alterutro Quanto Graviditatis Mense Rupto, in Hungaria*, A. D. 1781, *in Cadavere ab auctore invento*. Augustæ Vindelic, 1788, quoted by Kussmaul's Reviewer (*Loc. citat.* p. 59).

rarely mentioned among the post-mortem appearances in cases recorded as tubal fœtations.

Tubo-uterine pregnancy presents some anatomical peculiarities with which it is important to be familiar. As in gestations of other portions of the oviduct, the internal or uterine orifice of the tube may become occluded, as was noticed by Schmidt[1] in the first example of this variety of tubal fœtation ever recorded. Granville[2] asserts that this is an invariable condition. In this he is in error, for the uterine orifice of the tube may sometimes remain patulous. Upon opening the right or gravid tube lengthwise, in a woman who had died when five months gone, Poppell[3] exposed two cavities. The lower one was that of the uterus lined by a decidua. The upper one, the ruptured fœtal sac, was divided from the lower of the two by a partition of muscular fibre, but communicated with it by an orifice which would admit the finger. The history of tubo-uterine pregnancies which go beyond the early months of pregnancy confirms this observation.

The fruit sac, in all cases belonging to this variety, is formed of that portion of the oviduct which traverses the uterine wall. The portion exterior to this is rarely if ever involved. One wall of the cyst may give way at an early stage of the gestation and allow the ovum to escape into the tissue of the uterus, where its development may be continued.

After death from rupture in the early stages it is sometimes difficult to determine the exact locality of the embryiferous sac. Virchow has called attention to the fact that the position of the round ligament will aid in deciding this question. This structure leaves the uterus at the point where the Fallopian tube joins the organ. If the gravid cyst is outside of the attachment of the round ligament, the pregnancy is tubal simply. If inside of it, the embryo is either contained in the uterine portion of the tube, or the rudimentary horn of a double uterus. Baart de la Faille, who recognizes the difficulty of distinguishing a tubo-uterine pregnancy from a fœta-

[1] Mém. et Observat. de l'Acad. Méd.-Chir. de Vienne, 1801.

[2] Graphic Illustrations of Abortion, 4to., London, 1834, p. 33.

[3] Monats. für Geb., Feb. 1868, and Brit. and For. Médico-Chir. Rev., Oct. 1855, p. 559.

tion in a rudimentary horn, says that this may be done by remembering that, in the former case, there is a membranous wall, such as was observed by Poppell, between the gravid sac and the uterine cavity; while, if the ovum is contained in a rudimentary horn, the fruit sac is joined to the developed half of the uterus by a muscular band.

In ovarian pregnancy the fœtal cyst is devoid of a peritoneal covering. The researches of Waldeyer have shown that the peritoneum is not prolonged over the surface of that organ. The chorion is in immediate contact with the interior of the sac. Rupture generally occurs during the first period of gestation.

The opportunity to make a post-mortem examination of primary ventral gestations during the first months succeeding impregnation, rarely occurs; but when it does it will be found —the germ being free in the peritoneal cavity—that the chorion is unsupported during the earliest stages of the pregnancy by any other tissue. It projects uncovered into the peritoneal cavity, excepting on that part of its surface by which it becomes united to the serous membrane.

The method by which the ovum establishes its connection with the maternal tissues in ovarian and primary ventral pregnancies has not been studied, so far as we are aware, but it is not probable that the process differs in any way from that which has been described in connection with tubal gestations.

The uterus after death from rupture in the early stages is found to be more or less enlarged. It always undergoes, to a greater or less extent, those changes which prepare it for the reception of the ovum. The organ is more vascular than natural, and its cavity is often found to be lined with a decidua. This is absent only when it has been discharged before the death of the patient. The cervix is filled with a plug of thick gelatinous mucus, precisely as it is in normal gestation. The uterus, although prevented from discharging its functions, prepares to do its work precisely as if the fertilized germ had entered its cavity.

The development of the decidua demands more than the brief allusions which have previously been made to it, and it will be fully considered in this place, as this will enable the

reader to more readily understand some of the symptoms which will be discussed.

The development of the decidua in extra-uterine pregnancies has given rise to much discussion. Even at the present time opinions are very varied in regard to it, some contending that it is formed in the uterus in all cases, and others that it lines the extra-uterine gravid cyst. The most prominent advocate of the latter opinion is Dr. Robert Lee,[1] who has insisted with great force that the decidua always surrounds the ovum. In this opinion he is supported by Churchill,[2] Schrœder Van-der-Kolk, and Leishman.[3] Barnes[4] appears to entertain the same opinion, while Clarke,[5] Virchow, Oldham,[6] Kiwisch, Ramsbotham,[7] and Cazeaux[8] believe that the decidua is always formed in the uterus. Hodge[9] asserts that it is generally produced here, while Blundell, Granville,[10] and Béhier[11] believe that it is sometimes, but not always, formed in the uterus. Barnes[12] also says, that in abdominal pregnancy, the decidua is not formed in the uterus,[13] thus leading to the inference that in tubal gestations, the membrane is sometimes formed in the interior of the oviduct. To complicate the subject still further, Chaussier[14] has described a case in which he asserts that the uterus and gravid sac were both lined by this membrane, and Rog-

[1] Lond. Med. Gaz., June 5, 1840, p. 436, and Trans. Medico-Chir. Soc. London, 1858, vol. xli. p. 137.

[2] Theory and Practice of Med., 8vo., Phila., 1862, p. 186.

[3] Syst. of Mid., 8vo., Glasgow, 1873, p. 210.

[4] Dis. of Women, 8vo., Phila., 1874, p. 362. Speaking of rupture of the cyst, he says: "Frequently the chorion and decidua remain attached to the sac." On page 370 he asserts that "in the case of tubal gestation partial detachment [of the ovum] is very easy, owing to the scanty development of decidua."

[5] Trans. of a Society for the Improvement, etc., 8vo., London, 1793, p. 216.

[6] Guy's Hosp. Reps., 1843.

[7] Prin. and Pract. of Obstet. Med. and Surg., 8vo., Philada., 1865, p. 572.

[8] Bull. de la Société Anatomique, Sept. 1836.

[9] Prin. and Pract. of Obstet., 4to., Phila., 1866, p. 532.

[10] Graphic Illustrations of Abortion, etc., 4to., London, 1843, p. 31.

[11] Gaz. Hebdom., No. 36, 1873. [12] Loc. citat. p. 370.

[13] This author's opinions seem to be somewhat undecided. Without positively stating his position, it may be inferred that he believes that the decidua is formed both in the sac and in the uterus.

[14] Journ. de Méd., May, 1814.

ers,[1] and Schrœder,[2] both believe that the decidua is formed in both of these localities.

In order to harmonize these diverse opinions, several facts must be taken into consideration. Dr. Lee's views must be considered exceptional. They were at variance with those of many of his contemporaries,[3] and were based upon recent post-mortem investigations and the examination of specimens contained in various London museums. Announced in 1840, Lee continued to publicly advocate the opinion that in extra-uterine fœtation, the cyst was always lined by a decidua for the space of eighteen years. As his views are diametrically opposed to those of equally competent observers, it must be concluded that there was an error of observation upon one side or the other. Clinical experience, and the examination of the records of many cases, lead to the conclusion that this was upon the part of Dr. Lee. It is greatly to be regretted that the earnestness and energy expended in the support of these opinions were not directed in a channel in which they would have forwarded, and not have impeded, the advance of knowledge.

Though Hennig has asserted[4] that there is a greater simi-

[1] Extra-uterine Fœtation and Gestation, 8vo., Phila., 1867. "As the evidence now stands, the decidua is as uniformly found surrounding the ovum in the tube as it is about the ovum in the cavity of the uterus." (p. 10.) "Dr. Robert Lee to the contrary notwithstanding, I am convinced, by the evidence afforded by a somewhat extended research, that an intra-uterine decidua is invariably formed in extra-uterine pregnancy." It was because he supposed that the ovum must be surrounded by some product developed by the mucous membrane of the genital tract, that Rogers (see p. 17) was led to deny the occurrence of ventral pregnancy. Campbell's views were very much the same.

[2] Manual of Midwifery, 8vo., N. Y., 1873, p. 130.

[3] Dr. Lee's papers are based, especially the second, upon a re-examination of previously described specimens. When these views were promulgated they exerted a considerable influence. Clayton, for example, states (*Lancet*, 1840–41, vol. xl. p. 654), in the account of the post-mortem of his patient, that the decidua was found in the uterus. This was undoubtedly true, but in the same journal (vol. xli. p. 28) he refers to the same case again, and denies that the decidua was formed in the uterus, and *asserts that it surrounded the ovum.* The change of opinion is explained by the fact that Dr. Lee had seen the specimen in the interval, and had succeeded in convincing Dr. Clayton that the facts were incorrectly reported.

[4] Monats. für Geb., 1869.

larity between the behavior of the tubal and uterine mucous membranes than is generally believed, even he throws grave doubts upon the existence of an extra-uterine decidua in tubal pregnancies. It is no part of the function of the mucous membrane of the Fallopian tube, and still less, that of the membrane lining one of the Graafian vesicles, to form a decidua. The latter is concerned in the development of the ovule, and the former in its transmission to the uterine cavity, where its growth and development are to take place. In the human female no important additions, either for the nutrition or development of the new being, are made in the oviduct. Heat and moisture are necessary for the maintenance of the life of the ovum during its descent, and these it is the office of the tube to furnish. In this particular, it is governed by the same laws that control germinal matter, whatever may be its endowments and in whatever situation it may be found.

It is a well established fact that in extra-uterine, the uterus undergoes changes similar to those of normal pregnancy. Boehmerus[1] long ago announced that the organ enlarged, became more vascular, and that a decidua was formed in its interior; in other words, that the changes, which ordinarily take place to fit it for the reception of the ovum, are not stopped by the arrest of the latter during its passage to the womb. In 1773, it was stated[2] that during the previous winter Hunter had met with a case of tubal pregnancy in which death was due to rupture of the cyst. The uterus contained a decidua, and Hunter stated that this confirmed two theories previously announced by him, viz., that the decidua belongs to the uterus, and is formed in it, and that in pregnancy this organ is not enlarged mechanically by the growth of its contents. The opinion of this astute observer, thus plainly expressed more than a century since, may be still accepted as the truth, and had others been equally careful in their investigations, a great deal of useless discussion would have been avoided.[3]

[1] Observat. Anatom. Rar., 1752.

[2] Medical Commentaries, 8vo., London, 1773, p. 429.

[3] The credit of discovering that the decidua is formed in the uterus, in extra-uterine gestation, is by some given to Hunter. This is erroneous. It really belongs to Boehmerus.

Much of the difficulty has arisen from the fact, that at the time of the death of the patient, even in the early stages of tubal pregnancy, the uterus is frequently found without any decidua in its cavity. Ollivier (d'Angers)[1] and Flint[2] found it absent in women who died when they were six weeks gone, Marshall[3] in one who was eight weeks gone, and Douchez[4] and Pize[5] each record the fact, that they failed to find it in cases in which death occurred in the tenth week of gestation. The absence of a decidua in the uterus, when a post-mortem examination is made, is no proof that it has not been formed in that organ. The failure to recognize this important fact has led to numerous errors. Its absence at the post-mortem examination only shows, that the membrane has been previously discharged. This may occur piecemeal, with the hemorrhages which are so common in extra-uterine pregnancy, or it may be voided entire, with pain and other symptoms of abortion, which lead to the diagnosis of that accident.[6] The

[1] Arch. Gén. de Méd., 2d sér., tome v. p. 403.

[2] Nashville Journ. of Med. and Surgery, Feb. 1860, p. 158.

[3] Trans. Obstet. Soc. London, 1864, vol. v. p. 154.

[4] London Med. Gaz., Oct. 2, 1830, p. 11.

[5] Bull. de la Soc. Anatomique, 1853, p. 40.

[6] Towards the close of the third month something resembling a mole was discharged from the vagina. (Ucelli, *Bibliothèque Méd.*, tome xxxviii. p. 265; *Journ. des Connais. Méd.-Chir.*, 1837, p. 4.) When about two months pregnant, had much pain with vomiting and straining after exertion. A few days later the decidua was voided with hemorrhage. (Martin, *Monats. für Geb.*, Feb. 1868; *Brit. and For. Med.-Chir. Rev.*, July, 1868.) When supposed to be six weeks pregnant she had vaginal hemorrhage and much pain. It is stated that *the placenta* was probably discharged at this time. (Finnel, *Med. Record* (N. Y.), 1868, p. 76.) The patient was about four months gone. Retroversion of the uterus was diagnosticated and an attempt made to induce abortion by introducing a catheter into the uterus, and the decidua was discharged. (Young, *Trans. Med.-Chirurg. Soc. of Edinburgh*, 1829, vol. iii. p. 536.) A membrane was discharged when the patient was about four months gone, which was supposed to be an ovum. (Perkins, *Phila. Med. Times*, 1872, and *Amer. Journ. of Obstet.*, May, 1872, p. 155.) In this instance the discharge of the decidua led Dr. Goodell, who saw the patient in consultation with Dr. Perkins, to conclude that she had aborted, and was at that time the subject of pelvic inflammation. The same woman was subsequently examined by the author, in consultation with Dr. P. The physical signs of pregnancy were then very manifest, and it was concluded that there was originally a twin conception, that one of the

discharge of the decidua *en masse*, is frequently accepted as confirmatory evidence of miscarriage, not only by the nurse but by the physician.

On the other hand, though rarely, the decidua may be found at an autopsy made at the very close of gestation. This is proved by the fact that it has been expelled in the false labor, which nearly always occurs in extra-uterine pregnancy, at or near the completion of the normal period of gestation. James[1] witnessed its discharge at the end of the seventh month. Pletzer,[2] Hennigsen,[3] and Hemard,[4] have seen it retained to term, and cast off during spurious labor.[5] Käjar's[6] patient probably retained it eight weeks beyond the time when gestation was completed.

The only testimony adverse to the conclusion that in these abnormal pregnancies the decidua is invariably formed in the uterus, and which is based upon observation, is that of Dr. Lee. Upon the opposite side are a number of accurate observers, the weight of whose evidence is enough to convince us, that this veteran authority is in this matter biased in his opinion. Those who, like Rogers and Schrœder, believe that the decidua is formed both in the uterus and around the ovum —and those who, like Barnes and Tanner, seem to be in doubt about the matter, appear to derive their views from tradition, and not from the examination of pathological specimens.

The truth in regard to this matter may be briefly summed up in the following propositions:—

1. In all varieties of extra-uterine pregnancy a decidua

ova had perished and been thrown off. Extra-uterine fœtation was not suspected.

[1] North Amer. Med. and Surg. Journ., 1827, vol. iv. p. 283.

[2] Monats. für Geb., April, 1867, and Brit. and For. Med.-Chir. Rev., Oct. 1867.

[3] Arch. für Gynäkol., 1870; New Syd. Soc. Bien. Ret., 1869-70, p. 397.

[4] Lancet, 1844, vol. ii. p. 74.

[5] At the end of the ninth month "something like a mole" was extruded from the uterus. (*Nouv. Journ. de Méd.-Chir. et Pharm.*, vol. xv. p. 51.) At the end of the ninth month, had labor-pains, which continued very severe till the end of the tenth month, when she expelled a "mole" the size of a pullet's egg. (Lalanne, *Annal. de la Méd.*, Jul. 1825.)

[6] Med.-Chir. Rev., Jan. 1837, p. 208.

forms in the uterine cavity, as in normal gestation, but none surrounds the ovum.

2. The decidua is rarely retained until the completion of gestation, and thrown off during false labor. More frequently, if the patient goes to term, it is discharged during the early periods of pregnancy in small fragments, and without producing pain; or else it is expelled *en masse* with symptoms of miscarriage.

3. The absence of a uterine decidua when death has occurred from rupture of the cyst, even in the early stages of pregnancy, is not proof that the membrane has not been formed, but simply that it has been expelled before the death of the patient.

The Corpus Luteum.—Those portions of the uterine appendages, which are not involved in the fœtal cyst, present no unusual appearances except anæmia in cases of death from rupture, and profound congestion in those in which death results from causes unconnected with the pregnancy. The corpus luteum is formed as it is after normal conceptions, and differs in no manner from that found in the ovary of women perishing during uterine pregnancy.

Its presence is the rule, its absence the exception, especially in the early months of gestation. It is a curious fact, however, that in a certain number of the cases of misplaced gestation, the corpus luteum has been found in the ovary which is on the side opposite to that occupied by the gravid cyst. There is reason to believe that this, though not peculiar to them, occurs more frequently in extra-uterine than in normal pregnancies.[1] Drejer, of Copenhagen, described[2] an example of transmigration of the ovum, in 1837; Meigs, of Philadel-

[1] This phenomenon is not peculiar to the human female. Bischoff, in 1842, published a work called "Die Entwicklung des Kuninchencirs," in which he announced the fact that he had observed migration of the ovum in bitches. Later he wrote to Kussmaul that it often happens in the deer. See review of Kussmaul's work, "Von dem Mangel der Verkümmerung und Verdopplung der Gebärmutter," etc. etc., Wurzburg, 1859. (*Edinburgh Med Journal*, 1860, vol. vi. part i. p. 275.)

[2] Amer. Journ. of Med. Sciences, 1837. The case was one of pregnancy in a rudimentary uterine horn.

phia,[1] one in 1839; and Oldham,[2] of London, another in 1845. Stedman,[3] Lee,[4] Kussmaul,[5] Shultze,[6] Poppell,[7] Saddler,[8] and Sager,[9] have likewise observed cases of extra-uterine fœtation with transmigration of the ovum.

Two explanations of this phenomenon have been offered, one by Oldham[10] and the other by Tyler Smith.[11] According to the former, the tube of the opposite side, and the one in which the ovum is finally developed, reaches entirely across the pelvic cavity and grasps the ovary from which the germ is liberated. The latter believes that the ovum descends to the uterus through the tube on the side upon which it is developed, enters the womb, crosses its cavity, enters and ascends the opposite tube. We have not been able to discover any facts which support the views of Smith, while Oldham's explanation of this peculiar phenomenon is rendered extremely probable, not only by the anatomical peculiarities of his own case, but also by several observations which have been made by other writers upon this subject. Sager[12] found both corpora lutea in his case of combined intra- and extra-uterine pregnancy in the right ovary, while the aberrant gestation was in the left tube. The right Fallopian tube was perfectly normal, except that the pavilion was practically bridled by some of its fimbriæ being attached to the opposite side, so that the tube could not grasp the ovary. As death occurred in the eleventh week of gesta-

[1] Med. Examiner, Phila., Nov. 9, 1839, p. 709, and Obstetrics, 8vo., Phila., 1852, p. 270. The reviewer of Kussmaul's work, above alluded to, says that migration of the ovum "was first observed by Bischoff." Drejer and Meigs both preceded him, however, as will be seen by reference to the dates cited.

[2] Guy's Hosp. Reports, 1845, p. 272.

[3] Boston Med. and Surg. Journ., 1856, p. 470.

[4] Trans. Medico-Chir. Soc. London, 1858, vol. xli. p. 141.

[5] Two cases. Schmidt's Jahr., No. 9, 1859, and Brit. and For. Medico-Chir. Rev., Oct. 1859, p. 555; Monats. für Geburtsk., Oct. 1862, and Brit. and For. Medico-Chir. Rev., Jan. 1863, p. 271.

[6] Wurtz. Med. Zeitsch., 1863; New Syd. Soc. Year Book, 1864, p. 364.

[7] Monats. für Geb., Feb. 1868; Brit. and For. Med.-Chir. Rev., July, 1868, p. 253.

[8] Med. Times and Gazette, Aug. 5, 1865, p. 140.

[9] Michigan Univ. Med. Journ., Oct. 1870.

[10] Loc. citat.

[11] A Course of Lectures on Obstetrics, 8vo., New York, p. 241.

[12] Tanner, Signs and Diseases of Pregnancy, 8vo., Phila., 1868, p. 288.

tion, there is no reason to believe that this pathological change occurred after the woman conceived. Farre has described a preparation which is in the Anatomical Museum of Cambridge, in which both tubes are simultaneously grasping the same ovary to which they have been attached by adhesions, and Rokitansky, in examining the body of a woman who died after uterine pregnancy, found the corpus luteum on the left side while the corresponding tube was much thinned, impervious, and its pavilion adherent to the sigmoid flexure of the colon. This eminent authority in pathological anatomy believed that this condition existed before pregnancy occurred, and that the ovum passed down by the tube of the opposite side. Oldham's views are still further confirmed, by Luschka's case of pregnancy in a rudimentary uterine horn.[1] The corpus luteum was on the left side, and the left horn was normal. The right or gravid horn ruptured in the third month. At the autopsy the latter was found to be connected with the opposite side by a round solid cord. There is no reason to believe that this was pervious at the time conception occurred, and hence the only explanation of the phenomenon is, that the ovum passed down upon the side opposite to that upon which it was developed.

Intra-uterine transmigration of the ovum, as described by Tyler Smith, is supported by few if any facts. Its possibility is denied by Klob[2] while Tanner[3] appears to believe it can happen, and quotes Scanzoni's case of pregnancy, in a left rudimentary uterine horn, as demonstrating its occurrence. There is nothing, however, in the account of this case which makes it necessary to accept this explanation, and therefore the conclusion may be legitimately drawn, that, in the majority of instances at least, the ovum passes down the tube, opposite to the ovary in which it is developed, and that as yet we have no positive evidence that intra-uterine transmigration of the ovum ever happens.

It may, however, be doubted whether it is necessary for the tube of the opposite side to be brought into actual contact with

[1] Monats. für Geburtsk., Band xxii. p. 31, 1863.

[2] Wochenblatt d. Ztschr. d. k. k., Ges. d. A. in Wein, 1861. Quoted by Barnes, loc. cit. p. 369.

[3] Signs and Dis. of Preg., 8vo., Phila., 1868, p. 288.

the ovary, for this to occur. Kussmaul has asserted that it is not necessary for the fimbriated extremity and the ovary to be brought together, in order that the tube should receive the ovule. He believes that in the human female, as in the amphibia, the germ has to traverse a portion of the peritoneal cavity in order to reach the oviduct. The force which enables it to make this short but perilous journey, is not inherent within itself, but, as Müller and Becker assert, it is probable that it is carried to the oviduct by a current, which constantly flows from the ovary to the pavilion. This explanation is not so unlikely as it may at first appear. That the cilia of the tube, constantly waving as they do, towards the uterine cavity, should create and maintain such a current, is neither impossible nor improbable; and the idea that the pavilion must grasp the ovary in order to receive the egg before it can be transmitted, needs to be established by renewed investigation. These statements make Oldham's explanation of transmigration of the ovum more plausible, since it does not, as he supposed, involve actual contact between the ovary and tube of opposite sides.

CHAPTER IV.

PATHOLOGICAL ANATOMY—Continued.

Appearances in latter months of gestation and after its close—Vary with the length of time that the child has been retained—In tubal pregnancy—Spiegelberg's case—Primary and secondary abdominal pregnancy—Liquor amnii—The fœtus—Its position, development, and sex—The placenta—Vascularity of the chorion in some instances—Species of the gestation cannot always be determined at the autopsy—Condition of the uterus—Changes in the fœtus when long retained—Side of the pregnancy.

If the woman does not perish from rupture of the cyst during the first four or four and a half months of gestation, it is not likely that an opportunity will offer to inspect the body until at or near, or even some time after, the close of pregnancy.

After term, or after the death of the child, the post-mortem examination reveals appearances which vary much with the length of time that the child has been retained. Upon opening the abdominal walls, the cyst may, or may not, be found adherent. If it is not, and the pregnancy is ovarian or tubal, the fœtus will be found surrounded by the proper tissue of these organs. If these species frequently go to full term the fact cannot generally be ascertained at the post-mortem examination. Spiegelberg has, however, met with and accurately described[1] the appearances presented in a tubal gestation which reached the ninth month. The following are the chief facts of the case:—

The patient was a peasant woman, aged forty-four years, who was pregnant for the fourth time. She reached term without having had any abnormal symptoms, when she was seized with slight labor-pains, which were "followed by convulsions, coma, and rapid prostration and death in a few days." The urine contained albumen and casts.

At the autopsy, the mature dead child was found with its

[1] New York Med. Journ., 1871, from Archiv für Gynækologie.

membranes, in a membranous sac, composed only of the Fallopian tube. This fact was confirmed by a careful microscopic examination made by Waldeyer. "Bundles of muscular tissue were found, the tissue of the ovary was recognized microscopically, and, by careful manipulation, the folds of the right broad ligament were separated from one another up to the point where the sac commenced, which thus corresponded with the position occupied by the Fallopian tube, while a probe passed from the angle of the uterus into the sac along a short canal." The placenta was situated on the anterior surface of the cyst, and death was due to separation of the placenta and hemorrhage into the sac, its rupture, and peritonitis.

In tubo-uterine gestations, the appearances described in the early months of pregnancy may persist to term without change, except such as results from the increase in the size of the product of conception.

A portion of the ovum may sometimes be found in the uterus, while the remainder is in the abnormal tubal cavity. According to M. Mondat,[1] M. Herbin met with an example of this in which the head of the child alone was found in the uterine cavity, while the trunk occupied the tubal cyst. Simply a small portion of the ovum may be developed in the tube, as was observed by Bell[2] in a woman who perished from hemorrhage and peritonitis after delivery, when a part of the afterbirth three and a quarter inches long was found adherent within the tube. The child may be developed in the uterine portion of the tube while the placenta is attached inside of the uterus. When the placenta occupies its normal position, the fœtal cyst may burst, and the child continue to develop in the abdominal cavity, as was observed by Hey,[3] Patuna,[4] and Hofmeister.[5] At the post-mortem examinations they each found the child free, excepting its attachment to the cord, which latter ran through the tube to join the placenta, which

[1] Arch. Générales de Méd., tome ii. 2d série, p. 67.

[2] London and Edinburgh Med. Journ., Nov. 1845, p. 817.

[3] In a letter to Dr. Hunter, Med. Observations and Inquiries, 8vo., London, 1796, p. 341.

[4] Cazeaux, loc. citat. p. 590.

[5] Rust's Magaz., 1823, vol. xv. p. 126 ; Campbell, loc. cit. p. 100.

was attached in the uterus. There is no other means of explaining these very curious and interesting observations than that just mentioned. In this way they are perfectly intelligible, and the adoption of a reasonable explanation is preferable to Keller's[1] course, who, in imitation of Velpeau and others, denies their correctness.

If the gestation is ventral, whether primary or secondary, the sac is composed of the ovular envelopes of the fœtus alone, or conjoined with an adventitious membrane formed as the result of irritation and inflammation. In a few instances of secondary abdominal gestation, the child has been found in the abdomen, uncovered by any membranes or surrounded only by an adventitious cyst. The former was observed by Carl Braun,[2] and the latter by Bandl.[3] Both were examples of tubal pregnancies which had ruptured early, destroying the amnion and chorion, as well as the tube wall, but without disturbing the placental attachments, so that, the supply of nutriment not being cut off, the development of the fœtus was not arrested. These are analogous to the examples of tubo-uterine pregnancy related by Hey, Hoffmeister, and Patuna, previously alluded to. Under these circumstances the shrivelled and altered fœtal membranes are found lining the original embryiferous cyst, and forming a constricting band, which has been described as resembling the falciform process of the fascia lata. This surrounds the orifice produced by the rupture which occurred in the early months of gestation, and from which the umbilical cord emerges to pass to the abdomen of the child. Under these circumstances the placenta is inclosed in a cavity, the opening into which is too small to allow the after-birth to pass through it.

In the study of the pathological changes which are met with in extra-uterine pregnancy it should be remembered that the ovum presents no abnormal or peculiar appearances. The impregnated germ when it commences its growth and develop-

[1] Des Grossesses Extra-utérine, 8vo., Paris, 1872, p. 19.

[2] Trush, Letter from Vienna to the Clinic, March 2, 1872, p. 105.

[3] Wiener Med. Woch., Aug. 8, 1874, and London Med. Record, Oct. 21, 1874.

ment in an abnormal position is endowed with the same vitality and formative force, which pertain to it when it has reached the interior of the uterus. This remark applies to all the stages of an extra-uterine fœtation.

Upon opening the fœtal cyst the liquor amnii will be found to present its normal characters. Hodge[1] says that the quantity is usually small. It may be abundant. Velpeau quotes a case from Vassal in which there was dropsy of the amnion. The same has been noticed by Depaul.[2]

The child may occupy any position in the sac. It may have its normal position with its head in the pelvis or on the brim. It may be transverse with its head in either iliac fossa, the back turned either towards the abdomen or back of the mother; or it may lie diagonally across the cavity, with one extremity of the fœtal ellipse in an iliac fossa and the other in the opposite hypochondriac region.

Hamilton[3] has asserted that the children of erratic gestations "are always less than intra-uterine fœtuses; they either do not receive so much nourishment as in the succulent uterus, or they generally come to their full growth long before their common term." Marc[4] says that they are generally poorly devèloped, but adds that there are exceptions to the rule, and that he met with one in 1802. Gardien[5] entertained the same opinion, and Daynac[6] thought that extra-uterine children were so poorly developed that there is little hope of saving them by gastrotomy. These opinions have been repeated by various writers since Daynac wrote in 1825. They are based upon the belief that when developed outside of the womb, the fœtus cannot obtain a sufficient quantity of nutritive matter.[7]

It is doubtless true, that extra-uterine children frequently

[1] Principles and Practice of Obstetrics, 4to., Phila., 1866, p. 532.

[2] Loc. citat.

[3] Outlines of the Theory and Practice of Midwifery, 12mo., Phila., 1790, p. 89.

[4] Dictionnaire des Sciences Médicales, 8vo., Paris, 1817, tome xix. p. 402.

[5] Traité Complet d'Accouchemens, 8vo., Paris, 1824, tome i. p. 543.

[6] Thèse à Paris, No. 71, 1825, p. 20.

[7] "Even when the gestation reaches the full time, it is extremely rare for the fœtus to be alive; it almost always dies for want of sufficient nutrition." (Bedford, *Prin. and Pract. of Obstet.*, 8vo., New York, 1861, p. 207.)

die before term, even when they are carried to it, but the rule is for them to live until the end of the ninth month, if the gestation is not terminated by rupture during its early stage. In these cases the child is by no means poorly developed. The weight has been recorded in but few instances, but some of these show that it may exceed the average. The infant removed from the abdomen of Helen Zopp by Patuna[1] exceeded the usual size. The same is true of the case of Perkins,[2] though the child was not weighed in either instance. Palmer[3] and Chavasse[4] have met with children which weighed seven pounds, death having occurred shortly after the completion of term; while Denman[5] describes another, which weighed the same after having been retained for thirty-two years. Bayle's[6] patient retained her child twenty-six years, and when she died it weighed eight pounds. At the end of eighteen months after conception, Lima[7] removed a fœtus weighing eight pounds and one-half by gastrotomy. At the autopsy of Dalrymple's[8] patient, who died one year after the completion of term, the infant was found to weigh eleven and one-half pounds. Pollak[9] does not state how much the children weighed in his case of combined intra- and extra-uterine pregnancy, but his testimony is important as a support to the statement that the product of a misplaced conception is not necessarily poorly developed. He says that the extra-uterine fœtus was large, "much larger and heavier than its yet living mate." These

[1] Dezeimeris, loc. citat., and Cazeaux, loc. citat. p. 590.

[2] Phila. Med. Times, March 15, 1872, and Amer. Journ. of Obstet., May, 1872, p. 159. This statement is made upon the authority of the writer, who saw the patient with Dr. Perkins, before her death, and who was present when the autopsy was made.

[3] Med. and Surg. Reporter, May 29, 1869, p. 416.

[4] Association Med. Journ., Nov. 30, 1855.

[5] Engravings, No. 13, 1815, Campbell's Memoir, foot-note, p. 53.

[6] Philosophical Trans., abridged ed., 4to., London, 1794, vol. iii. p. 222.

[7] This case appears to have been reported more than once. It appeared in the *Gazetta Medica de Lisbon*, March 1, 1860, and was copied by the *British Medical Journal*, May 12, 1860, p. 360. It again appeard in the *Gazetta Medica de Bahia*, May 25, 1868, and was copied by the *Amer. Journ. of Obstet.*, Aug. 1868, and a number of other journals.

[8] Trans. Med.-Chir. Soc. London, 1848, vol. xxxi. p. 163.

[9] St. Louis Med. and Surg. Journ., May 10, 1871.

facts, therefore, prove that the nutrition of the fœtus may be as perfectly insured out of as within the uterus, and that in some instances the child exceeds the usual size by several pounds.

Monsters are rarely met with among extra-uterine children. Duncan[1] describes one child whose abdominal walls were imperfectly developed. Hughes[2] met with two small excrescences on the side of the head. Hodge[3] reports a case in which the upper portions of the child were distorted from pressure, the infant having been tightly jammed in the mother's pelvis. Oulmont,[4] in 1853, met with an anencephalic fœtus which had been retained for many years, and Johnson mentions[5] the fact that he has seen both feet clubbed.

The most remarkable freak of development of which we have any account is that noticed by Dr. W. B. Smith,[6] who found that the umbilical cord, instead of originating from the usual position, issued from the anus and went from thence to join a healthy placenta. The details of the post-mortem examination are so circumstantially related, that though this statement, as far as we know, is without parallel, we cannot feel justified in denying its authenticity. It is remarkable that imperfect development and malformations are not more common among children developed outside of the uterus.

The sex of the child is not very frequently mentioned in the records of cases. We find it stated, however, in 74 instances. Of these children 41, or 55.4 per cent., were boys, and 33, or 44.6 per cent., were girls. According to Hofacker,[7] of 2000 children born after intra-uterine pregnancy, 1037, or 51.9 per cent., were males, and 963, or 48.1 per cent., were females. These proportions are the same as those obtained from an examination of Simpson's statistics. According to him,[8] among 1436 children of whom the sex is mentioned in 1432, there were 739, or 51.7 per cent., boys, and 639, or 48.3 per cent., girls. This shows a

[1] Med. Times and Gazette, July 20, 1872, p. 69.
[2] London Med. Gazette, 1850, p. 539.
[3] Loc. citat.
[4] Moreau, Des Grossesses Extra-utérines, 12mo., Paris, 1853, p. 113.
[5] Med. Exam. (Phila.), Sept. 1850.
[6] New York Medical Repository, 3d Hexade, vol. i., 1810.
[7] Tanner, Signs and Diseases of Pregnancy, 8vo., Phila., 1868, p. 50.
[8] Obstetric Memoirs and Contributions, 8vo., Philada., 1855, vol. i. p. 747.

slight preponderance of males among children developed outside of the uterus, but this slight difference is doubtless unimportant. If a larger number was available for consideration, it is probable that it would be found that the normal proportion of the sexes is maintained amongst extra-uterine children.

The result of this examination in regard to the sex of the child, effectually settles a theory of Prof. Hubbard, who advanced the opinion[1] that sex is determined by the time at which fecundation takes place, males being begotten from one to ten days before, and females one to ten days after menstruation. In other words, he thought that sex depended upon the differences in the maturity of the ovule. He afterwards stated[2] that extra-uterine children were all males, and that the fecundation of the ovum high up in the Fallopian tubes explains all the problems in regard to the etiology of this interesting accident. Unfortunately for the theory, it was based upon few facts.

The umbilical cord is almost always normal in its formation. Turnbull[3] has seen it become so slender within two inches of its placental termination as not to exceed a crow-quill in thickness. The placenta varies considerably in different cases. Ryan[4] says that it is broader and thinner, and that its vessels are comparatively smaller than in uterine pregnancy. Dezeimeris[5] makes the same statement, and Ryan believes that the child usually perishes after the third month, owing to the vessels being incapable of supplying it with a proper supply of blood. Of this there is not the slightest evidence. Burns[6] thought that the placenta is broader and thinner, and Desormeaux[7] that it is thinner but denser than in normal gestation. Hodge,[8] on the other hand, says that it is both thicker and firmer, and quotes Dr. Paul, who has seen it three inches in thickness. It is sometimes enormously broad, as was observed by Perkins,[9]

[1] Buffalo Med. Journ., 1850. [2] Ibid., Sept. 1851, p. 215.
[3] Memoirs Med. Soc. of London, 1792, p. 195.
[4] Manual of Midwifery, 8vo., Burlington, 1835, p. 312.
[5] Journ. des Connaissances Médico-Chir., Janv. 1837.
[6] Principles of Midwifery, 8vo., Phila., 1810, p. 164.
[7] Dict. des Sciences Méd., 8vo., Paris, 1829, tome vii. p. 269.
[8] Loc. citat. p. 532. [9] Amer. Journ. of Obstet., May, 1872.

and it would seem as if this were a necessary condition, since the organ is frequently attached to structures which are by no means naturally vascular, and hence the extent of surface has to make amends for deficient supply. In rare cases true placental tissue appears to be absent. Turnbull[1] has carefully described and illustrated an example of this. The portion of the fœtal cyst lying above and in front, and which was not more than one-tenth of an inch in thickness, was more vascular than the rest. This vascularity extended downwards over the intestines and upwards over the lower portions of the liver and stomach. Vessels were also sent off to the mesentery, mesocolon, and the abdominal parietes, and in fact to a great part of the visceral contents of the abdomen. Dr. Turnbull says, in a footnote, that the fœtus derived its nourishment from the vessels of the mesocolon, "for those of the umbilical cord ran into and anastomosed with the vessels of that part."

In some instances after the death of the child blood is effused into and beneath the organ. The quantity thus poured out is sometimes very large.[2] Perkins reports this placental apoplexy as appearing to have followed an injury received when the woman was near her term.

The placenta may be attached to any portion of the surface of the peritoneum, within the ruptured fœtal cyst whether it is ovarian or tubal, or lastly, within the uterus itself. Sivard[3] has seen it attached to the mesentery and colon of the left side; Courtail[4] to the omentum and stomach; Clarke[5] to the kidneys and intestine; Tilt[6] to a great part of the mesentery, mesocolon, portions of the small intestines, and the two or three superior lumbar vertebræ; Hughes[7] to the omentum; Baldwin,[8] Wilson,[9] and Koeberlé[10] to the anterior abdominal wall in the line of

[1] Loc. citat. p. 192.
[2] Perkins, loc. citat.; Braun, The Clinic, March 2, 1872, p. 105.
[3] Chambon, Maladies des Femmes, 8vo., Paris, tome ii. part ii. p. 51.
[4] Ibid., p. 51.
[5] Mem. Med. Soc. of London, 1792, p. 197.
[6] Med. and Phys. Journ. of London, 1828, vol. lix. p. 397.
[7] London Med. Gazette, 1850, p. 539.
[8] Southern Med. and Surg. Journ., Jan. 1839.
[9] Indian Annals of Med., Oct. 1855.
[10] Keller, loc. citat.

the incision made either at the post-mortem examination or during an operation for gastrotomy.

We are not aware that any injections have ever been made to demonstrate the circulation between the mother and the child. It would be interesting to do this. It would seem reasonable to infer from what has been observed in women who died during the early stages of pregnancy, that the maternal tissues play but little part in the formation of the afterbirth, and that the villi of the chorion have no other connection with the maternal vessels, which are increased both in size and number, than that of close approximation to their surface to which they adhere. The nutritious fluids would therefore have to pass through two membranes, that of the bloodvessels of the mother and that of the villi of the chorion. We are not in a position, however, to intelligently discuss this question at the present time. The whole subject of the anatomy of the placenta demands renewed investigation, since Hicks[1] has denied the existence of the maternal sinus system described by Hunter, Goodsir, Reid, and others.

It has already been stated that in tubal and ovarian pregnancies the sac which contains the fœtus is composed of the proper tissues of these organs, but in ventral gestation, whether primary or secondary, the matter is entirely different. In some instances the chorion may be at once exposed on opening the abdominal wall, notwithstanding the statements of Campbell[2] to the contrary.

When the impregnated egg falls into the peritoneal cavity it contracts adhesions, and as it grows these may increase until a considerable portion of the neighboring organs may become united to the chorion, and thus increase its strength. As in peritoneal pregnancy the ovum would naturally fall into the retro-uterine pouch, the uterus and its appendages are nearly always adherent to the chorion. This may lead to atrophy of the organs involved. The process by which these

[1] Journ. of Anatomy and Physiology, May, 1872, and Trans. Obstet. Soc. London, 1873, vol. xiv. p. 149. Prof. Turner (*Journ. of Anat. and Physiology*, Nov. 1872) denies the correctness of Hicks' views, and in the main supports the opinions of Goodsir and Reid.

[2] Loc. citat. p. 136.

adhesions are formed is, probably, not absolutely inflammatory, but is analogous to those vital nutritive changes by which the ovum attaches itself to the lining membrane of the uterus in normal gestation.

The external surface of the bare chorion presents a shining glistening appearance, or it may become obscured and its strength materially increased by deposits of lymph. In this case there is a true adventitious cyst. The walls of the sac are not generally very vascular, but large vessels may ramify over them, as was witnessed by Turnbull, Smith,[1] Baudelocque,[2] and Blackman.[3] The last found the vessels so large that he declined to proceed with the operation of gastrotomy after the abdominal walls had been opened.

It should be borne in mind that, at the autopsy of a woman who has carried an extra-uterine child to or near term, it is often extremely difficult, nay more, it is absolutely impossible to determine the true seat of the pregnancy.[4] Pressure and the other forces brought into operation by the ovum during its growth so change the relations, and even the structure of the organs that it is impossible to determine the original seat of the ovum. The uterine appendages are frequently found so thinned and atrophied that their recognition is difficult, or even impossible. This fact should be borne in mind, so that those who put their observations upon record may so accurately record the facts, that data may be gradually accumulated that

[1] Campbell, loc. citat. p. 60. [2] Ibid., p. 135.

[3] Amer. Journ. of Medical Sciences, July, 1845, p. 56.

[4] Jno. Hunter (*Observations on Certain Points of the Animal Economy*, 4to., London, 1792, p. 174), who believed that there were three varieties of misplaced pregnancy (ovarian, tubal, and abdominal), thought they could be distinguished from one another at the post-mortem examination. He says: "The arteries and veins belonging to the part in which the child is contained must be enlarged; which being the increase of a natural part, will be readily ascertained, and the nature of the case as readily determined. We may lay it down as a principle that when the spermatic artery and veins of either side is (*sic*) enlarged in an extra-uterine case, that the fœtus is in the ovarium or Fallopian tube, since there are no other bloodvessels which supply these parts; and if any other system of vessels, as the mesenteric, are increased in size, while the spermatic are in a natural state, we may with equal certainty conclude the fœtus to be contained in the general cavity of the belly."

will aid us in determining the comparative frequency of the species of misplaced gestations.

It remains now to briefly allude to the condition of the uterus and appendages in women who die at term. The womb is more or less displaced. It is generally elevated, the cervix being carried towards and above the pubis. At the same time it is pushed to one side, though it is sometimes found in the middle line. Though the fœtus is generally developed behind the uterus, it may lodge anterior to the organ, which is consequently pushed backwards and downwards. In rare cases even the bladder is found behind the vicarious uterus. The womb is enlarged in almost all instances. Very rarely, indeed, does it fail to undergo some nutritive change, but at term the organ is not often found larger than that of the fourth or fifth month of pregnancy, and at this time it rarely contains a decidua; this has usually been thrown off before death occurs.

The autopsy of women who have lived some time after the death of the child, may reveal characters very different from those described. The fœtus now either undergoes decomposition, or the cyst shrinks, the liquor amnii being reabsorbed, and the product of conception lies quiescent in the abdomen. In the former case the cyst walls will be found inflamed, and they may be partially or wholly destroyed. They may become attached to the surrounding organs, the bladder, vagina, intestinal canal, or, to the abdominal wall, by either or by all of which channels the cyst may be found discharging its decomposing contents. The fœtus may be found but little altered, or most of the soft parts and small bones may have disappeared before the autopsy is made.

In the second case, in which the child remains a foreign body —but innocuous—the cyst wall may undergo either a cartilaginous or a calcareous degeneration. Cloquet[1] records an example of cartilaginous change in the sac of a three months' fœtus removed from a woman seventy-eight years of age. Morand[2] saw the envelope partly cartilaginous and partly calcareous. Under the same circumstances the fœtus may

[1] Revue Médicale, 1833, tome iv. p. 135.

[2] Mémoirs de l'Academie Royale des Sciences, 1748.

undergo either of two changes. It may become the seat of the deposit of calcareous salts—ossified, the older writers termed it. It is then converted into a lithopædion. This has been witnessed by Albosus,[1] Van Sweiten,[2] Amaud,[3] Majon,[4] Daynac,[5] Nebel,[6] and many others. In other cases it is said that the fœtus becomes converted into a matter like adipocere. This latter must be a rare alteration. Though frequently mentioned by systematic writers, we have been able to find but few facts in regard to it. In other cases the child simply dries up and becomes indurated and mummified, from absorption of its fluids, while in others it may remain almost unchanged year after year. The last is not the least strange of the terminations of extra-uterine fœtation, for the child may be found as sound as if death had occurred immediately before the autopsy.

It is of some interest to determine upon which side of the body extra-uterine pregnancy is the most frequent. This question presents the most interest in connection with tubal pregnancies. Various opinions have been expressed in regard to the frequency of misplaced conceptions on the two sides. Campbell,[7] Hecker,[8] and Barnes,[9] all assert that tubal gestations are more frequent upon the left than the right side. Löw and Lumpe[10] believe that this is not only true of tubal, but likewise of ovarian pregnancies. Barnes explains this opinion by supposing, that the left tube is liable to displacement from compression by the sigmoid flexure of the colon, which is situated close to the tube, and is often distended by accumulations of feces and gas. On the other hand, Lyman[11] believes that tubal fœtations occur more frequently upon the right than the

[1] "The Infant of Sens." Madame Le Boursier du Courday, *Abrégé de l'Art des Accouchemens*, etc., 12mo., Paris, 1759, p. xxxvi., and Astruc, *Traité des Maladies des Femmes*, 12mo., Paris, vol. iv., 1765, p. 78. The case occurred in 1582.

[2] Velpeau, Dict. de Méd., tome xiv. p. 415. [3] Ibid.

[4] Cruveilhier, Essai sur l'Anatomie Pathologique, 8vo., Paris, 1816, tome ii. p. 130.

[5] Thèse à Paris, No. 71, 1825, p. 16. [6] Campbell, loc. citat. p. 45.

[7] Loc. citat. [8] Monat. für Geb., Feb. 1859.

[9] Diseases of Women, 8vo., Phila., 1874, p. 365.

[10] Boston Med. and Surg. Journ., May 28, 1857.

[11] Nashville Journ. of Med. and Surgery, 1860.

left side. In eleven cases analyzed by him, the fœtal cyst was situated on the right side in eight, and on the left in three instances. May[1] says "it is very remarkable that the right tube should be almost invariably that in which the pregnancy takes place," and finally, Rokitansky states[2] that of six specimens of tubal conceptions which had been preserved in the Vienna Museum at the time when he wrote, five were seated on the right and only one on the left side. The weight of authority is, therefore, in favor of the greater frequency of misplaced gestations on the left side, especially when the ovum is arrested in the Fallopian tubes. This opinion, however, is not supported by an analysis of a large number of cases. Of 180 tubal gestations, the locality is mentioned in 162. Of these, 92 were situated on the right, and 70 on the left side. In 149 of these tubal fœtations, the ovum was situated in that portion of the oviduct which is exterior to the uterus, while in the remaining 31 it was developed in the part which traverses the tissue of the organ. These, therefore, belong to the variety called "interstitial," or tubo-uterine. Of the first class the ovum was situated in the right tube in 75, and in the left in 60 cases, while in 14 instances the side is not mentioned. Of the 31 examples of tubo-uterine gestation, 17 were right and 10 were left pregnancies, the locality of the ovum not being stated in 4 instances.

In ovarian gestation the ovum would seem to be more frequently developed on the left than the right side. Of 27 cases, the left was the gravid ovary in 15, and the right in 8, while the side is not mentioned in 4 cases.

These facts show that tubal pregnancies occur with almost equal frequency upon the two sides of the body. The small number of cases of ovarian fœtation analyzed would seem to show a preponderance in favor of the left side, but no importance is to be attached to this fact, since the number is not large enough to warrant us in drawing any conclusions. This statement is borne out by the results of the analysis of the tubal gestations included in the first hundred of the five

[1] Assoc. Med. Journ., Sept. 20, 1856, p. 820.

[2] Manual of Pathological Anatomy, 8vo., Phila., 1855, vol. ii. p. 256.

hundred cases upon which this work is based. This examination seemed to indicate that the ovum was much more frequently arrested in its descent through the right than the left tube—more than in the proportion of 2 to 1. This greatly excited the curiosity of the author, and led him to speculate much in regard to the causes of the apparent discrepancy, but this led to no result, for the analysis of the whole number of tubal pregnancies, known to have occurred in 500 extra-uterine fœtations, corrected the error and furnished a new illustration of the fact, that deductions drawn from statistics are valueless unless the numbers examined are large.

CHAPTER V.

SYMPTOMS.

Those described by Petit—Division into three periods for study—Those of the first period—Colicky pains—Metrorrhagia—Expulsion of decidua—Vaginal examination—Uterus is enlarged—Periuterine tumor—Ballottement—Examination by the urethra—Symptoms of second period—Existence of pregnancy no longer doubtful—Fœtal movements—General symptoms—Physical signs—Abdominal enlargement on one side—Superficial position of child—Mobility of tumor—Auscultatory signs—Vaginal examination—Displacement of uterus—Post-uterine tumor—Detection of fœtus by the vagina—Position of bladder—Sounding the uterus—Mechanical effects of the gravid cyst—Labor at term—Secretion of milk—The pseudo-puerperal state which follows false labor—The child generally dies during or immediately after labor.

Before the middle of the last century a number of cases of extra-uterine pregnancy had been observed, and more or less accurately recorded, at least so far as the symptoms were concerned, though often without any correct knowledge of the condition which was being described. It was, however, finally established that a fœtus could be developed outside of the uterus, and in the year 1770, Antione Petit[1] asserted that misplaced pregnancy was characterized by the following peculiarities:—

1. The menses, contrary to what is seen in normal gestation, continue to appear, but in smaller quantities, throughout the pregnancy.

2. The breasts do not enlarge or secrete milk, as they do after uterine conceptions.

3. The gravid tumor is situated on one side, the fœtal movements are felt on the corresponding side, and the woman has unilateral varices, cramps, and œdema.

If these statements could be verified the detection of extra-uterine gestation would be an easy task, but unfortunately for the comfort of the obstetric surgeon, scarcely one of them contains a grain of truth; yet, strange to say, the opinions of Petit influenced and impeded the progress of our knowledge

[1] Traité des Maladies Femmes, 8vo., Paris, tome ii. p. 38.

of this subject for more than half a century. Even Capuron[1] as late as 1823 enumerates this catalogue of symptoms, and evidently believed that they occur. From whence Petit derived his ideas it is impossible to say, for Astruc,[2] whose work was accessible to him, taught doctrines much nearer the truth. Even Dionis, who belonged to the time when obstetrics was emerging from the hands of the midwives, had clearer notions[3] in regard to extra-uterine gestation than Petit.

It remained, therefore, for the writers of our own times to clear away the obscurity with which tradition and authority had surrounded this subject, and since Marc,[4] Gardien,[5] and others denied the correctness of Petit's statements, facts have been accumulating; but even yet we find the deductions from them are too much biased by traditions and preconceived opinions.

The symptoms of extra-uterine conception vary with the different stages of the gestation. They may be conveniently studied under three divisions:—

1st. During the first months of pregnancy when the fœtal heart is still inaudible.

2d. After the period when the fœtal heart can be heard, and until after the close of spurious labor at term.

3d. After the termination of false labor, or the death of the fœtus.

First Period.—It is very important to study the symptoms of the first period, since it has been demonstrated that tubal gestation frequently terminates by rupture before the fourth month, and that if the pregnancy goes beyond this time, the probabilities are that the child will be carried until the time of gestation is completed. The first class of cases remains to-day the opprobrium of obstetrical surgery. This is largely due to the obscurity which surrounds the symptomatology of this early stage of the accident.

[1] Cours Théorique et Pratique de Accouchemens, 8vo., Paris, 1823, pp. 675-6.

[2] Traité Maladies des Femmes, 12mo., Paris, 1765, tome iv. p. 73.

[3] A General Treatise of Midwifery, 8vo., London, 1719, p. 81.

[4] Dict. des Sciences Médicales, 8vo., Paris. 1817, tome xix. p. 403.

[5] Traité Complet d'Accouchemens, 8vo., Paris, 1824.

We all know how uncertain and ill-defined the symptoms of the early stages of normal gestation are, and many authors of high standing assert that no peculiar symptoms follow an extra-uterine conception until the end of the first three or four months. That this *may* be true cannot be denied. Periodical medical literature contains the records of some facts which prove the correctness of this assertion, but this is by no means the rule. An extra-uterine gestation is frequently ushered in quietly enough, and during the first four or six weeks all may go well, but after this time symptoms supervene, which in their violence are as unlike the signs of a uterine pregnancy as the surface of a stormy sea is unlike that of a dead calm. The one moves on with some sort of regularity, the discomforts of the condition appearing in a certain order, but the other follows no plan, and sets all order at defiance.

The patient in the first instance supposes herself to be pregnant, and during the first four or eight weeks nothing particular occurs to warn her of her anomalous condition. The usual signs of this early period of gestation appear successively; or indeed she may enjoy better health than she did during the same period of previous pregnancies; when suddenly and without any warning the unfortunate victim of this terrible accident is seized with a very characteristic symptom. This is a violent pain in the abdomen, usually called colic by the patient and her friends. The pain is seated in the hypogastrium, and is usually worse upon one side. It is extremely violent, preventing the woman from standing erect or lying stretched out in bed. It produces considerable and even profound prostration. The surface may become pale and cool, the skin covered with a cold, clammy perspiration, and the pulse small and thread-like. There may be vomiting, and the suffering may be so great as to cause syncope. The pain is apt to be associated with some, and even great tenderness in the hypogastric and iliac regions, which has led to the supposition that the patient was suffering from peritonitis.[1] After a longer or shorter

[1] Peltzer, Monats. für Geb., April, 1867, and Brit. and Foreign Medico-Chir. Rev., Oct. 1867, p. 541 ; Monod, L'Union Médicale, 1855.

period, varying from a few hours to a day or more, the pain disappears, and the patient may appear to be nearly restored to health. She is likely, however, to suffer more or less at all times, and if she does not, the calm is a deceitful one, for sooner or later the storm breaks out again, and she has a fresh accession of pain of the same terrible severity. These paroxysms are renewed with more or less regularity at intervals varying from a few days to two or three weeks. Sometimes the attacks come on at regular intervals, as in the case reported by Cerise,[1] in which the paroxysms occurred once a month.

These pains rarely set in earlier than the end of the first month after conception, and their accession is sometimes postponed until the fourth or fifth month, as has been noticed by Phillipart,[2] Dreessen,[3] Greenhalgh,[4] Lalanne,[5] and others. They generally, however, appear before this period. If rupture does not occur, the attacks of colicky pains may disappear some time after the fifth month of gestation. Sometimes, however, they recur towards the end of pregnancy, after the woman has enjoyed fair health during a long interval. Meadows[6] has met with an example of this. During the early part of the pregnancy the sufferings of the woman were very great. For several months she had good health, after which the old symptoms reappeared. In some instances the attacks of pain continue nearly or quite to the end of gestation.

In many cases the paroxysms come on without assignable cause, but in others they appear to have a traumatic origin. Putnam states[7] that his patient had four distinct attacks of severe pain, one of which followed coitus, while the other three occurred immediately after defecation.

The cause of these severe paroxysms of pain is involved in

[1] Gazette des Hôpitaux, No. 30, 1846.

[2] Ibid. 1865.

[3] Monats. für Geburts., Feb. 1868, and Brit. and For. Med.-Chir. Rev., July, 1868, p. 253.

[4] Med. Mirror, Nov. 1864, p. 689.

[5] Annales de la Méd., Juillet, 1825.

[6] Trans. Obstet. Soc. of London, 1873, vol. xiv. p. 311.

[7] Amer. Journ. Med. Sci., Oct. 1853, p. 348.

some uncertainty. A recent writer upon the subject attributes them to peritonitis.[1] It is by no means proved that this is a correct explanation—indeed it is certain that in most cases some other cause produces this distressing symptom. Peritonitis has long been made to play an important part in the explanation of many of the phenomena connected with extra-uterine pregnancy. The truth is, that it is a rare complication of this condition until after the termination of the usual period of gestation, when it often plays a conservative part by attaching the wall of the cyst to the abdominal walls or adjacent organs, and thus facilitates the piecemeal escape of the fœtus. Post-mortem examinations of the bodies of women who have died from rupture of the cyst, and who have previously suffered severely from this symptom, have conclusively shown, by the absence of peritonitis, that it sustains a very unimportant part in the production of these attacks of colicky pain. The true explanation of the symptom is to be found in the wide differences between this and normal gestation. In the latter the ovum is developed in an organ, the size of which increases in proportion to the growth of its contents. This growth of the uterus, it is to be remembered, is not a mere mechanical effect of the increase in the size of the product of conception, but it is the result of vital nutritive changes, by which its tissues are entirely and marvellously altered. On the other hand, when the ovum is arrested in the ovary or Fallopian tube, it is developed in an organ which becomes distended mechanically by the growth of the fœtus, and which, not being intended by nature to perform such an important function in the plan of the reproduction of our species, does not undergo those nutritive changes which will enable it to afford a nidus for the growing ovum.

It appears probable that these paroxysms of colicky pain are produced by contractions of the fœtal cyst. These can occur in Fallopian gestation, and the absence of the symptom in certain cases of misplaced fœtation, can be accounted for by the fact that there are no muscular fibres in the tissues surrounding the ovum. The pressure of the fœtal cyst upon the contiguous structures may be another element in the pro-

[1] Duguet, Annales de Gynécologie, Paris, 1874, tome i. p. 337.

duction of this phenomenon, for Blass[1] has observed that to place the woman upon the hands and knees, with the head depressed, will sometimes relieve the suffering. This can be accounted for by concluding that the compression of the surrounding tissues by the fœtal sac is diminished.

This explanation accounts for the fact, that in the intervals between the paroxysms the woman may enjoy moderate or even perfect comfort. As the growth of the ovum is less interfered with in abdominal gestations than it is in those of the ovary or tube, it may be that this symptom occurs especially in the latter species of misplaced pregnancy. The records of ventral conception, however, are so few that we are not warranted in accepting this statement as proved at the present time. Tubal pregnancy may go to term without producing this pain, for Speigelberg's[2] patient reached the end of her ninth month without experiencing any abnormal symptoms. This symptom has attracted the attention of numerous writers upon this subject, but a comparatively small number have attached any diagnostic importance to it. Heim,[3] Campbell,[4] Blundell,[5] Rogers,[6] and Barnes,[7] however, assign it a place in the symptomatology of misplaced conception. This subject will claim attention in the discussion of the diagnosis of the condition, so that the consideration of the value of the symptom may be postponed for the present.

Another important phenomenon of this early stage of extra-uterine gestation is hemorrhage from the vagina. The frequency of this symptom no doubt led Petit[8] to the erroneous conclusion that the menses were not suppressed under these circumstances, an opinion in which he was supported by

[1] Keller, loc. citat. p. 47, from Monats. für Geb., iii. p. 148.

[2] Archiv. für Gynækol., 1871, and New York Med. Journ., July, 1871, p. 86.

[3] Keller, Des Grossesses Extra-utérines, 8vo., Paris, 1872, p. 45.

[4] A Memoir on Extra uterine Gestation, 8vo., Edinburgh, 1842, p. 121.

[5] Principles and Practice of Obstetrics, 8vo., London, p. 478.

[6] Extra-uterine Fœtation and Gestation, 8vo., Phila., 1867.

[7] St. Thos. Hosp. Reports, 1870, and Diseases of Women, 8vo., Phila. 1874.

[8] Loc. citat. p. 38.

Turnbull[1] and others. Velpeau[2] and Keller[3] say that there are many exceptions to this rule. It is an important question, however, to determine whether the sanguineous vaginal discharge, so frequently present in this condition, is really menstrual or not. Goupil[4] and Stoltz[5] assert that it is not, but that it is metrorrhagic. This opinion appears to be correct, for the former has shown that under these circumstances the flow loses its periodicity entirely, that it occurs at uncertain and irregular intervals, like the colicky pains. This fact did not escape the keen observation of Madame La Chapelle.[6]

This vaginal hemorrhage sometimes consists of dark-colored, coagulated blood. Sometimes it is attended with the discharge of the decidua *en masse*, or in pieces so small that they can only be detected by microscopical examination, as has been remarked by Scanzoni. Metrorrhagia is, however, not a constant attendant of displaced pregnancy.[7] Goupil believes that it is more constant in those cases which end by rupture during an early stage of the gestation than it is in those which go to full term and recover. Dugeut[8] believes that cases of the latter class are nearly all abdominal fœtations, and suggests that metrorrhagia is a symptom which belongs to ovarian and tubal pregnancies. In the present state of our knowledge we are not in a position to either accept or reject this opinion. It does not seem improbable, however, that future observation may prove that it is correct, and that after ventral conception the woman is likely to have hemorrhage only when the decidua is discharged. Before and after this period it would not be so liable to occur.

If metrorrhagia does not set in earlier, it is very likely indeed to make its appearance immediately before rupture of the cyst takes place. Barnes[9] writes that "a condition that favors and

[1] Memoirs of Medical Society, London, 1792, vol. iii. p. 185.
[2] Dict. de Médecine, vol. xiv. p. 411. [3] Loc. citat. p. 45.
[4] Clin. Memoirs on Diseases of Women, N. S. Soc. Ed., London, 1866, vol. ii. p. 266.
[5] Nouv. Dict. de Méd. et de Chir. Pratique, Paris, 1873.
[6] Goupil, loc. citat. p. 266. [7] Rogers, loc. citat. p. 18.
[8] Annales de Gynécologie, tome i., 1874, p. 335.
[9] St. Thos. Hosp. Reports, 1870, N. S., vol. i. p. 371.

gives warning of the impending rupture is the hemorrhage which so constantly precedes it." It, however, frequently attends the attacks of severe colicky pain, which occur previous to rupture, and as women who manifest these symptoms may go to the full term of pregnancy, it may be concluded that while rupture should always be feared under these circumstances, the occurrence of even very severe pain and hemorrhage combined, need not lead the medical attendant to despair of his patient carrying her child to term, and even far beyond it.

This hemorrhage is due to a variety of causes. It is no doubt often owing to general congestion of the internal genital organs, the result of the profound irritation to which they are subjected. At other times it is probably due to the separation of the ovum from the cyst walls.[1] An additional and important cause is the separation of the decidua which lines the uterus, and which may be thrown off at any time from the commencement to the end of pregnancy.

The expulsion of the decidua in one mass, during the early stages of the gestation, is attended with expulsive pains and all the other symptoms of abortion. The woman is often supposed to have miscarried, or to have expelled a mole or blighted ovum. Not only does the patient frequently commit this error, but likewise her nurse and even medical attendant. All such bodies discharged by the vagina should be carefully examined by the physician to determine whether they do or do not contain an ovum. The want of care in this particular has often led to errors that might have been easily avoided.

During this time the woman experiences, in addition to the symptoms just alluded to, the usual signs of pregnancy. These are well known, and it is not necessary to do more than speak of them. It is to be remembered, however, that in this anomalous condition the fact that the woman believes herself *enceinte* is not without its value.[2] These women will often persist that they have conceived, notwithstanding that the opinion is discouraged by their medical attendant. It is a well-known fact that, in other conditions, as in spurious preg-

[1] St. Thos. Hosp. Reports, 1870, N. S., vol. i. p. 371.

[2] Bernutz and Goupil, loc. citat. p. 265.

nancy, this idea has complete control of the mind of the woman, but this state is so different from extra-uterine conception that there is no difficulty in distinguishing between them.

Vaginal examination furnishes some important information even in the early stages of the pregnancy, and an attempt to make the touch should never be omitted. It will not be demanded until violent pains, or hemorrhage, or both together, have directed attention to the fact that there is something abnormal about the woman's condition. When these occur they warrant and demand a full physical examination. As the pain is apt to be attended with extreme tenderness, it is often impossible to make a satisfactory investigation of the pelvic organs. If the examination can be fully completed, it will reveal the fact that the uterus has undergone, to a greater or less extent, those changes which affect it in ordinary pregnancy. Hunter[1] was among the first to notice this fact. Most authorities agree in the opinion that the increase in the size of the uterus is the general rule in extra-uterine gestation. Campbell[2] says that it occurs with few exceptions. Burns acknowledges that this change follows in tubal and ovarian pregnancies, but is doubtful about its existence in ventral. Gardien,[3] Marc,[4] and Baudelocque[5] appear to have entertained the same views. Levret[6] believed that the uterus enlarged more in tubal gestations and in those abdominal pregnancies in which the placenta was attached to the exterior of the womb. Depaul,[7] one of the most recent and authoritative writers upon this subject, adopts the same opinion, while Béhier[8] acknowledges that enlargement of the uterus does occur, but thinks that it is not the general rule.

[1] Med. Commentaries, Edinburgh, 8vo., London, 1773, p. 429.
[2] Loc. citat. p. 107.
[3] Traité Complet d'Accouchmens, 8vo., Paris, 1824, tome i. p. 530.
[4] Dict. des Sci. Médicales, 8vo., Paris, 1817, tome xix. p. 405.
[5] Ibid., p. 456.
[6] Desormeaux, Dict. des Sci. Méd., 8vo., Paris, 1829, tome vii. p. 271.
[7] Archives de Tocologie, Paris, 1874, p. 262.
[8] Gaz. Hebdom , No. 36, 1873.

He looks upon it more as an accident than as a necessary condition of extra-uterine gestation. What difference the various locations of the ovum in a misplaced conception may have upon the development of the womb, is a question which must be left for future observers to decide. So far as we are at present informed, we seem to be justified in expecting to find the uterus more or less enlarged in all the species of extra-uterine fœtation. There are rare, exceptional cases, however. Morley[1] and Kelly[2] report having met with them. Morley's patient died from a tubal pregnancy when she was between five and six months gone. Duncan,[3] on the other hand, calls attention to the fact that the womb may appear, by measurement, to be unaltered in size, when such in reality is not the case. This gentleman found, on passing the uterine sound, that it did not enter beyond the usual distance of two and a half inches; yet, after death, the uterine walls were found to be thickened and the whole organ considerably enlarged.

The increase in the size of the uterus is not equal to that of a uterine pregnancy of the same duration, though Simmons[4] is said to have examined a case of tubal gestation in which the organ was found enlarged in the same proportion that it would have been if the ovum had been in its cavity. This, however, is by no means the usual condition, especially in those cases which nearly or quite reach the full term of gestation. In the early stages, however, the normal relation between the development of the uterus and the ovum which it ought to contain, may be nearer the normal standard; but of this we have no more than presumptive evidence. Whatever may be true of this stage of the gestation, there is no doubt, that, while the uterus is augmented in size, its development is arrested before term is reached. Campbell's[5] remark, that the size of the organ does not equal that of the fifth month of gestation, will be found to be true in nearly every instance.

[1] Provincial Med. and Surg. Journ., June 25, 1851, p. 267.
[2] Med. Obs. and Inq., 8vo., London, 1797, vol. iii. p. 44.
[3] Edinburgh Med. Journ., Jan. 1864, p. 670.
[4] Thos. C. James, North Amer. Med. and Surg. Journ., 1827, p. 278.
[5] Loc. citat. p. 107.

Besides this increase in size, the uterus may be found to be deviated from the normal position by the presence of a tumor on one side, behind, or even in front of the organ. If the patient is not too tender, this tumor can sometimes be recognized at a very early period. Thomas[1] discovered it at the third, and Siredey[2] at the end of the first month of gestation. The mass is elastic, fluctuates, or semi-fluctuates; and, by ballottement, shows that it contains a solid body floating in liquid.[3] The tumor may be more or less firmly fixed, or it may enjoy considerable mobility. The presence of a tumor is, of course, a very important physical sign of the condition which is being described; and if the other symptoms, of which mention has been made, have previously manifested themselves, the discovery of a periuterine enlargement, associated with increase in the size of the uterus, removes almost all uncertainty in regard to the diagnosis. If the tenderness is so great as to preclude a satisfactory examination of the pelvis, the woman may be thoroughly anæsthetized before the exploration is commenced. The danger of retching succeeding the administration of ether is the only objection to this means of diagnosis.

Although Siredey discovered the fœtal tumor at the end of the first month, others have not had this good fortune, in many cases, probably, because the physical examination of the pelvis and lower portions of the abdomen has either been omitted entirely, or not been made with sufficient care. Every experienced gynæcologist knows that very small enlargements in the neighborhood of the uterus can often be detected by careful manipulation. Still it must be acknowledged that a small fœtal sac is recognized with difficulty in the early periods of gestation. Dr. Noeggerath,[4] of New York, has, however, proposed a new method of exploration which promises to furnish important additions to the information obtained by the vaginal and rectal touch. He proposes rapid dilatation of the urethra so as to allow the finger to be introduced into the bladder, through which the ovaries, Fallopian tubes, broad

[1] New York Med. Journ., 1875, p. 563.
[2] Thèse à Paris, 1860, p. 98.
[3] Thomas, loc. citat.
[4] Amer. Journ. of Obstetrics, May, 1875.

ligaments, and the fundus of the uterus can be efficiently and quickly examined by the aid of the fingers of the other hand in the vagina or the rectum. There is great reason to hope that this ingenious addition to our methods of investigation may greatly aid in detecting the periuterine tumor in the early stages of extra-uterine gestation.

Symptoms of Second Period.—The symptoms of extra-uterine pregnancy become more marked in the second stage of gestation, after the woman has quickened and the fœtal heart becomes audible. The question as to the actual existence of pregnancy is now easily settled, so that the location of the ovum is the only point which needs to be decided. During this period, the ordinary signs of pregnancy continue. The colicky pains may persist or entirely disappear. After the fourth month their severity is generally materially diminished, if they do not cease to occur. After these pains have completely disappeared, they may again be renewed in the last two months of gestation, as has been already stated was observed by Meadows, of London.

The woman will frequently assert that she feels the fœtal movements upon one side, and in the latter months of gestation they sometimes become extremely painful. This has been noticed by Mayor,[1] Zais,[2] and Boinet.[3] Mason[4] has seen them so strong as to make the woman scream with agony; and Hey[5] states that he has seen them so violent in the latter months of pregnancy as to induce a return of the colicky pains which had appeared in the second month after conception. Cyprianus and Chambon[6] speak of the fœtal movements as appearing more vigorous to the woman than in normal gestation. As term is approached, at or near the time of spurious labor the child perishes. This is not unfrequently attended with symptoms which attract the attention of the mother. These consist in a series of violent, disorderly, and even painful move-

[1] Instruction sur l'Art des Accouchemens, 8vo., Lausanne, 1828, p. 218.
[2] Revue Médicale, tome ii., 1831, p. 108.
[3] Archives de Tocologie, Paris, 1874, p. 125.
[4] Medical Examiner, Phila., Jan. 1846, p. 25. [5] Loc. citat. p. 314.
[6] Maladies des Femmes, 8vo , Paris, partie ii. tome ii. p. 52.

ments on the part of the child, after which they cease entirely. The fœtus is often spoken of as giving a violent struggle at this time. Messer,[1] Petersen,[2] Tueffard,[3] Boinet,[4] and Dubouë[5] have all directed attention to this symptom. The last of these authors says that these violent efforts of the child caused the mother much suffering. This symptom is by no means constant in its occurrence.

The metrorrhagic discharge may continue during this stage, or it may not. There is no doubt about the fact that this, as well as the paroxysmal pains, may disappear during the second part of the evolution of the fœtus, or, indeed, that in exceptional cases they may be absent throughout the whole period of gestation. If the decidua has been thrown off during the early months of pregnancy, metrorrhagia is exceedingly apt to be absent during this stage.

The breasts undergo the usual changes. They enlarge, milk is secreted, and the areolæ are altered as after conceptions in which the ovum is developed within the uterus. The mammary signs are sometimes typically developed.

Examination of the Abdomen.—Upon inspection the enlargement is generally found to be mainly upon one side. Instead of having the normal oval outline of the gravid uterus, the transverse is often greater than the perpendicular diameter of the fœtal tumor. Sometimes the head and breech of the child form projections, visible to the eye, in either flank. It must not be forgotten, however, that the abdominal enlargement may present no departure from the natural outline. The fœtal movements are sometimes visible on inspection. M. Koeberlé has seen[6] them so strong that they moved the bedclothing which was over the woman. Keller[7] asserts that the umbilicus, instead of being pushed forward as in normal pregnancy, is strongly retracted. This needs corroboration. We have always seen it pouting, as in uterine gestation. The abdominal brown line and umbilical areola may or may not be developed.

Palpation adds to the information obtained by inspection,

[1] Campbell's Memoir, p. 70.
[2] Dublin Med. Press, Aug. 10, 1859.
[3] Amer. Journ. of Medical Sciences, Oct. 1849, p. 522.
[4] Loc. citat., p. 125.
[5] Ibid., p. 644.
[6] Keller, loc. citat. p. 48.
[7] Ibid., p. 47.

when the tenderness of the parts will permit a thorough examination in this manner. By this means the fœtus can often be felt to be very superficially situated in the abdomen. It sometimes appears as if the skin only was between the hand and the child. This sign, however, has but little value as an indication of misplaced pregnancy.

The gravid uterus, it is well known, enjoys more or less mobility, but, according to Duboué,[1] an extra-uterine fœtal cyst is fixed in the cavity of the abdomen. Doubtless this is often the case, and when it is so it may be of considerable diagnostic value. There are exceptions to the rule, however. Mounsey[2] says that he has seen the "burden" fall from one side to the other as the woman changed her position. This extreme mobility continued for the ten years during which the child was carried after the end of the normal term of pregnancy. The author has seen the extra-uterine tumor as movable as in normal gestations, at least until the end of the seventh month in one case, and in another, seen two weeks after term, the mobility was nearly as great as that of a gravid uterus at the end of the ninth month. Just after the tumor emerges from the pelvis, a mass may be felt somewhere in the hypogastrium, generally in the iliac fossa opposite to that in which the child is developed. This is the fundus of the enlarged uterus, and it may lead the patient to believe that the tumor originally started on that side and afterwards changed its position to the opposite side.[3] As pregnancy advances the fundus uteri can frequently be made out by careful palpation, as a hard pear-shaped body on the anterior surface of the gravid sac. It may form a projection which is visible on inspection.

Auscultation reveals the same sounds that are heard in normal pregnancies. These are sometimes remarkable for their intensity. Attention has been directed to the fact by Martyn[4] and Spencer Wells. When exhibiting the specimens removed from Dr. Perkins' patient to the Obstetrical Society of Phila-

[1] Archives de Tocologie, 1874.
[2] Philosophical Trans., ab. ed., 4to., London, 1745, p. 1012.
[3] Duboué, loc. citat. p. 581.
[4] Trans. Obstet. Soc. London, 1870, vol. xi. p. 57.

delphia, the author remarked,[1] that, though he had examined many pregnant women at the Philadelphia Hospital, he had never listened to a placental murmur which was so intense. A short time since we saw a lady, who was carrying an extra-uterine child, in consultation with Dr. E. L. Duer, and Professors Ellerslie Wallace and William Goodell. She was at that time two weeks beyond term, and the child had died during spurious labor. Dr. Duer, who had charge of the patient, stated that, when he first auscultated the abdomen, he was astonished at the intensity of the placental *bruit*, which was the loudest he had ever heard. The placenta appeared to be located in the left iliac fossa and corresponding lumbar region. Keller[2] believes that this sound is rarely heard in misplaced pregnancies, and adds, that when it is, the placenta is inserted on the anterior abdominal wall. This is by no means true, for in Dr. Perkins' case, just alluded to, in which the sound was so remarkable for its intensity, the organ was attached to the posterior surface of the cyst over the right flank and vertebral column.

Preternatural intensity of the sounds of the fœtal heart or the placental bruit, ought always to excite suspicion and lead to a careful physical examination of the woman in whom they are discovered.

Vaginal Examination.—Upon vaginal examination in this stage of gestation, the uterus will be found to be enlarged, but upon careful investigation it will be ascertained that the development is not in proportion to the duration of the pregnancy. This is a very important fact, and is especially noticeable in the latter months. By combined internal and external examination, the length of the organ can be accurately determined, when the fundus can be felt above the pelvis on the anterior surface of the fœtal cyst. The neck will be found more or less softened, enlarged, and otherwise altered, as after normal conceptions, but especially in the latter months it may be noticed that these changes are not in proportion to the duration of the pregnancy. Compared with what it should

[1] Amer. Journ. of Obstet., May, 1872, p. 150.
[2] Loc. citat. p. 48.

be at this time, the cervix is small, firm, and hard, and presents most of the characteristics of a non-impregnated womb.

The uterus is generally found to be displaced. It may be pushed to either side, when the bladder often shares in the dislocation.[1] In rare cases the organ is pushed downwards in the pelvis and retroverted, or it may even protrude at the vulva.[2] The most frequent deviation of its position is for it to be carried to one side and at the same time to be pushed forwards and elevated above the pubis, where it is found in contact with the anterior abdominal wall, so that it can only be reached with the greatest difficulty.[3] The uterus is frequently not found until after repeated efforts have been made.[4] This displacement of the os, pregnancy having previously been decided to exist, is a sign of great value, and should always lead the medical attendant to subject his patient to careful examination.

During this period of the evolution of the fœtus a tumor forms in the vagina. This is generally situated behind the uterus, but it may sometimes be in front, as has been noticed by Depaul.[5] In the last stages of gestation the post-uterine tumor may completely fill the pelvis, displacing the uterus in the manner previously described. Rupin[6] saw the action of the bowels completely suspended by pressure at the end of the sixth month. The enlargement in the pelvis may fluctuate or semifluctuate. In other instances portions of the fœtus may be felt through the vaginal walls. These may be so thin as to make it appear as if there was almost no tissue between the child and the examining finger. Johnson[7] reports the fact,

[1] Duboué, loc. citat. [2] Dr. King, Campbell's Memoir, p. 76.

[3] Armour, Glasgow Med. Journ., 1830; Scott, Trans. Obstet. Soc. London, vol. xv. p. 140; Stiles, Phila. Med. Times, April 4, 1874; Mainwaring, Trans. of a Society for the Improvement of Medical and Chirurgical Knowledge, 1800, vol. ii. p. 290; Young, Trans. Medico-Chir. Soc., Edinburgh, vol. iii. p. 536; Bonnie, Thèse à Paris, 1822.

[4] Perkins, loc. citat.; Colman, Med. and Phys. Journ., London, 1799, p. 262; James, North Amer. Med. and Surg. Journ., 1827, p. 283; King, Richmond Med. Journ., Sept. 1868; Denny, Amer. Journ. of Med. Sciences, July, 1850, p. 49.

[5] Loc. citat. [6] Gazette des Hôp., No. 13, 1860.

[7] Phila. Journ. of Med. and Phys. Science, 1825, vol. xi. p. 120.

that upon vaginal examination he found the tissues interposed between the finger and the child's head to be so thin, that the sutures and posterior fontanelle could easily be traced upon its surface. Hodge[1] felt the spinous process of the vertebræ through the vaginal wall. This superficial position of the fœtus, as discovered by vaginal examination, is not peculiar to extra-uterine pregnancy. Pajot[2] has recently directed attention to this fact. The child may or may not be detected by ballottement through the vagina. Efforts to effect this will often be successful, however, though the tenderness of the parts frequently interferes materially with the examination. Evesque[3] states that he has seen excessive uneasiness produced by mere contact of the finger with the os uteri.

Vaginal examination will sometimes reveal the presence of peculiar symptoms. According to Marc,[4] Baudelocque met with a fœtal cyst, which contained a large number of vessels the pulsations of which were very strong and could be felt upon all the parts of the tumor, which were accessible through the vagina. This symptom is rarely mentioned by those who have observed cases of misplaced gestation, yet it is known that the cyst walls are sometimes very vascular, as was witnessed by Turnbull[5] and Blackman.[6] The latter abandoned the operation of gastrotomy on account of the large size and great number of the vessels which he found in the anterior wall of the fœtal sac after he had opened the abdomen.

Not only have the pulsations of the maternal arteries been detected by vaginal examination, but Löw and Lumpe[7] assert that they have felt the fœtal pulse through the vagina, a "new sign" of extra-uterine pregnancy, to which they attach great diagnostic value. They believe, that, "on account of the position of the ovum and the peculiar arrangement of the vessels in these extraordinary cases, it would probably be possible, in most

[1] Loc. citat.

[2] Des Causes d'Erreur dans le Diagnostique de la Grossesse; Annales de Gynécologie, Paris, 1844, p. 212.

[3] Thèse à Paris, 1806; Campbell, loc. citat. p. 63.

[4] Dictionnaire des Sciences Médicales, 8vo., Paris, 1817, p. 402.

[5] Loc. citat.

[6] Amer. Journ. of Medical Sciences, July, 1845, p. 56.

[7] Boston Medical and Surgical Journ., May 28, 1857, p. 328.

if not all instances, to discover some pulsating artery belonging to the fœtal vascular apparatus, if sufficient time be taken, and the examination is made with great care." The fact which Löw and Lumpe have recorded is very curious, and does not seem to have attracted any attention. No other observer, so far as we are aware, has confirmed these statements. The sign cannot have much diagnostic value, for the simple reason that the child is frequently so situated, that it can only be touched with great difficulty by the vagina, or indeed if it occupies a transverse position in the abdomen, and the retro-uterine tumor is of considerable size, it cannot be reached at all. In other instances the woman is afflicted by such exquisite tenderness, that this examination is impossible. The detection of the fœtal pulse depends only upon the degree of attenuation of the tissues intervening between the finger and the portion of the child which is in the pelvis. Allusion has already been made to the fact, that excessive thinning of either the vagina or abdominal wall is no indication of the existence of misplaced gestation. It appears probable therefore, that the "new sign" noticed by Löw and Lumpe is rarely present, and that when it is, it has not the great diagnostic value which they attached to it.

At the time that the vaginal examination is made, a catheter should be introduced into the bladder in order to determine whether it occupies its normal position or not, and if it does not, the direction of its displacement, which Duboué, of Pau, believes always corresponds to that of the uterus. It may sometimes be pressed to one side when the womb forms a portion of the anterior wall of the sac, and maintains its position in the median line. The author has been a witness of this fact. In rare cases the bladder takes a position below and behind the fœtal tumor, as was observed by Goodbrake.[1] Vedder[2] has seen it adherent to the anterior abdominal wall, so that, even when empty, it would have been wounded by an incision, made to perform the operation of gastrotomy.

During the examination of the organs of the pelvis, it is important to decide positively whether the uterus is empty or

[1] Boston Med. and Surg. Journ., July 5, 1860.
[2] Amer. Med. Times, June 15, 1861.

not. This done, pregnancy having been previously determined to exist, the symptoms become positive, and the condition of the woman is put beyond all doubt. This can only be determined by the use of the sound, a mode of exploration which should not be resorted to without due caution. In the first stages, before the fœtal heart can be heard, and when the results of ballottement are negative, the use of the sound, if permissible, would be attended with much more important results. In the second stage, after the existence of pregnancy has been determined, it is not generally so important to accurately decide whether the uterus is empty or not, since the indications are to allow the pregnancy to go on to full term. This mode of examination is not without some sources of error. Duboué thrust the sound through the posterior wall of the uterus, into the peritoneal cavity, and thus confirmed his erroneous conclusion that he had to deal with a uterine pregnancy. A short time since the author saw, in consultation with her attending physician, a young lady, who had an abdominal tumor which resembled a gravid womb. The fœtal heart and placental bruit could not be heard, though the fœtus could be felt so plainly through the abdominal wall, and was so superficial in its situation, that it led her physician to suspect that it was extra-uterine. The woman was near full term, but her medical attendant passed the uterine sound very cautiously. It went up nearly five inches. The patient went to term and was happily delivered of her child. The passage of the sound by no means always leads to a premature labor. Schrœder was well aware of this fact. He says,[1] "in utero-gestation the sound may pretty easily pass between the membranes and the uterine wall, and . . abortion is by no means the usual consequence of a careful introduction of the sound."

A physical exploration of the rectum may be resorted to to confirm or add to the information obtained by vaginal examination. The post-uterine tumor will be felt pressing upon the intestine, and the child can sometimes be felt within it.

The mechanical effects of the gravid cyst are those of any other tumor of the peritoneal cavity. It may press upon the various delicate tissues of the abdomen and pelvis, and

[1] Manual of Midwifery, 8vo., New York, 1873, p. 135.

thus produce much discomfort and uneasiness, or even severe pain. Œdema of one or both of the lower extremities occasionally, though not very frequently, results from pressure on the larger venous trunks of the pelvis and abdomen.

It may press upon the bladder and render the discharge of urine difficult and painful, or arrest the flow entirely, as was witnessed by Bergeret.[1] The rectum may be so narrowed as to lead to obstinate constipation, or discharge from the intestine may be entirely arrested. Craighead[2] has seen the bowels completely obstructed in combined intra- and extra-uterine pregnancy at the end of three months. J. Hall Davis[3] witnessed the same thing in a left tubal gestation at four, and Tenderini[4] and Rupin,[5] each at six months.

Labor at Term.—If extra-uterine pregnancy is prolonged until the end of the normal period of gestation, it is the rule for the woman to have pains identical in all particulars with those of labor at the end of normal pregnancy. The pains of this spurious labor have the natural, intermittent periodical character, so that the patient, the midwife, and even the physician in attendance, are not undeceived until a vaginal examination is made by the latter. Even then, accoucheurs have more than once failed to recognize the true state of affairs, and important obstetrical operations have been proposed, and even attempted, under the impression that the fœtus was contained in the uterus. In rare cases, spurious labor does not occur at the end of gestation. Observations of this kind have been recorded by Prefect,[6] Ramsbotham and Adams,[7] Hanius,[8] Tait,[9] Atlee,[10] Edgar,[11] and Perkins.[12]

[1] Recueil Périodique, tome xiv. p. 289.

[2] Amer. Journ. Medical Sciences, Jan. 1850, p. 114.

[3] Trans. Patholog. Society, London, 1853, vol. iv. p. 230.

[4] New York Med. Journ., July, 1873, p. 97.

[5] Gaz. des Hôpitaux, No. 13, 1860.

[6] Cases in Midwifery, 8vo., Rochester, 1783, vol. ii. p. 161.

[7] Med. Times and Gazette, July 21, 1860, p. 57, and Mr. Adams, Trans. Medico-Chir. Soc. London, 1861, vol. xliv. p. 1.

[8] Dublin Journ. Med. and Chem. Sci., 1835, vol. vi. p. 158.

[9] Trans. Med.-Chir. Soc. London, 1873, p. 219.

[10] Diagnosis of Ovarian Tumors, 8vo., Phila., 1873, p. 194.

[11] St. Louis Med. and Surg. Journ., 1871, p. 306.

[12] Phila. Med. Times, March 15, 1872, p. 223, and Amer. Journ. of Obstet., May, 1872, p. 155.

In some instances the pains come on prematurely, as in normal pregnancy. Hope,[1] Meadows,[2] Davies,[3] James,[4] and Aubinias[5] saw them occur at the end of the seventh month. In Heys'[6] patient they set in when she was eight months gone. On the other hand, there is some reason to believe that this false labor may be delayed for some time after the end of gestation. Ramsay[7] states that he saw it commence at the end of eleven, and Gordon,[8] at the end of thirteen months. Delayed labor in extra-uterine pregnancy is rare, however.

The duration of this spurious labor varies considerably. Macartney[9] describes the pains as lasting eight hours; Ramsbotham[10] and King[11] twenty-four hours. In other cases they may be prolonged much beyond the usual time. Maclarty[12] saw them continue five days; Stergerthal[13] and Chevillon[14] each seven days; Otto,[15] twelve days; Bosseut[16] for two weeks; and Bouquet[17] has seen the symptoms of labor continue more or less severe for three weeks. The severity of the pains appears to be different at different times in the same patient. They may gradually increase in intensity until they assume the characters of those belonging to the second stage of labor, and then gradually subside. Their severity, of course, varies much in different persons. Sometimes they are fugitive and comparatively trivial, so that it is difficult to recognize their true nature; while at other times they are of the most severe

[1] Med. and Phys. Journ., London, 1801, vol. vi. p. 360.
[2] Trans. Obstet. Soc. London, 1873, vol. xiv. p. 310.
[3] Lancet, Feb. 19, 1831, p. 702.
[4] North Amer. Med. and Surg. Journ., 1827, vol. iv. p. 283.
[5] Gazette Médicale, No. 44, 1862.
[6] Med. Observ. and Inquiries, 1769, p. 341.
[7] Med. Repository (New York), 1804, p. 221.
[8] Medical Commentaries, 1794, p. 323.
[9] Dublin Journ. Med. and Chem. Science, 1835, vol. vii. p. 412.
[10] Medical Times (London), Nov. 13, 1852, p. 481.
[11] Richmond Med. Journ., Sept. 1868.
[12] Med. Commentaries, 1793, vol. xvii. p. 481.
[13] Philosophical Trans., ab. ed., 4to., London, 1734, vol. vi. p. 554.
[14] Gaz. Méd. de Paris, Mai 29, 1858.
[15] North Amer. Med. and Surg. Journ., 1827, vol. iv. p. 285.
[16] New England Journ. of Med. and Surgery, 1817, p. 134.
[17] Recueil Périodique de la Soc. de Méd. de Paris, tome iii. p. 63.

type, and tax the poor patient's powers of endurance to the last degree.

In certain cases, though not very frequently, this spurious labor is repeated at intervals of variable duration. Cotton[1] records an example in which the second attack of pain set in twelve days after the commencement of the first. In Simon's[2] and Baeza's[3] patients it recurred at the end of a month, in Hey's[4] in six weeks, while Dr. William Smith[5] states that a woman under his care had pains like those of labor three times, first at the end of gestation, then ten weeks later, and lastly three months from that time. Blundell[6] asserts that he has seen labor-pains recur at intervals for years, and Schmidt[7] reports a case of three years' duration, in which they recurred at eight distinct periods. Dr. John W. McIntosh[8] has met with a most singular example of repetition of labor-pains; he says that in 1852 he saw a woman who had "been suffering seven years at regular intervals indicating the usual period of gestation, the pains continuing thirty-six to forty-eight hours. Each confinement, so called, was terminated by a discharge of bloody mucus per vaginam, which affording relief, she was able in a few days afterwards to resume her domestic duties." Cazeaux refers,[9] without giving any authority, to a similar case, in which the pains returned at a period corresponding to the usual term of pregnancy for ten years.

This unavailing labor is usually, though not invariably,[10] attended with a hemorrhagic discharge from the vagina. In rare cases the loss of blood may be profuse, as witnessed by James[11] and Tenderini.[12] The latter gentleman states that his patient fainted, and that he was forced to arrest the hemor-

[1] New York Med. and Phys. Register, 1822, vol. i. p. 325.
[2] Philosoph. Trans., abridg. edit., 4to., London, 1756, vol. x. part ii. p. 1016.
[3] New Sydenham Society's Bien. Retro., 1867, p. 397.
[4] Med. Obs. and Inquir., 1769, p. 341.
[5] Campbell, loc. citat. p. 49. [6] Lancet, Aug. 16, 1828, p. 612.
[7] Cazeaux, Theoret. and Pract. Midwifery, 8vo., Phila., 1869, p. 594.
[8] Southern Journ. of Med. and Phys. Science, 1853, vol. i. p. 244.
[9] Loc. citat. p. 594.
[10] King, Richmond, Medical Journ., Sept. 1868.
[11] North Amer. Med. and Surg. Journ., 1827, vol. iv. p. 283.
[12] New York Med. Journ., July, 1873, p. 97.

rhage with a tampon. This metrorrhagia is sometimes preceded by separation of the decidua, as has been witnessed by Prof. James, Hemard,[1] Hennigsen,[2] Lalanne,[3] and many others. The separation of this structure and its discharge during the spurious labor are not, however, the cause of the vaginal hemorrhage, which occurs at the same time. This loss of blood occurs in women who have discharged the decidua with symptoms of abortion during the early months of gestation, as well as in those who have repeated false labors, such as occurred to the woman whose history has been published by McIntosh.

This false labor and vaginal hemorrhage are followed in many instances by a vaginal discharge, which resembles more or less closely the lochia which succeed a normal parturition. This discharge is not always bloody, and lasts several days.

That this ineffectual labor should occur at the end of the ninth month of extra-uterine gestation is a very interesting and curious fact. Janvrin[4] thinks that its occurrence indicates that the pregnancy belongs to the interstitial variety. There is very good evidence that this is not true. There is nothing to lead to the belief that it is peculiar to any single species of erratic gestation. We have reason to conclude that it occurs alike in all the forms when the full term is reached. This fact has an important and interesting bearing upon the determining cause of labor when the pregnancy is normal. This was recognized by Dr. Ramsay at the beginning of this century. He says,[5] that, "from the regular appearance of labor at or near the end of nine months in extra-uterine as well as in uterine pregnancy, we have not reason to conclude that labor is excited by any faculty of the uterus, but by some state or quality of the child." More importance may be attached to this idea, when it is remembered, that, though the uterus undergoes certain changes in extra-uterine fœtations, analogous to those occurring after normal conceptions, and

[1] Lancet, 1844, vol. ii. p. 74.

[2] Archiv. für Gynækologie, 1870; New Sydenham Society's Bien. Retros., 1869-70, p. 397.

[3] Annales de la Médecine, Juillet, 1825.

[4] Amer. Journ. of Obstet., Nov. 1874.

[5] Medical Repository, New York, 1804, p. 326.

though a decidua is formed in its cavity, labor-pains supervene at the end of the usual period of gestation, whether this decidua has been discharged or not, at some time anterior to the supervention of the parturient effort.

Indeed it would seem that the fact, that it is the rule for labor to occur at or near term in cases of extra-uterine gestation which are prolonged to that period, overthrows all theories based upon the view that the determining cause of labor has its seat in the uterus. In 1819, Power[1] proposed his "reflex sphincter" theory, comparing the uterus to the bladder and rectum. In 1855, Brown-Séquard[2] advanced the ingenious idea that the uterine action was set up by the accumulation of carbonic acid in the blood circulating in the organ. In 1871, Dr. A. F. A. King,[3] of Washington, D. C., promulgated the view that it was due to mechanical distension of the uterus by the child; and in the next year Dr. C. C. P. Clarke,[4] of Oswego, N. Y., proposed the theory, that the determining cause of labor is "a spontaneous separation of the decidua," which "thus becomes a foreign body in contact with the inner surface of the uterus," and as such excites reflex contraction of this organ. The history of misplaced gestation seems to present insuperable objections to the acceptance of any of these opinions. Under these circumstances labor comes on when there is no child to irritate the uterine "sphincter," when there is no reason to believe that there is any accumulation of carbonic acid in the bloodvessels of the organ, when its cavity is not distended by a mature child, and when it is not excited to reflex contraction by a separated, ripe decidua in its interior.

It would appear, therefore, that we have to look outside of the uterus for the determining cause of labor. Possibly it may be found in the ovary, as suggested by Dr. Tyler Smith, and possibly in some "state or quality of the child," as Ramsay supposed, or in some condition of the placenta.

The cause of labor-pains at the close of extra-uterine gesta-

[1] Cazeaux, loc. citat. p. 281. [2] Ibid., p. 282.

[3] Amer. Journ. of Obstetrics, Feb. 1871. Dr. S. C. Busey (Ibid., May, 1871) criticizes and, we think, effectually disposes of Dr. King's views.

[4] Ibid., Feb. 1872, p. 577.

tion has never been accurately determined. Velpeau and Marc[1] believed them to be due to contractions of the fœtal cyst, while Duges and Dezeimeris[2] thought they originated in uterine contractions. The sac, it is said, has been seen and felt contracting by Marc and Baudelocque.[3] Barnes, Davis, and Cayley[4] have found muscular fibres in the walls of the sac, but this was in a case of tubo-ovarian pregnancy. There is no doubt but that the cyst may contract in tubal and interstitial gestations, but it is so thin and the muscular fibres are so feebly developed that we can hardly account for the severe pains which occur in these cases by attributing them to contractions of the cyst wall. If it is true that this phenomenon is not peculiar to tubal gestations, but occurs alike in those of the ovary and abdomen, it is at once apparent that we must seek another explanation of their production. Upon this point there is some, but not much, clinical evidence. Turnbull[5] records the fact that he has seen the uterus dilate under the influence of these pains so that it would admit several fingers, and Galli[6] has seen the organ relax so that he could pass his finger into the cavity of the womb and assure himself that it was empty.

The most important evidence which we have in regard to this matter is that furnished by Mr. Scott.[7] He operated upon Dr. Meadows' patient when she was in the throes of false labor at the end of the seventh month. After the abdomen was opened he observed that the uterus was contracting regularly and at intervals, as in normal labor. The opinion of the reporters of the case that the pregnancy was tubal may be questioned, but even granting that it was, the observation of Mr. Scott, and the fact that spurious labor occurs in both primary and secondary ventral, as well as in extra-abdominal gestations,[8] warrant us in concluding that these pains, like

[1] Dict. des Sciences Méd., 8vo., Paris, 1817, tome xix. p. 402.
[2] Dict. de Méd. et de Chir. Pratiques, 8vo., Paris, 1833, tome ix. p. 316.
[3] Dict. des Sciences Méd., 8vo., Paris, 1817, tome xix. p. 407.
[4] Barnes, Diseases of Women, 8vo., Phila., 1874, p. 378.
[5] Mem. Med. Soc. of London, 1792.
[6] Dict. des. Sciences Méd., 8vo., Paris, 1817, tome xix. p. 407.
[7] Trans. Obstet. Society, London, 1873, vol. xiv. p. 370.
[8] Skirvani, loc. citat.

those of normal parturition, are due to contractions of the uterus.

In connection with labor at the close of extra-uterine pregnancy, it is important to remember that it rarely ends in rupture of the fœtal cyst. There is no doubt that this may occur, but it is so rare that it should be allowed no weight in deciding for or against operative interference. This error was committed by Mr. Scott.[1] The great dread of most who have written upon this subject is inflammation of the peritoneum. Béheir[2] believes that this labor often ends in rupture of the cyst and death of the mother from peritonitis. In this opinion he is by no means alone, but there appears to be no clinical evidence to sustain the assertion. The sac, as before stated, rarely ruptures at this time, and when it does so it generally opens either into the uterus, rectum, or vagina. Peritonitis plays but a small part in the pathology of extra-uterine pregnancy at this period of its development. Writers upon this subject have believed that it ought to be a frequent complication, and have, therefore, concluded that it was so.

Under the influence of false labor the cyst of a tubo-uterine fœtation has in a few instances opened into the uterus, after which the child has been expelled by the uterine effort. The first instance of this happy result appears to have been recorded by Laugier.[3] The patient was his own wife. This lady became pregnant for the fourth time in September, 1771. Symptoms of labor appeared June 17th following. On the 24th there was severe hemorrhage, and the hand was passed into the uterus, when the bag of waters was felt, with the leg and foot of the child protruding into the uterine cavity through the orifice of the right Fallopian tube which clasped the leg at the knee. The bag of waters was ruptured, and a re-examination confirmed these observations. An unsuccessful attempt was made to grasp the second foot. Traction was made upon the one which protruded until the thigh was delivered, when the other leg was brought down. The body now refused to advance, when the hand was introduced, and it

[1] Meadows, loc. citat. [2] Gazette Hebdom., No. 36, 1873.
[3] Archives Générales de Méd., tome xxviii. p. 332.

was found that the tube had contracted upon the head of the child. The delivery was finally accomplished. There was hemorrhage, and the hand was introduced and the placenta removed.

Dr. J. Braxton Hicks has seen[1] the child expelled spontaneously in a case of premature labor, when the woman was five and a half months gone. The tubo-uterine cyst opened into the uterus. His patient unfortunately perished from rupture of the peritoneal surface of the cyst four days after delivery. Prof. Hicks was not aware of Laugier's experience, and believed his case to be unique. Dr. Widney,[2] of California, has since then made a somewhat similar observation. His patient was delivered spontaneously at term. The placenta did not separate. The hand, passed into the uterus, discovered the orifice of the right tube two inches in diameter. This led into a cavity with regular walls, and which contained the after-birth, which was removed. It is not certain that in this instance the child may not have been developed in the uterus and the placenta only in the tube.

Other varieties of misplaced pregnancy may terminate by rupture into other hollow organs. Giffard[3] has seen the whole child expelled by the bowel between the fifth and sixth months. Yardley and Sansbury,[4] of Philadelphia, witnessed the expulsion of the body of a five months' extra-uterine fœtus, the cyst of which had ruptured into the rectum. Unfortunately the sphincter ani seized the child by the neck, and traction gave so much pain that it could not be borne. It was before the day of anæsthetics, and the narrators appear to have been somewhat puzzled for a time, but they were not long in determining upon a method of treatment. The application of force from without having proved unavailing, they concluded to apply it from within, and to do this gave the woman a dose of castor oil, and thus purged her of her child, for it came away with the first dejection.

[1] Trans. Obstet. Soc. London, 1868, vol. ix. p. 57.
[2] Boston Med. and Surg. Journ., March 9, 1871.
[3] Cases in Midwifery, 8vo., London, 1794.
[4] North Amer. Med. and Surg. Journ., 1826, vol. i. p. 292.

Clark[1] saw labor come on near term. The next day the hairy scalp of the child could be felt in the rectum, the waters having previously escaped by that channel. Dr. Clark passed his whole hand into the bowel, and putting his fingers into the child's mouth, extracted the head of a seven months' fœtus per anum. After this the body and secundines were expelled spontaneously. Dr. Clark's patient recovered, but not without some sloughing of the anus and perineum.

Examples of rupture of the cyst into the vagina during labor have been reported by Charlton and Williams,[2] Emmons,[3] and Huguier.[4] In the first case the rupture was mistaken for the dilated os uteri. The head presented; the child, which was at term, was *easily turned*, but could not be extracted. In the second patient the presentation was "high and out of reach," when a violent pain suddenly brought a hand into the vagina. Various unsuccessful efforts were made to turn the child, which was at term, apparently with the impression that the fœtation was intra-uterine. In Huguier's case the termination was more happy. The woman had reached term. Extra-uterine pregnancy had been recognized, and the patient was being carried to the operating room to have gastrotomy performed, when the vagina ruptured and the child was spontaneously expelled. In an analysis of five hundred cases, these are the only illustrations of rupture of the cyst during labor which have occurred, and in not a single instance has it opened into the peritoneal cavity.[5] It will, therefore, be seen that the continuity of the cyst walls is rarely destroyed by labor—so rarely, indeed, that

[1] Philadelphia Med. Museum, 1806, vol. ii. p. 292.

[2] London Med. Gazette, 1843–44, vol. xxxiii. p. 43.

[3] Boston Med. Magazine, July, 1833, and Baltimore Med. and Surg. Journ., 1833, vol. i. p. 231.

[4] Lancet, Nov. 20, 1852.

[5] Matthews (*Atlanta Med. and Surg. Journ.*, Aug. 1872) has reported a case in which it is possible that rupture into the abdominal cavity may have occurred during false labor. He says that the last pain "continued for forty minutes, without any *seeming* relaxation." During this pain a noise was distinctly heard by all present, like "something bursting in the abdomen." It was felt by the woman. After this the pains ceased. At the autopsy the abdomen was found to contain some coagula, and "the Fallopian tube seemed to have been lacerated obliquely."

neither our prognosis nor treatment need be influenced by its possibility.

Not only are the organs designed by nature to insure the development of the fœtus sympathetically excited in extra-uterine pregnancy, but those which are intended for the nourishment of the child after its birth are likewise called into activity. Hence, we find this unfruitful labor followed by the secretion of milk in the breasts, a fact which was noticed as early as 1678.[1] The milk has its usual characters, though there are some exceptions to this rule. Turnbull[2] has seen it bear "a much nearer resemblance to pus than milk." The quantity is not less than after natural delivery, and it is sometimes excessive.[3] The secretion may continue for only a few days, or it may be prolonged much beyond the usual period of lactation. Bell[4] and Percival[5] have seen it continue for several years, and Cazeaux[6] asserts that it has been known to persist for thirty years, during which time the woman did not menstruate. A most curious statement in regard to this secretion is made by Mounsey.[7] His patient carried her extra-uterine child twelve years. At the end of eleven years a swelling formed at the navel, which the woman opened with an awl. One year later the opening was enlarged, and portions of the child extracted at intervals, until it was all removed. Dr. Mounsey says that after her delivery "her breasts swelled and she gave milk in plenty for two months, in quantity, color, and consistence, as after delivery at the proper time."

From these facts it appears that the victim of an extra-uterine pregnancy, at the close of the ordinary period of gestation,

[1] Mad. Le Boursier du Courdray, Abrégé de l'Art des Accouchemens, etc., 12mo., Paris, 1759, p. xxxvi.

[2] Mem. Med. Soc. of London, 1792, vol. iii. p. 185.

[3] Hanius, Dublin Journ. Med. and Chem. Sci., 1835, vol. vi. p. 158; Johnson, Med. Times and Gazette, June 8, 1872, p. 655; Macartney, Dublin Journ. of Med. and Chem. Science, 1835, vol. vii. p. 412; Lalanne, Annales de la Méd., Juillet, 1825.

[4] Med. and Philosoph. Comment. of Edinburgh, 8vo., London, 1774, vol. ii. p. 77.

[5] Medical Commentaries, 1774, p. 77. [6] Loc. citat. p. 594.

[7] Philosoph. Trans., ab. ed., 4to., London, 1756, vol. x. part ii. p. 1012.

is in a state which approaches very closely to that of a woman after normal labor. She first has pains, similar in their characters to those of true labor. These are accompanied in most cases by a hemorrhagic vaginal discharge, which persists after the spurious labor is over, and takes the place of the lochia, while to complete the analogy, the functional activity of the mammary glands is established at the usual period after the cessation of the pains. Excepting that the child has not been expelled, the condition of the woman differs but little from that which succeeds normal labor. She is in a pseudo-puerperal state, and in many particulars demands the same treatment that a woman actually delivered does. She is in a condition in which the liability to inflammatory diseases of the abdominal and pelvic cavities is increased, while her susceptibility to the effects of septic and purulent infiltration of the blood is probably likewise augmented. The recognition of the fact that the woman's condition approaches so closely to that which follows normal labor, is extremely important. The failure to appreciate this truth has led many accoucheurs to subject their patients to methods of treatment which are proper only after the woman has been fully restored from her pseudo-puerperal state.

The influence of the spurious labor upon the child is a matter of some interest. It is probable that the labor pains themselves have but little effect upon the fœtus, as long as the cyst walls remain intact. When the ordinary period of gestation is reached, no matter whether labor supervenes or not, it is probable that the infant experiences a more or less profound change. It has now reached the full period of its development, and the placenta is undergoing those changes which prepare it for separation. Notwithstanding these facts, it has been stated that the child does not always die at this time.

The case of Polinus, who asserted that a healthy boy was discharged spontaneously by an abscess in the right hypochondrium some time after the termination of the usual period of gestation, and also that of Schmidt, who, according to Meissner, extracted a child still living from an abdomen in which it had been carried three years, are, of course, not worthy of belief. It is, however, the opinion of a number

of competent observers, that the life of the fœtus may be maintained for some time after the termination of the usual period of gestation. Tanner[1] and Leishman[2] apparently credit this opinion; Cazeaux[3] and M. Depaul[4] assert it positively. Grossi[5] has reported a case in which he states that fœtal movements were felt by himself and his consultants until twenty-three months after the cessation of the menses. Starley[6] mentions the fact, that his patient and her friends felt the child move for nearly seven weeks after the birth of the intra-uterine infant at term, in a case of twin conception. This is the only clinical evidence which the examination of five hundred cases has furnished in favor of the opinion that an extra-uterine child may live beyond the usual period of gestation. Nothing need be said about the value of such testimony. It is well known how easily physicians may be deceived in regard to fœtal movements. When some one records the fact that he hears the fœtal heart for a considerable time beyond the normal period of pregnancy, the subject will demand careful investigation. In the present state of our knowledge it seems more reasonable to conclude, that the prolongation of the life of the fœtus is apparent, not real, and that there has been an error in determining the time at which conception occurred. There is also to be considered the fact that the natural term of gestation may be considerably prolonged. Ramsay, in consequence of the almost regular appearance of labor at or near the end of the ninth month in cases of extra-uterine as well as intra-uterine pregnancy, has suggested (as has already been mentioned) that labor is caused "by some state or quality of the child." This "quality of the child" may be supposed to be a change which has prepared it to commence a new mode of existence, in which its feeble life has to be carried on independent of its mother. There is reason to believe that the fœtus lives but little longer than the time when this

[1] Signs and Diseases of Pregnancy, 8vo., Phila., 1868, p. 296.
[2] Syst. of Midwifery, 8vo., Glasgow, 1873, p. 212.
[3] Theory and Pract. of Mid., 8vo., Phila., 1869, pp. 592–596.
[4] Archives de Tocologie, Sept. 1874.
[5] Gazette Médicale, Jan. 1846.
[6] New York Med. Journ., March, 1873.

condition of ripeness is reached, if such an expression may be allowed.

The fact that some of the children which have been carried beyond the usual term have been found to be remarkably large, does not prove that they lived and grew beyond the usual time in the vicarious uterus. Excessive development may be accounted for, when it occurs, in the same manner as in uterine gestations.

It has been reported, as an evidence of prolonged vitality of the child, that the jaws contained several teeth. This likewise is testimony of no value, since it is a well-known fact that children sometimes cut teeth before birth. The author has seen a child born with four.

Attention has already been directed to the fact that the death of the child may be attended with violent struggles, or even convulsive movements upon its part. These are felt by the mother, and may annoy her greatly, or cause her extreme pain.

CHAPTER VI.

SYMPTOMS—Continued.

After completion of term or death of the child—Diminution in size of the abdomen—Discharge of the contents of cyst through abdominal wall, bladder, vagina, and bowels—Intestinal and vesical fistulæ—Offensive perspirations—Symptoms of rupture of the cyst in early months of gestation—Peritonitis is unusual after this accident—Pregnancy in a hernial sac—Twin conceptions in extra-uterine pregnancy—Pregnancy while carrying an extra-uterine fœtus—Repeated extra-uterine pregnancy.

We have now followed the progress of extra-uterine pregnancy to the completion of the ordinary term of gestation, but the accident has a history which extends beyond this, and often covers a very long period. It is a well-known fact that an extra-uterine child may be retained for an indefinite time. Nebel[1] had a patient who lived to be over ninety-one years of age, and who had carried the product of a misplaced conception for fifty-five years. Though the presence of an encysted fœtus is not incompatible with life, and even with comfort and usefulness, the woman who bears such a burden with her is in constant danger of the cyst taking on inflammatory action which will greatly endanger, and may even destroy her.

The changes which occur in the economy of the woman after the death of the fœtus, which, if it has not occurred before, takes place during or shortly after the close of false labor, will be best understood by studying them somewhat in the order of their occurrence. As the woman commences to regain her non-puerperal state, a very important change takes place in the size of the abdomen. This diminishes more or less, but the woman does not regain her natural proportions as long as she continues to carry the child. With the death of the fœtus the secretion of the amniotic fluid ceases. Not only is this the case, but it is either partially or entirely reabsorbed. This is an important symptom, and is rarely absent.

[1] Campbell, loc. citat. p. 45.

Prefect[1] and Gunning,[2] however, have seen the abdomen remain unchanged in size after the woman had reached term, while Bell,[3] Mr. F. Hutchinson,[4] Ramsbotham,[5] and Mr. Jonathan Hutchinson,[6] have each seen the belly continue to enlarge after the termination of the usual period of gestation. Mr. J. Hutchinson, aware of the almost uniform occurrence of diminution in the size of the abdomen, was strongly influenced by its absence in concluding that his patient was not pregnant, but had an ovarian tumor; while Dr. Meadows[7] admits that he did not attach sufficient importance to the absence of this symptom in the poor patient from whom he attempted to remove a fibro-cystic tumor of the uterus and a cancer of the omentum, supposing the mass to be an extra-uterine fœtus. When the amniotic fluid is not reabsorbed, but, on the contrary, continues to increase in quantity after the close of pregnancy, the cyst may fluctuate very distinctly. This has been noticed by Mr. Jonathan Hutchinson and others. The true importance of this diminution in the size of the abdomen will become apparent in the discussion of the diagnosis of misplaced gestation after the death of the fœtus.

After this, the product of conception may become desiccated or mummified, or it may be converted into a substance resembling adipocere. At other times calcareous matter is found in its tissues or upon its surface, while the same alteration may take place in the cyst-walls. These processes have elsewhere claimed attention, and need not be more than alluded to here.

The woman is liable to have an attack of peritonitis at any time after the death of the child, or after the close of the usual period of gestation. This is not generally severe. Indeed, there is good reason for believing that the disease is usually latent, and when it is not so, it is almost always of a subacute type. The process is often conservative in its charac-

[1] Cases in Midwifery, 8vo., Rochester, 1783, vol. ii. p. 161.
[2] Med. and Phys. Journ. of London, vol. xlix. p. 311.
[3] Med. Commentaries, Edinburgh, vol. ii. p. 77.
[4] London Med. Gazette, Nov. 7, 1835, p. 169.
[5] Med. Times (London), Nov. 13, 1852, p. 481.
[6] Lancet, July 9, 1873, p. 71.
[7] Trans. Obstet. Soc. London, vol. xv. p. 145.

ter, and attaches the sac to the various surrounding organs and to the abdominal wall. In this way nature prepares for the discharge of the contents of the fœtal cyst in those cases in which the child does not become mummified, or is not converted into a lithopædion, or into adipocere.

In those instances in which the gestation terminates by the cyst opening through the abdominal wall, bladder, vagina, or bowels, pus, the decomposing flesh, and the bones of the child are discharged in larger or smaller quantities. When the sac opens through the bladder, the unfortunate woman suffers from all the symptoms of stone. If the communication is with the vagina or rectum, she has the symptoms of vaginitis or inflammation of the lower bowel. The latter is frequently attended with a diarrhœa. The inflammatory complication is the result of the irritation produced by the putrid discharges as well as by the mechanical effects of the bones. When due to the latter it may be so severe as to produce sloughing and a recto-vaginal fistule.[1] The other effects are those which would be expected from a foreign body in any one of these organs. They are pain, a sense of weight and heat, and, in the case of the rectum, violent tenesmus. Occasionally, after communication with the intestinal canal is established, the fœtal cyst, which had been previously dull, becomes resonant on percussion from the admission of gases from the bowel.[2]

When the sac opens into the rectum or bladder, and through the abdominal wall, in the same woman, fecal and urinary fistulæ may result, forming a very interesting complication of these methods of termination.

Suppuration in an extra-uterine cyst more frequently produces intestinal than vesical fistule. The former may occur spontaneously, or may be produced during an operation for the relief of the patient. Illustrations of the first class have been recorded by Saxtorph,[3] Drake,[4] Houston,[5] Adams,[6] Che-

[1] Dr. John Smith, Med. and Philosoph. Commentaries of Edinburgh, 8vo., London, 1778, p. 314.

[2] Hicks, Trans. Obstet. Soc. London, 1868, vol. ix. p. 93.

[3] Schmidt's Jahr., 1857, and New York Med. Journ., May, 1858.

[4] Philosoph. Trans., ab. ed., 4to., London, 1756, vol. x. part ii. p. 1019.

[5] Ibid., ab. ed., vol. vii. p. 555.

[6] Brit. and For. Medico-Chir. Rev., Jan. 1873.

villon,[1] Davis,[2] Duboué,[3] Baeza,[4] and Blandina de Barros.[5] It occurred as the result of gastrotomy to Debenham,[6] Darby,[7] Hooper,[8] and Hicks.[9] The latter cases may be divided into two classes. In the first, intestinal fistule is the necessary result of gastrotomy in a person in whom the fœtal tumor has previously communicated with the intestinal canal. Hooper's and Hicks's cases belong to this class. In Darby's patient the stomach was unhappily ruptured during the operation; while Debenham had the misfortune to wound the intestine in trying to remove some fœtal bones, which were adherent to the cyst, through an enlarged fistulous opening.

This subject is one of considerable interest in connection with the result of erratic gestation either with or without gastrotomy. Drake says, that after the child was discharged through an abscess, near the navel, whatever the woman took into her stomach was passed half digested by the fistulous opening, for six months. The character of the food affected the digestion. Coarse bread was voided without much change, while white bread and other articles of better quality were discharged half digested. In this instance, therefore, the communication with the intestinal canal must have been situated high up in the tube. It is probable that this was likewise true with Davis's patient. He also noticed that the fistule discharged a fluid, like bile.

Of the thirteen women who presented this complication, only two died. One perished from starvation, the opening being into the stomach,[10] so that everything she took passed at once into the cyst. The other died from exhaustion. It appears, therefore, that, contrary to what might be reasonably expected, the appearance of feces, among the discharges from the abdominal opening of an extra-uterine gravid cyst, does not make

[1] Gaz. Méd. de Paris, May 29, 1858.
[2] Dublin Med. Press, Dec. 18, 1861, p. 423.
[3] Archives de Tocologie, 1874, tome i. p. 578.
[4] Loc. citat.
[5] Bull. Générale de Thérapeutique, 1874, p. 324.
[6] Philosoph. Trans., 4to., London, 1753, vol. xlvii. p. 92.
[7] Trans. State Med. Assoc. South Carolina, 1872.
[8] Trans. Med. Soc. of Virginia, 1872, p. 121.
[9] Trans. Obstet. Soc., London, 1868, vol. ix. p. 97.
[10] Darby, loc. citat.

the prognosis more unfavorable. On the contrary, such cases usually recover, though the track by which the intestine communicates with the abdominal wall may continue open even after the patient is otherwise perfectly restored.[1]

But one other instance of fecal discharge through a fistulous orifice, occurred among the 500 cases which we have examined. Dr. Colman,[2] finding that the cyst had ruptured into the vagina, five months after term, dragged a full-grown child through the orifice, without enlarging it, otherwise than by the traction exerted. The next day feces were discharged by the vagina, but the woman recovered.

Vesico-abdominal fistula is very rare. It only occurred once in five hundred cases, and this was reported by Baeza.[3] Urine and feces were both discharged through an opening which formed at the navel, yet the woman recovered.

During the discharge of the decomposing child through the rectum, vagina, bladder, or abdominal wall, the mother is subjected to all the dangers which result from the absorption of purulent and putrid matter. The same may occur before the sac has opened externally, if inflammation in the cyst walls and adjoining parts has gone on to suppuration.

Hence, during this stage of the disease, the symptoms of pyæmia may be added to those properly belonging to the extra-uterine pregnancy.

During the period of discharge, the woman is liable to become profoundly exhausted. Anæmia, hectic, and night sweats may supervene, so that the mother's vital powers are insufficient to effect the work of elimination. When unaided by art this process is apt to be very tedious. Mounsey[4] and Diamantophulous[5] enlarged fistulous openings into the abdominal wall one year after their formation. Johnston[6] saw the process continue through the same channel for three years, and

[1] Davis, loc. citat., and Duboué, loc. citat. The latter states that there is a slight bloody discharge from the fistula at each menstrual period.

[2] Med. and Phys. Journ., London, 1799, vol. ii. p. 262.

[3] New Syd. Soc. Bien. Ret., 1867.

[4] Philosoph. Trans., abridg. ed., vol. x. part ii. p. 1012.

[5] Monats. für Geburt., Nov. 1857, and Brit. and For. Medico-Chir. Rev., April, 1858, p. 555.

[6] Edinburgh Med. Journ., Nov. 1857, p. 137.

Levan[1] for a "long time," before he interfered. Hicks[2] performed gastrotomy one year after communication with the bladder was established. Petersen[3] saw death occur from exhaustion two years after an opening had formed in the same organ, and fourteen months after discharge had commenced by the bowel. Bosseut[4] performed lithotomy, and successfully removed nearly one hundred and fifty fœtal bones from the bladder, four years after elimination had commenced through that channel. Dr. Davies[5] saw fœtal remains voided by the bowels for two years; Dr. Samuel Smith[6] for two years and a half, when the patient died; and Dr. John Smith[7] states that he has seen the discharge from the bowels continue for four years in women who finally recovered.

After the patient has reached term, and during the time when nature is preparing to eliminate the fœtal remains, the body sometimes exhales offensive odors. Conant[8] has seen the perspiration become so offensive that all of the woman's attendants deserted her. Food was passed to her through a window. This discharge sometimes diminishes the contents of the cyst. Hale[9] has seen the abdomen of a woman a little more than two years pregnant, considerably reduced in size in a single night with no sensible evacuation to account for it, excepting a profuse and exceedingly fetid perspiration. Blandina de Barros[10] and Adams[11] both observed a very bad odor exhaled from the body. Bronson[12] has also seen the respiratory mucous membrane as well as the skin give off a "peculiar odor," in a woman who retained her child a few months beyond term. However interesting and curious these facts may be, the skin

[1] Trans. Penn. State Med. Soc., 1867, 4th series, part iii. p. 219.
[2] Guy's Hosp. Rep., 1862, p. 133.
[3] Dublin Medical Press, Aug. 10, 1859.
[4] New England Journ. of Med. and Surg., 1817, p. 134.
[5] Lancet, Feb. 19, 1831, p. 702. [6] Campbell, loc. citat. p. 61.
[7] Medical and Philosoph. Commentaries of Edinburgh, 8vo., London, 1778, p. 314.
[8] New York Med. Journ., 1865, p. 140.
[9] Boston Med. and Surg. Journ., 1857, vol. lv. p. 413.
[10] Bull Générale de Thérapeutique, 1872.
[11] Gazette Méd. de Paris, Aug. 1872.
[12] Amer. Med. Monthly, 1860, p. 481.

and respiratory mucous membrane rarely eliminate any products of the decomposition of the fœtus which render their secretions offensive. The symptom has been found to be present in only one per cent. of the cases which we have analyzed.

Symptoms of Rupture of the Cyst.—By no means every woman who becomes pregnant with a child outside of the uterus carries it to term. Not more than half of them do this. The largest portion of the other fifty per cent. are the victims of rupture of the cyst—one of the most terrible accidents that can happen to a woman. The symptoms of this are well marked. The patient has probably had various attacks of colicky pain, as well as the other symptoms previously described, which have led her to believe that something was amiss in connection with her present pregnancy. She now suddenly has a new accession of pain in one iliac fossa, usually associated with metrorrhagia. At the moment of rupture the woman feels as if something had been torn inside of her.[1] She then becomes very weak; her skin is cool and pale, often covered with a clammy cold sweat; her pulse is almost obliterated. She frequently faints, and the syncope is often of the most terrible character, the depression being profound. Convulsions and delirium may supervene, or the intellect may remain perfectly clear. In short, the patient has all the symptoms of violent shock succeeded by those of hemorrhage, for which the slight loss of blood by the vagina is by no means sufficient to account. The abdominal pain is very severe. Sometimes the abdomen visibly enlarges, as has been observed by Tucker,[2] Finnel,[3] and Lobstein.[4] Tucker also adds that he detected fluctuation. With this is associated dulness on percussion, or the latter may be present when there is little or no increase in the size of the belly.[5] Rogers[6] appears to think that enlargement of the abdomen can generally be detected after rupture

[1] Ingleby, Edinburgh Med. Journ., 1834.
[2] Med. and Phys. Journ. of London, 1813, vol. xxix. p. 448.
[3] New York Med. Journ., March, 1857, p. 237.
[4] Med. and Phys. Journ. London, 1817, vol. xxxvii. p. 196.
[5] Rogers, Extra-uterine Fœtation and Gestation, 8vo., Phila., 1867, p. 15.
[6] Ibid., p. 27.

of the cyst. If such is the case, it has escaped the notice of almost all writers on this subject.

If metrorrhagia has not preceded[1] the symptoms of rupture, it quickly follows them in almost all instances. Syncope has been mentioned as one of the phenomena of this accident. It may occur at the moment of laceration, or some time later. When it supervenes early it is generally due to the shock from the injury, but afterwards it may be owing to the anæmia. It is often impossible to determine to which of these causes it is due. It is doubtless sometimes the result of their combined influence. The fainting is frequently repeated, the woman being revived only to fall into another death-like swoon. There is one point in connection with this symptom which calls for a few remarks before dismissing the subject. Speaking of syncope, Goupil says[2] that it seems to be constant no matter where the seat of rupture may be; and, again, he asserts[3] that "It is the first in the series of events which announce with certainty internal hemorrhage." Both of these statements are incorrect. Rupture of the fœtal cyst, though frequently followed by syncope, often happens without it. On the other hand, the occurrence of fainting during the progress of extra-uterine pregnancy does not indicate internal hemorrhage with any certainty. It may attend the attacks of colicky pain which are so characteristic of this condition. Campbell[4] was aware of this, and it has been confirmed by other writers.[5] It is important to remember

[1] Roper, Trans. Obstet. Soc. London, 1866, vol. vii. p. 167; Barnes, Ibid., p. 168; St. Thomas's Hospital Reports, 1870; and Diseases of Women, 8vo., Phila., 1874; Goupil, Clin. Memoirs on Diseases of Women, New Syd. Soc. ed., 8vo., London, 1866, vol. i. p. 246.

[2] Loc. citat. p. 267. [3] Ib., p. 268.

[4] Loc. citat. p. 104. He speaks of "pains in different parts of the abdomen, sometimes so intense as to excite syncope, or even convulsions, and to be uncontrollable by the most powerful doses of opium."

[5] Putnam, Amer. Journ. Med. Sciences, Oct. 1853, p. 348; Shurtleff, Nashville Journ. of Med. and Surgery, Feb. 1860, p. 158; Hooker, Ibid., p. 161; Purdy, New York Med. Times, June, 1863, p. 261, though there was not syncope at the time of rupture which occurred at the end of the second month of gestation; Burci, Gaz. Med. Ital., 1857, and Med. and Surg. Reporter, Feb. 1858, p. 112; Hughes, London Med. Gaz., 1850, p. 539; Perry, Journ. of Gynæcolog. Soc. of Boston, Sept. 1869, p. 140. Evesque, Thèse à Paris, 1806, speaks of having seen faintings commence near the end of the second

these facts, for Bernutz and Goupil attach much diagnostic value to the occurrence of syncope, but it will be seen, from what has been said, that this opinion is entirely without foundation.

Allusion has already been made to the changes that may take place in the condition of the abdomen, its sudden increase in size with fluctuation, and it now remains only to speak of the information which may be gained by vaginal exploration, made after the symptoms of rupture have supervened. A tumor has rarely been found. The uterus may sometimes be pushed from its natural position by a mass, either on one side or behind it, but rarely in front of it. If this tumor has been previously discovered, or is found after the supervention of the symptoms of rupture, it is a cardinal fact. It is well known that the worst hemorrhages frequently come from cysts in which the ovum is still retained, and which do not collapse, though they may give rise to a hemorrhage which will be fatal in a short time. Consequently, this tumor should be sought in all cases in which the pregnancy has progressed far enough for it to have formed. This, Siredey has proved, is as early as the end of the first month.

The accumulation of blood in the pelvic cavity may give rise to a sense of fulness, which can be felt through the vagina and behind the uterus, but no distinct tumor will be found unless the patient lives long enough for the peritoneum to become inflamed and for the effusion to become encysted. Then all the physical signs of pelvic hæmatocele will disclose themselves.

The cause of the various symptoms of rupture is difficult to determine. The tableau which they make is a composition which owes its origin to the combined effects of shock and loss of blood. Intimately associated as these are, it is difficult, and often impossible to determine the part which each plays in bringing about this terrible array of symptoms. To this state Barnes[1] has given the name of "abdominal collapse," and mentions the fact that it can be distinguished from the

month of gestation, and continue till the woman died of rupture when three and a half months gone. Syncope produced by colicky pain is mentioned by a number of other authors.

[1] Diseases of Women, 8vo., Phila., 1874, p. 362.

collapse resulting from injuries of the chest by the absence of oppression in respiration, and from that due to wounds of the head by the preservation of the mental faculties.

The patient may perish almost immediately after this accident. This, however, is not the usual result, and the woman may live for several days. When this is the case reaction sets in after some hours, when another set of symptoms supervene, which it is important to interpret correctly. The belly enlarges, becomes tympanitic and tender; the circulation is excited, and the temperature elevated one or two degrees; in short, the patient has all the symptoms of acute peritonitis. Almost all writers upon this subject have described this disease as a result of rupture. Velpeau[1] believed that it destroyed the patient from the second to the fourth day after the sac gave way, if it did not lead to encystment of the effused blood and escaped ovum. Hodge,[2] Schrœder,[3] Cazeaux,[4] Chailly-Honoré,[5] Tanner,[6] Depaul,[7] and Campbell,[8] all believe that peritonitis is a cause of death after rupture. Leishman[9] says that it is a very violent and dangerous complication, and Barnes[10] states that "it usually supervenes rapidly. A few hours' time is often enough to light up almost universal peritonitis." It is therefore evident that the very highest authorities assign peritonitis an important place among the destructive consequences of rupture. In this they are supported by the symptoms which succeed the effusion of blood, but in opposition to this apparent clinical fact we have the sad results of too many post-mortem examinations.

[1] Dict. de Méd., 8vo., Paris, 1836, vol. xiv. p. 417. [2] Loc. citat. p. 531.
[3] Loc. citat. p. 131. [4] Loc. citat. p. 596.
[5] Traité Pratique de l'Art des Accouchemens, 8vo , Paris, 1867, p. 135.
[6] The Signs and Diseases of Pregnancy, 8vo., Phila., 1868, p. 298.
[7] Archives de Tocologie, 1874, tome i. p. 10.
[8] The opinions of this author are based upon imperfect observations. He writes (p. 131), that, "when the fœtus and other parts of the ovum have been dislodged from their envelope, they may then excite violent inflammation of the ambient organs which, with the hemorrhage, may destroy the patient." He then refers to the cases of Drs. A. Smith, Messer, King, and others, related in his own memoir, in which there was no rupture, but peritonitis *without it*.
[9] Loc. citat. p. 213. [10] Loc. citat. p. 363.

Bernutz and Goupil, who have investigated the consequences of effusion of blood into the peritoneal cavity with great care, say[1] that when it is due to rupture of a vicarious uterus "the peritoneal complications are much less than one would at first have fancied." Rogers[2] even goes further than this, and denies that peritonitis ever occurs as a result of rupture. This opinion is too absolute. It is said that in December, 1872, an instance of death from this cause, was reported to the *Société Anatomique* of Paris.[3] Another has been observed by Switzer. The cases of Tilt, West, Duncan, Bright, and Stiles will be alluded to when speaking of encystment of the escaped ovum. The only other evidence which we have to offer, to show that the peritoneum may become acutely inflamed under these circumstances, is the statement of Wright,[4] that he found evidences of it in a woman who died in fourteen hours after the supervention of the symptoms of rupture. There appears to be something (probably it is the loss of blood) which prevents the frequent occurrence of inflammation of the peritoneum, as a sequel of this accident. It is so rare under these circumstances that the possibility of its supervention need scarcely be taken into consideration. This fact is not only interesting, but it is important, since a number of competent authorities assert that one of the methods of recovery after rupture is secondary encystment of the fœtus.

A woman under the care of Dr. Elliotson[5] died on the third day, and the peritoneum, instead of being inflamed, was found to be very pale. The patients of Craighead[6] and Whitwell[7] each lived three days after the symptoms appeared, and yet no mention is made of peritonitis. Sager[8] and Selwyn[9] are candid enough to admit that they diagnosticated inflammation of the peritoneum under these circumstances. The

[1] Loc. citat. p. 269. [2] Loc. citat. p. 39.

[3] Le Mouvement Médicale, No. 2, 1873, and London Medical Record, Feb. 26, 1873, p. 119.

[4] Med. Times and Gazette, Jan. 9, 1869, p. 34.

[5] Trans. Medico-Chir. Soc. London, 1827, vol. xiii. p. 51.

[6] Amer. Journ. Med. Sciences, Jan. 1850, p. 114.

[7] Brit. Med. Journ , March 24, 1860, p. 225.

[8] Detroit Rev. Med. and Pharm., Aug. 1868.

[9] Trans. Provincial Med. and Surg. Association, 1834, vol. iii. p. 232.

former states that the symptoms supervened on the morning after the accident. Although life was prolonged three days and a half after the gravid sac gave way, there was not a trace of peritonitis. The same condition was found after death in four days in the cases of Robbs[1] and Harbert,[2] and after six days in that of Barnes.[3] Much additional negative evidence could be produced if it was deemed necessary. There are few things in regard to extra-uterine pregnancy which excite more surprise than the rarity with which peritonitis is noted upon examination after death from rupture of the fœtal cyst.

The practical conclusions that may be drawn from a careful investigation of this subject, *are*—

1. That peritonitis is a rare sequel of rupture of the cyst, and even when pain, tenderness, and other symptoms of this affection supervene after the escape of the ovum, they do not necessarily indicate the existence of inflammation.

2. Peritonitis so rarely follows rupture of an extra-uterine gravid cyst, that the possibility of its occurrence need not be taken into consideration in the decision of any questions relating either to prognosis or to treatment.

Pregnancy in a Hernial Sac.—In discussing the causes of extra-uterine fœtation, hernia of a portion of the internal genital organs was mentioned as one. Bovin and. Duges suggested that this might give rise to misplaced gestation. Four undoubted cases have been reported among the number examined. The first of these occurred in 1706, and the patient was under the care of a French surgeon named Gouey. The observation seems to have been forgotten till Dr. J. H. Aveling, who has done much to interest the profession in the history of obstetrics, rescued it from among the Sloane MSS., it being an extract from the fifth part of "La Véritable Chirurgie établie sur l'expérience et la raison par le Sieur Louis Leger de Gouey," which was printed at Rouen in 1716.[4] The

[1] London Med. Gaz., March 19, 1836, p. 983.

[2] West. Journ. of Med. and Surgery, 1849, p. 110.

[3] St. Thos. Hosp. Repts., 1870, N. S., vol. i. p. 365.

[4] Obstet. Journ. of Great Britain and Ireland, July, 1873, p. 241. It is also quoted by Sprengel (*Histoire de la Méd.*, tome viii.), as a case of Cæsarean section.

patient was an unmarried girl, and this tumor becoming troublesome, Gouey concluded to operate, supposing it to be a hernia. A three months' male fœtus was removed alive, and duly christened according to the custom of the Catholic church. The mother recovered. The narrator of the case is so evidently at fault in his anatomy, that it is impossible to determine in what portion of the genital organs the ovum was situated.

The second case was published by Skirvani.[1] In October, 1850, a woman who had suffered from an imperfectly developed left inguinal hernia from childhood, felt a round body fall into the sac while in the act of stooping. Two months later movements were detected in the tumor. She had labor-pains at term, and April 24, 1851, an incision five inches long was made over the tumor, which reached to the knees. A living child was extracted, but it died in an hour. The mother recovered.

In 1855, Genth[2] reported the third case. The patient had an inguinal ovarian hernia. She became pregnant with her fourth child early in 1852. When she was between four and five months gone, the tumor was incised, and a living child removed. The placenta was partially detached; the mother lost much blood, but recovered.

The remaining example of this singular accident was recorded by Müller.[3] The patient, who was the victim of right inguinal hernia, conceived and went to term, at which time the child was removed by incision. The mother died from hemorrhage. Keller[4] alludes to a hernial gestation which was reported by Widerstein. We have been unable to obtain the particulars of the case. The patient is said to have had a congenital hernia of the ovary, and she experienced such severe pains that Widerstein decided to operate. The fœtus was removed, and the mother recovered rapidly. A similar obser-

[1] Nouvelle Encyclograph. des Sciences Méd., Oct. 1852.

[2] Verhandl. der Ges für Geburtsh., Berlin, 1855, and Brit. and For. Med.-Chir. Rev., Jan. 1857.

[3] Allgem. Wien. Med. Zeitung, 1862, and Brit. and For. Med.-Chir. Rev., Jan. 1863.

[4] Des Grossesses Extra-utérines, etc., 8vo., Paris, 1872, p. 20, from Schmidt's Jahrbuch, 1853, b. lxxx. p. 10, 38.

vation was recorded by Rektorzik,[1] who, however, while acknowledging the pregnancy to have been extra-abdominal, denies that it was extra-uterine. He believes that the child was contained in one horn of a bilocular uterus. The swelling appeared in the right inguinal region immediately after pregnancy commenced, and gradually increased in size until term, when the tumor reached to the knees. The child, which was saved, was removed by operation, but the mother died comatose on the same evening.

Keller[2] asserts that extra-abdominal pregnancy occurs especially in crural hernia. In the cases mentioned the protrusion was by the inguinal ring in four—those reported by Skirvani, Genth, Müller, and Rektorzik—while the species is not mentioned by Gouey and Widerstein. That Keller's opinion is not sustained by facts, is proved by the study of the history of hernia of the uterus and its appendages. This can take place through the inguinal ring, crural arch, or obturator foramen.[3] It would seem reasonable to infer that the first of the three varieties would be found the most common, since the round ligament passes through the internal abdominal ring, and traverses the inguinal canal to be lost in the labia majora. Thus, as it were, a channel is preserved for the escape of the uterus or some of its appendages. We believe that, contrary to the assertion of Keller, escape by the inguinal is more frequent than by the crural ring, and that consequently hernial pregnancy is more frequently inguinal than crural. M. Lallemand[4] has seen the unimpregnated uterus protrude twice. In one the hernia was inguinal, and in the other crural. Choppart[5] has met with an inguinal hernia of the uterus, with the left tube and ovary of the same side, and Cruveilhier,[6] one which was crural. Fischer,[7]

[1] Œsterr. Zt., 18, 1860; New Syd. Soc. Year Book, 1861, p. 334.

[2] Des Grossesses Extra-utérines, etc., 8vo., Paris, 1872, p. 20.

[3] Tanner, Signs and Diseases of Pregnancy, 8vo., Phila., 1868, p. 476.

[4] Dictionnaire des Sciences Médicales, 8vo., Paris, tome xxxi. p. 226.

[5] Courty, Traité Pratique des Maladies de l'Utérus, 8vo., Paris, 1866, p. 717.

[6] Ibid., p. 717.

[7] Annales de la Chirurgie Française et Étrangère, Paris, 1842, tome v. p. 249.

and Ledesma,[1] have seen the impregnated uterus protruding through the inguinal ring, making it necessary to deliver the child by section of the tumor and uterus. In two other herniæ of the gravid womb, observed by Kennedy,[2] and Murray,[3] the organ escaped at the umbilicus.[4]

Protrusions of the uterine appendages, through the abdominal wall, are likewise chiefly inguinal. Mr. Percival Pott's[5] celebrated case, in which both ovaries were removed, seems to have been of this class. Oldham[6] has likewise reported two examples of extrusion of these organs through the inguinal canal. Tanner,[7] alludes to an instance in which the Fallopian tubes escaped. To sum up the results of this investigation, we find that in seventeen hernias, of the whole, or parts of the internal genital organs of the female, the escape took place at the inguinal ring in ten, at the crural ring in three, and at the umbilicus in two women, while the species of the hernia is not mentioned in two instances. This result corresponds in the main with that reached by Deneux,[8] in his investigations in regard to ovarian hernia. Among these he found the crural to be to the inguinal, as one to nine. This certainly does not support M. Keller's statement that extra-abdominal or hernial pregnancy is most frequently crural.

The general symptoms of this variety of misplaced pregnancy appear to differ somewhat from those of extra-uterine gestations, which are intra-abdominal. The tumor may be both painful and sensitive, but the paroxysmal attacks of abdominal pain and colic, which have been spoken of as so characteristic

[1] Tanner, loc. citat. p. 480.

[2] Observations on Obstetric Auscultation, Dublin, 1833, p. 40.

[3] Trans. Obstet. Soc. London, 1860, vol. i. p. 77.

[4] Sennert (*Medic. Practica*, lib. iv. sect. 2, chap. xvii. p. 654), Nicholas Polinus, Ruysch (quoted by Simon, *Mém. de l'Acad. Royale de Chirurgie*, 2d ed., 8vo., Paris, 1819, tome ii. p. 230), and Saxtorph (*Bibliothèque Médic*, tome ii. p. 2), have each reported examples of hernia of the impregnated uterus, but it appears to be uncertain whether the organ escaped through the inguinal or crural ring. See, also, Bovin, and Duges, *Traité Pratique des Maladies de l' Utérus*, 8vo., Paris, 1833, tome i. p. 168.

[5] The Chirurgical Works of Percival Pott, 8vo., London, 1779, vol. ii. p. 210.

[6] Proceedings of the Royal Soc. London, 1857, vol. viii. p. 377.

[7] Loc. citat. p. 479.

[8] Recherches sur la Hernie de l'Ovarie, Paris, 1813.

of misplaced pregnancies in organs which are not intended to undergo any amount of distension, are absent. The patient is inconvenienced chiefly by the locality and size of the tumor. Rektorzik reports this as reaching to the knees. Skirvani mentions the interesting fact that his patient had pains like those of labor at term. The physical signs are those of an extra-abdominal tumor with a narrow pedicle; in Genth's case the size of a little finger. The fœtus itself and its movements can be felt in the mass, while the sounds of the child's heart, and the placental murmur, can be heard on auscultating it. Gouey mentions the fact that at three months he was able to feel the pulsations of the umbilical cord, though he was not aware of the nature of the sensation.

Hernial pregnancy occurs in one out of every one hundred and twenty-five cases of extra-uterine gestation. Of the five cases which we have analyzed, three lived and two died. Widerstein reports an additional recovery, making the mortality 33.3 per cent. None of the cases were left to nature, all the children being removed by section of the tumor.

Twin Conception in Extra-uterine Gestation.—This subject has already been alluded to in connection with the causes of misplaced pregnancy. Attention was then called to the fact that twin conceptions are much more frequent in extra-uterine than they are in normal gestations. It is a striking fact, however, that both children are rarely developed in the same locality. In a large majority of these plural conceptions one ovum finds its way into the interior of the uterus, while the other is arrested at some point in its descent. This fact, as already mentioned, has led Prof. Barnes[1] to believe that twin conception is one cause of extra-uterine fœtation. The proposition may probably be stated more correctly by saying that erratic gestations are more frequent after multiple than single conceptions.

But two examples of twin pregnancy, in which both ova remained outside of the uterus, occurred in the five hundred

[1] Loc. citat. p. 367.

cases examined. The first happened in 1756, and was recorded by Dr. Thomas Bell.[1] The patient, Ellen Noon, went to full term in her first pregnancy, and retained her children for eight months subsequently, when an opening, which had formed at the umbilicus, was enlarged, and the bones of two infants extracted. The second case was reported by Rupin[2] in 1860. His patient died after an attempt to remove the children by section of the vagina at the end of the sixth month of pregnancy.

Dr. W. B. Smith,[3] in 1810, reported the results of an examination of the body of a colored woman, forty years of age, who had died of "chest disease." It is stated that a fœtus was found in each ovary, and the record appears to be reliable. The only suspicious statement about the case is, that it is said that in the child in the left ovary, the umbilical cord, instead of taking its usual origin, issued from its anus. The case is circumstantially related, but unfortunately not a word is said of the anterior history of the woman, and we are left in perplexing doubt as to whether the two conceptions were simultaneous or not. While wanting these facts the case cannot be cited as a twin pregnancy. It may have been an example of two extra-uterine gestations occurring at different times in the same woman.

Trezevant[4] possibly met with a twin conception, both children remaining extra-uterine. If so, one ovum perished at an early period. The woman died when she was between six and seven months advanced in her gestation. Dr. Trezevant, in describing the post-mortem appearances, says: "Upon removing the membranes from their attachments for the purpose of extracting the placenta, I was struck with the appearance of a large vesicle about the size of a walnut on the outer surface of the membranes of the fœtus. Upon opening this a small fœtus, of about from four to six weeks old, was discovered." The author adds that it was perfect, and showed no signs of decay. He then proceeds to describe the fœtus so

[1] Med. Comment., Edinburgh, vol. ii. p. 72.
[2] Gaz. des Hôpitaux, No. 13, 1860.
[3] New York Medical Repository, 3d Hexade, vol. i.
[4] Medical Recorder, 1825, vol. viii. p. 464.

particularly that it is impossible to doubt the existence of the second ovum. The only explanations of the facts which present themselves are that this body was the dead and retained fœtus of a previous extra-uterine pregnancy, or that it was a twin conception, both ova remaining extra-uterine, and one having perished in the early stages of its development.[1] Medical literature contains the records of few facts which throw light upon this curious and interesting observation. The only case in which analogous anatomical appearances were discovered is that recorded by Haydon,[2] who found an encysted ovum of eight weeks, and a recent fœtus of six months' development in the abdomen of the same woman. In this instance, however, there was a distinct history of a previous pregnancy, with symptoms of rupture and recovery. This is wanting in the history of Dr. Trezevant's patient, and therefore it seems not unreasonable to conclude that his case was an illustration of twin pregnancy, both children being extra-uterine. We have, therefore, two, and possibly three instances of multiple conception in which both ova were arrested in their transit to the uterus in five hundred cases of extra-uterine gestation.

In the same number there were no less than twenty-one[3] multiple impregnations, one child being developed within,

[1] The reporter believes that the very rare and interesting phenomenon which he describes is an example of superfœtation. This opinion does not need to be combated.

[2] Trans. Obstet. Soc. London, 1864, vol. v. p. 280.

[3] These are reported by : Cooke, Trans. Obstet. Soc. London, 1864, vol. v. p. 143 ; Sager, Michigan Univ. Med. Journ., Oct. 1870, p. 456 ; Argles' Lancet, Sept. 16, 1871, p. 394 ; Salle, New Orleans Med. Journ., Oct. 1860, p. 727 ; Duverney, Œuvres Anatomiques, vol. ii. p. 355 ; Whinnery, Amer. Journ. of Med. Sci., April, 1846, p. 351 ; Ott, Prag. Med. Wochenschr. 12, 1864 ; Taffnell, Dublin Quart. Journ. of Med. Sci., May, 1862, p. 462 ; Mad. La Chapelle, Pract. des Accouch., tome iii. p 152 ; Loudon, Campbell's Memoir, p. 65 ; Craighead and Hodge, Amer. Journ. of Med. Sci., Jan. 1850, p. 114 ; Sinks, Leavenworth Med. Herald, Feb. 1873 ; Pennefather, Lancet, June 20, 1863, p. 688 ; Buck, Bost. Med. and Surg. Journ., 1856, vol. liii. p. 371; Löw and Lumpe, Ibid., 1859, p. 328; Starley, New York Med. Journ., March, 1873, p. 299 ; Pollak, St. Louis Med. and Surg. Journ., May 10, 1871 ; Gordon, West. Journ. of Med. and Surg., Oct. 1848 ; Satterthwait, New York Med. Journ., 1872, vol. xvi. p. 387 ; Tebbets, Nashville Journ. of Med.

and the other outside of the uterine cavity. These form a very interesting group of cases, not only on account of the difficulty in diagnosticating the condition, but in regard to their management when they reach term. Of the twenty-one women alluded to, fourteen died and seven recovered—a mortality of 66.66 per cent. The death-rate of the five hundred cases analyzed was 67.20 per cent. It, therefore, appears that the coexistence of intra- and extra-uterine pregnancy does not increase the risks of the mother.

Under these circumstances the woman may carry both children to term, when the one contained within the uterus may be born in a natural manner, as has been reported by Satterthwait, Pollak, Loudon, Whinnery, Gordon, and Starley. Other women, as the one attended by Cooke, have very difficult labors, because the extra-uterine cyst and its contents encroach upon the pelvic cavity. At other times the intra-uterine child perishes. In Argles' patient it died at the end of the second month, though the extra-uterine fœtus continued to live for five months longer. In Sinks' case the uterine child perished when six months old. In other instances the woman died from rupture of the extra-uterine cyst with or without abortion taking place. If the uterine child is expelled and the woman recovers, the misplaced gestation progresses as if it had been uncomplicated by uterine pregnancy.

Pregnancy while carrying an Extra-uterine Fœtus.—If an extra-uterine child, carried beyond term, becomes encysted, the condition is not incompatible with pregnancy. Of twenty-two women, seven became pregnant once, eight twice, four three times, one four times, and two five times while carrying extra-uterine children. In many of these instances labor was perfectly easy and normal. It has terminated before the physician could reach his patient. The extra-uterine child

and Surg., Feb. 1860, p. 160; Deocene, Gaz. des Hôpitaux, 1852, p. 147; Pellischek, Œsterich. Zitschr. f. Prakt. Hielkunde, 1865.

Since this page was written McGee has reported (*Richmond and Louisville Medical Journ.*, March, 1875, p. 311) another example of combined gestation. The extra-uterine child was discharged by the bowel, and the intra-uterine one by the natural passages, near the end of the fourth month.

sometimes forms an obstacle to the birth of the recent uterine conception. The management of this complication will claim attention when the treatment is considered.

Of course the occurrence of intra-uterine pregnancy while a fœtus is contained in the abdomen materially increases the dangers of the woman. The excitement incident to the condition, and the succussion and compression of the tumor during labor, are very liable to lead to inflammation and suppuration of the cyst.

The tumor resulting from the misplaced conception may produce very distressing mechanical effects during a subsequent normal gestation. Gordon states that he had the care of a woman[1] who bore five children while carrying one which had become encysted. During the first four pregnancies nothing remarkable occurred, but in the fifth the tumor was pressed downward into the pelvis, where it obstructed the bowel to such an extent as to render defecation impossible until it was pushed up with the finger. Hennigsen[2] observed a displacement in the opposite direction. The woman's sixth conception was misplaced. She survived, and two years later she conceived again. As the uterus increased in size the tumor resulting from the previous gestation was pushed up as high as the liver. As a consequence, the woman suffered greatly from dyspnœa, so that it was necessary to induce premature labor when she was between seven and eight months gone. After the child was born the tumor returned to its original position in the lower part of the abdomen. A few days later it suppurated, and death occurred from pyæmia.

It is of interest to determine whether a woman ever becomes pregnant with an intra-uterine child during the first nine months after an extra-uterine conception. As the uterus is empty, it might be thought that this would not be an unlikely occurrence. The question is of interest on account of its bearing upon the possibility of superfœtation. Dr. Matthews Duncan[3] has shown that in uterine conceptions the cavity of

[1] Western Journ. of Medicine and Surgery, October, 1848.

[2] Archiv. für Gynækologie, 1870, and New Sydenham Society's Bien. Retrospect, 1869–70, p. 397.

[3] Researches in Obstetrics, 8vo., Edinburgh, 1868, p. 171.

the womb does not become closed for several months; not until the ovum becomes large enough to bring the decidua reflexa in close and firm apposition with the decidua vera. This does not take place until some time in the third or fourth month, and during all this period repeated impregnation is supposed to be possible by many competent observers. In extra-uterine pregnancy the cavity of the uterus never becomes closed. The decidua reflexa is not formed. The canal of at least one of the Fallopian tubes may remain patulous, and nothing obstructs the ascent of the spermatozoa when deposited in the vagina except the plug of tough mucus which fills the cervix. This is not enough to prevent impregnation, since it is not more thick nor more dense than the accumulated secretion of that part in some non-gravid women. The decidedly greater preponderance of twin conceptions in misplaced than in normal pregnancy, with the fact that it is only very rarely that both ova are developed outside of the cavity of the uterus, would appear to support the conviction that impregnation may occur during the normal period of gestation with a misplaced child. However, there appears to be no clinical evidence to support this opinion. The cases of combined intra- and extra-uterine pregnancy rarely present any considerable difference in the size and development of the two ova. When they are unlike, the one occupying the normal position is usually the larger and stronger. We know of one case, that of Dr. Pollak,[1] in which the extra-uterine child is reported to have been better nourished than its intra-uterine fellow. After stating that the latter was well developed, Dr. Pollak says that the former was "much larger and heavier than its yet living mate." It seems probable also that the function of ovulation is suspended after conception. The occurrence of a discharge of blood from the vagina during the evolution of a misplaced ovum is no indication that the ovaries still continue to maturate and discharge ova. The blood thus lost is not menstrual but metrorrhagic. The periodicity of the discharge is not maintained. It may, therefore, be fairly concluded that we have no evidence that repeated impregnation ever occurs in extra-

[1] St. Louis Med. and Surgical Journ., May 10, 1871.

uterine pregnancy during the usual period of gestation. Even after this has been completed, a second impregnation does not occur until the woman regains her natural condition and those phenomena which belong to the pseudo puerperal state have disappeared. It is clearly wrong to call a conception which occurs after this time a super-fœtation, as is done by Leishman.[1]

Repeated Extra-uterine Pregnancy.—Women have been known to bear more than one extra-uterine child. Primerose observed[2] this in 1594. There was an interval of about three years between the pregnancies. Davis refers[3] to a case in which two cysts were found after the death of the woman. Each contained a well-developed child which had been carried for seven years. It may be that this was a twin conception. Dr. Gabriel King[4] has seen two misplaced gestations in the same woman with an interval of three years between them. Campbell[5] quotes from the *Journal de Médecine, Chirurgie, Pharmacie*, etc., 1785, the history of a woman whose eighteenth conception was erratic. She recovered and retained the child thirty-three years, and died at the age of seventy-five years. At her autopsy it was found that "the abdomen contained an ovoid mass weighing five and a half pounds, composed of perfectly dry cartilaginous structures, inclosing a mature male fœtus, with its funis and placenta. After the removal of this last, another body the size of a hen's egg, also cartilaginous, containing a fœtus the size of one of two months, was found to the left side of the uterus." This likewise may have been a twin conception. Varnier and Mangin,[6] in the *Journal de Médecine*, 1786, state that they made a post-mortem examination of a woman who died aged 74 years, and they found what they believed to be a double ventral pregnancy.

M. Galiay[7] has known a woman to conceive two extra-

[1] A System of Midwifery, 8vo., Glasgow, 1873, p. 198.

[2] De Mulierum Morbis et Symptomatis, lib. iv. p. 316.

[3] Principles and Practice of Obstetric Medicine, 4to., London, 1836, vol. ii. p. 937.

[4] Edinburgh Med. Essays and Observations, 1742, p. 441.

[5] Loc. citat., foot-note, p. 55.

[6] Moreau, Des Grossesses Extra-utérines, 12mo., Paris, 1853, p. 115.

[7] Gazette Médicale de Paris, July 29, 1837.

uterine children. In the interval between the two pregnancies, the product of the first was evacuated through the rectum, after which she enjoyed good health for five or six years, when she conceived again. This child was also located outside of the womb, and, like the first, was finally discharged through the bowel, after which the woman regained her health.

In 1850, Dr. F. Brown reported[1] that he had the care of a woman who, after having aborted a number of times, finally carried a child to term, but it proved to be extra-uterine. Two years later she conceived again. At the end of the sixth month symptoms of labor came on, after which the cyst opened through the abdominal walls. The orifice was enlarged and the bones extracted.

In 1853, M. Oulmont had under his care, in the Hôpital de la Salpétrière,[2] a woman aged thirty-one years, who had never borne any children, and who died of rupture of the cyst when she was three months gone. At the autopsy the product of the recent conception was found in the pavilion of the tube on the right side. A second tumor was found at the extremity of the left tube. It was smaller than the one on the right side, and contained a small anencephalous fœtus, which, after an attentive examination, M. Oulmont concluded was the result of a conception some years before.

The only remaining example of repeated extra-uterine fœtation, of which the author has any knowledge, is one reported to the Obstetrical Society of London, in the year 1863, by Dr. N. J. Haydon.[3] It is to be regretted that the clinical history of the patient is not more complete, but the case is so interesting that the particulars are inserted in full. S. C——, a young woman servant, died after a few hours' illness, from rupture of the sac of a tubal fœtation. Between four and five years before, she was supposed to have been pregnant and to have aborted, but no fœtus was seen. At this time she was very dangerously ill, and for some time not expected to live. The man with whom she had been intimate went to sea because he believed her to be pregnant. "About six months

[1] St. Louis Med. and Surg. Journ., May, 1850, p. 205.
[2] Moreau, loc. citat. p. 110.
[3] Transactions, vol. v. p. 280.

before her death he returned, and a fresh intimacy took place, and he again neglected her shortly before her death, which was supposed to have been caused by poison taken to procure abortion. No evidence, however, was elicited at the inquest on this point; but she complained twenty-four hours before her death of pain in head, stomach, and bowels, though she did not seem in very great pain. She continued in a very low state the whole time of her illness, during which she had several fits, and died twenty-four hours after the commencement of the attack. It should be stated that there was no medical evidence of the symptoms during life, and, therefore, their character is very imperfectly described.

"The post-mortem examination showed all the organs healthy, except the uterus and appendages, which are described in the report below."

Dr. Tyler Smith and Dr. J. Braxton Hicks were appointed by the Obstetrical Society to examine this specimen, and they reported the result as follows:[1] "Uterus nearly four inches long, two inches wide. The walls proportionately thick. Interior of uterus lined with a very thick decidual membrane, now easily separable. This layer is quite as thick as is found in normal gestation at its fullest development, and, under the microscope, is found to possess the elements of the decidua of pregnancy. It is uncertain whether the so-called Montgomery cups are present.

"The left ovary and Fallopian tube are normal in position and structure. The *right* tube, however, passes off from the uterus, at one and a half inches below the fundus; while that on the left at only three-quarters of an inch, which gives the appearance as if the right tube arose from the middle of the uterus. The length of the right is much greater than the left, being, including the sac (to be described below), four and a half inches, while the other is only three inches. This is by no means owing to the development of the sac itself, for whereas the distance from the uterine end of the ovary to the uterus on the left is three-quarters of an inch, that on the right is two and a half inches.

[1] As this case is a very remarkable one, the author has presented the report in full, notwithstanding its defects of style.

"*Extra-uterine Sac.*—At about one and a half inches from the uterus, in right side, the tube is dilated into a sac, now about three inches in diameter, probably originally globular in form when full. The walls are made up throughout of hypertrophied muscular fibre, and the thickness varies much in different parts; that near the uterus being almost half an inch thick, while at the outer part, where there is a rupture, it is reduced to the thickness of parchment. Through this rupture the fœtus and appendages escaped. The ovary was twice the size of the other, and attached to about the middle third of the sac. A corpus luteum was found in it approaching the development of that of a six months' normal pregnancy, except that the centre was already filled with a white structure, and seemed to have possessed a well-defined border to the cavity. Its color was also very pale and feebly shown, so as almost to escape observation. It was probably thus influenced by the death of the fœtus at a period before it had gone through the full changes of a normal corpus luteum.

"The other ovary possessed no such structure.

"The fœtus which had escaped was the size of that of about a three months' pregnancy, inclosed in its own ovular sacs, the principal part of the placenta escaping with it. A clot also is appended, probably was found within the sac, and took part in increasing its tension. The head is flattened, scarcely any bony structure to be felt, and the whole had a shrivelled appearance, and had been dead some time before the mother died.

"So far there is nothing unusual in the case; but appended to the edge of the rent in the sac is a small, irregular, solid mass of the size of a large walnut, which, upon examination, proves to be a small fœtus, packed very tightly within a membrane, the base of which is adherent to the outside of the sac by firm membranous adhesions, which form a narrow pedicle. It is our opinion that it is attached to the exterior of the sac. By changing its position it appears distinctly to be so, although at first sight there is some difficulty in distinguishing, inasmuch as it is fixed on the edge of the rent.

"This opinion is much confirmed by the fact that a band which comes from the other Fallopian tube is attached to the

pedicle in such a manner as to show it could not have been but outside.

"As regards the inclosed fœtus, the scapula can be plainly seen on either side with the bones of the arm. A section was made through the dorsal aspect in middle line, the vertebræ were partially formed, and the cavity of the cranium, inclosing a granular yellow mass, full of plates of crystals.

"The muscular tissues on the back of scapulæ retained their fibrous sheaths, still possessing much toughness. There was no trace of any ovular structures beyond the inclosing membrane.

"From hence we infer the following:—

"1. That some time since, the patient had conceived extra-uterine; that the fœtus was attached to the fimbriated extremity of the Fallopian tube in such a manner as not to form impediment to subsequent conception. That this fœtus died at about the second month of pregnancy, inclosed still in its ovular structures, that it then dwindled gradually away to its present state, the chorion villi being absorbed.

"2. That at a later period, probably some six months before death, she again conceived, also extra-uterine, but the ovum had this time descended to the middle of the tube, that it was there arrested, lived about three months, and then died, three months after which the sac bursted.

"It appears probable that the position and length of the Fallopian tube were owing to a congenital abnormal arrangement of the parts. It seems improbable that the development of one side of the uterus could have been the cause, inasmuch as the interior of the uterus was perfectly symmetrical, and the walls of equal thickness."

This observation of Dr. Haydon is of great interest, and the report of Drs. Smith and Hicks greatly increases the value of the case. It appears to be probable that the first conception was truly extra-uterine, and that it occurred in the fimbriated extremity of the tube. It is not certain, however, that the second conception was not in an undeveloped uterine horn. The gravid Fallopian tube is described as being longer than its fellow, and as entering the uterus one inch and a half below its fundus. The fact that this organ was symmetrical in its

development would appear to show that the anatomical peculiarities belonged to the tube alone. It is much to be regretted that nothing is said in regard to the position of the round ligament, but this uncertainty does not rob the case of its interest. The occurrence of tubal pregnancy; the probable rupture of the cyst at the end of two months; the recovery of the woman, and her subsequent illegitimate intimacy with the same man; her second conception, with death from rupture, and the discovery of two ova on the same side at the autopsy; all make a picture which we believe to be unique.

On rare occasions the abdomen may contain more than two extra-uterine children. Campbell[1] refers to two cases in which it inclosed three children at one time. Both women recovered; the decomposed fœtal structures being discharged through orifices in the abdominal walls.

The only other case which we can cite as a possible example of repeated extra-uterine pregnancy, is that of Dr. Smith, to which allusion has already been made, and in which a child is said to have been found in each ovary. The woman escaped death from the pregnancy, and finally perished from "chest disease."

It is a remarkable fact that Dr. Haydon's was the only patient who died from the misplaced conception out of the whole number of cases of repeated extra-uterine pregnancy to which reference has been made. It would appear, therefore, that the repetition of this accident does not materially increase its dangers.

[1] Loc. citat. p. 111.

CHAPTER VII.

TERMINATIONS AND MORTALITY.

Rupture of the cyst—Its frequency—Period at which it occurs—Duration of life after—Recovery after it—Encystment of the effused blood and the ovum by peritoneal inflammation—The child may be retained for an indefinite period after its death—It may remain almost unchanged, be mummified, converted into a lithopædion or adipocere—Inflammation and suppuration of cyst—Discharge of its contents through alimentary canal—Through the vagina and bladder—Through abdominal wall—Comparative safety of these modes of termination—Time at which the cyst begins to discharge its contents—Mortality—Causes of death—Comparative mortality of different species.

Most writers upon this subject have devoted a separate chapter to the consideration of the various terminations of erratic conception. This is not one of the least interesting questions which claim consideration in connection with the accident, whether viewed with regard to the marvellous circumstances under which life is sometimes preserved, or the frightful rapidity with which it is destroyed in other cases.

An extra-uterine fœtation may terminate, in its early stages, in rupture of the cyst. After the middle of gestation it may end in the death of the child, which may become encysted, and, after undergoing various alterations, it may remain as an innocuous foreign body. At other times the fœtus decomposes, and is discharged by the sac communicating with the alimentary canal, vagina, or bladder; or the formation of an opening on the surface of the abdomen.

Rupture of the Cyst. — The gravest accident that can happen to the victim of misplaced pregnancy is rupture of the gravid cyst. This is attended with the most alarming symptoms, and frequently terminates in death within a short time. The almost universal opinion of the profession is, that this accident is uniformly fatal, and, if not so, that we have no reliable means of combating its dangers. True, some have

raised their voices and used their pens to advocate surgical interference, but as yet no one has been bold enough to hazard an operation under the circumstances. Operative interference is condemned by the highest authorities upon the subject, and he who would subject a woman, under these circumstances, to the dangers of gastrotomy, would have to possess the courage of McDowell and his immediate followers. The subject, however, is worthy of careful investigation; indeed, this is one of the most practical questions which the student of the clinical history and the results of extra-uterine pregnancy can investigate.

In order to appreciate the various influences which must be considered before the question is decided, several other matters must be investigated. The time at which the cyst gave way in the 174 cases of rupture which occurred in the 500 studied is stated in the following

Table showing the period of Rupture of the Cyst.

Time of gestation.	Species of the pregnancy.					
	Tubal pregnancy.					
	Tubal proper.	Ovario-tubal.	Tubo-uterine.	Ovarian.	Abdominal.	Doubtful.
3 weeks	1	....	....	....	....	....
4 "	2	....	....	1	....	....
5 "	1	....	....	....	....	....
6 "	14	....	1	1	....	....
8 "	25	....	1	....	1	1
9 "	4	....	....	....	....	1
10 "	12	2	2	....	....	....
3 months	19	1	10	3	....	1
3½ "	10	1	....	1	....	....
4 "	8	....	1	3	....	1
4½ "	4	....	....	....	....	....
5 "	2	1	2	3	....	....
5½ "	1	1	1	1	....	....
6 "	3	....	1	....	1	1
6½ "	....	1	....	....	....	....
7 "	1	....	....	....	....	1
8 "	....	1	1	....	....	1
8½ "	....	1	....	....	....	....
9 "	....	1	....	1	....	....
15 "	....	....	....	....	....	1
Doubtful	10	....	....	1	....	....

This exhibit fully confirms the prevalent opinion upon this subject. Rupture, especially in tubal pregnancy, whatever may be its form, generally occurs before the end of the fourth month. In 26 of the cases, the accident supervened at the end of the second month. After this there appears to be a period of comparative safety, which lasts till the end of the third month, at which time there were 30 cases of rupture. After the end of the fourth month it is much more rare, but it may occur at any time up to the end of gestation, or even after it in rare cases.

Ths earliest period mentioned is three weeks. This case was reported[1] by the late Dr. Cathcart, of Philadelphia, and is certainly of great interest. Rokitansky has known rupture to occur within a fortnight after conception.[2]

The period during which life was prolonged is mentioned in 113 of the 174 deaths from rupture of the cyst. Of these, 39 died in ten hours or less. Of the 39, three expired almost immediately, and three others lived only two hours. Twenty women lived between 10 and 18 hours, and 29 between 18 and 42 hours after rupture. Of the remaining 25, 10 died at the end of the second day; 5 at the end of the third; 1 in two and a half days; 1 in three and a half days; 2, each at the end of the fourth, sixth, and seventh days; 1 at the end of the eighth day; while another did not succumb for two weeks. Of the whole 113 women, 81 had died at the end of twenty-four hours after rupture is supposed to have occurred; while at the end of forty-eight hours, only 15, or a little more than 13 per cent. of the whole number, were alive. This is certainly sufficiently terrible, especially when we remember that many of these women were stricken down when they believed themselves to be in perfect health. No disease could destroy life more quickly than this sometimes does. It may hurry its victim out of existence as rapidly as the assassin's knife or the most terrible of all nature's convulsions.

Pyan,[3] Clayton,[4] Godefroy and Everard,[5] and others, have

[1] Phila. Med. Times, Dec. 27, 1873, and Trans. Patholog. Soc. of Phila., 1874, p. 182.

[2] Manual of Pathological Anatomy, 8vo., Phila., 1855, vol. ii. p. 256.

[3] Mémoirs de l'Acad. Roy. de Méd., Paris, 1845.

[4] Lancet, 1840–41, p. 654, and Ibid., 1841–42, p. 28.

[5] Annales de la Méd. Physiologique, 1827, vol. xii. p. 39.

been called upon to make post-mortem examinations for the coroner under these circumstances. Bovin and Duges[1] give the results of the autopsical examination of a woman who appears to have died of extra-uterine pregnancy. She was exhumed several days after burial, because her husband was suspected of having destroyed her. Filliter's[2] patient was found dead in bed by the side of her husband; and Koner[3] has reported the history of a woman whose demise was so sudden that she was supposed to have been poisoned by arsenic.

Notwithstanding the frightful rapidity with which death closes the scene, in many of these cases, there yet remains the small percentage which makes a struggle for existence, and lives beyond the most fatal period which succeeds the accident. Some writers apparently believe that recovery after rupture is not infrequent, and among these is Churchill.[4] Others think recovery possible, but not frequent. Ramsbotham[5] and Campbell[6] entertain this opinion, while, on the other hand, Rogers, the author of the most important memoir on extra-uterine fœtation which has ever been written in this country, asserts[7] most positively that no case of recovery after rupture has been recorded, and that we have no evidence whatever that it can occur. Examples of alleged recovery have been reported by Ingleby,[8] Evory Kennedy,[9] Barnes,[10] and Wellington.[11] The true nature of all of these is involved in more or less doubt. The observation of Ingleby is the most important, and is the only one of the four which was known to Dr. Rogers. Camp-

[1] McDonnel, Med. Mirror, Jan. 1866, p. 8.

[2] Med. Times, London, Sept. 10, 1853, p. 264.

[3] Encyclog. des Sciences Méd., Fevrier, 1837.

[4] Having spoken of sudden death, this author adds: "But there are many exceptions to such prompt terminations. The patient may survive the shock, hemorrhage, and subsequent inflammation, and the parts may accommodate themselves to the presence of the fœtus, so that the patient shall recover a certain amount of health, and suffer but little local inconvenience; nay, she may even again conceive and bear children."—*Theory and Pract. of Mid.*, Phila., 1862, p. 185.

[5] Loc. citat.

[6] Loc. citat. p. 126.

[7] Extra-uterine Fœtation and Gestation, 8vo., Phila., 1867, p. 41.

[8] Edinburgh Med. Journ., 1834.

[9] Brit. Med. Journ., Jan. 23, 1869, p. 67.

[10] St. Thos. Hosp. Reports, 1870.

[11] Boston Med. and Surg. Journ., 1873.

bell[1] believed this to have been a true example of extra-uterine gestation, and with the light which is thrown upon it by some cases which appear to have been unknown to Dr. Rogers, and others which have since been published, we are unable to see the force of the latter's criticism. The fact that an observer so accurate as Dr. Ingleby was, says that the decidua was expelled with symptoms of rupture, is of considerable importance, and goes far to support his views, though Ramsbotham appears to attach no value to this fact, he having, before Rogers, expressed the opinion that it was not an example of survival after rupture. In regard to the cases of Kennedy, Barnes, and Wellington, it is useless to say a word. There is nothing in their histories which would lead us to believe that they might not have been pelvic hæmatoceles.

The conviction that recovery may sometimes follow rupture of the cyst rests upon more important testimony than that furnished by the observations just mentioned. The onus of disproving it must rest upon Rogers, Bernutz, and others, who deny the possibility of its occurrence. Mention has already been made of what Dezeimeris and others have called secondary ventral pregnancy. More than a century since, Patuna recorded the famous case of Helen Zopp, in whose abdomen he found a child unenveloped by any membranes, and connected with its parent by means of the cord and placenta alone, the latter of which was attached to the interior of the fundus uteri. In 1769, the equally famous case of Mr. Hey was made public in a letter to Dr. Wm. Hunter,[2] and a similar observation was made by Hofmeister in 1821.[3] The conditions discovered at the post-mortem examinations of these two women did not differ from those found in the case of Patuna, except that in the latter, the membranes of the ovum had been destroyed, while they were intact in the cases of Hey and Hofmeister. In all of these cases the sac of a tubo-uterine pregnancy[4] had been ruptured, but the attachments of the placenta had not

[1] Loc. citat. p. 126.

[2] Med. Observations and Inquiries, London, 1769, p. 341.

[3] Rust's Mag. 1823, vol. xv. p. 126; Campbell, loc. cit. p. 100.

[4] Rogers (loc. cit. p. 24) calls these ovario-tubal pregnancies; upon what grounds it is impossible to determine.

been destroyed, and hence the embryo went on developing as if nothing had happened.

Precisely the same thing may occur in gestations of that part of the oviduct, which is situated between the pavilion and the portion of the tube which traverses the uterine tissues. In 1864 Hillmann[1] reported what was probably an example of secondary abdominal pregnancy, in which the child was removed some time after the completion of term by enlarging an abdominal fistula. Dr. Hillmann evidently failed to understand what he observed, and he suggests that the peritoneum may have discharged the functions of the fœtal membranes. Rogers,[2] who cited this observation of Hillmann's, was likewise uninformed in regard to this mode of termination, since he doubts the accuracy of the observations of the reporter, and believes that the phenomenon was apparent, not real, and was due to adhesions between the fœtal membranes and the peritoneum. If any one continues to entertain doubts that the appearances described by Hillmann can occur, these are effectually disposed of by the observations of Braun[3] and Bandl.[4] The former had under his care a patient who died at the full term of an extra-uterine pregnancy. At the autopsy the placenta, which was very large from interstitial hemorrhage, was found attached to the right Fallopian tube. Upon following the umbilical cord downward, it was found to enter a tumor in the right tube and to be surrounded by the ruptured shrivelled fœtal membranes. Excepting the attachments of the cord, the fœtus, which weighed ten pounds, was free in the abdominal cavity. There were evidences of both old and recent peritonitis discovered at the autopsy. The patient died in November. In the preceding July she was an inmate of the Vienna Hospital, where she was treated for peritonitis.

A very similar condition was discovered at the autopsy of Bandl's patient. The right ovary and tube were involved in

[1] Berlin. Klin. Wochen., Nov. 21, 1864, and Brit. and For. Medico-Chir. Rev., 1865.

[2] Loc. citat. pp. 12, 13.

[3] Related by Dr. T. Trush in a letter to the Clinic, Mar. 2, 1872, p. 105.

[4] Wiener. Med. Woch., Aug. 8, 1874, and Med. Times and Gaz., Sept. 19, 1874.

a tumor six inches long, five broad, and four thick, which was situated partly in the true, and partly in the false pelvis. This tumor contained the placenta, and its walls were composed of firm layers of a substance 3′ to 4′ in thickness. Facing the uterus, and just under the brim of the pelvis, there was a round aperture in the tumor. It was one inch in diameter, with sharp edges, which closely resembled those of the falciform process of the fascia lata, and through it the funis passed to join the placenta. Surrounding and projecting from this orifice were the ruptured, corrugated, shrivelled membranes, while the fœtus, which weighed eight pounds, was contained in an adventitious cyst of pseudo-membranes.

There is no reason to doubt that these two cases are, as their narrators believe, examples of rupture of the cyst, and subsequent development of the child, and that of Prof. Braun is of especial interest because the date of the accident is fixed with tolerable certainty by the severe symptoms which followed, and necessitated the admission of the patient into the Vienna Hospital.

In all the examples of survival after rupture which are authentic, and to which allusion has been made, the cyst wall, with or without the fœtal membranes, gave way without seriously disturbing the attachments of the placenta. The advocates of the opinion that this accident is always fatal may possibly object to these examples being cited as illustrations of recovery. It has been shown that the extent of the lesion in rupture has very little influence upon the issue of the accident, or even upon the rapidity with which death follows. Some of the most insignificant solutions of continuity in the walls of the sac are the soonest followed by death. Hence there is little to be drawn from this argument.

Less positive but almost equally convincing evidence is to be deduced from another class of cases, the occurrence of which is denied by Rogers and his followers. Allusion is made to those in which the embryo escapes from the sac and becomes encysted. Switzer has reported a case as tubal pregnancy, which Tilt[1] looks upon as an example of rupture producing

[1] Uterine and Ovarian Inflammation, p. 73.

hæmatocele. The patient lived ten days, and died of peritonitis. Study of this history confirms the idea that it was an extra-uterine gestation, especially when it is remembered that "a layer of plastic lymph lined the cavity of the uterus." Bernutz agrees[1] with this opinion. Bright[2] has recorded an example of secondary encystment of the embryo, from the effects of which the patient died in six months. The embryo escaped when the woman was three months gone. The cavity from which it escaped was discovered. Stiles[3] has known a woman to live nearly to term, the cyst having given way when she was three and a half or four months advanced in her gestation. There can be no doubt about the formation of a secondary sac in this instance. Dr. Evory Kennedy[4] had charge of a woman whose history is not so reliable, but in whom it seems not improbable that an extra-uterine fœtus underwent secondary encystment. She had symptoms of rupture when three months gone, and lived for eighteen years, when Dr. Churchill discovered an orifice in the roof of the vagina, through which pus was discharging. This was enlarged, and a fœtus of three months' development extracted. West has seen[5] a woman live seven days after she came under observation, with a tumor produced from rupture of a tubal cyst of two months' development and secondary peritonitis. At the autopsy it was found that the fœtus had escaped entire. The pelvic cavity was filled with coagulated blood which had moulded itself among surrounding organs and set up secondary peritonitis. Dyce[6] reports an instance of death from rupture, in which the symptoms had supervened upon the reception of an injury six weeks before the woman's admission into the hospital. She lived three days after coming under observation, during which period she improved, when, immediately after Dr. Dyce had dictated her history, she suddenly collapsed, and died in

[1] Clin. Mem. on Dis. of Women, N. Syd. Soc. Ed., 8vo., London, vol. i. p. 196.

[2] London Med. Gaz., Dec. 6, 1828, p. 29.

[3] Phila. Med. Times, Apr. 4, 1874.

[4] Brit. Med. Journ., Jan. 23, 1869, p. 68.

[5] Edinburgh Med. Journ., Dec. 1853.

[6] Med. Times and Gaz., Aug. 11, 1860, p. 137.

nine minutes. At the post-mortem some recent peritoneal adhesions, and more than sixty ounces of blood, fluid and coagulated, were found in the abdominal cavity. A portion at least of this blood must have been effused before the patient came under the care of Dr. Dyce. It is impossible to believe that the large quantity could have been poured out in nine minutes, even though the rent in the gravid cyst would admit a finger. Dr. Duncan, of Edinburgh,[1] reports the history of a woman who was two months gone, without having had any of the usual indications of having conceived, excepting suppression of the menses. She was then seized with all the symptoms of pelvic hæmatocele, and the usual physical signs of this accident supervened. A month later, when she appeared to be recovering, the tumor formed by the encysted blood, and which could be felt in the hypogastric region, suddenly burst, producing general peritonitis, which proved fatal in a short time. At the autopsy the encysted hematocele was found, and in it the ruptured extra-uterine cyst and a two months' ovum. The only other record with which we have met bearing upon the subject of secondary encystment of the child is one by Mr. Tilt.[2] The report is indefinite in many particulars, and it cannot be accepted as affording any evidence in favor of the statement that recovery may follow rupture. The records of the 500 examples of extra-uterine fœtation which have been examined, contained no other evidence than the foregoing, that recovery may follow rupture, excepting Haydon's case and two observations made respectively by Prof. Sager, of the University of Michigan, and Dr. J. Braxton Hicks, of London. The former gentleman[3] was called to a woman who was five or six weeks pregnant, and who had all the symptoms of rupture of an extra-uterine cyst. She reacted in six hours, and continued to do well until the morning of the fourth day, when, contrary to Dr. Sager's directions, she insisted upon getting out of bed to micturate, and died shortly afterward. In a conversation with Prof. Sager in regard to this subject, he stated that it appeared

[1] Edinburgh Med. Journ., Jan. 1864, p. 670.
[2] Med. and Phys. Journ. of London, May, 1828.
[3] Detroit Rev. of Med. and Phar., Aug. 1868.

as if the woman might have recovered if she had rigidly obeyed directions. The observation of Dr. Hicks[1] is more important, since it involves less speculation. This case has already been alluded to. The patient died, when four months pregnant, of internal hemorrhage, the result of an attempt to destroy the fœtus by puncturing it with a trocar. About a fortnight before her death she had some symptoms of rupture, but these were not distinctive. At the post-mortem the cyst, which had originally contained the ovum, was found ruptured; and outside of it, having formed new connections, was the perfect ovum with its placental attachments, on the side opposite the opening into the cyst and to the posterior surface of the uterus. There is no reason why pregnancy should not have progressed to term in this instance, and there seems to be no other method of explaining the conditions found at the post-mortem examination than that mentioned.

This completes the evidence in favor of the possibility of recovery after rupture of an extra-uterine gravid cyst. To sum it up, we have the following facts:—

1. That in gestations of the tube, wherever located, the cyst may rupture, and the woman go to full term. The fœtal membranes may remain intact, as in the cases of Hey and Hofmeister, or they may be ruptured, when the child is free in the abdominal cavity, as in the cases reported by Putuna, Braun, and Bandl. In both instances the placenta remains undisturbed, and in both, the children may be as well developed as in uterine pregnancy.

2. In these cases there may or may not be peritonitis leading to secondary encystment of the fœtus.

3. Rupture of the gravid cyst in the early stages of extra-uterine pregnancy may be followed by encystment of the ovum and effused blood by peritoneal inflammation, as in the cases of Bright, Stiles, West, and Duncan. Under these circumstances it is proved that the woman may live for several months, and it is not unphilosophical to conclude that she may recover.

4. Rupture of an extra-uterine cyst may occur during the early period of gestation, the ovum escape, and attach itself to

[1] Trans. Obstet. Soc. London, 1866, vol. vii. p. 95.

some portion of the peritoneum, and then continue its development, as is proved by the observation of Dr. J. Braxton Hicks.

In the light of these facts the statements of Rogers[1] and Bernutz,[2] that this accident is invariably fatal, cannot be admitted. It is now important to determine the frequency with which recovery occurs. From a careful examination of this subject it must be acknowledged that a happy termination of rupture of the cyst is exceedingly rare. There is little doubt that it is more common than is supposed by some. On the other hand, it is equally certain that restoration to health is much less frequent than other equally competent authorities have supposed. The rule is that these melancholy cases end in death. Notwithstanding the examination of the records of 500 cases, no additional testimony can be presented in favor of occasional recovery after rupture of the cyst in an extra-uterine fœtation.

Tubo-uterine gestations may sometimes terminate more favorably than those of the portion of the oviduct exterior to the uterine walls. The cyst generally gives way at or before the end of the fourth month, the rupture occurring outwardly through the peritoneal surface of the sac. In rare instances the uterine surface may give way, after which the child may be born by the natural passages, as happened to Feilitz, Laugier, and Hicks.

Changes which follow Retention of the Fœtus for a long Period.—After the completion of the usual period of pregnancy in those women in whom the sac is not ruptured, the liquor amnii ceases to be secreted, and that which has been previously formed is reabsorbed.

In consequence of this the cyst walls contract, and are applied closely to the surface of the child. They may or may not be strengthened by inflammatory adhesions. If the product of conception is to remain as an innocuous foreign body, the cyst may undergo one of several changes, or it may remain much as it was at the close of gestation. In the former case

[1] Loc. citat. p. 41.

[2] Clin. Mem. on Dis. of Women, N. Syd. Soc. Ed., 8vo., London, 1866, vol. i. p. 242.

it may be converted into substances resembling either cartilage or bone, or both these changes may occur in the same case. In the year 1748, Morand[1] exhibited to the *Academie Royale des Sciences* a cyst and child which had been removed from a woman who died in the Hôtel-Dieu de Joigny in July, 1747. The fœtal sac, which was nearly two lines in thickness, had undergone calcareous change in some parts, and cartilaginous in others. The child had remained thirty years in the abdomen of its mother. In some instances the sac becomes so hard that much force is required in order to break or cut it.

Under these circumstances the fœtus may be found in one of several conditions. In the first place it may remain almost unchanged, even after a long time has elapsed. Francis Bayle[2] has recorded the history of a woman, of Toulouse, who became pregnant in 1652, and died in 1678. Upon opening her abdomen a child, weighing no less than eight pounds, was found in it. Though somewhat changed, it had not undergone any putrefaction, and had no bad smell, even after it had been kept three days out of the mother's belly. Children have been removed from the abdomen many months after their death, as fresh and plump, and with the same color and consistence, as if they had just died.

At other times, the fluids being reabsorbed, the infant is greatly compressed, and converted into a hard, mummified mass. The most remarkable change is that in which calcareous salts form on their surface or in their tissues, and they become "ossified" or "petrified," according to the older writers upon this subject. This was noticed in 1582 in a child taken from a woman of Sens,[3] and which had been carried by its mother for twenty-eight years.[4] Nebel[5] found the child "pet-

[1] Mémoires de l'Acad. Roy. des Sciences, 1748.

[2] Philosophical Transactions, abridged ed., 4to., London, 1794, vol. iii. p. 222.

[3] Johannis Albosi, Observatio Lithopædii Senonensis, Senonis, 8vo., 1582, and Astruc, Traité des Maladies des Femmes, 12mo., Paris, 1765, tome iv. p. 78.

[4] In 1659 this child, it is said, was contained in the cabinet of Frederick III., King of Denmark.—Madame Le Boursier du Courdray, *Abrégé de l'Art des Accouchemens*, etc., 12mo., Paris, 1759, p. xxxvi.

[5] Campbell, loc. citat.

rified," after having been carried fifty-five years. Majon[1] found a fœtus of three months' development, which had undergone calcareous alteration in a woman who died when seventy-eight years of age. Cruveilhier in his magnificent work, *Anatomie Pathologique du Corps humain*,[2] describes and illustrates the appearances presented by a child removed from the body of a woman who had carried it for many years. Its surface was incrusted with calcareous matter. When the product of conception undergoes this change, it is said to be converted into a lithopædion.[3] This transformation appears to be rare. Calcareous salts are not unfrequently deposited in the walls of the fœtal sac, when the child has been carried for a long time, but it appears to be unusual to meet with this alteration in the tissues of the infant itself. This fact is in accordance with what we now know of the methods by which calcareous degeneration is produced in living tissues. That these salts should be deposited in the walls of the sac is not strange, since throughout its whole life this continues to be nourished by the maternal fluids. In the child, however, vital changes cease when its circulation is arrested, so that if calcareous salts are formed on its surface or in its dead tissues, they must be the result of chemical processes alone.

The fœtus sometimes undergoes another alteration. In this case it becomes converted into a friable fatty substance like adipocere. Denny[4] has published the history of a woman whose child underwent this change. He describes the tissues as having the appearance of lard. The conversion of the child into adipocere appears to be more rare than for it to become incrusted with calcareous matter. Under all these circumstances the child is converted into an innocuous mass, which may be carried by the mother for an indefinite period.

[1] Cruveilhier, Essai sur l'Anatomie Pathologique, 8vo., Paris, 1816, tome ii. p. 130.

[2] Tome i., xviii., Liv. pl. vi.

[3] Simpson says (*Dublin Med. Press and Circular*, Sept. 24, 1862, p. 306), that Smellie, when speaking of a child which had undergone this alteration, made the curious mistake of stating that the case was reported by Dr. Lithopædion.

[4] Amer. Journ. of Medical Sciences, July, 1850, p. 49.

Discharge of the Child through the Bowel, Bladder, Vagina, or Abdominal Wall.—If the cyst does not become quiescent it inflames and suppuration occurs. The child now becomes more or less altered. During this process the woman may perish either directly from the inflammatory complication, or from the absorption of the putrid materials which result from decomposition. Within certain limits, however, inflammatory action is conservative. Now, for the first time, peritonitis plays an important role in the clinical history of extra-uterine gestation; but it is generally peritonitis of a subacute rather than an acute type, which produces adhesions between the cyst and the adjoining organs including the anterior abdominal wall. This is the first step which nature makes to repair the error that has been committed. This completed, an attempt is made to throw off the child, and the cyst opens into the alimentary canal, vagina, bladder, or externally upon the abdominal wall. Air being thus admitted into the cavity of the cyst, the decomposition of its contents goes on rapidly until the soft parts are destroyed.

When the cyst communicates with the alimentary canal, it may open into any part of the large intestine, but the passage is generally through the rectum or sigmoid flexure. Petit,[1] Moreau,[2] and Chailly-Honoré,[3] all say that an extra-uterine fœtal cyst may open into the stomach, and its contents be discharged by vomiting. They do not state the facts upon which they make this assertion, and there is nothing in what they have written to lead us to believe that any one of them has witnessed such an occurrence. We know of but one instance in which the cyst and stomach communicated. This is recorded by Prof. John T. Darby.[4] The cavity which contained the child had opened through the abdominal wall, when Dr. Darby enlarged the orifice and extracted the fœtus. He adds, "Immediately after delivery of the cystic contents, the entire contents of the stomach emptied themselves into the cavity of the cyst, through a ragged, jagged opening, two inches in

[1] Traité des Maladies Femmes, 8vo., Paris, tome i. p. 90.
[2] Traité des Accouchemens, 8vo., Paris, 1841, tome ii. p. 366.
[3] Traité Pratique de l'Art des Accouchemens, 8vo., Paris, 1867, p. 135
[4] Trans. State Med. Assoc. of South Carolina, 1872, p. 97.

width." The rupture was closed with sutures, but the patient died from starvation, which it would seem must always follow this accident, if the woman survives the inflammation produced by the discharge of the contents of the stomach in the fœtal cyst. Schrœder says,[1] that Raneyer saw gastric fistula result from the sac opening through the abdominal wall, but he does not state that the pieces of a decomposed child were discharged by vomiting. The elimination of the soft parts of a putrid decaying child in this manner, is almost too disgusting to think of, and we have not been able to find any instance of its occurrence, notwithstanding the statements of Petit, Moreau, and Chailly-Honoré.

Communication of the cyst with the bowel, however, is a frequent occurrence. In the cases which we have analyzed, it happened sixty-nine times. Of the 500 cases which form the basis of this work, 248 went to or beyond term, and of these the cyst opened into the bowel 65 times, or in 26.20 per cent. Of the 69 cases, 45 recovered by discharge of the fœtus, and 24 died before this could be accomplished, a mortality of 34.78 per cent.

The cyst may communicate with the bowel by one, or several openings. Adams[2] and Will[3] have each observed three, and Jules Cloquet[4] has seen no less than five.

The child has been spontaneously expelled entire through the rupture into the bowel in a few instances, and in others it has been forcibly extracted through the same channel by the medical attendant. The cases of Giffard, Yardley, and Clark have already been mentioned. Of these, Giffard's was the only one in which the child was expelled without some help from the medical attendant. A like observation has been made by Dr. Peck.[5] His patient was four months gone, and the child escaped while she was at stool. In addition to Clark, Patuna[6] has also extracted a full term child by the rectum, after the

[1] Manual of Midwifery, 8vo., New York, 1873, p. 133.

[2] Loc. citat.

[3] Edinburgh Med. Journ., Aug. 1854.

[4] Pathologie Chirurgicale, 4to., Paris, 1831.

[5] Medical and Surgical Reporter, April 9, 1870, p. 294.

[6] A Dissertation on Retroversion of the Womb, by Samuel Merriman, 8vo., Phila., 1817, p. 44.

cyst had opened into it. His patient had conceived twenty months before.

The cyst opens into the vagina much more rarely than into the bowel. It occurred spontaneously in 12, or 4.83 per cent., of 248 women who had gone to term or beyond it. Of these, seven recovered and five died, a mortality of 41.66 per cent.

Communication with the bladder occurred in 9 of the 248 women, or in 3.62 per cent. Of these, 4 recovered and 5 died, a mortality of 55.55 per cent.

Lastly, the contents of the fœtal sac were evacuated through the abdominal wall in 40, or 16.12 per cent., of the 248 cases. Of these, 30 recovered and 10 died, a mortality of 25 per cent. The opening may form in any part of the lower and middle region of the abdomen, but it is most frequent about the umbilicus and in the middle line just below it.

It will thus be seen that the fœtal sac opens most frequently into the intestinal canal. Next to this, communication with the exterior occurs oftenest through the abdominal wall. Though the latter is 10 per cent. less frequent than the former, it is 9 per cent. less fatal. The cause of this difference is easily determined. Pus and other decomposing fœtal matters poured into the lower bowel irritate and inflame the mucous membrane, while the mechanical difficulties in discharging the long and flat bones by this channel are so apparent that it is not needful to do more than to allude to them. Rupture of the cyst into the vagina and bladder is a less common occurrence than either of the others, and the above results would appear to show that it is likewise more fatal. Of the two, discharge of the contents of the sac through the bladder is the most to be dreaded, for, according to these results, this is 11 per cent. more fatal than opening into the rectum, while by the vagina the mortality is only 7 per cent. more.

These results are based upon numbers too small to make them at all reliable. They are precisely opposite to the conclusions reached by M. Puech, the accuracy of whose figures is vouched for by Courty.[1] According to this authority, 5 of 23 women in whom the cyst opened into the vagina died, a mortality of 21.73 per cent. He found that communication

[1] Traité Pratique des Maladies de l'Utérus, 8vo., Paris, 1866, p. 996.

with the bladder was less fatal than with the vagina, only 3 out of 17 women having died after this happened, a mortality of 17.64 per cent. In the main, however, our own results confirm the conclusions of Mattei,[1] who has analyzed 100 cases of extra-uterine pregnancy which had gone to term or beyond it. He concludes that discharge through the abdominal walls is the most frequent, and states that it happened in 38 per cent. of all the cases, but it occurred spontaneously in only 21 of these, the remainder being operations for gastrotomy. By the bowels, bladder, and vagina, he found the percentage to be respectively 30, 8, and 7 per cent. Daynac[2] believed that the elimination of the fœtus through the abdominal walls was the most unfavorable of these terminations. The investigations of Mattei, Puech, and the author prove, however, that the woman is subjected to a considerable increase of danger when the discharge takes place by the bowel. Indeed, Mattei is probably correct in his statement that this is the most unfavorable of all the various terminations of an old extra-uterine pregnancy. Our own investigations would appear to show that the elimination of the fœtus by the bladder or vagina is more fatal, but the figures are too small to warrant us in accepting their results as final.[3]

[1] Gazette des Hôpitaux, No. 110, 1860.

[2] Thèse à Paris, No. 71, 1825, p. 14.

[3] The results obtained by Puech, Mattei, and the author may be compared in the following table:—

Channel of elimination, etc.		No. of cases.	Frequency of occurrence in per cent.	Died.	Mortality in per cent.
Abdominal walls	Mattei	21	21.00	1	4.76
	Puech	28	....	4	14.27
	Author	40	16.12	10	25.00
Intestinal canal	Mattei	30	30.00	19	61.29
	Puech	69	....	24	38.78
	Author	65	26.20	24	34.78
Vagina	Mattei	7	7.00	2	28.57
	Puech	23	....	5	21.73
	Author	12	4.83	5	41.66
Bladder	Mattei	8	8.00	2	25.00
	Puech	17	....	3	17.64
	Author	9	3.62	5	55.55

It is, however, a fact that the opening of the fœtal cavity into the vagina is very likely to terminate in disaster unless art intervene. One would suppose that this would be one of the most favorable channels by which the débris of an extra-uterine fœtus could be discharged. It is the natural outlet for the child. The size of the canal is specially adapted for its expulsion, and there is no tightly contracted irritable sphincter at its outlet.

It is not difficult to believe that the passage of the putrid soft parts and bones of a decomposing fœtus into the bladder would give rise to serious trouble. When this occurs, the unhappy woman becomes the subject of all the symptoms of stone. These may be greatly aggravated not only by the irritating character of the fluids which find their way into the organ, but likewise by the large number of bones, any one of which may become the nucleus of a stone. Bosseut[1] removed no less than 146 fœtal bones from the bladder by lithotomy.

In some instances the fœtal cavity opens by more than one channel in the same patient. Worship[2] and Simon[3] have seen the rectum and vagina; Adams,[4] Drake,[5] Chevillon,[6] and Wier,[7] the bowel and abdominal wall; Hemard,[8] Petersen,[9] and Morlanne,[10] the rectum and bladder opened into in the same woman. As though enough havoc had not been worked in these instances, Baeza[11] and Shultze[12] state that they have seen these cysts discharging at the same time by three channels, the bowels, bladder, and abdominal wall. Under exceptional circumstances, the contents of extra-uterine fœtal cavities may

[1] New England Journ. of Med. and Surgery, 1817, p. 134.
[2] Philosoph. Trans., ab. edit., 4to., London, 1756, vol. x. part ii. p. 1015.
[3] Ibid., p. 1016.
[4] Gazette Méd. de Paris, Aug. 1872, and Brit. and For. Medico-Chir. Rev., 1873.
[5] Philosoph. Trans., ab. ed., 4to., London, 1756, vol. x. part ii. p. 1018.
[6] Gaz. Méd. de Paris, Mai 29, 1858.
[7] Medical Times (London), Nov. 8, 1851, p. 496.
[8] Lancet, 1844, part ii. p. 74.
[9] Dublin Med. Press, Aug. 10, 1859.
[10] Recueil Périodique, tome xiii. p. 63.
[11] New Syd. Soc. Bien. Retros., 1867, p. 397.
[12] Brit. and For. Medico-Chir. Rev., Oct. 1867.

make their way to the surface by fistulæ through the perineum. Chailly-Honoré[1] says this is one of their outlets; and the late Dr. Yardley,[2] of Philadelphia, has recorded an observation of this kind.

The time at which the fœtal sac opened into the bowel, vagina, bladder, or through the abdominal wall is not as accurately stated in many histories as would be desirable. Cases have already been alluded to in which this event occurred from one to four months before the termination of the ordinary period of gestation, but always, so far as can be ascertained, after the death of the child. These cases, as well as those in which the communication was established during labor, are excluded from the following

Table showing the time at which the Cyst opened after the completion of the ordinary term of Pregnancy.

Duration of pregnancy.	Bladder.	Vagina.	Bowel.	Abdominal wall.	Total.
1 to 6 months	....	1	18	5	24
6 to 12 "	....	2	....	3	5
1 to 2 years	....	2	2	8	12
2 to 3 "	3	....	2	1	6
3 to 4 "	....	....	1	3	4
5 to 6 "	1	....	1	2	4
6 to 7 "	....	....	1	....	1
7 to 8 "	....	....	1	1	2
8 to 9 "	....	....	1	1	2
10 to 11 "	....	....	1	1	2
14 to 15 "	1	....	1	....	2
15 to 16 "	....	....	1	....	1
16 to 17 "	....	....	....	2	2
18 to 19 "	....	1	....	....	1
19 to 20 "	....	....	1	....	1
31 to 32 "	....	....	1	....	1
	5	6	32	27	70

This examination shows that the sac may open in either of the directions mentioned, at any time between one month and thirty-two years after the completion of gestation. Hillmann[3]

[1] Traité Pratique de l'Art des Accouchemens, 8vo., Paris, 1867, p. 135.

[2] Amer. Journ. of Med. Sci., April, 1846, p. 348.

[3] Berlin. Klin. Woch., Nov. 21, 1864, and Brit. and For. Medico-Chir. Rev., 1865.

reports an instance in which it occurred at one month after term, and two after the death of the child. The event is most frequent, however, between the first and sixth months, while the second period of frequency is during the second year. In the remaining periods the figures are so small as to give them but little significance.

Mortality.—In 500 cases the result is stated in 499. Of these 336 died and 163 recovered, a mortality of 67.20 per cent. The following table shows the cause of death in the 336 fatal cases.

Rupture of cyst	174
Pregnancy	16
Exhaustion	54
Peritonitis	24
Hemorrhage	4
Hemorrhage into cyst after puncture to destroy the child	1
" into cyst	3
" from separation of placenta	3
" after vaginal section	1
" from separation of placenta in gastrotomy	1
" secondary, after gastrotomy	1
Hæmatocele	2
Septicæmia	4
Intestinal obstruction (from tumor)	8
Sloughing of cyst	1
Traumatic inflammation of cyst	1
Starvation from rupture of stomach during gastrotomy	1
Convulsions	2
Malacosteon	1
Shock after gastrotomy	1
Not stated	26
From causes unconnected with gestation	7

In this catalogue of mortality rupture of the cyst heads the list with the fearful number of 174 out of 329 deaths, the 7 not directly due to pregnancy being excluded. In other words, 52.88 per cent. of all the women who die from extra-uterine fœtation perish from rupture of the gravid cyst. This fact deserves to be made prominent. It is asserted by some good authorities that this accident is uniformly fatal,[1] and though

[1] Rogers, loc. citat., and Med. Record (N. Y.), 1867, vol. ii. p. 22.

an attempt has been made to show that there are good reasons for believing that women have survived it, this cannot be regarded as other than an exceptional occurrence. Recovery is so rare after rupture, that the physician has no right to allow the fact that it *may* occur to influence him in deciding upon a plan of treatment.

Sixteen deaths are assigned to pregnancy. This may deserve a passing notice. They would possibly have been more correctly classified if they had been included under the head of exhaustion, as all the other deaths may be said to have been due to "pregnancy." Under this head, however, are included those cases in the histories of which no cause of death is assigned by the author, and in which the post-mortem appearances are faithfully described. The women went to term and perished at this time or a little later.

The single example of death from hemorrhage after puncture with a trocar to destroy the fœtus is reported by Dr. J. B. Hicks.[1] A second element, vomiting from the chloroform administered to perform the operation, may have had something to do in bringing on the fatal issue.

Of the two cases of hæmatocele, one was reported by Fleuriot,[2] and the other by Ollivier (d'Angiers).[3] In the first instance the pregnancy was tubal, and on the right side. The hæmatocele was ovarian, and the hemorrhage was from the side opposite the pregnancy. In the second the blood was effused from tubo-ovarian varices, the pregnancy being in the right tube. In these cases the effusion of blood may have been entirely unconnected with pregnancy, but when we remember the tendency of this to produce pelvic congestion, and that the tube in both cases contained the ovum, it does not seem improper to include these as deaths from extra-uterine pregnancy. Dr. J. M. Duncan has likewise reported[4] a case of extra-uterine pregnancy in which the death of the patient resulted from the rupture of an encysted hæmatocele, but, as the gravid cyst was found within the cavity which contained the blood, and as

[1] Trans. Obstet. Soc. London, 1866, vol. vii. p. 95.
[2] Bull. de la Soc. Anatomique, Paris, 1855, p. 399.
[3] Archives Générales de Méd., 2d série, tome v. p. 403.
[4] Edinburgh Med. Journ., Jan. 1864, p. 670.

this was ruptured, the death was really due, though remotely, to the latter.

The single instance of death from starvation was due to rupture of the stomach during gastrotomy, and is recorded by Dr. John T. Darby.[1]

The 7 deaths from causes unconnected with gestation occurred in women who had not reached term, and were due to hanging,[2] phthisis[3] (in two instances), suicide,[4] cholera morbus,[5] and in two cases to causes not definitely stated. It is more than probable that in most of these, the patients would have succumbed from rupture of the cyst or exhaustion, if they had not been hurried off by violence or intercurrent disorders.

Of the comparative mortality of the various species of extra-uterine fœtation, it is impossible to form any correct opinions until their relative frequency is determined by careful post-mortem observations. The opinion has long prevailed that tubal pregnancies are peculiarly fatal, and there can be no doubt that it is correct. Of 149 cases in which the ovum was located in that portion of the tube which does not traverse the tissues of the uterus, 145 died. This, however, may give a very incorrect impression of the mortality of tubal pregnancy, but it certainly confirms the views held by high authorities. Many writers seem to have a vague impression that they may go to term, while others flatly deny that this can occur.[6] Authentic cases, however, have been reported by Cheeseman,[7] Cooke,[8] Spie-

[1] Trans. State Med. Assoc. of South Carolina, 1872, p. 97.

[2] Bussiere, Phil. Trans., abridged ed., vol. iii. p. 605.

[3] Armour, Glasgow Med. Journ., 1830, vol. iii. p. 154. The duration of the pregnancy is uncertain; the pelvic organs appear to have been a mass of disease. Bedford, Prin. and Prac. of Obstet., 8vo., N. Y., 1861, p. 208. The woman died when she was seven months gone.

[4] Stanley, Trans. College of Phys. London, vol. vi. p. 414.

[5] Hodge, Prin. and Pract. of Obstet., 4to., Phila., 1866, p. 529. Died when seven months gone.

[6] Mr. Lawson Tait (*Lancet*, Aug. 2, 1872, p. 169) says, "I have satisfied myself that not a single instance of so-called Fallopian pregnancies at full term, recorded in literature to which I have access, really deserves the name;" and Goodell (*Phila. Med. Times*, Jan. 10, 1874, p. 236) has asserted, that, "When an extra-uterine pregnancy goes to full term, he believes it to be always ventral and never tubal."

[7] Lancet, Sept. 14, 1861.

[8] Trans. Obstet. Soc. London, 1864, vol. v. p. 143.

gelberg, Bandl, Braun,[1] and Saxtorph.[2] Mr. Jonathan Hutchinson[3] has likewise reported a case, but as Mr. Lawson Tait remarks,[4] though on insufficient grounds, there may be doubts about its having been a tubal conception. Of the five authentic cases of gestation of this species which reached term, in two, Cheeseman's and Cooke's, the product of conception was situated at the fimbriated extremity of the tube. They are therefore robbed of their interest, for it is not difficult to understand how the ovum, when its descent is arrested in this locality, may go on developing until it attains the ordinary size of the intra-uterine fœtus. Bandl's and Braun's cases were secondary abdominal pregnancies, the tube and fœtal membranes having ruptured during the early stages of gestation, after which the development of the child was continued in the peritoneal cavity.

There remain therefore but two authentic cases, according to many authorities, of primary tubal gestations which reached term. These are those of Saxtorph and Spiegelberg. The particulars of the first have not been fully recorded.

That the Fallopian tube is capable of being so distended as to furnish a nidus for a full-grown fœtus is proved beyond doubt by Spiegelberg's observation, and the only important question in this connection is whether this does not occur much more frequently than is generally supposed.

It is probable that ovarian pregnancies likewise generally terminate in death by rupture, during the first few months of gestation. This, however, cannot be positively stated. The gravid ovary may contract adhesions with some of the adjoining organs, so that the fœtal sac may be strengthened sufficiently to retain its contents to term.

It appears reasonable to conclude that of all the species the mortality of ventral pregnancy is the lowest. The fact that no organ is distended in these cases to afford a covering for the growing ovum supports this opinion.

[1] Reported by Dr. T. Trush, in a letter to the *Clinic*, March 2, 1872, p. 105.

[2] Quoted by Spiegelberg, loc. citat.

[3] Lancet, July 19, 1873, p. 71.

[4] Ibid., Aug. 2, 1873, p. 169.

CHAPTER VIII.

THE DIAGNOSIS.

Errors are frequent—Before the fœtal heart can be heard—Value of various symptoms—From pelvic inflammations; pelvic hæmatocele—From pregnancy of an undeveloped uterine horn—After the fœtal heart can be heard—Value of different symptoms—From normal pregnancy—Retroversion of gravid uterus—Rupture of uterus—After the death of the child—Value of different symptoms—From fibroid and ovarian tumors, and cancer of the fundus uteri—Use of trocar or aspirator for diagnostic purposes—From piliferous cyst of the ovary—Diagnosis of the species.

The history of misplaced gestation abounds in illustrations of errors in diagnosis committed by the most eminent and experienced men. Some of the most remarkable errors are those in which uterine has been mistaken for extra-uterine pregnancy. Women have more than once, only very narrowly escaped being subjected to grave surgical operations, by the child being born by the natural passages. It is well known that Heim of Berlin,[1] who, Montgomery says, "was considered the Magnus Apollo on all questions" concerning this accident, induced the celebrated Diffenbach to open the abdominal cavity to remove an extra-uterine fœtus, when the woman was not even pregnant. The operation was performed August 5, 1828, solely upon the authority of Dr. Heim. A careful examination of the history of the woman, who fortunately recovered, does not reveal reasons sufficient to have led to this diagnosis.

In the same year another woman is said to have been operated on in Berlin, who, the gastrotomy proved, was not carrying an extra-uterine child, but was suffering from an intestinal tumor. But a few years since, Meadows, of London, performed the same operation only to find two tumors, one uterine and the other omental. Keller quotes Schreyer as authority for saying that two physicians, who thought they

[1] Montgomery, An Exposition of the Signs and Symptoms of Pregnancy, 8vo., Phila., 1857, p. 331.

had recognized an extra-uterine pregnancy, made prolonged attempts to deliver by the forceps. Failing in this they opened the abdominal cavity, and as they found no infant, they recommenced their labors with the forceps. The result was not the most happy, as the woman died. The autopsy revealed the presence of a fibrous tumor of the uterus.

All experienced obstetricians are fully aware of the fact that the diagnosis of pregnancy is often attended with difficulties. It is generally acknowledged to be unwise to assert positively that a woman has conceived, unless the fœtal heart can be heard or the child be detected by ballottement. It is not to be expected, therefore, that the detection of this condition when the ovum is being developed outside of the cavity of the uterus, is attended with fewer difficulties.

The subject may be considered under three sections: first, the diagnosis before the fœtal heart becomes audible; secondly, from this period until the death of the child before or at term; and thirdly, after the fœtus has perished.

Before the Fœtal Heart can be heard.—By many it is supposed to be impossible to detect extra-uterine gestation until it is several months advanced. There is reason to believe, however, that it may be discovered at a much earlier period than is generally supposed. As tubal pregnancy is the most frequent species, and as it generally ends in death from rupture in the early stages of gestation, it is of the utmost importance to be able to distinguish it before this occurs, in order, if possible, to prevent this unhappy accident. Extra-uterine pregnancy is by no means an uncommon accident, yet it rarely falls to the lot of one person to see many cases, and he is, therefore, generally taken at a disadvantage. The careful study of the records of a large number of cases shows that, in the early stages, extra-uterine gestation runs a moderately uniform course, and that if the ovum is developed in an organ which is capable of undergoing only a moderate amount of distension, it will give rise to symptoms which attract the attention of the woman to her condition, and lead her to believe that there is something unusual about her pregnancy. For several weeks, from six to eight, she may not experience

any peculiar symptoms. She has from the first a conviction that she has conceived. If with this are associated colicky pains, located in the hypogastrium, or one iliac fossa, of the most severe character, producing collapse more or less profound, with or without syncope; if these pains come on in paroxysms or have violent exacerbations at more or less regular intervals, with a bloody discharge from the uterus, the existence of extra-uterine pregnancy should always be suspected. If symptoms of abortion supervene with the discharge of a decidua, or if the phenomena of rupture of the cyst follow the symptoms just enumerated, it is the duty of the woman's medical adviser to treat her as if she were carrying an extra-uterine child.

There is no other known condition which is attended with the peculiar assemblage of symptoms to which attention has been directed. Dr. Rogers[1] believes these phenomena to be of great diagnostic value. Speaking of the "periodic and more or less severe spasms of pain usually described as colic," he says that they are "almost pathognomonic," and adds, that if they are "accompanied by sanguinolent and by occasional clotty discharge from the uterus, they are almost certainly indicative of extra-uterine pregnancy. When these two signs follow and accompany the signs of pregnancy, . . . it will be, to use the mildest term, very unwise to regard them otherwise than of the greatest significance, for I do not doubt that in eight cases of them, at least, in every ten, extra-uterine pregnancy will sooner or later be found to exist." A woman may sometimes have many of the symptoms of the condition being discussed, during an attack of dysmenorrhœa, but the anterior history of that disease is entirely different from that of misplaced pregnancy.

Attention must be given to each detail, and, when all these indications present themselves, the chances are so greatly in favor of the existence of extra-uterine gestation, that the practitioner is justified—nay, it is his duty—to treat his patient as if its existence had been proved. A more extended clinical experience will probably show that the existence of misplaced gestation can be detected quite as easily, if not more

[1] Loc. citat. p. 14.

easily, than normal pregnancy in its early stages. The one pursues an irregular, and the other a regular course. The severe symptoms of an erratic conception can scarcely fail to attract attention.

If there have been no evidences of either miscarriage or rupture of the cyst, combined vaginal and abdominal examination may reveal the presence of a tumor by the side of the uterus, a sign of the highest importance; but unfortunately there is generally so much tenderness of the parts at this stage of the pregnancy, that it is useless to attempt to derive any knowledge from a physical examination, unless the patient be anæsthetized. The administration of ether, the anæsthetic generally used in America, and the only one which should be employed, is not unattended with danger, since the vomiting which it so often causes may lead to rupture, the most fatal of all the terminations of misplaced conception. But, under the circumstances, the aid of anæsthesia may be invoked for diagnostic purposes. The dangers of the condition are so numerous and so terrible that no means should be left untried to discover the true condition of a woman suspected to be the victim of this unfortunate accident. This advice is given upon the principle that the greater of two evils is the one to be avoided. Every known precaution should, of course, be taken both before and after its administration, to prevent the unpleasant effects of ether. Much may be done by moral influences to prevent the patient from struggling; while the proper use of food before, and the administration of bromide of potassium, and other remedies after it, may in a great measure control the vomiting.

The discovery of a tumor by the side of the uterus, in which the sign of ballottement can be detected, removes all doubts. Dr. Thomas[1] has recognized a three months' fœtus by ballottement, and says that he has been able to demonstrate the presence of the child in this manner in three out of four cases which he has seen. In order to be able to recognize pregnancy by ballottement, it is necessary that the fœtus should have attained a certain size, and that the walls of the

[1] New York Med. Journ., June, 1875.

cavity by which it is inclosed be thin enough to allow it to be felt through them. Ballottement is not always an available sign of uterine pregnancy in its early months. Gardien says it can be appealed to at the end of four and a half months; Cazeaux,[1] Tanner,[2] and Leishman[3] at the end of the fourth month. Montgomery writes very plainly regarding this subject: "My experience leads me to say that although we may occasionally succeed in performing re-percussion during the fourth month, it is not in general likely to be decidedly satisfactory until that month is complete."[4] From what has been said it will be seen that Dr. Thomas detected this physical sign earlier than is usually done in uterine pregnancy. It is to be remembered, however, that Hodge[5] says that the child can be discovered by ballottement in the third month. It is not, however, to be wondered at, that this method of examination may be found useful at an earlier period in erratic than in normal fœtation, owing to the fact that the tissues interposed between the examining finger and the embryo may be both thinner and softer than they are in intra-uterine pregnancy. Hicks has distinguished the pelvic extremity of a child through the vagina at the end of three and a half months.[6] The fœtal tumor can frequently be recognized by careful bimanual palpation shortly after the second month. Giffard[7] did this long ago, and Siredey[8] detected it only one month after the commencement of pregnancy. Bœhmer[9] discovered the peri-uterine enlargement at three months in a case of supposed ovarian gestation. These results were obtained by the ordinary methods of examination. If they are not satisfactory, the patient should be examined through the bladder, as recommended by Dr. Noeggerath,[10] of New York. According to this plan, the urethra is rapidly dilated, after which the

[1] Loc. citat. p. 246.
[2] Loc. citat. p. 121.
[3] A System of Midwifery, 8vo., Glasgow, 1873, p. 174.
[4] Signs of Pregnancy, 8vo., Phila., 1857, p. 171.
[5] Loc. citat. p. 76.
[6] Trans. Obstet. Soc. London, 1866, vol. vii. p. 96.
[7] Cases in Midwifery, 8vo., London, 1734, p. 153.
[8] Thèse à Paris, 1860.
[9] Observat. Anatom. Rar., fascic. i.—Halæ, Magdeburgicæ, 1752.
[10] The Vesico-vaginal and Vesico-rectal Touch. A new method of examining the uterus and its appendages, *Amer. Journ. of Obstet.*, May, 1875, p. 123.

index finger of one hand is passed into the bladder, and the index finger of its fellow into the vagina or rectum, by which means the fundus uteri and tubes can be readily examined. We have a great deal to hope for from this method of examination, in the detection of extra-uterine pregnancy; and as the uncertainty of diagnosis is the great impediment to the adoption of any rational plan of treatment, we look forward with great interest to the results of the suggestion made by Dr. Noeggerath. Depaul[1] is not correct, therefore, in saying that extra-uterine gestation cannot be diagnosticated during the first three or four months of pregnancy. The tenderness of the tissues, which is so often present, is the greatest impediment to its early detection.

It must not be forgotten, however, that the woman may go to term without presenting any unusual symptom.[2] Fortunately, under these circumstances, she does not seek medical advice until after the existence of pregnancy can be determined by hearing the sounds of the child's heart.

During the first months, extra-uterine pregnancy has been mistaken for pelvic inflammation by Goodell,[3] Agnew,[4] and others.[5] The extreme tenderness to touch, movement, and in respiration which are sometimes present, might lead to this mistake, especially when the woman is supposed to have aborted, as was the case with Dr. Perkins' patient, who was seen at different times by Drs. Goodell and Agnew, the one calling her disease pelvic peritonitis, and the other pelvic cellulitis. This error can easily be avoided by a careful examination of the

[1] Archives de Tocologie, 1874, vol. i. p. 261.

[2] Dr. J. W. Craddock (*Med. Exam.*, Phila., May, 1846, p. 286) reports that nothing remarkable happened during the gestation, which went to term. Goodbrake (*Boston Med. and Surg. Journ.*, July 5, 1860) says that the only unusual symptom presented by his patient, who went to term, was difficulty in urinating. Hancox (*Brit. Med. Journ.*, Dec. 17, 1859) states that the first stage of pregnancy was normal, but, when the woman was in her seventh month, she was injured by a man who raped her, after which she was never well. Conant (*New York Med. Journ.*, 1865); Emmons (*Boston Med. and Surg. Journ.*, July, 1833); Spiegelberg (*loc. citat.*), and M. Briquet (*Recueil Périodique*, tome xiii. p. 63) all report that their patients arrived at term without experiencing any abnormal symptoms.

[3] Amer. Journ. of Obstet., May, 1872, p. 156.

[4] Ibid., p. 156.

[5] Greenhalgh, Medical Mirror, Nov. 1864, p. 689.

clinical history of the patient. Pelvic peritonitis and pelvic cellulitis are attended by no such symptoms as those described as characterizing the early stages of an extra-uterine fœtation. There is wanting the conviction on the part of the woman that she is pregnant. The pain of pelvic inflammation may be somewhat paroxysmal, but the exacerbations are periodical, returning with the menstrual periods; in fact, are new outbreaks of the disease induced by the excitement of the genital organs in the performance of this function. Moreover, the tumors formed in the two conditions differ. The one is cystic, and contains fluid and solid contents. The other, if it contain any fluid, merely fluctuates. The retro-uterine tumor of extra-uterine pregnancy, and the fulness of pelvic peritonitis felt in the same position, give such different sensations when they are examined by the vagina, that it is difficult to see how this mistake can arise.

Extra-uterine gestation may be occasionally confounded with pelvic hæmatocele. It may sometimes be impossible to distinguish between them. Duncan[1] relates the history of a woman who one month before her death had all the symptoms of intra-peritoneal hemorrhage. The process of encystment was going on with every prospect of recovery, when the tumor, which reached three inches from above downwards, suddenly burst, producing fatal peritonitis. At the autopsy, the primary hemorrhage was found to have been due to the rupture of an extra-uterine fœtal sac. Barnes[2] has likewise met with blood effusion from the same cause, which became encysted. It has been stated, however, that peritonitis, by which means alone intra-peritoneal blood effusions can become encysted, rarely follows the rupture of an ectopic gestation, while it is a fact generally acknowledged, that such collections of blood do not become perceptible to the finger in the vagina, until after they have been encysted. Now, non-encysted intra-peritoneal effusions of blood, or, as Barnes[3] styles them, "cataclysmic" hæmatoceles, generally arise from one of three causes—ovarian disease, rupture of the uterus, or rupture of an extra-uterine fœtal cyst. Though examples of rupture of the uterus

[1] Edinburgh Med. Journ., Jan. 1864, p. 670.

[2] Diseases of Women, 8vo., Phila., 1874, p. 512.

[3] Ibid., p. 506.

during the first four months of gestation have been reported,[1] this accident is so rare as to be thrown out of consideration.

In "cataclysmic" hæmatocele from ovarian disease, there is the previous history of the disorder of the ovary. If the ovarian disease have not been such as to produce previous symptoms, as in the case reported by Ollivier (d'Angiers),[2] in which death followed in seven hours after rupture of ovarian varices, the diagnosis cannot be made. It is interesting to remember, however, that Ollivier's patient was also pregnant, and that the product of conception was contained in the right Fallopian tube. Bernutz says,[3] that ovarian hæmatocele generally occurs *without menstruation or metrorrhagia*, and that at the outset of the attack there are two distinct groups of symptoms, the one referable to internal hemorrhage, the other to inflammation of the abdominal serous membrane, without any of the signs of dysmenorrhœa. These symptoms conjoined point strongly to ovarian hæmatocele. It is needless to point out the distinctions between this condition, and the symptoms of rupture of a misplaced pregnancy. The error can only arise in the extremely rare cases in which an intraperitoneal effusion due to the latter becomes encysted, and in these it would lead to no bad results, for if this should occur the case should be treated as one of hæmatocele, having no connection with extra-uterine pregnancy.

During the early stage of gestation, extra-uterine pregnancy may likewise be confounded with conceptions in the rudimentary horn of a double uterus. These cannot be distinguished from each other during the life of the woman. They run much the same course, but conceptions in an undeveloped horn terminate by rupture rather later than those in the tube. That these conditions cannot be distinguished from each other during life need excite no surprise, when it is remembered that it is difficult to do this even at a post-mortem examination. Taking the round ligament as a guide, as proposed by Virchow, two of the cases figured by Kussmaul in his work

[1] H. Cooper, Brit. Med. Journ., 1850.

[2] Loc. citat. p. 403.

[3] Loc. citat. vol. i. p. 188.

as pregnancies of a rudimentary horn were not such, but examples of tubal gestation.[1]

As both of these varieties of pregnancy pursue much the same course, and as that of a rudimentary horn generally terminates in rupture, though at a rather later period than one of the tube, nothing would be gained if the diagnosis could be made during the life of the patient. The indications for treatment are the same under both circumstances.

After the Fœtal Heart can be heard.—The question of pregnancy has been settled by hearing the fœtal heart or by the discovery of the child by ballottement, and thus one source of difficulty has been removed. The diagnosis is based upon the symptoms which have already been alluded to as characterizing the first half of pregnancy, conjoined with those which are developed as the gestation progresses. The pain may or may not continue, but the sympathetic signs of pregnancy become more marked. The gravid tumor is usually developed upon one side of the uterus, which it deflects either to the right or left, or pushes forwards, towards and above the pubis, so that the os is reached with difficulty or cannot be found at all. Associated with this is retro-uterine fulness. If the head or breech present they will be likely to be felt through the vagina, but if the child occupy a transverse position in the fœtal cyst the retro-uterine projection will be found to fluctuate more or less perfectly. The cervix uteri in the mean time, though somewhat enlarged and more soft than natural, is found to be hard, firm, and not developed in proportion to the duration of the pregnancy. These signs make an extra-uterine gestation exceedingly probable. If with them is conjoined the history of a previous abortion with discharge of the decidua, the diagnosis is morally certain, and the introduction of the sound to measure the depth of the uterus is justifiable. If the length of this organ does not correspond with the development of the gravid tumor, and if the uterus is found to be empty, the diagnosis is absolute. If, when the woman reaches term, false labor supervenes, and is

[1] Barnes, loc. citat. p. 393.

followed by the secretion of milk and a bloody discharge from the vagina like the lochia, it is also certain, as there is no other known condition which gives rise to this assemblage of symptoms. Pseudo-pregnancy resembles it in the presence of false labor-pains at term, but in this the ordinary signs of gestation are absent, while there is no abdominal tumor, and no secretion of milk.

Depaul, who believes that extra-uterine conception cannot be diagnosticated until after the first three or four months of gestation, depends entirely upon the physical signs. He does not appear to attach any importance to the rational symptoms of the early stages, and relies upon the following symptoms, it being premised that the existence of pregnancy is not called in question: the deviation of the uterus; the disproportion between the development of that organ and the duration of pregnancy; the development of the gravid tumor on one side instead of in the middle of the abdomen, as in normal pregnancy; the small amount of liquor amnii; the superficial position of the fœtus, the head and pelvis of which form projections appreciable by sight or touch; the abnormal shape of the gravid tumor, the transverse diameter of which is often greater than the vertical.

It will not be improper to carefully study the different signs to which M. Depaul and the author have attached diagnostic importance. Many of those relied upon by M. Depaul are of but little value when taken singly, and while clinical records show that this eminent authority has been very successful in his attempts at diagnosis, a critical examination of the physical signs upon which he bases his conclusions will show that they are very unreliable. The neck of the uterus may sometimes be displaced and a fœtal tumor appear to be developed upon one side, in consequence of lateral deviation of the uterus. In this case, however, the organ and its contents can be returned to their natural position by changing the posture of the woman, or by manipulation, while an extra-uterine fœtal tumor is said by Duboué to be generally fixed in its abnormal position. This, however, is not an infallible sign, as the

[1] Loc. citat. pp. 522–3.

author has had reason to learn. He has seen the gravid sac in a woman seven months gone, in a misplaced pregnancy, as movable as the uterus in a normal gestation of the same duration. Moreover, the movements imparted to the fundus of the vicarious uterus were distinctly perceived to be transmitted to the cervix by the finger in the vagina. The small amount of the liquor amnii and the superficial position of the fœtus, whether distinguished through the abdomen or vagina, are of no value whatever. On the contrary, the latter has led to frequent errors. Mr. Spencer Wells[1] and M. Pajot[2] both recognize this fact. The writer met with an example of thinning of the abdominal walls a few years since which was exceedingly puzzling. He was asked by Dr. E. W. Watson to see a young woman, to decide the nature of an abdominal tumor, which was the size of a seven and a half or eight months' gravid uterus. Upon making pressure upon the enlarged abdomen a fœtus was felt receding from beneath the finger, against which it immediately rebounded. It was so superficial in its situation, that it appeared impossible to believe that there was anything more than the skin of the abdominal wall interposed between the fingers and the child. The os uteri was small, and could be reached with difficulty through the long narrow vagina. Besides the abdominal ballottement there was not a single indication of pregnancy. Neither the fœtal heart sounds nor the placental bruit could be heard, and the mammæ were like those of a virgin. A few weeks later this patient gave birth to a living child after a natural labor.

Projections of the abdomen produced by the head or breech, as well as the transverse position of the child, whether perceived by sight or touch, which M. Depaul looks upon as important physical signs, are, taken alone, of no value whatever. If the head, as is often the case, be at the brim or even in the pelvis,

[1] Trans. Obstet. Soc. London, 1864, vol. v. p. 151. He says that he has repeatedly been summoned when it was thought that gastrotomy might be necessary, "but in every case the child had proved to be within the uterus; although from the extreme thinness of the abdominal walls and uterus, in some cases the child seemed to be covered by scarcely anything more than skin."

[2] Annales de Gynécologie, Paris, 1874, tome i. p. 215.

the contour of the fœtal tumor will be normal. On the contrary, every accoucheur knows how often the child occupies a transverse position in normal pregnancy. A year ago the writer examined a woman about noon by abdominal palpation, and diagnosticated a transverse position. That night she fell into labor and was delivered by spontaneous evolution.

The signs mentioned at the commencement of this section are much more reliable than those relied upon by M. Depaul. Retro-uterine fulness associated with displacement of the os uteri forwards and upwards, even above the pubis, is of the greatest importance. Under these circumstances the diagnosis will be aided by the detection of a hard pyriform body upon the anterior surface of the fœtal cyst. This is the body of the uterus. In addition to these symptoms Duboué[1] attaches great importance to deviations of the bladder and rectum. In cases in which it is desirable not to explore the interior of the uterus, he states, that pregnancy having been determined to exist, and it being uncertain whether it is intra- or extra-uterine, marked displacement of the bladder and rectum in the same direction shows that the uterus has been forcibly carried with them, a fact which tends to confirm the existence of extra-uterine pregnancy. Of course this symptom would be of no value if the patient were not seen until after the death of the fœtus, or if from any other cause the existence of pregnancy could not be ascertained positively. An ovarian or other pelvic tumor, large enough to displace the uterus, would have the same effect.

Extra-uterine has been mistaken for normal pregnancy during the latter half of gestation. M. Tarnier,[2] Depaul,[3] and Duboué[4] have fallen into this error, and the latter, as well as Charlton and Williams,[5] and Emmons,[6] have undertaken to perform grave operations under the idea that the child was in the uterus. The author has mistaken extra-uterine for normal gestation simply from a want of a true appreciation of the symptoms which presented themselves and which pointed so

[1] Loc. citat. p. 656.
[2] Boinet, Arch. de Tocologie, 1874, p. 126.
[3] Ibid., p. 336. The woman had dropsy of the amnion.
[4] Ibid., p. 578.
[5] London Med. Gazette, 1843–44, vol. xxxiii. p. 43.
[6] Baltimore Medical and Surg. Journ., 1833, vol. i. p. 231.

strongly to the true condition that it ought to have been recognized. The opposite error, of mistaking uterine for mis placed pregnancy, is much more common, and more dangerous in its results, on account of the temptation to resort to surgical interference; a course which would be wrong under any circumstances, for an extra-uterine gestation which has passed four and a half months will probably go safely to term. M. Pajot[1] says that a woman was some years since presented to the *Société de Chirurgie* of Paris, who had been pronounced to have an abdominal pregnancy by the most eminent men of that city. M. Dubois examined her and diagnosticated a normal pregnancy. She was naturally delivered some time later. In 1860, M. Pajot says he saw a woman said by competent men to be the victim of this accident. They were misled by finding the fœtus lodged immediately beneath the surface of the abdomen, and the head located very superficially in the vagina, so that it appeared to be covered by nothing but the vaginal wall. However, by carefully examining the uterus M. Pajot found that the neck had undergone some of the changes usual to pregnancy, and pronounced the gestation uterine, which proved to be correct. M. Huguier[2] had decided upon performing gastrotomy the next day, and his patient was delivered spontaneously during the evening of the day upon which he decided an operation to be necessary. This errror can be avoided by careful examination with reference to the symptoms to which attention has been directed, and especially by remembering the counsel of Pajot, and carefully comparing the changes in the cervix uteri with the size of the gravid tumor. If the former has undergone alterations, which at all correspond in the degree of their development with the duration of pregnancy, the child will be found to be within the uterus. It is a noticeable fact, that, when normal has been mistaken for misplaced pregnancy, the location of the child has nearly always been very superficial. It has already been shown that this alone is not of any value as a sign that the child is not contained in the uterus.

[1] Des Causes d'Erreur dans le Diagnostique de la Grossesse; Annales de Gynécologie, Paris, 1874, tome i. p. 212.

[2] Depaul, loc. citat. p. 269.

To mistake extra-uterine gestation for retroversion of the gravid womb is an error that may be easily committed. Merriman[1] believed that most of the reported examples of this accident at term, were illustrations of posterior uterine displacement or of retention of a fœtus which had escaped into the peritoneal cavity through a rent in the uterus. Krohn, Bonnie,[2] Capuron, Lisfranc,[3] White,[4] Young,[5] J. Hall Davis,[6] and A. H. Smith,[7] all speak of having committed this error. Depaul says, that Dolbeau and Charpentier made the same mistake.[8] Armour[9] relates a case of ovarian pregnancy, in which attempts were made to reduce the supposed uterine dislocation by a surgeon who was called in consultation. Davis and Goodell,[10] both tried to bring on labor under the supposition that the fœtus could not be born spontaneously, owing to the abnormal position of the womb. Bonnie states, that in his case violent efforts were made to replace the tumor under the mistaken idea that it was the fundus uteri, and failing in this, it was tapped. Lesouef asserts, that the tumor was likewise tapped in a woman who was seen by Dupuytren, Lisfranc, Dubois, and Maygrier. Two days later, the fœtus, which was four months old, was passed by the rectum. Barnes[11] has seen the cyst produce retention of urine and occlusion of the bowel, leading to the belief that the gravid uterus had become retroverted. On the other hand, M. Bailly[12] states that Depaul and others supposed a retroverted gravid uterus at five months to be a misplaced pregnancy.

The only way in which these errors can be avoided, is by a careful investigation of the rational and physical signs

[1] A Dissertation on Retroversion of the Womb, 8vo., Phila., 1817.
[2] Thèse à Paris, No. 181, 1822, p. 36.
[3] Capuron, Revue Médicale, 1833, tome iv. p. 136.
[4] Medical Commentaries, vol. xx. p. 254.
[5] Trans. Medico-Chir. Soc. Edinburgh, 1839, vol. iii. p. 536.
[6] Trans. Obstet. Soc. London, 1871, vol. xii. p. 332.
[7] Amer. Journ. of Obstetrics, May, 1872, p. 161.
[8] Archives de Tocologie, tome i. 1874, p. 340.
[9] Glasgow Med. Journ., 1830, vol. iii. p. 156.
[10] Amer. Journ. of Obstetrics, May, 1872, p. 155.
[11] Loc. citat. p. 365.
[12] Archives de Tocologie, 1874, p. 731.

presented by the patient. The colicky pain, with profound prostration and occasional syncope, will be found to be absent in retroversion. In the latter we do not have metrorrhagia, which is so frequent in erratic gestation. Retention of urine is much more frequent in the early stages of pregnancy with posterior displacement of the womb, than it is when the child is being developed outside of the uterine cavity. The latter is attended with difficulty and pain in urinating at times, but rarely produces retention.

Upon physical examination the uterus can be more or less completely isolated by Sims's bimanual manipulation, when it will be found that the fundus of the organ does not occupy the normal position. On the other hand, in extra-uterine fœtation when not of the tubo-uterine variety, the tumor will be found to be adjacent to, but distinct from the uterus, the fundus of which can frequently be felt in front of the gravid cyst. It must be acknowledged, however, that the differential diagnosis in these cases is often very difficult. In some instances time alone will clear up the mystery. The fact that so many experienced and deservedly eminent obstetrical authorities have been misled in the diagnosis of these conditions shows that the greatest care should be exercised in investigating the symptoms before coming to a conclusion. The same fact teaches that the errors of others should be viewed leniently. Any person may commit the same blunder, but it appears reasonable to believe that a critical examination will generally lead to correct conclusions. Errors in diagnosis are more frequently due to want of observation than to any want of knowledge.

During the progress of spurious labor at term, extra-uterine pregnancy has been mistaken for rupture of the uterus. Edmundson[1] fell into this error. When seen, the woman had been sixty-six hours in labor. Various efforts were made to pass the hand into the uterus, but they all failed. The woman died. Don Francisco le Flores Moreno, of Cadiz,[2] states that he was called to a woman in labor at term. She had been for

[1] Med. Times, London, July 12, 1846, p. 287.
Annales de la Méd. Physiologique, 1828, tome xiv. p. 533.

some time under the care of a midwife, who asserted that she had felt the head of the child presenting, but that it had suddenly disappeared in the midst of a severe pain. Moreno diagnosticated rupture of the uterus. A large number of gentlemen were called in consultation, but the error was not corrected until the autopsy was made. The mistake was ascribed to the statements of the midwife, who seems to have been a competent and experienced woman. The narrator appears to infer that she did not find the head presenting, but it is probable that she was perfectly correct in her observation, and that the child suddenly changed its position in the cyst.

This error is to be avoided by a careful examination of the uterus, when the os will be found to be displaced in most instances, and always to be much less developed than it should be at the full term of pregnancy. In this way the midwife who had charge of Dr. Kelly's patient would have avoided the mistake of opening the retro-uterine tumor in labor, under the impression that it was the bag of waters.

Diagnosis after the Death of the Child.—If the patient is not seen until after the death of the child, the diagnosis of an extra-uterine pregnancy may be very difficult. Many years may have intervened before the woman comes under notice. Of course, if the cyst has opened into the bowels, bladder, or vagina, or a fistule has formed through the abdominal wall, there will be little or no trouble in arriving at a correct conclusion. Difficulty will arise only when the cyst has not ruptured, or, having opened into the bladder or into the rectum out of reach, it has not discharged any of its solid contents. Under these circumstances, a correct conclusion can be reached by carefully sifting the clinical history. No point is too minute for examination. As a rule, it will be found that all such women have a firm conviction that they were pregnant when the abdominal tumor made its appearance. Though more than a score of years may have passed, they will not have abandoned the idea that they still carry a child somewhere in the abdominal cavity. Such women will nearly always give the history of labor at or near term, attended with uterine hemorrhage,

and followed by the secretion of milk; after which they will assert that the abdomen diminished in size, and that this diminution steadily continued until the tumor reached the dimensions presented when the patient comes under observation. This association of phenomena is very characteristic, and, when they are all present, erratic gestation should always be suspected. The diminution in the size of the abdomen after labor is a most important symptom.

Under these circumstances, extra-uterine pregnancies have been supposed to be fibroid tumors,[1] ovarian cysts,[2] and cancer of the fundus uteri.[3] Fibroid and ovarian tumors may be distinguished from extra-uterine pregnancy by the absence of the symptoms of pregnancy during the early stages of their development, the absence of false labor at or near the end of nine months, and the steady, regular increase in their size after the end of the usual period of gestation. It is true that there may be difficulties in arriving at a correct conclusion. Meadows[4] performed gastrotomy to remove an extra-uterine child which he supposed had been carried for sixteen years, and found a fibro-cystic tumor of the uterus with cancer of the omentum. This woman confidently believed that she was pregnant at the time that her disease commenced. As is so frequently the case in spurious pregnancy, she pertinaciously maintained this idea, and, under the delusion, simulated labor occurred at term. Dr. Meadows, however, found no retro-uterine fulness; and the woman made the positive statement that the abdomen did not diminish in size after this false labor. This latter fact ought to have awakened very grave suspicions, and to have led to a very careful examination of

[1] Guéniot, Bulletin de la Société Anatomique de Paris, 1865; Depaul, Arch. de Tocologie, 1874, p. 270; Peaslee in Janvrin's case, Amer. Journ. of Obstet., Nov. 1874.

[2] Ramsbotham in Mr. F. Hutchinson's case, Medical Gazette, London, Nov. 7, 1835, p. 169; Mr. Jonathan Hutchinson, Lancet, July 19, 1873, p. 71; Jacquemier and Perrin in Boinet's case, Archives de Tocologie, Paris, 1874, p. 126; Atlee supposed that Stiles's patient "was either pregnant or suffering from an ovarian tumor," Phila. Med. Times, April 4, 1874.

[3] Atlee, General and Differential Diagnosis of Ovarian Tumors, 8vo., Phila., 1873, p. 194.

[4] Trans. Obstet. Soc. London, vol. xv. p. 145.

the patient. Taken in connection with the absence of a retro-uterine tumor, it would have justified a different conclusion. Mr. Lawson Tait[1] relates a very interesting history in which he mistook multilocular cystic disease of both ovaries for extra-uterine pregnancy. He had previously diagnosticated ovarian disease, but the patient misled him, at a second examination, by giving a very clear history of pregnancy, and a missed labor several years before. She, however, added that she *had no uterine hemorrhage at this time, and that her size did not diminish* after it. Mr. Tait, who fully recognizes the value of these two symptoms, says that he was unable to harmonize the physical signs with the clinical history, and hence he draws the following practical conclusion, that, under these circumstances, "we should place very little confidence in the statements of patients if they are not in harmony with the physical signs."

While attaching great importance to the diminution of the size of the abdomen after the termination of the usual period of gestation with or without spurious labor, it must not be forgotten that there are exceptions to this rule. The cases of the two Hutchinsons as well as a few others have already been cited. These exceptions are rare however, and when they occur Mr. Jonathan Hutchinson believes that a patient examination will enable a correct conclusion to be reached. He says:[2] "If another case of like obscurity should come under my care, in which, on examination with the patient on her back, no solid substance could be detected, I would at once make the woman support herself on her hands and knees, and in that position I have no doubt that the fœtus if present would be felt." This suggestion of a resort to abdominal ballottement may prove successful in removing doubts in regard to the nature of the condition in those rare cases in which the amnion continues to secrete after the death of an extra-uterine fœtus. In this instance the very distinct fluctuation assisted greatly to mislead Mr. Hutchinson.

The same rules which enable us to distinguish extra-uterine pregnancy, coming under notice after the death of the child,

[1] Trans. Obstet. Soc. London, vol. xv. p. 135.

[2] Lancet, July 19, 1873, p. 72.

from fibroid tumors of the womb and ovarian cysts, apply with equal force to its diagnosis from cancer of the fundus uteri. Indeed the natural history of malignant disease shows that it so rarely invades this portion of the organ, that such a mistake seems scarcely possible.

Encephaloid disease of the liver, mesentery, omentum, and ovaries has been mistaken for an extra-uterine child in at least one instance.[1] The patient was seen by Sir Philip Crampton, Drs. Beatty, Montgomery, Kennedy, Labatt, Churchill, and Bellingham. The tumor was found after the birth of her fourth child, and all the gentlemen named believed that it was an extra-uterine fœtus. This opinion appears to have been based upon the outline of the tumor, which was so nearly identical with that of a fœtus, that, "as the abdominal walls were very thin, it appeared impossible to be deceived." An operation was advised, and at this juncture Mr. J. M. O'Ferral, surgeon, saw the patient, and after a careful examination pronounced the tumor to be malignant. The skill and tact in examination, and the knowledge of the natural history of disease shown by the last gentleman in connection with this case, are greatly to be admired.

It is to be remembered that this was supposed to be a combined intra- and extra-uterine conception. In the sequel it will be shown that the author thinks that it is conclusively proved that the primary operation of gastrotomy, or other surgical measures are not to be resorted to unless very rarely, and when there are special and important indications for interference. The proper course under these circumstances would, therefore, be to wait until time removed the difficulties in diagnosis. If the extra-uterine tumor is fœtal, it will probably diminish in size by absorption of the liquor amnii, while, if it is a cystic ovary or malignant disease, it will remain stationary or continue to grow.

In cases of doubt, the fœtus being dead, the trocar has been used to draw off some liquor amnii in order to confirm the diagnosis. This practice cannot be too strongly condemned. Unless it has been decided to operate immediately for the re-

[1] Medical Times, London, Jan. 19, 1845, p. 341.

moval of the fœtus, the use of the trocar is utterly unjustifiable. A few, but very few women have long survived its use. Mr. Jonathan Hutchinson,[1] in a clinical lecture upon this subject, says that this practice "is in itself attended by great danger, nor shall I deal honestly with you or myself if I do not candidly admit, that, with due care and patience, I do not think that paracentesis ought to be necessary in a case of fœtal tumor simulating ovarian dropsy." Mr. Hutchinson reached this conclusion after having been so unfortunate as to see fatal peritonitis follow the use of the trocar in his hands. Dr. Cardeza's patient was tapped after consultation with Dr. W. L. Atlee of Philadelphia,[2] on November 19th, and the latter gentleman performed gastrotomy five days later. As soon as the cyst was opened, "there was a rush of offensive gas." Jordon[3] used the aspirator for diagnostic purposes, the woman, there is every reason to believe, having no bad symptoms at the time. She was given chloroform, the puncture made, and two hours after "complete collapse came on." Speaking of the use of the aspirator under these circumstances, Dr. Jordon remarks: "The doubts cast on my diagnosis, and the variety of opposing views in regard to the nature of the case, which unfortunately resulted in the use of the aspirator, were nearly the cause of the patient's death."

Scott[4] resorted to the use of the same instrument, apparently for the purpose of withdrawing some fluid from the cyst to relieve pain and tension rather than to confirm his diagnosis. At 8 o'clock on the evening of the next day, the woman's condition, which previous to aspiration had been good, was very serious. There were symptoms of blood poisoning, and the tumor, which had previously been dull on percussion, had become tympanitic, though there was no communication between the sac and the intestinal canal. Gastrotomy was performed at once, and on opening the cyst a quantity of gas escaped. His unfortunate patient died of septicæmia thirty-one hours later.

[1] Lancet, July 19, 1873, p. 72.
[2] Phila. Med. Times, Jan. 10, 1874, p. 236.
[3] Trans. Obstet. Soc. London, vol. xv. p. 131.
[4] Ibid., vol. xv. p. 142.

When the author met Drs. Perkins and Goodell in consultation, in regard to the patient of the former, he wished to tap the retro-uterine tumor to confirm the diagnosis. This he now believes was an error, and both the gentlemen mentioned, very properly objected to the procedure. Two days later, however, at another meeting, both consented to the measure, and Dr. Goodell drew off three or four fluidounces of undecomposed liquor amnii. This gentleman has stated[1] that this was done "with great relief to the patient." "The next day," Dr. Perkins writes,[2] "she was sitting up and talking to her friends most of the day." The same night, however, she was taken ill, and "from this time she had constant pain, high fever, great prostration," and died three days later. This certainly does not speak well for the "great relief to the patient" from tapping the cyst. Notwithstanding the slight diminution of pressure, the poor woman died only three days later. The post-mortem, however, did not furnish any evidence that decomposition had commenced in the cyst. Monod[3] performed paracentesis about three years and a half after the completion of term. The first operation was performed in September, and three pints of odorless, yellow, thick fluid were withdrawn. Eight days later it was necessary to repeat the operation, when much pus and some hair were found mingled with the fluid which escaped. The last and seventh puncture was made on the 13th of January following, when a large quantity of fœtid pus was discharged. Four days later the woman died. Mr. Jonathan Hutchinson[4] was so unfortunate as to lose his patient from peritonitis resulting from paracentesis.

It must be acknowledged, however, that in a few instances no bad results have followed this practice. Ramsbotham[5] withdrew sixteen ounces of dark-brown fluid from a fœtal sac in 1851. The woman was relieved and attended to her domestic duties for more than seven months afterward. No fresh fluid was effused, but the woman died in less than a year.

[1] Phila. Med. Times, Jan. 20, 1874, p. 236.
[2] Amer. Journ. of Obstet., May, 1872, p. 157.
[3] L'Union Médicale, 1855. [4] Loc. citat. p. 71.
[5] Medical Times (London), Nov. 13, 1852, p. 481.

McCullough[1] employed paracentesis twenty-one months after the commencement of pregnancy, and removed thirty-six pints of a fluid which resembled pale ink. Seven months later the cyst opened through the abdominal wall, and the decomposing child was removed by enlarging the orifice, after which the patient recovered. Notwithstanding the success of tapping in the hands of Ramsbotham and McCullough, facts show that it is a dangerous proceeding, and that neither the trocar nor aspirating needle can be safely used for diagnostic purposes. Puncture with either is liable to be followed by collapse, peritonitis, or septicæmia, either of which may prove fatal. Under no circumstances, should either be used unless the medical attendant is prepared to perform gastrotomy at once, if the fluid withdrawn is found to be amniotic.

Piliferous cyst of the ovary has frequently been mistaken for an ovarian conception. Tandy,[2] Swineburne,[3] and Blandin,[4] have each made this mistake. Many years ago our countryman, Dr. Detwiller, reported[5] what he believed to be a combined intra- and extra-uterine pregnancy. The latter was nothing more than a piliferous ovarian cyst, yet this case is quoted by almost all writers upon this subject as a genuine example of conception outside of the uterus. Campbell[6] and Velpeau[7] both fell into this error. It is only necessary to call attention to this fact. It is now generally known that the presence of steatomatous matter, hair, teeth, and even bones in the interior of an ovarian cyst, is not an indication that the woman in whom such a growth is found has ever been pregnant. This question will hardly present itself for solution during life, for these errors have resulted from a misinterpretation of post-mortem appearances.

The Diagnosis of the Species of an Extra-uterine Pregnancy.—If it is difficult to detect extra-uterine pregnancy, it is yet more so to determine whether the product of

[1] British American Journ. of Med. and Phys. Sciences, Oct. 1845, p. 174.
[2] St. Louis Medical and Surgical Journ., Jan. 1850, p. 15.
[3] Trans. New York State Med. Assoc., 1860, p. 102.
[4] Ibid., 1864, p. 432. [5] Phila. Journ. of Med. and Surg.
[6] Loc. citat. p. 31.
[7] Dictionnaire de Méd., 8vo., Paris, 1836, tome xiv. p. 417.

conception is being developed in the ovary, tube, or peritoneal cavity. Indeed it may be said to be practically impossible to decide this question. If colicky pain and metrorrhagia are absent and the gestation pursues a comparatively normal course to the completion of term, it is probable that the ovum is in the abdominal cavity. This is not always the case, however, for Spiegelberg has seen tubal pregnancy go to term without producing any peculiar symptoms. On the other hand, there is good reason for believing that ventral conceptions sometimes produce the most violent colicky pains. Furthermore, these would be very likely to be absent when the ovum is arrested in the fimbriated extremity of the Fallopian tube.

Pregnancy of the portion of the tube outside of the uterus, and of the ovary, would on the other hand, in most instances, give rise to severe paroxysmal pain and metrorrhagia. Noeggerath's method of exploration by dilating the urethra may lead to some definite results in the study of this subject.

The tubo-uterine variety may produce a tumor which may be proved to be a part of the uterus, as was noticed by Prof. R. W. Gibbes,[1] of South Carolina, and which he concluded to be a fibroid tumor. De la Faille[2] correctly diagnosticated tubo-uterine pregnancy in one instance because he found the pain very intense upon lightly pressing the uterus. The true value of this symptom is not determined.

It, therefore, appears that at the present time we possess no information which will enable the physician to make more than a shrewd guess in regard to the species of an extra-uterine conception during the life of his patient.

[1] Trans. State Med. Assoc. South Carolina, 1872, p. 49.

[2] Monats. für Geb., June, 1868, and Brit. and Foreign Medico-Chir. Rev., Oct. 1868.

CHAPTER IX.

THE PROGNOSIS.

Always grave—Tubal, the least favorable—Ventral, the most so—Varies with the stage of gestation—Dead fœtus may be retained for a long time without endangering the mother—Combined intra- and extra-uterine pregnancy—Pregnancy while carrying an encysted fœtus.

The prognosis of extra-uterine pregnancy is always grave. When the germ is arrested in that portion of the tube which is between the pavilion and the uterus, it is generally supposed to be invariably fatal by rupture, before the end of pregnancy. The observations of Saxtorph and Spiegelberg, already cited, disprove this. It is probable that the prognosis of this variety is less grave than is generally supposed; that is, that it may go to term more frequently than is usually believed. Of this, however, there is no absolute proof. Although there is reason to believe that rupture of the cyst may end in recovery, this happens so rarely that for purposes of treatment it should always be looked upon as fatal. This is true not only of tubal, but of ovarian and tubo-uterine pregnancies as well. On the whole, however, in the tubo-uterine variety the prognosis is more favorable than in pregnancy of the ovary, or of the portion of the tube between the uterus and the pavilion, since the cyst may sometimes open into the uterine cavity, as was observed by Laugier, Feilitz, and Hicks. There is reason to hope that the prognosis of this variety may yet be rendered more favorable by art, if our skill in diagnosis can only be brought to such perfection as to determine its existence before the occurrence of fatal rupture.

Of all the varieties of extra-uterine gestation, that of the abdominal cavity is the most favorable. This is owing to the fact that there is no impediment offered to the growth of the ovum. Unlike tubal and ovarian gestations, no tissues are distended which are unable to bear pressure.

The prognosis varies materially with the stage of gestation.

It is much graver in the first than it is in the latter half of pregnancy. If a woman reaches the middle of the fourth month without rupture, it is probable that she will go to term. Her having reached this period is an indication that the ovum has engrafted itself in an organ that will bear distension, or else that it is in the peritoneal cavity. At term, when false labor-pains supervene the prognosis is for a time more unfavorable. This period of increased fatality continues until the woman's system has, in a measure, recovered from the pseudo-puerperal condition which is induced. During the pseudo-puerperal state that follows term, the woman may sometimes die suddenly with symptoms of collapse. The author met with an illustration of this fact a short time since. He saw a lady in consultation with Drs. Duer, Wallace, and Goodell. She had reached term two weeks before. Her condition was serious, though there was no reason to anticipate sudden death. After having been unusually cheerful during the morning, symptoms of profound collapse came on suddenly and without apparent cause in the afternoon, and terminated fatally in a few hours.

After the death of the fœtus, and the restoration of the normal condition of the system, the retention of an extra-uterine fœtus is not incompatible with a long and useful life, but a woman is never free from danger while she is carrying an encysted child. Violent exercise, injuries, blows, strainings, and similar mechanical irritations may be the exciting cause of inflammation of the sac at any time. Hence, violent pain, with fever and evidences of inflammation following these, always demand a cautious prognosis.

Depressing diseases, as any of the continued fevers, or local affections which induce a profoundly typhoid condition, endanger the woman by impairing the nutrition of the cyst, and leading to destructive inflammation.

The discharge of the contents of the fœtal cyst through the rectum, vagina, bladder, or abdominal wall, frequently ends in recovery, and the last is the most favorable of these terminations. Its prognosis is not rendered more unfavorable by the occurrence of fecal fistule.

Of these various terminations, the discharge of the contents

of the sac through the rectum is the most unfavorable. Though the vagina is the canal through which the child naturally enters the world, the communication of the cyst with this channel appears not to be as favorable as might be supposed.

The occurrence of profound prostration, hectic, or septicæmia during the process of elimination, is always a grave indication. It should never be forgotten, however, that a woman in this condition may recover under the most extraordinary circumstances.

Combined intra- and extra-uterine pregnancy is not more unfavorable than when only one germ is fecundated, and that is developed outside of the womb.

Hernial or extra-abdominal gestation, which is at the same time extra-uterine, is one of the most favorable varieties both as regards the life of the mother and child. As the latter can be removed without opening the abdominal cavity, its life can generally be saved without materially increasing the dangers of the mother. In all other varieties the life of the child is to be considered as inevitably lost, unless it can be saved by gastrotomy after the death of the mother.

The supervention of pregnancy in a woman who is carrying an encysted extra-uterine child, while it may produce no bad symptoms, always increases the danger of the woman. The throes of labor may displace and bruise the cyst, and lead to inflammation, suppuration, and purulent or putrid contamination of the blood at a period when the woman is least able to resist these unhappy influences. The natural history of erratic pregnancy appears to warrant the conclusion that the life of a woman who conceives a uterine child while carrying one outside of the womb, is not so much endangered by accidents occurring during labor as it is by those which may follow it. Experience proves, however, that a woman may safely give birth to a number of infants while carrying an encysted fœtus in her abdomen.

CHAPTER X.

THE TREATMENT.

During the first half of pregnancy—Palliative measures—Radical treatment—Destruction of the ovum through the system of the mother—Extirpation of the sac—Puncture of the cyst—Its removal by section of the vagina—Galvanism and electricity—Injection of narcotics into the cyst—Compression of the tumor—The comparative value of these methods of treatment—Of rupture of the cyst—Gastrotomy after rupture.

The treatment of extra-uterine pregnancy varies with the stage of gestation. It may, therefore, be considered under three heads: 1. During the first four months; 2. During the remainder of the usual term of gestation; and, 3. After that period, or after the death of the fœtus.

Treatment in the First Period.—This may be considered under two heads, palliative, and curative or radical treatment. The first is highly important. A great deal was said in the description of the symptoms about colicky pains. It is generally for the relief of these that the physician is first called to see the patient. They can be relieved by narcotics, of which opium is the best. This should be given in large doses, and the quantity should be large enough to induce the desired effect, which is, complete relief from pain. Contractions of the fœtal cyst being the probable cause of these pains, they indicate that the pregnancy is tubular rather than abdominal, and that rupture of the cyst is impending; therefore they should be relieved as promptly as possible in order to avert this deplorable calamity. Dr. Campbell says[1] that these pains are sometimes so severe as "to be uncontrollable by the most powerful doses of opium." Under such circumstances they might be arrested by the administration of anæsthetics; but these can never come into general use for the management of this troublesome symptom, because their administration en-

[1] Loc. citat. p. 104.

dangers rupture of the cyst, by causing the patient to struggle while the effects are being induced, or passing off. The vomiting which so often follows anæsthesia may have the same effect, and thus the remedy may hasten the very danger which it was given to prevent. The opium may be administered either by the mouth or hypodermically. The rapid action of the latter makes it preferable. At the same time strong sedative applications should be made to the abdomen, and the patient should be kept as quiet as possible. The depression which accompanies these outbreaks of pain is sometimes so profound as to call for the administration of powerful stimulants. These must be given as required.

Constipation and difficulty in urinating are to be met, with the usual remedies. Purgatives must be administered with great caution, however, and all drastic cathartics are to be avoided. The straining which they produce may result in rupture of the sac. A patient who is suspected to be carrying an extra-uterine child should be instructed to avoid all sudden exertion, straining at stool, lifting heavy weights, or any laborious occupation. She should likewise avoid anything likely to excite the emotions.

The radical or curative treatment of extra-uterine pregnancy in the first months of the evolution of the fœtus, is a matter of great importance. If our knowledge were sufficient to enable us to distinguish abdominal from tubal pregnancy, the former might be allowed to progress to term, since it is known to frequently recover. In tubal gestation it is not proved that this happy event can be anticipated. Rupture of the cyst will probably occur and end fatally before the end of the fourth month. To prevent this, and save the life of the woman, it has been proposed to destroy that of the fœtus. No question of morality can enter into the consideration of this subject. There is no hope that the child will become viable, and if it should live as long as this, the history of the operation of gastrotomy for its relief shows that the results are so fatal to the mother, that the accepted custom of obstetrics, to save hers, as the more valuable life, when one has to be sacrificed, applies here with great force. If extra-uterine pregnancy has been diagnosticated, there is no doubt about

the propriety of destroying the life of the ovum, if this can be done without increasing the dangers of the mother. The various measures that have been proposed to accomplish this, will be separately considered.

Destruction of the Ovum through the System of the Mother.—It was proposed by Von Ritgen[1] to effect this by depressing the vital powers of the mother. He subjected the woman to a sort of "*cura famis*," while at the same time he administered purgatives and ergot. He reports an alleged cure by this method. It never came into general use, for the obvious reason that clinical experience teaches that the state of the mother's health has little effect upon the nutrition of the fœtus. Phthisical patients frequently bring fat, well-nourished children into the world. Cazeaux[2] proposes to effect the same end by copious and repeated bleedings. Iodide of potassium[3] and mercurial frictions[4] have also been used under the same circumstances. Barnes[5] has suggested giving strychnia so as to produce the minor toxical effects on the mother, and on account of the well-known destructive influence of the virus of syphilis upon the fœtus in utero, asks, if syphilization would be justifiable. Janvrin[6] used hypodermic injections of ergotine in his case, under the idea that he had to deal with a tubo-uterine (interstitial) pregnancy, though it is impossible to determine upon what grounds he based his conclusion. He believes that the final discharge of the child by the bowel was hastened by the influence of this drug, though there is not the slightest evidence that the conclusion is correct. All of these measures will be found alike unavailing. Barnes' suggestion of syphilization cannot be too strongly opposed. Almost every one has seen women, though badly infected with this disease, bring forth living, though diseased children, and the

[1] Neue Zeit. für Geb., 1840, ix. p. 206.

[2] Theoret. and Pract. Midwifery, 8vo., Phila., 1869, p. 601.

[3] Keller, Des Grossesses Extra-utérines, 8vo., Paris, 1872, p. 54.

[4] Schlesier, Casper's Wochenschrift, 1845, No. 31 ; Moreau, Des Grossesses Extra-utérines, 12mo., Paris, 1853, p. 120.

[5] Diseases of Women, 8vo., Phila., 1874, p. 373.

[6] Amer. Journ. of Obstetrics, Nov. 1874, p. 432.

wonderful persistency with which an ovum is sometimes retained in uterine pregnancy, under the most hopeless circumstances, leads us to infer that syphilization would not always prove successful in destroying the life of the child. Besides this, the moral objections to the practice would appear to be insurmountable. Janvrin's proposition to use ergotine by hypodermic injection must be condemned. Its utility in bringing on contractions, in a uterus in a state of quiescence, is very uncertain, but granting that its action is certain, and that it will always induce contraction of the cyst, this is precisely what is not to be desired. Rupture of the sac is the most unfortunate result of extra-uterine pregnancy; the one accident of this singular slip of nature which has never been relieved; and all drugs, the action of which would hasten this in the slightest degree, cannot be too sedulously avoided.

Extirpation of the Fœtal Sac.—Keller[1] says that Heim and Osiander proposed to remove the fœtal tumor by the bistoury. He does not tell us where they proposed to make the incision. In later times, Brown,[2] Routh,[3] Playfair,[4] Meadows,[5] and Greenhalgh[6] in England, and Darby[7] in this country, have proposed to perform gastrotomy, and extirpate the sac before rupture occurs. This operation is condemned by Hewitt[8] and Spencer Wells.[9] There is no doubt that it is possible, but it has never been performed. Mr. Wells, whose opinions on all questions appertaining to abdominal surgery are of the highest value, opposes it, on the ground that women who are the subjects of extra-uterine pregnancy frequently recover. However, if the diagnosis of misplaced gestation was certain in any case, and it could be proved that the gravid cyst was situated in the ovary or in the Fallopian tube, the operation would be perfectly justifiable. In the first species the ovary

[1] Loc. citat. p. 54.
[2] Transactions Obstet. Soc. London, 1870, vol. xi. p. 8.
[3] Ibid., p. 61.
[4] Ibid., p. 61.
[5] Ibid., 1872, vol. xii. p. 271.
[6] Ibid., p. 273.
[7] Trans. South Carolina State Med. Assoc., 1872, p. 102.
[8] Trans. Obstet. Soc. London, 1872, vol. xiii. p. 273.
[9] Ibid., p. 273.

alone would have to be removed, and the operation would be simply that of ovariotomy. In the other case the fœtal sac might be extirpated, or if this was not possible, the supra-cervical portion of the uterus and its appendages could be removed, with a better prospect of the woman's recovery than she would have after rupture of the cyst. The great impediment to operative interference, is the difficulty in diagnosis.

Puncture of the Fœtal Cyst.—In 1864, Sir James Y. Simpson[1] put on record the fact, that he had punctured a fœtal cyst through the vagina, and evacuated the liquor amnii in a woman six months gone, with the hope that the life of the fœtus would be destroyed. For two days the patient did well, but on the morning of the third day she was extremely ill, and died before night, the sounds of the fœtal heart being heard till the last. In 1865, Hicks,[2] of London, punctured the sac through the vagina in a woman three and a half months gone, not with the intention of withdrawing the liquor amnii, but to destroy the fœtus by direct injury with the trocar. This he succeeded in doing, but his patient died of internal hemorrhage on the fifth day. In 1867, Greenhalgh[3] tried the same method, his patient being between three and four months advanced in her gestation. The "hair trocar" was introduced through the vagina on October 8th, and fifteen drachms of liquor amnii were withdrawn. The patient did well until Oct. 27th, when she had a rigor, hypogastric pain, and a sanious discharge from the vagina, followed by the expulsion of some coagula and the decidua, after which she did well. On the third of the following November, he could hardly discover a trace of the extra-uterine swelling. Greenhalgh was unaware that this treatment had been previously proposed and employed. On the 5th of July, 1867, the late Dr. Tanner[4] resorted to vaginal puncture for the same purpose. He was unaware of the operations of Simpson and Hicks, for he believed his case "to be unique." His

[1] Edinburgh Med. Journ., March, 1864, p. 865.
[2] Trans. Obstet. Soc. London, 1866, vol. vii. p. 95.
[3] Lancet, March 23, 1867.
[4] Signs and Diseases of Pregnancy, 8vo., Phila., 1868, p. 306.

patient continued desperately ill until August 8th, when she passed the decomposing fœtus by the bowel, immediately after which she began to improve. Several months later, Martin[1] reported that he had punctured the cyst through the abdominal wall, when the pregnancy had lasted about three months. The woman died. In a recent discussion before the Obstetrical Society of New York, Prof. T. G. Thomas stated[2] that he had twice punctured the sac to arrest the progress of extra-uterine pregnancy. Both women died, one from secondary hemorrhage, and the other from septicæmia. An extended examination of the literature of extra-uterine pregnancy has not led to the discovery of any other efforts to arrest the growth of the ovum by this method. The result certainly is not what might have been hoped for from such an operation. Of the seven women only two recovered, and one of these, whose history is reported by Dr. Tanner, cannot be said to have been benefited by the operation. She continued desperately ill for a month, when the cyst opened into the rectum and discharged its contents by the bowel. It is an important fact that the child was decomposing. Greenhalgh alone may be said to have been successful. This is certainly no very flattering exhibit for puncture of the cyst, especially when it is remembered that Sir James Y. Simpson heard the fœtal heart beat until the death of his patient. It, therefore, appears that the death of the fœtus is not insured by the discharge of the liquor amnii. The history of extra-uterine pregnancy proved long since that the presence of that fluid was not necessary to insure the complete development of the child outside of the uterus. Reference to the examples of development of the fœtus after rupture of a tubal pregnancy, the placenta remaining intact, will fully demonstrate this fact. The practice is not without danger to the mother. It has been stated, in speaking of the diagnosis of extra-uterine gestation, that the trocar should never be used for that purpose without it is the intention to remove the fœtus at once, either by gastrotomy or another operation. To admit air into an extra-uterine fœtal

[1] Monats. für Geburtsk., Feb. 1868, and Brit. and For. Medico-Chir. Rev., July, 1868.

[2] Amer. Journ. of Obstet., Nov. 1875, p. 522.

cyst is always a dangerous proceeding. It leads to decomposition of the fluid and solid contents, with rapid blood poisoning and death, if the offending cause is not removed. If the fœtus is destroyed in the early stages, the hope for the patient is that it will become encysted, and remain quiescent throughout the rest of her life. To do this, it is necessary in most instances, to maintain the integrity of the cyst walls. Puncture with a trocar or aspirator does not, therefore, hold out any hope of success.

Removal of the Embryo by Section of the Vagina with the Galvanic Cautery.—Prof T. G. Thomas,[1] of New York, has very recently proposed and successfully practised a new operation for the removal of all of the contents of the fœtal cyst, which, with slight modification, promises to lead to important results. On Feb. 7, 1875, Dr. Thomas operated on a woman three months gone in the following manner: She was etherized and placed in the left lateral position on a table which stood before a window admitting a strong light. A Sims speculum was introduced into the vagina. "Through this," continues Dr. Thomas, "the cyst to the left of the uterus could be distinctly palpated. Now fixing a long-handled tenaculum in the cervix uteri, and another in the vagina, near the left ilium, this part was by them put on a stretch so as to make that side of the canal a triangle, the base of which was over the cyst, and the apex at the vulva. Assistants held the tenacula during the operation. Taking the platinum knife of the galvano-caustic battery, which was brought to a white heat, I now passed it gently over the base of the triangle described as created in the vagina, carrying it from one tenaculum to the other. By repeating this, the vaginal wall, over the lower segment of the cyst, was slowly cut through. In six minutes the cyst was opened by the incandescent knife, and a straw-colored, slightly pinkish fluid was thrown out with such force as to fly into my face and over my clothing.

"Thus far no blood whatever had been lost. I now passed my index finger into the cyst, and felt a fœtus lying horizon-

[1] New York Med. Journ., June, 1875.

tally with the head towards the ilium, and the feet towards the uterus. Passing in the middle finger likewise, I caught the feet between the two, and turning the fœtal body, drew them through the artificial os which I had created, and delivered the child from the vicarious uterus which it occupied. The cord was then cut, and I proceeded to deliver the placenta by gentle traction and detachment as is done after natural labor. Thus far thirteen minutes had been consumed."

After a little more than half the placenta had been separated, a very severe hemorrhage set in, so that Dr. Thomas had to tear off the separated portion, and inject a solution of subsulphate of iron into the sac. This instantly checked the loss of blood, but left the sac filled by coagula and a portion of the placenta. The woman was put to bed in twenty-eight minutes after the commencement of the operation. On the fourth day symptoms of septicæmia set in, but they yielded to the treatment adopted. On the fifteenth day the portion of the placenta which remained came away.

This is the most important contribution which has recently been made to the treatment of extra-uterine gestation in its early stages. Dr. Thomas hoped to avoid peritonitis by opening the sac by an incision made between the folds of the broad ligament. By this means the serous membrane escaped injury. The incandescent knife prevented hemorrhage, and he hoped to avoid septicæmia by removing all of the cystic contents, the placenta included. Here the distinguished operator, with all due deference to his great experience and well-known skill, it seems to the author committed a serious error. By attempting to remove the placenta he nearly realized the sad experience of Baudelocque, whose patient died at once from hemorrhage, and by the necessity of suspending the operation, and injecting the subsulphate of iron he may have induced the septicæmia, and thus subjected his patient to the very dangers which he was seeking to avoid.

In all these operations the placenta should be left *in situ*. Experience has proved that the danger of immediate hemorrhage from its removal is greater than that of secondary hemorrhage and septicæmia, which may result from allowing it to remain. With this single modification the operation of

Dr. Thomas appears to promise much for the early relief of certain cases of extra-uterine gestation. By this means the cyst can be opened without fear of hemorrhage. If the fœtal tumor is distinctly retro-uterine, it can be done with great readiness. If it is tubal, there is reason to hope that the knife can be carried up between the folds of the broad ligament, and the cyst opened without disturbing the peritoneum. The drainage of the sac is fairly insured by position, while it can be easily washed out by disinfectant solutions. By these means we have reason to hope that septicæmia can be avoided, even though the placenta is left to come away in decomposing pieces. We have every reason to believe, at least, that trusting to these measures is less dangerous than to run the risk of fatal hemorrhage or rupture of the cyst by removal of the placenta.

Galvanism and Electricity.—In 1857 Bachetti, of Pisa,[1] announced the fact that four years before, he had caused the death of the fœtus, by inserting needles into the cyst, and passing through them an electro-magnetic current. The tumor, which was the size of a man's fist, gradually contracted to that of a pigeon's egg. Moreau, in his work, *Des Grossesses Extra-utérines*, published in the same year, 1853, in which Bachetti first employed this method of treatment, gives Voillemier the credit of having suggested its use. Burci[2] has recently reported another successful case in which the growth of the fœtus was arrested by electro-puncture.

Cazeaux[3] suggested that electric shocks through the cyst would kill the child. Hicks,[4] of London, and Allen,[5] of Philadelphia, have each tried the method. Hicks placed one pole of a galvanic battery in the vagina and the other over the tumor on the abdominal wall. This was tried twice, and the fœtal movements ceased during the application of the current, but returned afterwards. Dr. J. G. Allen has been successful in two instances. He applied one pole of an ordinary electro-magnetic machine to the tumor in the vagina through an ordi-

[1] L'Union Médicale, 1857.

[2] Bull. Général de Thérapeutique, 1872, p. 276.

[3] Loc. citat. p. 601.

[4] Trans. Obstet. Soc. of London, 1866, vol. vii. p. 96.

[5] Amer. Journ. of Obstet., May, 1872, p. 161.

nary glass speculum, the other being applied to the surface of the abdomen over the fœtal cyst.

Dr. Barnes[1] rejects Bachetti's plan of using electro-puncture, and prefers that suggested to Lesouef by Duchenne. The latter believed that the discharge from a Leyden jar produced profound local stupor with lessened calorification and dimunition in the activity of the capillary circulation. He directs that the excitors should be covered with a thick coating of wax, the terminal bulbs only being left bare. One is to be passed into the rectum in contact with the tumor, being careful to avoid the lumbo-sacral plexus of nerves, while the other is passed into the vagina and brought in contact with the anterior inferior part of the cyst. Keller opposes the use of electricity in any form, because he believes that there is danger of the current bringing on contraction of the cyst or the surrounding muscles, and producing separation of the placenta and its consequences. This objection is not without force. The experience of Hicks likewise proves that an electric current by no means surely destroys the product of conception. Therefore this method of treatment cannot be relied upon in all cases, yet the happy results obtained by Allen prove that it may be effectual. This appears to be preferable to Bachetti's method of electro-puncture.

The Injection of Narcotic Substances into the Cyst.—This method of destroying the fœtus was proposed by Joulin[2] in 1863, and was successfully put in practice by Friedreich[3] one year later. The latter injected one-tenth of a grain of morphia the first time. Two days later, when the cyst was smaller and not so tender, one-sixth of a grain was injected. Four injections of the same quantity were made afterwards. The only doubt about this case is in regard to the diagnosis. The history is not sufficiently clear to make it certain that the pelvic tumor was not inflammatory. Kœberlé[4] was successful with a solution of the hydrochlorate of morphia and the

[1] Diseases of Women, 8vo., Phila., 1874, p. 371.
[2] Keller, loc. citat. p. 56.
[3] Med. Times and Gazette, Jan. 21, 1865, p. 71.
[4] Keller, loc. citat. p. 77.

diagnosis was placed beyond doubt in this case by the discharge of a small quantity of liquor amnii. An accident occurred in this instance, for upon removing the instrument there was considerable hemorrhage, and, notwithstanding pressure was made, there was some blood effused into the abdominal walls. Joulin believed that the narcotic solution might sometimes be thrown into the embryo, when its death would be nearly instantaneous. In other cases it is thrown into the fœtal cyst, poisoning the amniotic fluid by which the child is surrounded. The injection of narcotic substances is recommended by Béhier, Tanner, and Keller. Tanner recommends that half a grain of morphia be thrown into the cyst by a hypodermic syringe.

Kœberlé has made an important and very interesting observation in regard to the future of his successful case. The ovum did not become encysted, but appeared to have been completely reabsorbed. This treatment, if adopted, should be resorted to as early as possible, so that this happy result may be realized. Of the true value of narcotic injections into the cyst we can say nothing. The facts in our possession are not enough to make any deductions valuable. As yet it cannot be said to count more than one success—that of M. Kœberlé. There are too many doubts about M. Friedreich's statements to warrant their unquestioned acceptance.

Compression of the Tumor.—Malin[1] has proposed to destroy the fœtus by compressing the tumor. He recommended the use of bags of sand. It is useless to discuss this measure. It is at best uncertain, and the hypogastric region is generally so tender that it cannot be borne, while there is danger of separating the placenta and causing rupture of the cyst.

From this summary of the results of the various efforts which have been made to destroy the life of the fœtus, in the early stages of its development, it at once becomes apparent that but little has yet been done in this direction. Notwithstanding the attempts that have been made to settle the therapeutics of this stage of misplaced pregnancy, experience will not

[1] Keller, p. 59.

yet warrant the adoption of any positive rules in regard to it. From a careful investigation of the history of these attempts, it appears, however, that all measures that necessitate wounding the cyst without removing the child are not without danger to the woman. They are not, however, to be condemned for this reason. Every important operation in surgery involves in itself more or less risk, and grave mutilations are daily and properly practised, in the hope of saving life, when it is well known that if they are not successful they will shorten it. In considering this question it becomes us, therefore, to determine, if possible, whether the risks of the therapeutic measure, though they may be grave, may not be less than those which follow when the accident is abandoned to nature. This it is at present impossible to determine. Future experience must decide the question.

In the mean time, the facts now in our possession indicate that the child ought to be either removed entire, or the cyst be allowed to remain uninjured. The results of tapping the tumor to remove the liquor amnii sustain this statement. It is further borne out by the unhappy consequences which followed aspiration in the hands of Jordan and Scott. For the same reason Bachetti's proposition to resort to electro-puncture, and Joulin's to inject narcotics into the sac to destroy the child, while they have not yet proved fatal, and are not to be hastily condemned, should be employed with a full knowledge that puncture of the cyst may interfere with the desiccation of the fœtus, so that it will remain in the abdomen an innocuous foreign body. This is the operator's hope when he resorts to this method of treatment. The natural history of misplaced gestation teaches that the happy experience of Kœberlé, in regard to the resorption of the solid portions of the ovum, is not likely to be very frequently realized. For these reasons, if the author was to be called to a case of extra-uterine pregnancy, at a time when the child could be destroyed, he would, while not condemning the injection of narcotic substances into the cyst, prefer the use of electricity, as employed by Dr. J. G. Allen, of Philadelphia; or else he would remove the child by section of the vagina with the galvano-cautery, as

performed by Professor Thomas, of New York, with this exception, that he would leave the placenta *in situ*.

The dread of wounding the cyst, expressed in these pages, may seem to many entirely unnecessary. Clinical experience alone must settle this matter; but as the hope of restoring these women to health depends upon converting their immature children into innocuous masses of foreign matter, it seems reasonable to believe that this can best be done by preserving the integrity of the cavity which contains them. The admission of air could hardly fail to result in decomposition of the liquor amnii and fœtus; and clinical experience has proved that this danger is not overcome even by the aspirator. Therefore, notwithstanding the dangers of producing rupture of the cyst by electricity, and of secondary hemorrhage and septicæmia supervening after complete removal of the child, it would seem that these methods of treatment offer the best chances of success.

Treatment of Rupture of the Cyst in the early Stages of Pregnancy.—In speaking of the result of this pitiless termination of extra-uterine gestation, it was stated that so few recover from it, that all hope of such a happy result is to be dismissed in considering the treatment. No doubt, notwithstanding the statement of Rogers to the contrary, a few women have recovered, though the number is very small—so small that when one is called to a case of the kind, it is his duty to look upon his unhappy patient as inevitably doomed to die, unless he can by some active measures wrest her from the grave already yawning before her. The history of human injury and disease presents no condition parallel to this one. However fatal the disorder, science and art have found some means of prolonging life or "smoothing the stormy passage to the grave."

A bleeding vessel, through which the red stream of life is rushing away, can be ligated. A gangrenous limb, which is destroying its possessor by sending its poisonous emanations to the remotest regions of his body, can be amputated. A cancerous breast, which is sapping the vitality of its victim hour by hour, can be removed with the prospect of temporary relief. An aneurism, that places life in constant jeopardy, can often

be cured by proximal or distal ligation. The tumultuous action of a heart organically diseased may be quieted till nature restores the balance, after which the person may enjoy a long and even a useful life. Even phthisis now counts its many cures; but here is an accident which may happen to any wife in the most useful period of her existence, which good authorities have said is never cured; and for which, even in this age when science and art boast of such high attainments, no remedy either medical or surgical has been tried with a single success. From the middle of the eleventh century, when Albucasis described the first known case of extra-uterine pregnancy, men have doubtless watched the life ebb rapidly from the pale victim of this accident as the torrent of blood is poured into the abominal cavity, but have never raised a hand to help her. Surely this is an anomaly, and it has no parallel in the whole history of human injuries. The fact seems incredible, for if one life is saved by active interference it may be triumphantly pointed to as the first and only instance of the kind on record. In the whole domain of surgery—for we cannot look to other than surgical measures under the circumstances —there is now left no field like this. In this accident, if in any, there is certain death. How often do we see persons recover from injuries which their surgeons tell them will be mortal if they do not submit to a grave and terrible operation, and which with a dogged determination they refuse to have performed, preferring to perish rather than to suffer such grave bodily mutilation; or else, with a keener instinct, they foresee a happier result and get well notwithstanding the evil prognostications of the surgeon, and in defiance of all the laws which, as man with his fallible knowledge supposes, govern human injuries. But in rupture of an extra-uterine fœtal sac, in the early stages of pregnancy, a whole lifetime—a whole century—is not enough to enable one person to make two errors in regard to the prognosis of this accident.

The only remedy that can be proposed to rescue a woman under these unfortunate circumstances is gastrotomy—to open the abdomen, tie the bleeding vessels, or to remove the sac entire. This treatment was suggested by Dr. W. W. Har-

bert[1] in 1849, and again by Dr. Stephen Rogers, of New York, in a paper read before the American Medical Association in 1866.[2] In 1853, M. Alexis Moreau[3] emphatically condemned gastrotomy under these circumstances, because he believed that the hemorrhage could not be arrested, and that opening the abdomen, and allowing air to enter it, would increase the peritonitis which, he supposes, always follows the effusion of blood resulting from rupture of an extra-uterine fœtal sac. For these reasons he says all operative interference is contraindicated. Desormeaux,[4] Moreau,[5] and others long since advised gastrotomy for rupture of the cyst, but it must be remembered, that by this, they meant rupture during the spurious labor, which occurs at or near the end of the ninth month of gestation. The first suggestion of performing gastrotomy to save a woman dying from early rupture of the cyst came, so far as we know, from our countryman Dr. Harbert, while to Rogers belongs the credit of formulating the arguments in favor of this practice and bringing them prominently before the profession. Since he wrote, the same plan of treatment has been advocated by Meadows, Hewitt, Greenhalgh, and Playfair, in a discussion before the Obstetrical Society of London.[6] Kœberlé,[7] Béhier,[8] Schrœder,[9] and Atlee[10] countenance the proceeding, but no person has yet performed gastrotomy for the relief of this accident. The great impediment to the adoption of this treatment is the uncertainty of diagnosis. This subject has been fully treated of in its appropriate place, and

[1] Western Journ. of Med. and Surgery, 1849, 3d series, vol. iii. p. 110. After describing a case of rupture, he says: "Whether the Cæsarean operation would promise anything in similar cases were the diagnosis made in time, is an inquiry that can only be answered by observation and experience."

[2] Trans. Amer. Med. Assoc., 1866, and Extra-uterine Fœtation and Gestation, etc., 8vo., Phila., 1867. Also Medical Record, New York, 1867, vol. ii. p. 22.

[3] Loc. citat. p. 123.

[4] Dict. des Sciences Médicales, 8vo., Paris, 1829, tome vii. p. 273.

[5] Traité Pratique des Accouchemens, 8vo., Paris, 1841, tome ii. p. 367

[6] Transactions, 1872, vol. xiii. pp. 270, 1, 2.

[7] Keller, loc. citat. [8] Loc. citat. [9] Loc. citat. p. 136.

[10] Phila. Med. Times, Jan. 10, 1874, p. 236.

it is only necessary to add here, that if these symptoms present themselves and are followed by the sudden appearance of those of rupture, the diagnosis is so reasonably certain that the performance of gastrotomy is imperatively demanded.

Another influence that has deterred surgeons from resorting to this operation under these circumstances, is the dread of not being able to arrest the hemorrhage after the abdomen has been opened. Doubtless this will often be found to be difficult, and it may be, sometimes impossible, but under these circumstances the ovary, the tube, or even the whole uterus can be removed. Women have recovered from this mutilation, and it is certainly not more fatal in its results than to leave rupture of an extra-uterine fœtal cyst to nature. The indications now are, that extirpation of the uterus is shortly to take its place on the list of legitimate operations.

Péan and Urdy,[1] have placed hysterotomy in a new position by their brilliant successes. They have saved no less than seven out of nine women upon whom they have operated. Many of these must, under less radical treatment, have been abandoned to a slow and painful death from hemorrhage and suppuration in the fibroid tumors by which they were afflicted. In some of their cases the adhesions were very numerous, and would have deterred less bold operators. The study of the reports of their operations, in which these adhesions were so formidable, and a consideration of the almost reckless manner in which they broke them down, cannot but lead us to the belief that the operation of gastrotomy for rupture of the sac of an extra-uterine fœtation, cannot be more dangerous; while it holds out an equal prospect of recovery. If success does not crown his effort, the surgeon has not the painful knowledge, as after ablation of the uterus for fibroid and other tumors, that he has shortened the life of his patient by a single day.

It should be remembered that rupture usually occurs before the end of the fourth month, and that in many of these cases, the contents of the cyst are discharged and float freely in the

[1] Hystérotomie. De l'Ablation partielle ou totale de l'Utérus, par la Gastrotomie, 8vo., Paris, 1873.

blood in the peritoneal cavity. It is also an established fact, that in early rupture the most severe hemorrhage occurs in those cases in which the contents of the cyst do not escape, and the blood flows from an orifice, sometimes so minute, that this is one of the most singular facts known in connection with extra-uterine pregnancy. This and the well-established fatality of the accident, warrant the conclusion that the woman's chances of life will not be lessened by enlarging the opening and removing the ovum. In gastrotomy for rupture of an extra-uterine fœtal cyst in the early stages of pregnancy, there need be no indecision about the method of dealing with the placenta. From the nature of the bleeding surface arises the chief difficulty in controlling the hemorrhage. If this was from a single vessel, it could be easily ligated, and the ligature brought out at the angle of the wound. In this case, however, the bleeding may come from the interior of a morbidly vascular cyst, and from a large surface. The only method of dealing with it is to ligate it, to remove it *en masse*, or to cauterize it. Here the suggestion of Dr. Sims, made with reference to ovariotomy, may be useful. In that operation he has proposed,[1] and has used fine silver wire for tying the pedicle. This he has demonstrated may be returned to the peritoneal cavity, where it soon becomes encysted, and where it may remain innocuous for an indefinite length of time. The objection to the silver wire is that it has to be twisted, a method of tightening, not so reliable for arresting hemorrhage as tying. Silk, or carbolized catgut, being animal substances, may be used, cut off short, and closed up in the peritoneal cavity. Since Professor Nathan R. Smith[2] of Baltimore, originated the intra-peritoneal method of treating the pedicle in ovariotomy, in 1821, ligatures have frequently been allowed to remain in the abdominal cavity after operations. Peaslee[3] has left fifteen, and Keith[4] thirty in successful cases, and they never gave any trouble. Péan and

[1] New York Med. Journ., December, 1872, and April, 1873.

[2] Amer. Med. Recorder, Jan. 1822.

[3] Amer. Journ. of Med. Sciences, July, 1864, p. 50, and Ovarian Tumors, etc., 8vo., N. Y., 1872, p. 431.

[4] Edinburgh Med. Journ., Dec. 1867, p. 525.

Urdy,[1] however, have exceeded both. They allowed no less than forty to remain in one instance, and the cure was perfect. Spiegelberg and Waldeyer[2] have experimented upon the effects of small foreign bodies, allowed to remain in the peritoneal cavities of bitches, from which they excised portions of the uterus and Fallopian tubes. They concluded that silk and hemp could be thus used without danger; that they did not lead to any acute local peritonitis, and that mortification of the tissues surrounded by them did not follow, but that the ligatures left were capsulated and became innocuous. Thus one great objection to gastrotomy for the relief of rupture of an extra-uterine cyst has been removed by the results of ovariotomy and by direct experiment.

The bleeding surface may be secured in tubal pregnancy by passing a double silk ligature through the broad ligament below the tumor and tying one strand on either side of the fœtal cyst. Thus a V-shaped portion of the ligament may be securely ligated. Portions of the cyst might be removed by the knife if they were loose and there appeared to be danger of their sloughing. If the pregnancy was ovarian the organ might be ligated and removed. Tubo-uterine gestations offer the greatest difficulties, and it may be that they are not adapted to this method of treatment, since a portion of the uterus would have to be included in the ligatures, but even this is not incompatible with recovery. Dr. Alfred Wiltshire, of London,[3] after the removal of an ovarian tumor, found that the originally short pedicle was too rotten to hold the clamp or ligature. As a *dernier ressort* the right half of the uterus was transfixed and tied with a stout silk ligature. The patient began to improve "from the hour of the operation," and she "uninterruptedly recovered without a rigor or the formation of a single drop of pus, the wound having united by first intention."

It is not unreasonable to hope that the galvano-cautery may be used to arrest the hemorrhage. The great objection to

[1] Loc. citat. p. 204.

[2] Virchow's Archives, 1868, and T. Spencer Wells, Diseases of the Ovary, 8vo., New York, 1873, p. 363.

[3] Trans. of the Patholog. Soc. of London, vol. xix. p. 295.

its use is that it can only be obtained in large cities. It is preferable to the actual cautery, which leaves minute particles of oxide of iron in contact with the tissues. It is not necessary to plunge a metal heated to white heat into the peritoneal cavity, though this has been successfully and safely done during the operation of ovariotomy. After the peritoneal cavity has been opened, the uterus and appendages can be drawn through the wound and the cautery applied. Injury to other tissues is thus avoided. Spiegelberg and Waldeyer, in the experiments before alluded to, removed portions of the uterus in bitches by the galvanic cautery, and proved that after this mutilation, the cauterized tissues do not become gangrenous and do not injure neighboring tissues, providing only that the abdominal cavity is kept perfectly closed. In the ninth volume of Langenbeck's Archives, Dr. Malowsky, of St. Petersburg, published[1] the results of some observations which confirm those of Spiegelberg and Waldeyer. He experimented on dogs, rabbits, and cats, using sometimes the galvanic and at others the actual cautery. Dr. Malowsky's experiments are of intense interest in their practical bearing, since he carefully studied and described the changes by which the capsulation takes place. He injected vermilion into the blood through the jugular vein, and as the substance is taken up by the white corpuscles, he was enabled to study the part which these play in the process.

It is possible that the galvanic cautery may be the best agent for arresting hemorrhage, in tubo-uterine pregnancy, after rupture. The great disadvantage of this instrument is that it is not always at hand, but if it cannot be had, the hot iron may be substituted if ligation cannot be successfully employed.

There appears to be no reason why the galvanic cautery may not be still further utilized in the treatment of this terrible accident. After the abdomen is opened the uterus and its appendages can be drawn through the wound, and as much tissue as is necessary removed by it without fear of hemorrhage. If it is necessary to remove the uterus, section should

[1] Spencer Wells, loc. citat. p. 369.

be made through the cervix, as recommended by Péan and Urdy, after which the stump should be fixed between the folds of the incision, in the same manner that ovariotomists fasten the pedicle of an ovarian tumor. Dr. J. R. Chadwick, of Boston, has used[1] Mr. Spencer Wells' ovariotomy clamp for this purpose.

If the hemorrhage cannot be arrested without resort to this grave mutilation, there need be no doubt about the propriety of removing the supra-cervical portion of the uterus. The woman's life may be looked upon as inevitably lost unless it can be saved by surgical measures, and the recent successes of M. Péan prove[2] that this operation is scarcely more dangerous than that of ovariotomy. This surgeon has now operated twenty times, with fifteen recoveries.

If the uterus is extirpated, the ovaries should be removed at the same time, in order to prevent the danger of another misplaced conception. M. Kœberlé's experience, though without parallel, teaches a valuable lesson in regard to this matter.

In ovarian pregnancy the gravid sac can be removed without difficulty. The operation is simply that of ovariotomy. In tubo-uterine gestation the question to be decided, after opening the abdominal cavity, is whether to remove the ruptured cyst with the neighboring parts, or whether to extirpate the whole of the supra-cervical portion of the uterus. The latter would probably be the better course, the stump being fixed in the angle of the wound.

The galvanic cautery is not necessary for the performance of this operation, and the author is not aware that its use has ever been suggested in extirpation of the uterus. Surgeons, who have practised this procedure, have contented themselves with bringing the organ and some of the adjoining parts out at the angle of the wound, and with constricting these by wire écraseurs, strong cords, and ovariotomy clamps to prevent bleeding, after which the diseased portion of the organ has been boldly removed. We believe, however, that the use of the galvanic cautery is destined to play a prominent part in this

[1] Boston Med. and Surg. Journ., Nov. 4, 1875. [2] Chadwick, Ibid.

operation, when it comes, as we think it will at no distant day, to assume an importance in the management of intractable forms of fibroid tumors, not unlike that of ovariotomy in regard to ovarian growths.

The advice to perform gastrotomy after rupture of the cyst will no doubt be received with many misgivings, and it may elicit criticisms similar to those of Daynac,[1] in 1825, in regard to gastrotomy for the removal of the mature child. This writer scarcely countenances the operation, which he says is recommended with much assurance by those who have never had occasion to practise it. There is nothing unreasonable in the recommendation which is here made, and there is no reason to believe that it will be impossible to arrest the hemorrhage after the abdominal cavity is opened. It will not be arrested unless this, or some other equally bold measure, is resorted to. It is at least morally certain that if the practical surgeon had to arrest bleeding from a similar surface on the exterior of the body, he would find some means of doing it, and in these days, when abdominal surgery has attained such a high degree of perfection, it appears to be simply criminal to sit idly by and see a woman die from rupture of an extra-uterine fœtal cyst without attempting to save her.

Another objection that has been urged against the operation, is the danger of opening the peritoneal cavity. This needs but few comments. The triumphs of the American operation, ovariotomy, first executed by McDowell, tried and tested by the two Atlees, whose efforts were afterwards so ably seconded by Peaslee, Sims, Kimball, and Dunlap in America, and Clay, Keith, and Wells in Great Britain, have demonstrated that the traditional idea of the danger of wounding the peritoneum is but an idle fancy. The experiences of the late civil war have proved the same thing. Gunshot wounds of the abdomen were found not to be necessarily mortal, but, on the contrary, a large proportion recovered. The legitimacy of the operation is not to be questioned because many may die who have been subjected to it. Not being a surgeon, the writer

[1] Thèse à Paris, No. 71, 1825, p. 19.

cannot be accused of being a partisan for operative interference. That he is not, will become apparent in discussing the merits of gastrotomy for the removal of extra-uterine children at or after the full term of gestation. This matter should be examined in a practical, common-sense way, and when the results of other grave surgical operations are examined it will be found that they often terminate in death. Amputation at the hip-joint is recognized as a proper procedure. It is terribly fatal, yet it is performed for the removal of malignant tumors of the thigh, which, a knowledge of the natural history of disease, long since taught surgeons, would return in a few months and destroy the patient, even if he survived the removal of so large a portion of his body.

The question is not, Will the patient die after the operation? It is, Will she live if abandoned to nature? This was answered in the sobs and sorrows of stricken households long ago. Are the dangers of opening the peritoneal cavity less than those of the rupture? The history of abdominal surgery and that of the condition which is being discussed teach us that they are infinitely less.

Another objection urged against the operation is, that it has to be performed when the patient is exhausted both by shock and hemorrhage. This is worthy of examination. It has already been shown that the phenomena of rupture are complex in their origin, due to injury to the tissues and the loss of blood. It has likewise been shown that the wound in the sac is often small, incredibly so when its dreadful results are considered. This fact leads us to believe that the shock is not due so much to the injury to the tissues from rupture, as it is to the presence and mechanical effects of the blood which is effused into the peritoneal cavity. After the symptoms of shock, come those which are due to the anæmia that results from the hemorrhage. These views are advanced with full knowledge of the profound effects produced by injuries of the genital organs, and after full consideration of the fact that these are apt to be attended by symptoms out of proportion to the destruction of their tissues. If it be true that the symptoms of shock are largely owing to the effusion of blood into the peritoneum, a hemorrhage which clinical experience

has abundantly proved will only be arrested with the destruction of life, what can be more reasonable than to attempt to remove the blood already poured out, and to arrest its further discharge? Besides this, in these days when anæsthetics are given for even trivial operations, the increase of the shock will not be material.

This operation, therefore, appears to be feasible; at least no one has demonstrated its impracticability, and in these days when Durham removes the kidney, Péan and Kœberlé the spleen, and Billroth the larynx successfully, this procedure ought to be tried. The details of the operation, the length of the incision and its position, will have to be determined. The division of the abdominal parietes should be sufficiently extensive to insure facility in operating, and to enable the surgeon to remove all the blood which is effused into the peritoneal cavity.

CHAPTER XI.

TREATMENT—Continued.

From end of fourth month until after labor at term—After term—Gastrotomy—Operation to which the name is applicable—Historical facts—Mortality when left to nature, and after an operation, compared—Primary and secondary operations—An operation to save the child unjustifiable—No operation should be performed until the woman is restored from the pseudo-puerperal condition, unless under special indications.

If the patient have passed beyond the fourth month, rupture of the cyst is much less likely to occur than it was before. Indications are now to be met as they arise, the patient's strength is to be maintained, and she is to be made as comfortable as possible. When labor comes on, the pain is to be controlled by large doses of opium, and the patient carefully watched. No operation should be performed unless the cyst has ruptured or the mother's condition become so desperate that she must inevitably perish. These are the only conditions under which gastrotomy is to be thought of at this period, for reasons which will be shown when discussing that operation. There can be no doubt about the propriety of performing it when the cyst has ruptured, because the condition then becomes analogous to that due to rupture of the uterus. It should never be forgotten that the cyst rarely gives way during the pains of the false labor which occurs at term.

After the termination of the usual period of gestation, various measures have been proposed for the relief of this accident. These are of course chiefly surgical. They will next claim consideration.

Gastrotomy.—We have now reached the consideration of this very important measure in the treatment of extra-uterine pregnancy. Many cases of alleged gastrotomy are scattered here and there throughout periodical literature. Cornax,[1] it has

[1] Sue, Essais sur l'Art des Accouchemens, 8vo., Paris, 1779, vol. ii. p. 62.

been erroneously stated, was the first who practised this operation. He is said to have done it in the middle of the sixteenth century. Abraham Cyprianus, Professor of Anatomy and Surgery, is said to have performed it[1] at Lonvade in December, 1694. Even Velpeau quotes[2] the operation of Cyprianus, as well as the same performed by others, as illustrations of gastrotomy, and many others have fallen into the same error, both before and since his day. Even now there is much confusion in regard to this subject, since all cases in which the abdomen is incised, are often reported as examples of gastrotomy. This is essentially wrong. If the cyst has contracted adhesions with the anterior abdominal wall, and has opened by one or more orifices upon its surface, the matter is a very simple one. Nature has indicated the way in which she desires to get rid of her encumbrance, and enlarging the orifice is an operation of little gravity. Confusion is worse confounded by including section of the vagina[3] with gastrotomy. The author's learned and venerated teacher, the late Professor Hodge, has committed this mistake.[4] At the outset, therefore, it is to be distinctly understood that the term gastrotomy is used in this work only when speaking of cases in which the operation has been performed upon women whose abdominal walls remain intact, whether the cyst have contracted adhesions or not.

The earliest case which we have been able to find upon record, is that of Primerose,[5] who operated in October 1594. The history of this patient has become classical. She was twice pregnant with extra-uterine children—first in 1591, and again some time before 1594. The cyst of the first child opened spontaneously through the abdominal wall. The fistula was enlarged, and this child extracted by Jacob Noierus, a surgeon. This operation proving successful, Primerose removed the

[1] Letter to Dr. Thos. Millington, Amsterdam, 1707.

[2] Dict. de Méd., 8vo., Paris, 1836, tome xiv. p. 419.

[3] Velpeau again falls into error, and includes among cases of gastrotomy one performed by "Ring," and reported in the *Med. Repository*, New York, vol. iii. This undoubtedly refers to the remarkable success of Dr. John King, of Edisto, South Carolina, who saved both mother and child by incising the vagina.

[4] Loc. citat. pp. 533-535.

[5] De Mulierum morbis et symptomatis, lib. iv. p. 316.

second infant by gastrotomy two months later. It is easy to imagine how he was led to perform the second and more hazardous operation. Felix Platerus[1] reported another successful case only three years later. After this we have found no indication that the operation was performed for more than a century. In 1714 Calvo[2] reported a case in France, and in 1764 Bard[3] another in this country.

Mr. John Bard was a surgeon in New York, and we know of no one who operated in this country before him. The patient was a Mrs. Stagg, the wife of a mason, and the operation was performed several years before it was published, for Mr. Bard communicated an account of it to Dr. Fothergill, in a letter, which was dated on the 25th of December, 1759.

On January 14th, 1791, this operation was performed upon this side of the Atlantic for the second time, the subject of it being a Mrs. Cocke, the wife of a Virginia planter. The operation, which was done by Dr. William Baynham,[4] a country physician, was entirely successful. The same gentleman operated with the same happy result upon a negro slave on February 6th, 1799.[5] This was the fourth American gastrotomy for the removal of an extra-uterine fœtus. The third one was performed by McKnight, and communicated to the famous Dr. Lettsom, by Dr. Mease of Philadelphia, and published[6] in 1795. Dr. Baynham's cases are well worth attentive study. They illustrate the intrepidity and good judgment so often displayed by the provincial surgeon, who, separated by long distances from his fellows, often has to act in the greatest emergencies without the counsel which he may earnestly desire. Almost a quarter of a century passed before the operation was repeated in this country. On the 6th day of October, 1823, it was again performed by Dr. Wishart,[7]

[1] De partum Corporis Humani, Structura et usa, 1597.

[2] Histor. de Acad. Roy. des Sciences, 1714, p. 29.

[3] Med. Observ. and Inquiries, 8vo., London, 1764, vol. ii. p. 369.

[4] New York Med. and Philos. Journ., Jan. 1809, vol. i. p. 161.

[5] Ibid., p. 165.

[6] Mem. Med. Soc. of London, 1795, vol. iv. p. 342. Dr. Charles McKnight lived in the State of New York. It is impossible to fix the time at which he operated. He was not living when Dr. Mease wrote to Dr. Lettsom.

[7] Phila. Journ of Med. and Physical Science, 1825, N. S., vol. i. p. 129.

likewise a country practitioner. The sixth American operation was performed on February 7th, 1846, by Dr. A. H. Stevens of New York,[1] a man who had all the advantages of a metropolitan experience.

Like all the major operations on the abdominal cavity, gastrotomy, for the extraction of an extra-uterine child, has been advocated and condemned with equal warmth. Even to-day there are some who appear to be undecided in regard to its merits, and there are many who deservedly occupy high positions in the profession, who are undecided about the method of conducting the operation. The operation is condemned by Blundell,[2] Burns,[3] Meigs,[4] Chailly-Honoré,[5] and Hodge.[6] Others speak very guardedly about the matter, among whom are Levret, Sabatier,[7] Columbat,[8] Cazeaux,[9] and Leishman.[10] These names all occupy an honorable position in the annals of obstetric science, and the very guarded position which Meigs, Hodge, Cazeaux, and Leishman occupy, will no doubt continue to influence many minds for a long time to come. In order to throw some light upon this subject, and to determine whether this opposition is groundless or not, it is necessary to know the mortality among women who carry an extra-uterine child to or beyond term, and who are left to nature, as well as the death-rate among those subjected to an operation. This we will make an effort to determine.

In the 500 cases analyzed for this work, 248 women went to or beyond term. The following table shows the rate of mortality among them, those subjected to an operation being included:—

[1] New York Journ. of Med. and Collat. Sci., May, 1846, p. 341.
[2] Lancet, Aug. 16, 1828, pp. 612–13, and Obstetrics, 8vo., London, p. 480–1.
[3] Principles of Midwifery, 8vo., Phila., 1810, p. 166.
[4] Obstetrics, the Science and Art, 8vo., Phila., 1852, p. 271.
[5] Traité Pratique de l'Art de Accouchemens, 8vo., Paris, 1867, p. 136.
[6] Loc. citat. p. 533.
[7] De la Médecine Opératoire, 8vo., Paris, 1832, tome iv. p. 481–2.
[8] Diseases of Females, 8vo., Phila., 1845, p. 582. [9] Loc. citat. p. 602.
[10] A System of Midwifery, Glasgow, 1873, p. 216.

Mortality of Extra-uterine Pregnancy reaching and passing beyond term—Cases of Operation being included in the calculation.

Duration of gestation.	Lived.	Died.	Doubtful.	Total.	Mortality in per cent
9 months . . .	13	45	1	59	76.27
9 to 12 months . .	13	17	....	30	56.66
12 to 18 " . . .	15	17	....	32	53.12
18 to 24 " . . .	10	9	....	19	47.36
2 to 5 years . . .	19	11	....	30	36.66
5 to 10 " . . .	11	7	....	18	38.88
10 to 15 " . . .	8	3	....	11	27.27
15 to 20 " . . .	4	5	....	9	55.55
20 to 25 " . . .	1	4	....	5	80.00
25 to 30 " . . .	2	1	....	3	33.33
30 to 35 " . . .	4	2	....	6	33.33
35 to 40 " . . .	2	....	....	2	.....
40 to 45 " . . .	2	....	....	2	.....
50 to 55 " . . .	2	....	....	2	.....
55 to 60 " . . .	1	....	....	1	.....
60 to 65 " . . .	1	....	....	1	.....
Doubtful	14	4	....	18	22.22
	122	125	1	248	50.4

The striking feature of this table is the high mortality at the ninth month. Only one out of every four women lives whose pregnancy terminates at this time. After this the mortality rapidly diminishes, falling 20 per cent. among those gestations which terminate within the succeeding three months. After this it remains comparatively stationary.

Of these 248 women, 60 were subjected to operations of various sorts, including 43 gastrotomies, 5 sections of the vagina, 1 section of the rectum, 3 gastrotomies by caustics, 2 sections of hernial sacs, 1 uterotomy,[1] 1 attempt at version, 2 deliveries by traction in tubo-uterine gestation, and 2 cases of gastrotomy and Cæsarean section combined. The following table shows the mortality following these various operations at different periods at and after the full term of gestation:—

[1] This name is applied, for want of a better, to an attempt which Dr. Caldwell (*Edinburgh Medical and Surgical Journal*, Jan. 1806, p. 22) made to extract a fœtus by a crucial incision of the posterior wall of the cervix and body of the uterus.

Table showing the results of Operative Interference in 60 Cases of Extra-uterine Pregnancy.

Duration of Pregnancy.	Lived.	Died.	Total.	Mortality in per cent.
9 months	8	9	17	52.94
9 to 12 months	1	7	8	87.50
12 to 18 "	11	5	16	31.25
18 to 24 "	3	1	4	25.00
2 to 5 years	4	2	6	33.33
5 to 10 "	1	....	1	.....
10 to 15 "	3	....	3	.....
20 to 25 "	....	1	1	100.00
Doubtful	3	1	4	25.00
	34	26	60	43.33

In estimating the value of operative interference, three cases of death should be deducted from this result. These are two gastrotomies performed by Cerise[1] and Atlee[2] respectively, in each of which the proper time for operating was allowed to pass, interference being decided upon only when the women were actually in *articulo mortis*. In the third case, Dr. Caldwell cut down upon the tumor by making a crucial incision through the posterior wall of the uterus. His patient was sixty years of age, and had carried her extra-uterine child for more than twenty years, when she had a great deal of pain, which led Dr. Caldwell to operate. The fœtus was found incrusted with calcareous matter, which was perforated, and an ineffectual effort made to drag the child into the world by a crotchet. The patient died the next day. This operation cannot be characterized as other than highly improper. If it be allowable to deduct these cases from the mortality, the death-rate would be lowered to 38.33 per cent.

By deducting these sixty operations from the 248 cases in the first table, we obtain a comparative estimate of the mortality of extra-uterine pregnancy, which has reached or passed beyond the normal period of gestation without operative interference or other treatment than that based upon general indications. This result is shown in the following

[1] Gaz. des Hôpitaux, No. 30, 1846.
[2] Phila. Med. Times, Jan. 10, 1874.

Table showing the Mortality of Extra-uterine Pregnancy, reaching or passing beyond Term, and left to nature.

Duration.	Lived.	Died.	Doubtful.	Total.	Mortality in per cent.
9 months . . .	5	36	1	42	85.71
9 to 12 months . .	12	10	....	22	45.45
12 to 18 " . . .	4	12	....	16	75.00
18 to 24 " . . .	7	8	....	15	53.33
2 to 5 years . . .	15	9	....	24	37.50
5 to 10 " . . .	10	7	....	17	41.17
10 to 15 " . . .	5	3	....	8	37.50
15 to 20 " . . .	4	5	....	9	55.55
20 to 25 " . . .	1	3	....	4	75.00
25 to 30 " . . .	2	1	....	3	33.33
30 to 35 " . . .	4	2	....	6	33.33
35 to 40 " . . .	1	....	....	1	.....
40 to 45 " . . .	2	....	....	2	.....
50 to 55 " . . .	2	....	....	2	.....
55 to 60 " . . .	2	....	....	2	.....
60 to 65 " . . .	1	....	....	1	.....
Doubtful	11	3	....	14	21.42
	88	99	1	188	52.65

This death-rate, 52.65 per cent., may, therefore, be assumed to be the ordinary mortality of extra-uterine pregnancy going to term or beyond it without operative interference. It will be seen by comparison of the three tables that this mortality is over 9 per cent. higher than that of those patients who were subjected to an operation for the removal of the child, while it is only 2 per cent. higher than the death-rate of the whole 248 cases under consideration. Having a basis for comparison, the results of gastrotomy can now be intelligently considered. Mr. Jonathan Hutchinson[1] and Dr. D. Lloyd Roberts,[2] of England, have already given considerable attention to this subject, and have tabulated all the cases of gastrotomy which they have been able to discover. The investigations of Dr. Roberts are open to criticism in some particulars. His eighteenth case, which was a hernial pregnancy, reported by Genth, and his 26th, which was of the same kind, reported by Rektorzik, ought not to be included among gastrotomies. The opening of an extra-

[1] Medical Times and Gazette, July, 1860.

[2] Trans. St. Andrew's Med. Grad. Assoc., 8vo., London, 1868, vol. i. p. 170.

abdominal cyst is a much less dangerous proceeding than the opening of one which is intra-abdominal. We have also excluded No. 19 of Dr. Roberts' list. This case was reported by Rousseau,[1] and the child was removed by cauterization of the abdomen, a method of delivery which will be separately considered. Every effort has been made to include in the following tabulated statement of the results of gastrotomy, only those cases to which this term is properly applied. It is very difficult to avoid errors of this kind. Though we believe this to be the largest collection which has ever been made, it is doubtless incomplete. We have excluded some cases which have been believed by others to be genuine gastrotomies. Among these is that of Buhl, included by Keller[2] in his list. The original account could not be procured, but the examination of various abstracts of the case led to the conclusion that it had ruptured through the abdominal walls.

The following is a tabular statement of 62 cases of gastrotomy.

TABLE SHOWING THE RESULTS OF 62 GASTROTOMIES FOR THE REMOVAL OF EXTRA-UTERINE CHILDREN.

a. Primary Operations, in which are included all Operations performed during or at the end of Gestation.

No of case.	Authority.	Age.	No. of preg.	Duration of pregnancy.	Adhesions of cyst.	Management of placenta.	Res'lt. Mother.	Res'lt. Child.	Remarks.
1	Paul B. Calvo, Hist. de l'Acad. Roy. des Scien., 1714, p. 29	..	..	9 months	....	.....	D.	D.	Died 11 days after the operation.
2	Mr. Clarke, Mem. Med. Soc. Lon., 1792, p. 176	..	..	Few days beyond term	....	Removed	D.	D.	Death due to hemorrhage from removal of the placenta.
3	Novara, Nouv. Jour. Méd.-Chir. et Phar., 1822, tome xv. p. 52	38	5	9 months	....	Left	D.	L.	Mother died of a "low fever." Operation performed Feb. 1814.
4	Ibid., tome x. p. 500	21	..	9 months	....	.....	D.	D.	The mother died 18 days after and the child 3 days before the operation.
5	Schreyer, Monats. für Geburt., xiv. p. 283. Keller, loc. cit. p 70	..	3	9 months	No	Removed; separated spontaneously	L.	L.	Recovery was rapid though there was some inflammatory reaction on the third day.
6	Schwank, Arch. Gén. de Méd., June, 1838	..	..	9 months	....	.....	L.	L.	

[1] Bull. Général de Thérapeutique, Mai, 1855.

[2] Loc. citat. p. 83.

No. of case.	Authority.	Age.	No. of preg.	Duration of pregnancy.	Adhesions of cyst.	Management of placenta.	Res'lt. Mother.	Res'lt. Child.	Remarks.
7	Wilson, Indian Annals of Med., Oct. 1855	23	..	6 months	....	.....	D.	D.	The operation was not completed. The placenta was found attached to the anterior wall in the line of the incision, and the hemorrhage was so profuse that the operation had to be abandoned.
8	Cerise, Gaz. des Hôpitaux, No. 30, 1846	38	9	9 months	....	Left.	D.	D.	The operation was performed when the woman was dying.
9	Deocene, Gaz des Hôp., 1852, p 175	..	2	9 months	....	.....	L.	D.	Combined intra- and extra-uterine pregnancy The intra-uterine fœtus was removed by Cæsarean section. The case is analogous to that of Dr. Salle, No. 15.
10	Stutter, Med. Times and Gaz, July 21, 1860, p 55	40	5	9 months	Yes	Left	L.	D.	Placenta loosened, and was removed *en masse* on the fifth day.
11	Ramsbotham and Adams, Medical Times and Gaz., July 21, 1860, p. 59; Trans. Med.-Chir. Soc. Lond., 1861, p. 1	28	1	9 months	No	Left	L.	D.	Child died at 6 months? Placenta large. Cord came away on fourth day. Greater part of wound healed by first intention.
12	Greenhalgh, Med. Mirror, Nov. 1864, p. 689	40	2	8 months and one week	....	.....	D.	L.	Died in 32 hours. The child lived but a few minutes.
13	Lecluyse, Bul. de l'Acad. de Méd., Belgique, 1869; Brit. and For. Med.-Chir. Rev., Jan. 1870	28	2	7 or 8 months	....	Left	D.	D.	The extra-uterine pregnancy due to a fistulous opening in the anterior wall of uterus Died from peritonitis on tenth day. On fifth day after operation the placenta was decomposing, and a portion of it was cut away.
14	W. D. Hooper, Trans. Med. Soc. of Virginia, 1872, p. 121	30	3	223 days?	Yes	.....	L	D.	The cyst had burst into the bowel.
15	E. P. Salle, New Orleans Med. Journ., October, 1860, p. 727	22	..	9 months	....	.....	D.	L.	Combined extra- and intra-uterine pregnancy. It was supposed to be extra-uterine alone. Gastrotomy was performed, and child was removed, after which the gravid womb was brought to view. The uterine child was removed by section of the uterus. Both children were saved. The mother died in three days, probably of septicæmia.
16	A. Meadows, Trans. Obst. Soc. London, 1873, p. 310	23	1	7 months	None	Removed	D.	L.	Died of hemorrhage and shock from removal of placenta and portions of the cyst. Child died the next day.
17	Plaignand, Maslieurat, and Dubois, Journ de Méd. Chir. Phar., etc., 1811, vol. xxii. p. 437	30	..	Short time after term	....	Decomposing	D.	D.	Had labor at term, during which the child died. Died two days after the operation. At the autopsy the cyst was found to be gangrenous.
18	Brückert, Rust's Magazine iii. p. 1	..	..	9 months	No	.....	D.	L.	The cyst had ruptured during ineffectual labor, and had given rise to peritonitis of which she died on the third day.
19	Matfield, Neue Zeitsch., i. 134, 1827; Keller, loc. cit. p. 70	..	..	9 months	No	Left	D.	L.	Died on the 20th day, of hemorrhage and peritonitis. The operation was performed on the eighth day of labor.
20	Donmoulin, Gaz, Méd. de Strausbourg; Keller, loc. cit. p. 72	..	..	9 months	....	.....	D.	D.	The patient was *in extremis* when M. Kœberlé, who was the operator, was called. The child was removed asphyxiated, but could not be saved. The operation was long and difficult, and the mother died a short time afterwards. The placenta was attached to the anterior wall of the abdomen.

b. Secondary Operations, including all those in which the Child had been retained some time after its death.

No. of case.	Authority.	Age.	No. of preg.	Duration of pregnancy.	Adhesions of cyst.	Management of placenta.	Res'lt. Mother.	Res'lt. Child.	Remarks.
21	Primerose, De mulierum morbis et symptomatis, Lib. iv. p. 316	30	8	.....	....	.....	L.	D.	This woman was twice the victim of extra-uterine pregnancy—first in 1591 and again in 1594. The first cyst discharged spontaneously through the abdomen, after which the opening was enlarged and child removed. Second fœtus removed two months later, Oct., 1594.
22	Platerus, De partium corporis humani, structura et usa, 1597	..	3	Some time beyond term	....	.....	L.	D.	A small swelling the size of an acorn had formed near the umbilicus, but the cyst had not ruptured.
23	Jno. Bard, Med. Obs. & Inquiries, 8vo. Lond., 1764. vol. ii. p. 369	28	2	More than a year beyond term	....	Not found	L.	D.	The abdomen fluctuated when the operation was performed.
24	Bononensi, Institut., 1767; Obs., 152, p. 363	..	2	7 weeks after d'th of child.	....	.....	D.	D.	The child was supposed to have been contained in the left tube.
25	Wilm Baynham, New York Med. and Phil. Journ., 1809, vol. i. p. 54	..	3	10 years after term	Yes	.....	L.	D.	The patient was a Mrs. Cocke, of Virginia, who was operated on June 14, 1791.
26	March. Comment. de Rebus, 1793, tom. xxv. p. 289	..	..	3 months after term	....	.....	D.	D.	Died thirty-eight days after the operation.
27	McKnight, Mem. Med. Soc. Lond., 1795, p.342	..	..	13 months beyond term	....	Could not be found	L.	D.	This is an American case, which was communicated to Dr. Lettsom by Dr. Mease, of Philadelphia.
28	Wm. Baynham, New York Med. and Phil Journ., 1809, p. 16	..	..	18 months child died at term	Yes	Left	L.	D	The operation performed Feb. 6, 1799. The placenta and cord came away in a fortnight.
29	F. Hutchinon. Lond. Med Gaz., Nov. 7, 183	28	1	14 months beyond term	....	Left	L.	D.	The patient was tapped thirty days before the operation.
30	Mathieu, Amales de la Chirur., Sept. 1841	38	4	18 months	....	Removed	L.	D	Operation Aug. 27, 1836. Child 19 inches long
31	Johnson, Med Exam. (Phil.), Sept. 1850, p. 11	..	1	18 months	Yes	Removed	D.	D.	Death due to exhaustion and peritonitis. This is probably No. 17 of Roberts' table.
32	G. C. Blackman, Amer. Jour. Med Sci., July, 185, p. 56	35	..	18 months	....	.....	D.	D.	The operation was not completed because on exposing the cyst it was found so vascular that it was deemed dangerous to incise it.
33	E. Whinnery, Ibid., April, 184, p. 351	..	2	4 years beyond term	....	.....	L.	D.	When the cyst was opened, the patient was so faint that the operation was discontinued. Twelve days later the patient pulled the fœtus away herself.
34	A. H. Stevens, New York Journ. of Med. and Collat. Sciences, May, 1846, p. 341	23	1	10 years beyond term	No	.....	L.	D.	The cyst had opened into the bowel. Operation performed February 7th, 1846.
35	Tueffard, Amer. Jour. Med. Sci., Oct. 1849, p. 522	9	6	12 months	Yes	.....	L.	D.	The child died at end of sixth month. The cyst had opened into the vagina The head had contracted adhesions with the intestines (Keller).
36	Bradley & Rogers, N. Orleans Med. Jour., Sept. 1851, p. 276	28	8	19 months	....	.....	L.	D.	Child died at the end of the 7th month. The incision extended from two inches above the umbilicus to the pubis.

No. of case	Authority.	Age.	No. of preg.	Duration of pregnancy.	Adhesions of cyst.	Management of placenta.	Res'lt. Mother.	Res'lt. Child.	Remarks.
37	Wishart, Phila. Jour. of Med. and Phys. Sciences, 1825, N. S., vol. i. p. 129	28	..	11 months	....	Removed	D.	D.	Died of peritonitis on the fifth day. Operation performed Oct. 6, 1823. Child weighed 1 lb. 7 oz., and the placenta 2 lbs. 5 oz.
38	Goodbrake, Bost. Med. and Surg. Journ., July 5, 1860, p. 466	43	10	3 years and 6 months.	....	.....	D.	D.	Died from pyæmia? Incision in linea alba from the umbilicus to the pubis.
39	J. F. da Silva Luvia or Lima, Brit. Med. Jour., May 12, 1860, p. 360	18	..	18 months	Yes	.....	D.	D.	Lived nineteen days, and died of peritonitis. Child weighed 8¼ pounds.
40	J. B. Hicks, Guy's Hosp. Rep., 1862, p. 128	32	2	Retained several m'ths beyond term	None	Could not be found	D.	D.	The cyst had ruptured into the rectum. When opened fetid gas escaped. Died in twelve hours, of exhaustion.
41	J. B. Hicks, Ibid., 1862, p. 133	40	..	4 years beyond term	Yes	.....	L.	D.	Cyst had ruptured into bladder. Gas escaped when it was opened; urine escaped by the external wound the 17th day.
42	Baeza, New Syd. Soc. Bien. Retrospect, 1867, p. 397	42	..	17 months	....	.....	L.	D.	There is possibly some doubt about this having been a case of extra-uterine pregnancy. The cyst consisted of several pouches, and communicated with the uterus. Water thrown into the cyst to cleanse it escaped by the os uteri. It is possible that the child was retained in utero.
43	Phillipart, Gaz. des Hôp. 1868, Brit & For. Medico-Chir. Rev. April, 1866, p. 535	30	1	19 months	....	.....	L.	D.	The child's head was so closely adherent to the cyst that it was impossible to remove the whole of it. Some bones were removed, and a few days later the remainder of the child was extracted with a hook.
44	M'Carthy, London Hosp. Reports, 1866, p. 301	32	5	13 months	Yes	.....	D.	D.	The operation appears to have been performed when the patient was in *articulo mortis*. She lived but an hour after it was performed.
45	J. B. Hicks, Trans. Obst. Soc. Lond., 1863, p. 93	26	..	6 months?	Yes	Left	L.	D.	The cyst communicated with the intestine, and had become resonant on percussion.
46	D. L. Roberts, Trans. St. Andrew's Med. Grad. Ass., 1868, p. 170	30	2	18 months	....	Not found	D.	D.	Died from peritonitis and putrid absorption.
47	Lawson Tait, Trans. Medico-Chir. Soc. Lond., 1873, p 219	29	..	13 months	None	Left	L.	D.	The cyst was stitched to the abdominal incision by a continuous tailor's stitch, thus closing the peritoneal cavity.
48	Thomas, Med. and Surg. Reporter, Oct. 25, 1873, p. 297	..	3	2 years	....	.....	D.	D.	Operated on by Dr. Emmet. Died in ten days.
49	Depaul, Obstet. Journ. of Great Britain, May, 1874, p. 836	32	..	2 or 3 months beyond term	Yes	Left	D.	D.	Died of hemorrhage on the eighth day after the operation.
50	W. L. Atlee, Phila. Med. Times, Jan. 10, 1874, p. 235	28	2	12 months	....	Left	D.	D.	The operation was performed when the patient was in *articulo mortis*.
51	Hildanus, Campbell's Memoir, p. 6	45	12	25½ mos.	....	.....	L.	D.	The cyst was about to burst.
52	W. R. Jordon, Trans. Obst. Soc. Lond., vol. xv. p. 130	29	1	11 months	....	Left	L.	D.	Placenta was immediately in the line of the incision.
53	Jno. Scott, Ibid., vol. xv. p. 140	32	1	12 months	....	Left	D.	D	Died in thirty-one hours.

No. of case.	Authority.	Age.	No. of preg.	Duration of pregnancy.	Adhesions of cyst.	Management of placenta.	Res'lt. Mother.	Res'lt. Child.	Remarks.
54	Zais, Revue Médicale, 1831, tome xi., p. 107	35	2	10 months	Yes	Left	L.	D.	A fistule persisted for five months after the operation.
55	Keller, Des Grossesses extra-utérines, 8vo., Paris, 1872, p. 6.	44	2	15 months	Yes	Left	L.	D.	The peritoneum was opened to the extent of 3 or 4 millimetres at the inferior angle of the wound. M. Kœberlé was the operator.
56	Keller, Ibid., p. 10	22	1	14 months	Yes	Left	L.	D.	Placenta was attached in median line, and was cut through. The peritoneal cavity was opened at superior part of the incision. The cyst and abdominal walls were stitched together. M. Kœberlé operated.
57	De Bouillon, Bul. de la Faculté, 1821	20	..	11 months	Yes	Left	D.	D.	Died from pyæmia. Appears to have had peritonitis at term.
58	VeyeldeCannstatt, Gaz. Méd., 1840	..	..	Few w'ks after term	Yes	Removed	D.	D.	Removal of placenta followed by excessive hemorrhage, which was arrested with great difficulty. Though adherent, the cyst was extracted in pieces.
59	E. W. Sawyer, Boston Med. and Surg. Jour., Nov. 12, 1874, p. 461	..	6	3 years	No	.....	D.	D.	The placenta was largely decomposed. Its remnants were removed. The woman died the next day, of exhaustion and blood-poisoning.

c. Nature of Operation doubtful, the duration of the Pregnancy not being definitely stated.

No. of case.	Authority.	Age.	No. of preg.	Duration of pregnancy.	Adhesions of cyst.	Management of placenta.	Res'lt. Mother.	Res'lt. Child.	Remarks.
60	Schmidt's Jahr., 1843	..	..	.....	....	Partly removed	D.	D.	Cause of death uncertain. Quoted from Roberts. The 16th case of his table.
61	Duckert, Med. Times, London, Nov. 20, 1849, p. 99	..	4	.....	....	Removed putrid	L.	D.	During pregnancy was gored by an ox. Three months later an abscess had formed, but had not opened when gastrotomy was performed.
62	Pauk, Allg. Wien Med. Zeit. and Brit. and For. Med.-Chir. Rev., 1862, p. 554	..	..	.....	....	.....	L.	D.	The woman was well in 2 weeks. No. 29 of Roberts' table, from which it is quoted.

Of the 62 cases here tabulated, 30 lived and 32 died, a mortality of 51.61 per cent. It is doubtful, however, if this can be accepted as the true mortality after gastrotomy. The question of the propriety of performing the operation in the interest of the child will not engage attention here. This result

is to be compared with that of the third table in this chapter, which shows approximatively the mortality of extra-uterine pregnancy left to nature, or to speak more correctly, allowed to progress without operative interference until nature had pointed out the way in which she intended to effect elimination by forming openings either through the abdominal walls, bowels, vagina, or bladder. Of these women, 52.65 per cent. perished, a mortality of only one per cent. in favor of gastrotomy. This is certainly a very poor showing for surgical interference in this unhappy accident, and one which the author was as totally unprepared for as any of his readers will be.

Let us before coming to any conclusions analyze the facts which we have collected a little more closely. The table is divided into three sections. The first includes all primary operations, or those in which the life of the child was considered in determining the time for interference, or in which the operation was performed shortly after its death at or near term.

In the second category are placed all operations performed some time after the death of the child, and when the system of the mother had recovered to a great extent from its puerperal condition. The results of primary and secondary operations have been examined with some care by various authors on extra-uterine pregnancy, but the comparative merits of the two operations are as yet undetermined. Ryan taught[1] that gastrotomy should only be resorted to "after the seventh month of gestation when the viability of the infant is certain." Plenck[2] recommends it only when the child is alive. Capuron,[3] Marc,[4] Duges,[5] Flores Mareno,[6] Chambon,[7] Gardien,[8] Velpeau,[9] Desor-

[1] Manual of Midwifery, 8vo., Burlington, 1835, p. 310.

[2] Élémens de l'Art des Accouchemens, 8vo., Lyons, 1792, p. 202.

[3] Cours Théorique et Pratique des Accouchemens, 8vo., Paris, 1823, p. 682.

[4] Dict. des Sci. Méd., 8vo., Paris, 1817, tome ix. p. 412.

[5] Dict. de Méd. et Chir. Pratiques, 8vo., Paris, 1833, tome ix. p. 324.

[6] Annal. de Méd. Physiologique, 1828, tome xiv. p. 541.

[7] Maladies de la Grossesse, 8vo., Paris, tome ii. p. 72.

[8] Traité Complet d'Accouchemens, 8vo., Paris, 1824, tome i. p. 536.

[9] Dict. de Méd., 8vo., Paris, 1836, tome xiv. p. 419.

meaux,[1] and Baudelocque,[2] all recommended it after the child was viable and in the interests of both mother and child. This opinion was expressed with emphasis in the days when abdominal surgery was in its infancy. The wonderful and glorious triumphs of the ovariotomists of this country and Europe had not yet proved that the abdominal cavity could be subjected to severe mutilation with hope of recovery. The opposition with which this operation was met, as well as the authoritative experience of many who have been quoted, gives great weight to their opinions. The recommendation of the authorities just cited has been supported more recently by Armour,[3] who, though condemning gastrotomy in the main, says that if the woman was at term he "would not willingly" allow the child to die without making an effort to save it. Protheroe Smith[4] would operate when the child is viable. Meadows[5] writes: "To me it seems an imperative duty when we know that we have not only a living, but, according to all experience, a viable child say at the seventh month and upwards, we should do our very utmost to rescue that life from its position of danger." He then adds that "resort to gastrotomy is to be . . . the recognized and orthodox rule in all cases of . . . . extra-uterine pregnancy when the child is living and has arrived at what is termed a viable age." Béhier believes that the operation should be performed without hesitation "when the woman is at term, and a living infant extracted." In a discussion at the Obstetrical Society of London in 1864,[6] Greenhalgh said, that, if he had known that the abdominal tumor of Mr. Cook's patient had contained a living child, he would have performed gastrotomy, have saved the child, and given the mother a chance of recovery. Dr. J. Braxton Hicks[7] supported this opinion, and added that if the infant had been dead he would not have operated. Kiwisch and Keller likewise recommend gastrotomy to save the child. In addition to these we have

[1] Dict. des Sciences Médicales, 8vo., Paris, 1829, tome vii. p. 273.
[2] L'Art des Accouchemens, 8vo., Paris, 1796, tome ii. p. 460.
[3] Glasgow Med. Journ., 1830, vol. iii. p. 164–5.
[4] Trans. Obstet. Soc. London, 1864, vol. v. p. 319.
[5] Ibid , 1873, vol. xiv. p. 315.
[6] Transactions, vol. v. p. 152.
[7] Ibid., p. 152.

the authority of four experienced ovariotomists in favor of the primary operation. These are Mr. I. Baker Brown,[1] Mr. Tait,[2] Dr. W. L. Atlee,[3] and Kœberlé.[4] This operation is therefore advised by the highest authorities of this century, and certainly where two human lives are in such great jeopardy it is no small thing to save one, even if it is that of a tender infant whose chances of reaching maturity are small. Notwithstanding the possibility of realizing this happy result, and even of saving both mother and child, as has been done a few times, the primary operation cannot be too emphatically condemned. It is not too much to say that this procedure adds only another danger to a life already trembling in the balance, which the delusive hope of saving the uncertain life of a child does not warrant us in assuming. This statement is a strong one, and it needs to be so when made in opposition to the high authorities who have been quoted, many of whom are deservedly known wherever the science of medicine is taught.

In support of the views just stated, let us compare the mortality which follows extra-uterine pregnancy left to nature and that which follows primary gastrotomies. In the 62 cases of abdominal section tabulated, 20 were performed at or before the end of the ninth month. Of these no less than 14 died, a mortality of 70 per cent. In the third table, on page 228, showing the mortality of 188 cases of extra-uterine gestation left to nature, or at least subjected to no serious operation, 99 died, a mortality of 52.65 per cent., or 17.35 per cent. less than if they had been subjected to gastrotomy with the hope of saving the child. In other words, nearly one out of every four mothers operated on with the hope of saving her extra-uterine infant, dies, not from the terrible accident of which she is the victim, but from the knife of the surgeon, who is deluded into the idea that art is safer than nature. Surely, to warrant us in assuming such a fearful responsibility, it must be shown that the chances of saving the child are great enough to outweigh the risks to which its mother is to be subjected. In the 20 primary operations which we are consider-

[1] Surgical Diseases of Women, 8vo., London, 1866, p. 359.
[2] Trans. Medico-Chir. Soc. London, 1873, vol. xvi. p. 222.
[3] Phila. Med. Times, Jan. 10, 1874, p. 235. [4] Keller, loc. citat.

ing, 8 children lived, and 12 died, a mortality of 40 per cent. One of the living children survived but a few minutes. Considering the lives of the mother and child as equally valuable, we have 40 persons, of whom 25 died, a mortality of 62.50 per cent., or 9.85 more than the mortality among the mothers if the difficulty had been left to nature. When we remember that not one in every five of those infants extracted alive can live to reach maturity, the facts here stated become still more impressive, and certainly must deter surgeons from increasing the dangers of their unhappy patients by subjecting them to a severe and bloody operation.

The fact that a woman carrying an extra-uterine child should be allowed to regain her non-puerperal condition, as nearly as possible, before being subjected to this important operation, has been recognized by a few writers. Turnbull,[1] at the beginning of the last decade of the last century, discussed gastrotomy in a manner which shows that our knowledge of this subject has advanced but little since his day. He recommends the postponement of the operation if possible to that period when nature makes some effort to expel the fœtus by the formation of fistulous openings. This is the time of election, but if the patient is sinking, exhausted from the irritation, without pointing out the way by which the fœtal remains are wont to be expelled, he advises the operation. This is the period of necessity. Daynac[2] emphatically condemns the primary operation but recommends secondary gastrotomy, when he hopes to find the cyst adherent. Ramsbotham[3] recommends the operation "when the fœtus has been some time dead, for experience has taught us that a fatal event, as far as the woman is concerned, has almost always, if not invariably, followed every operation undertaken with the intention of saving the child's life while it yet lived, or performed soon after its death." Dr. Tanner's[4] opinions upon this subject are expressed in no vague terms. He says that "gastrotomy should never be performed with the object of preserving the fœtus.

[1] Mem. Med. Soc. London, 1792, pp. 210–9.
[2] Thèse à Paris, No. 71, 1825, p. 21.
[3] Medical Times, London, Nov. 13, 1852, p. 482.
[4] Signs and Diseases of Pregnancy, 8vo., Phila., 1868, p. 309.

Indeed, if adopted at all, it ought not to be resorted to until some time after the child's death; when the system of the parent, though affected by the irritation set up by the fœtus, has been restored as nearly as possible to the condition of the non-pregnant state." This is a reiteration in a more forcible manner of the views expressed by Campbell[1] towards the middle of the present century. Mr. Jonathan Hutchinson,[2] who has carefully investigated this subject, holds the same opinion, and he is supported in it by Roberts,[3] Leishman,[4] Playfair,[5] and lastly Mr. Spencer Wells.[6] In the discussion before the Obstetrical Society of London, previously alluded to, Mr. Wells questioned the morality of Dr. Hicks's statement that the rule of practice should depend upon the child's being alive or dead. With a dead child a woman may live many years, and Mr. Wells thought it hardly right to subject her to such a dangerous operation with the slender chance of saving the child. This is a protest of great force, coming as it does from the most renowned among those who practise abdominal surgery. It appears to be conclusive that primary gastrotomy for the relief of extra-uterine pregnancy is an unjustifiable operation, and that instead of diminishing, it increases the dangers of the mother. Operations performed at this period ought not, therefore, to be taken into consideration in computing the mortality of gastrotomy.

It now remains to study the results of the secondary operation. Thirty-nine examples of this have been tabulated, of which 22 were successful and 17 unsuccessful, a mortality of 43.58 per cent. It will be remembered that the death-rate of extra-uterine gestation treated without active interference was 52.65 per cent., or 9 per cent. in favor of the operation. A portion of this mortality, however, did not belong to the operation. McCarthy and Atlee operated upon women in

[1] Memoir on Extra-uterine Gestation, 8vo., Edinburgh, 1842, p. 150.

[2] Surgical Measures in Extra-uterine Pregnancy, Holmes's System of Surgery, 8vo., London, 1864, vol. iv. p. 514, and Lancet, July 19, 1873, p. 70.

[3] Trans. St. Andrew's Med. Grad. Assoc., 1868, vol. i. p. 173.

[4] A System of Midwifery, 8vo., Glasgow, 1873, p. 126.

[5] Trans. Obstet. Soc. London, 1866, vol. vii. p. 5.

[6] Ibid., vol. v. p. 152.

articulo mortis, who were practically dead before surgical measures were resorted to, and the latter, some days before performing gastrotomy, subjected his patient to paracentesis, a very dangerous procedure in any case of extra-uterine gestation. Veyel de Cannstatt removed the placenta, and not satisfied with this took away the adherent cyst in pieces, a measure which is entirely unjustifiable, and almost certainly destroys the patient's chances for recovery. The three deaths mentioned may, therefore, be fairly deducted from the mortality of the secondary operation; two, because gastrotomy was performed too late to do any good, and one because it was improperly done. We have, therefore, for consideration 36 cases with 14 deaths, or a mortality of 38.88 per cent., or 13.77 per cent. in favor of performing the secondary operation rather than to trust to nature. We may, therefore, conclude that secondary gastrotomy for extra-uterine pregnancy affords the mother increased chances of life. It is not, however, to be resorted to indiscriminately. It should be postponed as long as possible—until there is some very obvious indication for interference. The views of Campbell, Tanner, and Ramsbotham upon the advantages of postponing the operation have already been quoted, but of all writers Mr. Jonathan Hutchinson has summed up this question in the fewest words. He gives[1] the following practical rule as regards treatment: "That extra-uterine fœtation cysts ought not to be meddled with in any way, either by puncture or incision, until suppuration has occurred and an abscess fistula has been formed." It is true that this reliance on the efforts of nature is not flattering to the self-conceit of the surgeon. By following this advice he is not deprived of the use of the knife, for when the pus approaches the surface it may be liberated by incision, or if the cyst has opened spontaneously the fistule is to be enlarged and all its contents removed at once. In this, however, the operator becomes but nature's helpmate, following as she leads, and the operation which he performs is degraded from the important and dangerous procedure, gastrotomy, to the simple and not dangerous performance of opening a large abscess.

[1] Lancet, July 19, 1873, p. 70.

Mr. Hutchinson's rule must not be too universally applied. Jacquemier has pointed out the fact that sometimes the autopsy reveals nothing to account for the death of the woman, there being neither rupture, hemorrhage, peritonitis, nor the process of elimination going on in the cyst. Death in such cases appears to be due to exhaustion of the vital powers. The author has seen an illustration of this in which the anterior abdominal walls stripped smoothly off the cyst, which was intact and which did not show the slightest traces of inflammatory action. Such women ought not to be allowed to perish without making an attempt to save them. To wait until nature makes her sign in an effort to eliminate the fœtus, is to subject the woman to certain death. The chance of saving such patients is infinitely less than if there had been sufficient inflammatory action to unite the abdominal and cyst walls, but the lives of such ought not to be abandoned in despair. Such cases are fortunately uncommon, and if the medical attendant of the victim of extra-uterine pregnancy, who has reached or gone beyond term, will only be willing to content himself with meeting the indications as they arise, relieving the labor-pains when they come on at term, and supporting his patient's strength when she has passed this period, without subjecting her to prolonged and frequent manipulations or torturing her with probes, sounds, and trocars, he will save more human lives, and will be called upon less frequently to perform gastrotomy, and more often to open abscesses and to enlarge fistulæ to extract decomposing children.

CHAPTER XII.

TREATMENT—Continued.

Gastrotomy—Mode of performing—Influence of adhesions between cyst and abdominal walls on the result—Blood and other fluids should not be admitted into the peritoneal cavity—Extraction when child is adherent to cyst wall—Management of the placenta—Vascularity of the cyst wall—Removal of the cyst wall—Gastrotomy by caustics—Treatment after gastrotomy—Gastrotomy to save the child after the death of the mother.

Before resorting to the operation of gastrotomy for the extraction of an extra-uterine child, the condition of the woman should be made as favorable as possible. Her bowels should be opened one or two days before the operation, after which a dose of opium may be administered to allay all excess of irritation. In these days no one would think of resorting to such a grave surgical procedure without anæsthetizing his patient, but every possible precaution should be taken to prevent subsequent vomiting.

The incision, unless there are special indications to the contrary, should be made in the median line, and in the manner recommended for the performance of ovariotomy. The same precautions should be observed to prevent blood finding its way into the peritoneal cavity, or into that of the fœtal cyst. The incision should be long enough to insure facility in extracting the child, providing this does not involve cutting beyond the adhesions and exposing the peritoneum. Rather than incur this danger, the child should be broken up and extracted piecemeal. The operator should always be provided with strong scissors and forceps for this purpose. If the adhesions are sufficiently extensive to allow a long incision to be made, the child can generally be seized by the feet and readily extracted.

There are several questions which demand careful study in connection with this operation. Prominent among these are the presence or absence of adhesions between the cyst and abdominal walls, and the method of managing the placenta.

Adhesions.—The presence or absence of adhesions between the sac and the anterior abdominal wall exercises an important influence upon the result of the operation of gastrotomy. If the cyst wall is connected with the abdominal parietes, the success of the operation is much more certain. Of the 62 cases of gastrotomy tabulated, the presence or absence of adhesions is mentioned in only 24. In 17 of these they were present, and in 7 they were absent. Of the former, 11 lived and 6 died, a mortality of 35.29 per cent. Of the latter, only three recovered and four died, a mortality of 57.14 per cent., a difference of 21.85 per cent. in favor of the presence of adhesions. These figures are small, but, with our present facilities, a larger number cannot be presented. While the examination of a larger number of cases might materially affect these results, common sense teaches us that the union of the cyst with the abdominal wall renders the prognosis of the operation much more favorable, but reference to the results shows that if the operation is imperatively demanded by the condition of the patient, the absence of adhesions ought not to prevent a surgeon from operating.

The diagnosis of adhesions is uncertain. Hicks says,[1] that the surgeon can make tolerably sure of securing an adherent surface by strict attention to the spot of greatest tenderness on pressure. It is highly important during the removal of a putrid fœtus not to extend the incision beyond the connections of the cyst and abdominal walls, and in order to avoid this the same authority advises that a small opening be made, the finger passed into the cyst in order to feel from within for evidences of adhesions. The incision should be enlarged in accordance with information thus obtained. So important is it not to open the peritoneal cavity, in cases where there is a putrid decaying fœtus, that there is no doubt that Hicks[2] is correct in saying, that, even if there are large vessels in the line of the incision in the abdominal walls, it is better to divide them than to expose the peritoneum.

M. Kœberlé has twice opened[3] the peritoneal cavity, in both

[1] Trans. Obstet. Soc. London, 1868, p. 100. [2] Ibid., p. 100.
[3] Keller, loc. citat. pp. 8, 12.

cases, by his efforts to extract the infant by the feet. To avoid this the child has to be removed with some care. It may be extracted by the head if that part should present in the line of the incision, but generally it may be easily removed by seizing the feet and withdrawing it, as in the Cæsarean operation. Precisely the same principles should guide the operator in both instances. If the adhesions are limited and the child decomposing, it would be better to extract it piecemeal rather than open the peritoneum. If the fœtus has undergone little change, there may be some difficulty in disintegrating it under the circumstances, so that the operator has to act in accordance with the peculiarities of the case immediately under his care.

Some who have been greatly impressed with the wonderful and rapid advances of abdominal surgery, since McDowell performed the first operation for removal of the ovary in 1809, may wonder at so much stress being laid upon the importance of preserving the integrity of the peritoneum. It is not the section of that membrane which is so dangerous, but it is the contact with it of the altered liquor amnii and other contents of the cyst, rendered putrid by the decomposition of the fœtus. The surgeon, in performing gastrotomy for the extraction of an extra-uterine child, should be just as desirous of preserving the peritoneum from contact with these putrid fluids and solids, as he is to prevent the escape of the contents of a polycystic tumor into the abdominal cavity in operating for ovariotomy.

If no adhesions are found on cutting through the abdominal walls, or if the cyst is torn in removing the child, the wound in the latter should be stitched to the abdominal parietes throughout its whole length. Mr. Lawson Tait[1] did this by a continuous tailor's stitch in a woman upon whom he successfully operated four months after the close of gestation and in whom the cyst was not adherent. M. Kœberlé[2] resorted to a somewhat similar measure after accidentally exposing the peritoneum in a patient in whom the cyst was adherent. In this way the peritoneum may be protected from putrid discharges.

[1] Trans. Medico-Chir. Soc. London, 1873, vol. lvi. p. 219.

[2] Keller, loc. citat. p. 13.

Adhesions between the Child and the Sac.—Before proceeding further a few additional remarks should be made in relation to extraction of the child after the cyst has been opened. At this point of the operation a difficulty may arise about which most writers on this subject have been silent. If an extra-uterine child have been retained for a long time, different portions of its body may contract more or less intimate adhesions with the cyst in which it is contained. Mr. Tait[1] was so impressed with the difficulties and dangers that might arise from this accident, that he recommended the primary operation. Phillipart[2] in performing gastrotomy found the child's head so adherent that it was impossible to extract the fœtus entire. Several bones were brought away and the patient watched. Hectic supervened, and she was in great danger, when the remainder of the fœtus was extracted with a hook. Pletzer,[3] Hicks,[4] and Tueffard[5] have described similar adhesions between portions of the child and its cyst, but one of the most remarkable recorded examples of this complication came under the notice of Dr. F. H. Gordon.[6] His patient was in labor at the end of the sixth pregnancy succeeding the one which was extra-uterine, the tumor resulting from which, prevented the descent of the uterine child. Dr. Gordon incised the vagina freely and applied the forceps to the extra-uterine infant, but could not extract it. He then perforated and made traction in various ways without effecting anything. The vaginal incision was enlarged until it was four inches long, and the right index finger was passed into the rectum and the left into the wound, when they were applied like the blades of the forceps on either side of the encysted child's neck, and traction made during a strong pain. The child was expelled and held in contact with the vulva, when the cause of the delay was found to be adhesions between the child and the sac in which it was contained.

[1] Loc. citat. p. 222.

[2] Gazette des Hôp., 1865, and Brit. and For. Medico-Chir. Rev., April, 1866, p. 535.

[3] Monats. für Geb., April, 1867, and Brit. and For. Medico-Chir. Rev., October, 1857.

[4] Trans. Obstet. Soc. London, 1862, p. 132.

[5] Amer. Journ. Med. Sci., Oct. 1849, p. 522.

[6] Western Journ. of Med. and Surgery, Oct. 1848.

These were three in number, one appeared to be the atrophied cord, and the others were fleshy bands, which were surrounded with tapes and divided. The tapes were then seized and traction made, when they were found to run into a fleshy mass five inches wide and an inch and a half thick, attached to the posterior wall of the sac above the brim of the pelvis and to the right side. The tapes were removed and the wound was closed, after which it healed by first intention. After the operation the labor-pains ceased, and recurred two days later, when the uterine child was born naturally and easily in less than two hours. The woman recovered as rapidly as after natural labor. This remarkable experience of Dr. Gordon shows how extensive and strong these adhesions may become, and the measures which he adopted inform us of one method of treatment, while Phillipart's practice illustrates another. Which is the preferable, future experience must determine. It is certain, however, that these adhesions must be dealt with carefully, for Debenham,[1] in attempting to remove some fœtal bones which were found to be adherent on enlarging an abdominal fistule, tore open the intestines so that feces were discharged through the incision for several weeks.

Management of the Placenta.—The propriety of removing the placenta during the operation of gastrotomy has been warmly discussed. As the same rules should govern the operator, whether he is performing gastrotomy, enlarging an abdominal opening, or extracting by section of the vagina, this subject will be fully discussed in this place and not referred to again.

The dangers which arise from separating the placenta have exercised an important influence in preventing the general adoption of operative measures for the relief of extra-uterine pregnancy. It was the fear of hemorrhage from the removal of this large body from a non-contractile surface, which made Levret and many of his successors condemn gastrotomy. The removal of the placenta certainly appears to be attended with very great danger. The part to which it is attached necessarily becomes very vascular, and there is no hope of

[1] Philosoph. Trans., 4to., London, 1753, vol. xlvii. p. 92.

arresting the hemorrhage by the ordinary mechanical means on account of the extent of the surface and its situation, often in the deepest parts of the abdominal or pelvic cavities. The application of astringents, as the salts of iron, is equally unsatisfactory, besides being dangerous, because they leave indurated masses of blood and tissues which have to be discharged from the deepest parts of the largest serous cavity in the body despite the impediments which oppose it. On the other hand, if the after-birth is allowed to remain, it has to be removed by disintegration, when there is the same difficulty in drainage which was spoken of in connection with the discharge of coagula formed by the application of astringents. This leads to blood poisoning, pyæmia or septicæmia, the most formidable complications of operative surgery. Between the dangers of these two distressing alternatives, removing the placenta or leaving it *in situ*, the operator has to choose in attempting to relieve a woman of an extra-uterine child. Professional opinion is still unsettled as to which plan to adopt. Roberts[1] is disposed to advise the extraction of the after-birth, if this can be accomplished without much difficulty, in order that one great source of irritation should be removed. Mr. Clarke[2] found the placenta adhering to the kidneys, intestines, and neighboring organs. He removed it, and the hemorrhage was mortal. The same result occurred to Meadows,[3] and excessive hemorrhage and death followed in Veyel de Cannstatt's case.[4] Baudelocque, the nephew, operated, on a woman seven months gone, by vaginal section, and removed the placenta, producing a frightful hemorrhage which he was unable to arrest, and from which his unfortunate patient perished in a short time.[5] The recommendation to remove the placenta has very recently been practically indorsed by the high authority of Prof. T. G. Thomas. In February of this year[6] this accomplished operator attempted to remove

[1] Trans. St. Andrew's Med. Graduates Assoc., 1868, vol. i. p. 173.
[2] Mem. Med. Soc. London, 1792, vol. iii. p. 197.
[3] Trans. Obstet. Soc. London, 1873, p. 310.
[4] Gazette Médicale, 1840, and Keller, loc. citat. p. 86.
[5] Grandval, Thèse à Paris, No. 223, 1832, p. 9.
[6] New York Med. Journ., June, 1875, p. 563.

a fœtus from a woman three months gone, by vaginal incision. Upon attempting to extract the placenta the hemorrhage became so profuse that he had to stop when the separation was a little more than half completed. The injection of the subsulphate of iron into the cyst arrested the bleeding, and after an attack of pyæmia the woman fortunately recovered.

The placenta was left *in situ* by Baynham[1] in his brillant operations in the latter part of the last century. Turnbull[2] wrote upon this subject as follows: "My firm opinion is that the separation and expulsion of the placenta should always be left to nature, for the extraction will generally be fatal from the hemorrhage following it." He then adds that he would leave the maternal portion of the cord hanging out of the wound, and make traction on it at intervals. Nothing has been added to this teaching after the lapse of more than three quarters of a century. Baudelocque,[3] the elder, Gardien,[4] and in later times Tanner,[5] Hicks,[6] Meadows,[7] Hutchinson,[8] Tait,[9] Barnes,[10] and Kœberlé[11] have practically repeated the same recommendation.

[1] New York Med. and Philosoph. Journ., 1809, p. 162.

[2] Memoirs Med. Soc. London, 1792, p. 211. This writer entertained very singular views in regard to the management of the third stage of labor. In a foot-note (Ibid., p. 213) he says that in normal labor "It is a standard, invariable rule with me" to "use the gentlest efforts in delivering the afterbirth; if these do not succeed, to leave its separation to nature." Dr. Turnbull was surgeon to the Eastern Dispensary, and in four years 1500 women were delivered there. He says: "I can honestly declare that during that period, neither in private nor in public practice have I experienced any inconvenience from its retention, although in some instances it has been retained three, four, or five days before it has entirely been expelled."

[3] L'Art des Accouchemens, 8vo., Paris, 1796, tome ii. p. 460.

[4] Traité Complet d'Accouchemens, 8vo., Paris, 1824, tome i. p. 537.

[5] Signs and Diseases of Pregnancy, 8vo., Phila., 1868, p. 311.

[6] Trans. Obstet. Soc. London, vol. v.

[7] Ibid., 1873, vol. xiv. p. 316. It is a curious fact that Dr. Meadows recommends this course, believing that the suggestion was new, and that when the child was removed the placenta and cyst would lose their vitality and atrophy.

[8] Med. Times and Gaz., 1860, and Holmes' Syst. of Surgery, vol. iv. p. 514.

[9] Med. Times and Gazette, August 2, 1873, p. 119.

[10] Trans. Obstet. Soc. London, vol. xiv. p. 325.

[11] Keller, loc. citat., pp. 8, 13. This writer repeats the opinions of his teacher, p. 68.

In the operations performed, in the cases the histories of which have been examined to prepare this work, the method of managing the placenta is mentioned 52 times. These comprise 23 gastrotomies, 4 dilatations of abdominal fistulæ, 2 gastrotomies by cauterization, 8 sections of the vagina, 7 deliveries by the rectum, either spontaneously or by force, 4 spontaneous deliveries in interstitial pregnancy, and 3 sections of hernial sacs. In two other cases, one a section of a hernial sac and another an incision of the posterior vaginal wall, an attempt was made to separate the placenta, but the effort had to be abandoned on account of the terrific hemorrhage which followed. Of these 52 cases, the placenta was wholly or partially removed 24 times, and allowed to remain 28 times. Of those in whom it was removed, 12 recovered and 12 died, a mortality of 50 per cent. Of the 28 women in whom the placenta was left *in situ*, 10 died, or a mortality of 35.71 per cent., or 15.29 per cent. in favor of leaving the organ. The cause of death after removal of the placenta was peritonitis in 3 women, an abscess between the diaphragm and liver in 1, primary hemorrhage in 3,[1] rupture of the cyst[2] in 1, while another was only operated on when the patient was in articulo mortis. Of the women in whom the placenta was allowed to remain after operation, 1 died from "low fever," 1 was comatose at the time of the operation, and died so, shortly afterward,[3] 1 perished from exhaustion, 1 from rupture of the cyst four days after spontaneous delivery,[4] 2 from pyæmia, 3 from secondary hemorrhage,[5] and the remainder from unknown causes.

[1] Baudelocque, Grandval, Thèse à Paris, No. 223, 1832, p. 9. Müller, Hernial pregnancy in which the placenta was removed after opening the sac, Allgem. Wien. Med. Zeitung, 1862, and Brit. and For. Medico-Chir. Rev., Jan. 1863, p. 273. Meadows, Trans. Obstet. Soc. London, 1873, vol. xiv. p. 310.

[2] Mr. Lawson Tait, Med. Times and Gaz., Aug. 2, 1873, p. 119. The cyst was ruptured during extraction after section of the vagina.

[3] Rektorzik—a hernial pregnancy—New Syd. Soc. Year Book, 1861, p. 334.

[4] Dr. J. Braxton Hicks, Trans. Obstet. Soc. of London, 1868, p. 57. It was a case of tubo-uterine pregnancy, and the cyst opened into the uterus.

[5] Two of the cases were reported by Depaul, Obstet. Journ. Great Britain, March, 1874, p. 836, and Arch. de Tocologie, 1874. The other was recorded

The deaths which concern us most are those from peritonitis, pyæmia, and hemorrhage. The latter are really the most important. Of 24 women operated on for the removal of an extra-uterine child, three died outright from hemorrhage resulting from the removal of the placenta; while Genth[1] and Thomas[2] had to desist from their efforts to remove the after-birth, when the act was partly accomplished, on account of the terrific hemorrhage. The frequency with which primary hemorrhage has occurred in these cases shows that the danger is too great to be lightly assumed. Few men are willing to take the responsibility of performing an operation in which it is known that there is great danger of the patient bleeding to death without the surgeon being able to prevent it.

Among the deaths of those in whom the placenta was allowed to remain, there are likewise three from hemorrhage; occurring in Rupin's patient on the third day after vaginal section, and in two of Depaul's on the eighth and twelfth days after the operation. In one of the latter,[3] M. Depaul was unable to find the source of the hemorrhage at the autopsy. It would seem, therefore, that secondary is nearly as dangerous as primary hemorrhage. This view is more apparent than real. Secondary hemorrhage rarely occurs as a sequel to any operation for the relief of an extra-uterine fœtation. Rupin's is the only illustration of it from separation of the placenta among the cases examined. Secondary hemorrhage from spontaneous expulsion of the placenta occurs only once to every five hemorrhages due to forcible separation of that organ. Putrid infection is, therefore, the great danger which results from allowing the placenta to remain *in situ*. If this could be removed with the after-birth, the recommendation to separate the latter would carry considerable weight. As there is no proof of this, the conclusion is irresistibly forced upon us that the placenta should be left after the removal of an extra-uterine fœtus, and the tendency to pyæmia and allied disorders combated by in-

by Rupin, Gaz des Hôpitaux, No. 13, 1860, and Brit. and For. Medico-Chir. Rev., Jan. 1861, p 268.

[1] Brit. and For. Medico-Chir. Rev., Jan. 1857, p. 278.

[2] New York Med. Journ., June, 1875.

[3] Arch. de Tocologie, 1874.

jections into the cavity of the cyst, and the other means now in vogue among ovariotomists. The danger of hemorrhage from removal of the placenta is so great that the practice of the younger Baudelocque, Meadows, and Thomas is utterly unjustifiable. Besides hemorrhage, rupture of the cyst is another danger which may follow attempts to remove the placenta after section of the vagina.

The placenta may separate at any time between the operation and the eighth or tenth day following it. The cord should be left hanging from the wound, and traction may be made upon it occasionally, to see whether separation has occurred, and to hasten it if it has not.

The location of the placenta should be determined, if possible, before commencing the operation of gastrotomy. It has been found attached to the anterior abdominal wall, directly in the line of the incision, by Wilson,[1] Ross Jordon,[2] and Kœberlé.[3] Baldwin[4] also found the placenta attached to the anterior abdominal wall when making the autopsy of his patient, and it was wounded in the very first incision, which was made two inches above the umbilicus. Wilson was forced to abandon the operation on account of the severe hemorrhage which followed the incision of the attachments of the placenta. Jordon and Kœberlé both allowed the organ to remain, and the latter cut through it. Their patients recovered.

A somewhat similar accident happened to Blackman.[5] He was forced to abandon the operation after opening the abdominal walls on account of the great vascularity of the cyst wall. Turnbull accurately describes the appearances observed at the post-mortem examination of a woman who died five months after the completion of gestation. The engraving which accompanies the text shows the vascular anterior wall of the cyst; and it is not difficult to imagine, that, had gastrotomy been resorted to in this instance, it would have been followed by severe hemorrhage. There appears to be no reason why these vessels could not be tied whether the cyst is adherent or free. Vascularity of the cyst walls would not appear to be a

[1] Indian Annals of Med., Oct. 1855.
[2] Trans. Obstet. Soc. London, vol. xv. p. 130.
[3] Keller, loc. citat.
[4] Southern Med. and Surg. Journ., 1839.
[5] Loc. citat. p. 56.

complication as dangerous as the attachment of the placenta in the line of the incision.

At the same time that the position of the placenta is being ascertained, that of the bladder should not be forgotten. A catheter must be introduced, and the urine withdrawn before the operation is begun. This is not enough, however. The position of the bladder should be determined with certainty. Vedder,[1] at the post-mortem of a patient who died at full term, found this organ adherent to the abdominal wall. It reached midway between the pubis and umbilicus, and, had gastrotomy been performed, it would have been opened by the incision.

Removal of the Cyst Wall.—Removal of the cyst wall in whole or in part has been recommended by Mr. Spencer Wells, and practised by Meadows and Veyel de Cannstatt. Upon both occasions death followed, with reason to believe that the shock produced by the removal of the cyst may have had something to do with the fatal result. What advantage is to be derived from such a course is not stated, and we do not hesitate to advise allowing the cyst to remain, whether it is free or adherent. If the former, it has already been stated that it should be stitched to the abdominal wall, in order to shut off the peritoneal cavity.

Gastrotomy by the use of Caustics.—Béhier states[2] that Rousseau and Beauvoisin have proposed to remove extra-uterine children by means of caustics applied to the abdominal wall in imitation of Recamier's plan of evacuating hydatid cysts of the liver. This operation has been performed a number of times in France, and was attempted by Playfair[3] in England, but it does not appear to have met with much favor outside of the country in which it was proposed. The recommendation antedates the time of Rousseau, for Evesque, whose thesis was published in 1806, advises[4] the evacuation of

[1] Amer. Med. Times, June 15, 1861, p 384.
[2] Gazette Hebdom., No. 36, 1873.
[3] Trans. Obstet. Soc. London, 1866, vol. vii. p. 1.
[4] Daynac, Thèse à Paris, No. 71, 1825.

the cyst by forming an issue on the tumor. In 1822 Bonnie[1] advised the application of irritants to the abdominal wall to produce an abscess, after which the fœtus was to be extracted piecemeal. In 1852 Rousseau[2] carried this recommendation into effect, and successfully delivered a child which had been retained some time beyond the usual period of gestation. Since that time the operation has been repeated by Monod,[3] Martin,[4] Boinet,[5] Depaul,[6] and Duboué of Pau.[7] This measure is proposed to avoid opening the peritoneal cavity, and hence it has been selected when adhesions were supposed to be absent. Vienna or Canquoin's paste has been employed. Boinet incised the skin before making the application, while others applied it directly on the surface. It has to be put on repeatedly, the dead tissue or eschar being removed before each fresh cauterization. Boinet and Duboué each made two applications of the caustic at intervals of two days. Martin made five in fifteen days, while in Rousseau's case the treatment had to be continued for a whole month. After two or more cauterizations, the cyst is to be opened with a knife, and the child extracted entire or in pieces. The caustic has generally been applied in the median line, but Rousseau, feeling the head of the child in the left iliac fossa, opened the cyst at that point. Two of the six women on whom the operation has been completed, died, one from hemorrhage, and the other from pyæmia.

The merits of this method of removing an extra-uterine child remain to be tested. It has not yet been resorted to sufficiently often to warrant any conclusions in regard to its usefulness. It is certainly a great advantage to secure adhesions between the cyst and abdominal walls before opening the former. To secure this by cauterization of the abdomen the patient has to be subjected to more or less prolonged

[1] Thèse à Paris, No. 181, 1822, p. 31.
[2] Bull. Générale de Thérapeutique. Mai, 1855.
[3] L'Union Médicale, 1855.
[4] Revue Médicale, 1856, tome ii. p. 673.
[5] Archives de Tocologie, Paris, 1874.
[6] Ibid., p. 11, and L'Union Médicale, No. 19, 1869.
[7] Archives de Tocologie, 1874, tome i. p. 577.

suffering, and the danger of blood poisoning from the absorption of putrid materials from the sloughing surface. It does not appear to be too much to say, that for these reasons gastrotomy by caustics should be limited to those cases in which adhesions are supposed to be absent. It remains, therefore, to compare the results of this procedure with those of stitching the cyst to the abdominal wall, as practised by Mr. Tait.

Treatment after Gastrotomy whether by Knife or Caustics.—The patient who has undergone gastrotomy, either by immediate incision or by means of caustics, is subjected to many of the dangers which may follow ovariotomy. She may perish from shock or collapse in the first instance, or later, from peritonitis—acute or subacute—and septicæmia. These are marked by their usual symptoms, and are in no wise peculiar to this operation. The patient is much in the position of one who has just been subjected to an operation for the removal of the ovary. The abdominal opening is a large one, and from the angle of the wound the umbilical cord projects, taking the place of the pedicle in those ovariotomies in which the clamp is used. The patient should therefore be treated much as one who has been subjected to that operation. It is to be remembered, however, that, unlike ovariotomy, gastrotomy, for extra-uterine gestation, involves the separation and removal of a large decomposing mass from the abdominal cavity within a few days after its performance. This necessarily implies more or less accumulation of putrid matter in the cavity of the cyst, the collection of which does not cease with the removal of the cause, but the detritus continues to be discharged from the surface to which the placenta was attached for some time after its separation, just as the lochia are thrown off after labor in a normal gestation. Hence a patient who has been operated on for the removal of an extra-uterine child is subjected to peculiarly unfavorable influences, as regards blood poisoning, and, as after ovariotomy, these cannot be overcome by position. The patient should, therefore, be most carefully watched in order to prevent the occurrence of the formidable results of purulent or putrid absorption.

The prevention of these, we believe future experience will

teach, is to be accomplished by the same means that have been recently adopted to prevent and relieve them after ovariotomy. In 1855, Dr. Peaslee[1] recommended the use of intra-peritoneal injections for this purpose. His plan can be employed to make intra-cystic injections after gastrotomy for the cure of an extra-uterine fœtation, and we have reason to hope with the same good results. If the fluids accumulate in the lower part of the cyst, they can be pumped out by a syringe. Whether Sims's[2] plan of drainage through the posterior cul-de-sac of the vagina, by means of puncture and the insertion of tubes, can be advantageously utilized in the after-treatment of these cases, is a question for future experience to decide. The prevention of this complication is the most important matter which will occupy attention after this operation.

The vomiting, tympany, and other symptoms are to be relieved in the usual manner. For information upon this subject the reader may consult special treatises on ovariotomy, those of Atlee, Peaslee, and Wells.

Gastrotomy after Death of the Mother.—Gastrotomy has been performed a few times, after the death of the mother, in the interest of the child. Hofmeister,[3] Casabon,[4] and Shultze, resorted to it and removed dead children. In the case reported by Casabon the infant was baptized under condition. Braun,[5] and Bandl,[6] have each extracted a child, immediately after the death of its mother, who breathed a few times, but neither lived. Though success has not thus far crowned these efforts, gastrotomy should always be resorted to in the interest of a viable and living child, on the sudden death of the mother. It should of course be performed with all the precautions that

[1] American Journ. of Obstet., Aug. 1870, and Ovarian Tumors, their Diagnosis and Treatment, 8vo., New York, 1872, p. 509.

[2] On Ovariotomy, 8vo , New York, 1873, reprinted from the New York Med. Journ., Dec. 1872, and April, 1873.

[3] Loc. citat.

[4] Monthly Journ. of Med. Sciences, Edinburgh, Feb. 1847, p. 633.

[5] Dr. Trush, Letter to the *Clinic*, March 2, 1872, p. 105.

[6] Wiener Med. Wochen., Aug. 8, 1874, and London Medical Record, Sept. 12, 1874.

are usually observed when the woman is alive. This course will continue to be necessary until we are furnished with a certain sign of death. The post-mortem examination of the woman should not be proceeded with immediately after the removal of the child, as has been done in several instances.

CHAPTER XIII.

TREATMENT—Continued.

Delivery by vagina—By incision of the rectum—When the cyst has opened through the abdominal wall—Through the vagina—Lithotomy to remove bones from the bladder—Removal of bones when the cyst is discharging by the bowel—Treatment of tubo-uterine pregnancy—Of combined intra- and extra-uterine pregnancy—Of labor with a retained extra-uterine child—Of hernial pregnancy.

Another measure which has been proposed for the removal of an extra-uterine fœtus, is incision of the vagina through Douglas's pouch. Dr. Charles Kelly[1] proposed this in 1756, and believed that the child might be easily extracted, when the head was engaged in the cavity of the pelvis and pushed down the posterior vaginal cul-de-sac. Attention has already been directed to the fact that in some instances the fœtal parts can easily be detected through the vagina, and that the tissues which separate the finger of the accoucheur and the fœtus, are exceedingly thin. When such a condition presents itself, it would seem to be a very simple matter to open the cyst with a bistoury, and to extract the fœtus by traction. This procedure would appear to have a very manifest advantage over gastrotomy, since it insures drainage while it does not compromise the peritoneum Marc[2] believes the operation to be preferable to gastrotomy when the head presents low down, and its different parts can be distinguished by vaginal examination. Bonnie[3] says that a child can be delivered in this manner. Dewees[4] preferred it to gastrotomy, and recommended the primary operation in the interests of the child. Velpeau,[5] and Cazeaux,[6] prefer it to gastrotomy, the former

[1] Med. Observations and Inquiries, 2d ed., 8vo., London, 1797, p. 44.

[2] Dict. des Sciences Méd., 8vo., Paris, 1817, p. 412.

[3] Thèse à Paris, No. 181, 1822, p. 27.

[4] Essays on Various Subjects connected with Midwifery, 8vo., Phila., 1823, pp. 335-6.

[5] Dictionnaire de Méd., 8vo., Paris, 1836, tome xiv. p. 420.

[6] Loc. citat. p. 602.

when the ovum is developed in the retro-uterine peritoneal cul-de-sac, and the latter when the head can be felt in the vagina during expulsive efforts in labor at term. Velpeau recommends operating before labor comes on, and Cazeaux after it has set in. Daynac,[1] and Tanner,[2] think that the operation should not be performed unless some prominent portion of the child's body can be traced through the vaginal wall. Voillemier[3] prefers it to gastrotomy. Ramsbotham,[4] after speaking of gastrotomy and its fatality when performed to save the child, thus alludes to section of the vagina: "The results have been more encouraging indeed when the fœtus has been cut down upon through the coats of the vagina, its head or foot being distinctly felt by an examination through that canal." Campbell[5] believes that under the same circumstances, division of the vagina is preferable to incising the abdominal walls.

Vaginotomy has, on the other hand, been opposed by Mr. Lawson Tait,[6] who says, that it "should always give place to abdominal section as being more scientific and less risky." Keller[7] speaks doubtfully about the matter, but on the whole is disposed to decide in favor of gastrotomy.

We are in possession of but little clinical experience to decide this vexed question. Campbell says, that "in nine cases in which the vaginal incision was practised, three mothers and their infants were preserved; in two instances the mother only recovered; on one occasion the child was saved, and in three cases both mother and child perished," or, five out of nine mothers, and four out of the same number of children. Tanner[8] says, that in ten operations, six mothers and three children were saved. The writer has been able to collect fifteen cases. In these, nine of the mothers died and six lived, a mortality of 60 per cent. Of the children only two were saved. Ten of these operations were primary, and were

[1] Thèse à Paris, No. 71, 1825, p. 22.
[2] Loc. citat. p. 311.
[3] Med. Times and Gazette, Oct. 16, 1841, p. 33.
[4] Med. Times, London, Nov. 13, 1852, p. 482.
[5] Loc. citat. p. 151.
[6] Med. Times and Gazette, Aug. 2, 1873, p. 119.
[7] Loc. citat. p. 151.
[8] Loc. citat. p. 311.

reported by King,[1] Normann,[2] Caignou,[3] Lauverjat,[4] Baudelocque,[5] De Lisle,[6] Norman,[7] Rupin,[8] Tait,[9] and Thomas.[10] One secondary operation which has been previously alluded to,[11] has been performed by Gordon[12] in order to deliver a uterine child in a subsequent pregnancy. The remaining operations were performed by Dubois,[13] Simpson,[14] Agnew,[15] and an unknown author quoted by Campbell.[16]

The operation of Dr. John King is one of the most remarkable on record. He was an American, and practised his profession at Edisto, South Carolina. He incised the vagina at term, and had the happiness to save both mother and child. Rupin and Thomas operated before the gestation was complete, the former at the end of the sixth and the latter at the end of the third month of gestation. It is to be distinctly understood that cases in which a fistula in the vagina was enlarged for the extraction of an extra-uterine fœtus are not included as examples of vaginal section. In this work the term is restricted to those operations in which the retro-uterine cul-de-sac was intact at the time the incision was made.

The number of cases of section of the vagina cited will not warrant us in drawing any conclusions in regard to the comparative merits of this operation and gastrotomy, which will not be subject to modification from future experience. The results do not appear at all favorable to vaginal incision. It has been already stated that the mortality following this operation is 60 per cent. It has been shown also that the death-rate

[1] Medical Repository, New York, 1813, p. 388, and An Analysis of the Subject of Extra-uterine Fœtation, etc., 8vo., London, 1818.
[2] Quoted by Keller, loc. citat. p. 79, from Arch. Générales de Méd, 1829.
[3] Keller, p. 79, from Lancette Française, tome ii.
[4] Sabatier, De la Médecine Opératoire, 8vo., Paris, 1832, tome iv. p. 454.
[5] Grandval, Thèse à Paris, No. 223, 1832, p. 9.
[6] Bull. de la Société Méd. de Emulation, May, 1813.
[7] Trans. Medico-Chir. Soc. London, 1827, vol. xiii. p. 348.
[8] Gaz. des Hôpitaux, No. 13, 1860.
[9] Med. Times and Gazette, Aug. 2, 1873, p. 119.
[10] New York Med. Journ., Jan. 1875, p 563. [11] Page
[12] Western Journ. of Med. and Surg., Oct. 1848.
[13] Voillemier, Med. Times and Gazette, Oct. 16, 1841, p. 33.
[14] Edinburgh Med. Journ., Sept. 1863, p. 270.
[15] Phila. Med. Times, Jan. 23, 1875, p. 270. [16] Loc. citat., foot-note, p. 70.

of extra-uterine pregnancy, not actively interfered with, is 52.65 per cent. Therefore it may be inferred that 7.35 per cent. of the women delivered by incising the vagina and who died, would have lived if their medical advisers had been willing to have trusted to nature. This showing is not favorable to surgical interference. Section of the vagina appears, however, to be more favorable than primary gastrotomy, the mortality after which is 70 per cent.

The causes of death are the same as in abdominal section, with the addition of rupture of the cyst. This accident happened to Mr. Tait. After the removal of the placenta some intestines protruded into the sac. Prof. Agnew had a similar experience in Dr. E. Wilson's patient, upon whom he operated. After the death of the patient the cyst was found to communicate with the peritoneal cavity, into which the injections used to wash out the sac were supposed to have escaped during the life of the patient.

If this operation is resorted to, it should be confined to cases in which some portion of the child, and especially the head, presents in the pelvis. The vagina should be incised over the most prominent part, and the child extracted as in ordinary deliveries. Normann used a crotchet. King withdrew it by the forceps aided by abdominal pressure, and Norman perforated, after which he withdrew the child by the forceps and blunt hook. The placenta should be left *in situ*. This is more necessary after vaginal section than after gastrotomy, since the removal of the after-birth endangers the integrity of the cyst walls. The wound should be left open to give egress to the discharges and to the placenta when it separates. Delivery by vaginal incision, if resorted to at all, should be confined to cases in which adhesions are supposed to be absent, and in which either the cephalic or pelvic extremities of the child can be felt through the canal. If the child occupies a transverse position in the abdomen, and has to be delivered by version, gastrotomy should always be performed in preference to section of the vagina, in order to prevent rupture of the cyst wall. There is no inducement, however, to repeat this operation. Experience thus far indicates, that, notwithstanding the brilliant success which has happily followed it in a few instances, the chances

of the woman recovering are not so great after vaginal incision as they are after gastrotomy.

Delivery by incising the Rectum.—Extra-uterine children have been spontaneously expelled by the rectum,[1] but this is a rare occurrence. Bonnie[2] quotes a case from the *Bulletin de la Faculté de Paris*, 1813–1814, in which this organ was incised to effect the delivery of a child. The woman, who was 28 years of age, appears to have been near term, and the vagina was closed by compression. The head of the child was felt pressing upon the rectum, which was incised, after which the child's head was broken up and the bones removed. The trunk was extracted entire, the anus dilating sufficiently to allow it to pass. The process occupied more than five hours. The placenta was delivered in the same way, and the woman recovered. There is nothing to lead to the repetition of this operation. It has not yet met, nor is it likely to ever meet with favor. It has no advantage over section of the vagina, while delivery by this narrow channel, which was never meant to give passage to the fœtus, is much more difficult than by the vagina, the capacity of which is adapted to its functions. Nothing is said in this place about the enlargement of an opening by which an extra-uterine cyst has communicated with the bowel. This will claim attention in discussing the management of extra-uterine pregnancy without active interference.

Treatment after the Death of the Fœtus at Term.—After the termination of spurious labor the patient should be sedulously watched, but the province of the physician is to relieve symptoms rather than to interfere actively. The results of surgical intervention have proved that the expectant treatment is the most successful. This does not imply, however, that the medical attendant has nothing to do. Pain is to be relieved by narcotics, and the patient's strength sustained by a generous diet and tonics. Inflammatory complications about the abdomen are to be relieved by the usual means, with the recollection that within certain limits these are conservative in

[1] Giffard, Cases in Midwifery, 8vo., London, 1734; Yardley and Sansbury, North Amer. Med. and Surg. Journ., 1826, vol. i. p. 292.

[2] Thèse à Paris, No. 181, 1822, p. 33.

their operation, since they attach the fœtal sac to the adjoining organs or to the abdominal wall, and thus prepare the way for the elimination of the fœtus and the fluid surrounding it. If septicæmia, peritonitis, or exhaustion endangering life, or rupture of the cyst should supervene, gastrotomy is indicated. Otherwise nature should not be interfered with until she indicates the channel by which elimination is to be effected, and then the surgeon should accept the position of her helpmate. If the sac opens through the abdominal wall, the orifice should be enlarged and the fœtus or its débris extracted. This is an operation which is not fatal, yet it has never been generally adopted. It does not seem to have met with the same favor as gastrotomy. Among the 500 cases analyzed, it has only been performed thirty-two times. The following table shows the results of the operation:—

Table showing the Results of Enlarging the Opening after the Cyst had opened through the Abdominal Wall.

Duration of pregnancy.	Result.		Total.	Cause of death.
	Lived	Died.		
9 months[1]	1	..	1	
9 to 12 "	3	..	3	
12 to 18 "	6	1	7	"Abscess" between liver and diaphragm.[2]
18 to 24 "	3	..	3	
2 to 5 years	8	..	8	
5 to 10 "	4	1	5	Starvation from rupture of stomach during the operation.[3]
10 to 15 "	1	..	1	
15 to 20 "	..	1	1	Suppuration of cyst after labor, and phthisis.[4]
30 to 35 "	1	..	1	
Doubtful	2	..	2	
	29	3	32	

The death-rate after this operation was therefore 9.37 per cent., yet this mortality was by no means due to the surgical measure under consideration, but, on the contrary, represents the mortality which will occur in spite of it. The procedure is unattended with danger, and saves life by removing a source

[1] In these cases the child died some time before the end of gestation.

[2] Ramsay, loc. citat. p. 221.

[3] Darby, loc. citat. p. 97.

[4] Hale, Boston Med. and Surg. Journ., 1857, vol. lv. p. 413.

of putrid infection, and greatly shortens the duration and the suffering of the eliminative process. The operation is therefore one of little danger, while great advantage can be derived from it. It has been successfully performed by a butcher,[1] the orifice being extensively enlarged. Flexman[2] preferred to dilate the orifice with a sponge tent, after which he successfully removed the fœtal bones. In some instances it is not necessary to even enlarge the opening if a portion of the fœtus can be seized so that traction can be made in accordance with mechanical principles. Dr. Gabriel King[3] relates the history of a woman from whom a footman pulled a fœtus, after which, on looking through the aperture, he saw the bones of another child, the product of a previous conception, inclosed in a sac. The late Prof. Dunglison[4] removed a fœtus entire and at term, in this manner. Bronson[5] drew one which was decomposing, through an opening one inch and a half wide which had formed three days before.

In the same manner when the cyst opens into the vagina the orifice may sometimes be enlarged and the child extracted. Churchill[6] treated Kennedy's patient in this manner, and removed a three months' child after eighteen years' residence in the body of its mother. In a recent discussion before the Dublin Obstetrical Society, Athill and Churchill[7] stated that the woman was still living. Drage[8] dilated the vaginal opening with the forceps and removed the bones, while Colman[9] simply resorted to traction and dragged a mature fœtus through the orifice in the vagina without any previous enlargement either by dilatation or with the knife.

After rupture into the bladder lithotomy has been per-

[1] Campbell, loc. citat. p. 46, from Philosoph. Trans., vol. viii.

[2] D. D. Davis, Principles and Practice of Obstet. Med., 4to., London, 1836, vol. ii. p. 947.

[3] Edinburgh Med. Essays and Observations, 1742, p. 441.

[4] Med. Intelligencer, May 15, 1839, and Med. Examiner, Phila., 1839, p. 761.

[5] Amer. Medical Monthly, 1860, p. 480.

[6] Brit. Med. Journ., Jan. 23, 1869, p. 68.

[7] Dublin Journ. of Medical Science, April, 1875.

[8] Trans. Obstet. Soc. London, 1861, vol. ii. p. 254.

[9] Med. and Phys. Journ., London, 1799, vol. ii. p. 262.

formed by Josephus,[1] Bosseut,[2] Thompson,[3] and Morlanne.[4] The first of these performed the supra-pubic operation, and it ended fatally. Bosseut removed one hundred and forty-six bones, together with a stone the size of an olive. Thompson opened the bladder through the vagina, the incision involving the urethra. The arms, legs, pelvis, and part of the skull were drawn from the sac into the bladder and then removed.

After communication with the rectum had been established Johnston[5] made an unsuccessful effort to enlarge the opening. Dr. William Smith[6] did this successfully to remove a parietal bone. Goodsir[7] and Amussat[8] have each removed the most of a decomposing fœtus through the anus, taking it away in pieces. Nicholas Patuna[9] removed a portion of the fœtus large enough, and so little decomposed, that the sex of the child could be determined. In 1806 Clark[10] recorded the fact that he passed his whole hand into the bowel, and putting his finger into the child's mouth made traction and extracted the head per anum. The body and secundines were expelled spontanously some time after. The next day the anus had contracted to the natural size, but on the third day it, as well as the perineum, began to slough. On the ninth day the parts were healing, but the fourchette was destroyed. On the 24th of December, 1848, Marsden[11] passed his hand far up the bowel and extracted a child eighteen inches long, well formed, but decomposed about the head and left arm. In 1863, Dr. J. Matthews Duncan[12] passed his hand into the rectum, in imitation of Prof. Simon's[13] method of examining that organ, and delivered a child which was

[1] Med. and Phys. Journ., London, 1805, vol. xiv. p. 519.
[2] New England Journ. of Med. and Surgery, 1817, vol. vi. p. 134.
[3] Lancet, Nov. 28, 1863. [4] Recueil Périodique, tome xiii. p. 70.
[5] Edinburgh Med. Journ. 1857, vol. ii. p. 137.
[6] Campbell, loc. citat. p. 51.
[7] Duncan's Annals of Med., 8vo., 1802, vol. vii. p. 412.
[8] London and Edinburgh Monthly Journ., Dec. 1841, p. 917.
[9] Dissertation on Retroversion of the Womb, by Samuel Merriman, 8vo., Phila., 1817, p. 44.
[10] Phila. Med. Museum, 1806, vol. ii. p. 292.
[11] Medical Chronicle, May, 1855.
[12] Edinburgh Med. Journ., July, 1863, p. 183.
[13] Amer. Journ. of Obstet., Feb. 1873, p. 568.

near term and still contained in its cyst, as in breech presentations. In two days the sphincter had regained its functions so that, though affected with diarrhœa, the patient no longer soiled her bed. During the past year Janvrin[1] passed his hand into the bowel to remove the bones of a decomposed fœtus from the cyst. Both Duncan and Janvrin followed the suggestion of Simon, apparently with the idea that the application of his method of examination to the delivery of an extra-uterine child was a new measure. In it, however, they had been preceded by an American, Dr. Clark, nearly three-quarters of a century.

This review of what men have done is useless if it leads to no practical results, if we cannot learn from it something of what we should do when the fœtal cyst opens into the bladder, vagina, or rectum. If the process of elimination is taking place through the bladder, many of the smaller bones may be removed without having to resort to lithotomy. It is well known that the female urethra is very dilatable, so much so that much of the débris can be simply extracted with the forceps after this is done. Leishman states[2] that some years since, Prof. G. H. B. M'Leod removed the bones of a fœtus from the bladder by dilating the urethra. It is possible that the long flat ones might be cut with blunt scissors, and extracted piecemeal. If not, the choice lies between the operations of lithotomy and gastrotomy. If the cyst is not adherent the former might be preferred, but if the sac is found to be united to the abdominal wall, gastrotomy will be found less dangerous, as the larger incision, which can be made in this operation, renders the extraction of the parts of the fœtus easy without endangering the integrity of any delicate organs.

After the sac has commenced to discharge its contents through the vagina, loose bones and portions of the decomposing soft parts which appear at the orifice, can be seized with the forceps and removed. The operation of enlarging the orifice is easily performed, and generally safe if rude manipulations are avoided in removing the fœtus. The danger of

[1] Amer. Journ. of Obstet., Nov. 1874, p. 428. [2] Loc. citat. p. 217.

rupture of the sac, an accident which happened to Tait when removing an undecomposed child, should never be forgotten. In enlarging an orifice in the roof of the vagina, the operator is sure of room enough to extract the child, which can be removed piecemeal.

By the rectum the matter is different. Any bones and pieces of the child which can be reached should be removed by the fingers or forceps. The patient should be etherized and the hand passed into the bowel, when, if the communication with the cyst is large enough, it may be carried into this and the child removed, as was done by Clark, Marsden, and Duncan. The last two have proved that this can be done safely. The sloughing which followed Clark's manipulation may have been due to the pressure that the parts endured before the body was spontaneously expelled. It is not so much the degree as the duration of pressure which injures in these cases. Immediate extraction is therefore to be preferred, after which there is every reason to hope that the functions of the sphincter ani will be restored as rapidly as was observed by Dr. Duncan. This application of Simon's method of diagnosis promises much for the relief of extra-uterine pregnancy when the sac has ruptured into the rectum. It will frequently enable the medical attendant to remove the bones and soft parts of a decomposing fœtus, or, in some instances, even the child entire, thus diminishing suffering and removing the dangers of blood poisoning.

It is important, however, to determine whether this treatment is adapted to all cases in which the cyst opens into the bowel. It is probably not, for in some instances the communication is so high up that the difficulties of removing the fœtus in pieces or entire by the rectum, are so increased as to make the operation dangerous. In other cases the opening into the bowel is so small as not to allow the child to pass unless the orifice has been previously enlarged. It is a question whether it is safe to do this. It would appear that incising vascular parts in a canal in which concealed hemorrhage is greatly to be dreaded, is a proceeding not to be resorted to lightly. Most operators have preferred gastrotomy under these circumstances, and we believe justly. The operation is

imperatively indicated when the orifice by which the cyst communicates with the bowel is of such a character that the fœtus cannot be extracted through it, and symptoms arise which show that the mother's life is in jeopardy.

Tubo-uterine Pregnancy.—There are some special questions which remain to be discussed in relation to the management of misplaced gestation. What has already been said in regard to treatment would not apply to the tubo-uterine variety of the accident, providing the diagnosis was made during the life of the woman. The delivery of the women under the care of Laugier, Feilitz, and Hicks by the natural passages, has suggested the hope that this variety of extra-uterine gestation can be relieved when term is reached, with a prospect of saving the child.

It is not too much to hope that under these circumstances the womb can be dilated and the child removed by incising the septum which divides the true and the vicarious uterine cavities. This has already been accomplished by Dr. H. Lenox Hodge, of Philadelphia. The history of the case has never been put upon record, and through the kindness of Dr. Hodge the author is enabled to make it public. It is narrated in the language of Dr. Hodge.

Case of Tubo-uterine Pregnancy. Labor brought on by dilating Os Uteri, at about the eighth month. Child delivered per vias naturales and lived about 10 *hours. Mother recovered.*

"On June 11, 1867, Dr. Swing, of Caius, near Parkersburg, Pennsylvania, brought his patient, Mrs. S., to the city for my opinion in consultation. Upon examination, I found the uterus anteflexed, somewhat congested, and an enlargement at its side which was thought to be ovarian. A uterine probe was passed into the cavity of the uterus, and the diagnosis of the position of the uterus and its size thus verified. On Monday, Oct. 11, I again saw the patient. Dr. Swing had brought her to the city for another consultation on account of marked changes in her condition.

"She is a married woman, 35 years old, and the mother of

four children. Her general health is good. Her last child was born January, 1866. She nursed the child until May, 1867. During lactation, she did not menstruate until January, 1867, and then only in January, February, and March. The interval between the last two was only two weeks. Since then she had not menstruated.

"She now suffers much from pain in the abdomen, and feels movements like those of a fœtus, only, she says, 'more powerful,' and they cause her to feel sick. She has also had great irritability of the bladder. There has been 'sick stomach' more or less for several months. She noticed in July that the abdomen was enlarging. The enlargement continued to increase until about three weeks ago. The abdominal tumor is now irregular in outline, and arises to about one and a half inches above the umbilicus. Movements can be felt below and to the right; and in the same position a rapid and feeble sound can be heard like that of a fœtal heart. The abdomen was sensitive to the touch. Upon making a vaginal examination the neck of the uterus was found softened, and the os dilated so as to admit the end of the finger.

"On Tuesday, Oct. 15, my father, Prof. Hugh L. Hodge, saw her in consultation with Dr. Swing and myself. In order to make the examination as complete as possible, the patient was etherized. My father passed his hand into the vagina, and his finger into the uterus. He found the cavity of the uterus empty, the fundus depressed especially toward the right Fallopian tube. He distinctly felt the fœtus, as it were, in the walls of the uterus and only separated by a delicate membrane from the cavity. He also felt the fœtal movements. In the opinion of each of us it was a case of extra-uterine pregnancy of the interstitial variety, and it was thought that the fœtus was one of about 8 months, and still living. It was decided to secure rest for two or three days after this examination, and then attempt to deliver, under the influence of ether, by dilating the os uteri, then to be guided by development of the case as it progressed, but if necessary to divide the membrane which appeared to separate the fœtus from the uterus, and to accomplish delivery with as little effort on the part of the mother as possible. Ether was given not only to prevent pain

but also to lessen as much as possible uterine contraction. It was not known how thin the different parts of the sac containing the child might be, and the danger of rupture into the peritoneal cavity was feared. For the same reason, it was not thought safe to allow the labor to be postponed any longer, and it was hoped that if done now the life of the mother might be saved, and possibly also that of the child.

"Wednesday, Oct. 16. She took yesterday a grain of opium, and has remained in bed. She has suffered but little pain, but has discharged some blood from vagina.

"Thursday, Oct. 17. She met me down stairs, but since yesterday has suffered severe pain and is scarcely able to walk. She says that she has often had such attacks at home. To-morrow was appointed for the operation.

"Friday, Oct. 18. Present, Prof. Hugh L. Hodge, Prof. Penrose, Dr. Latta, Dr. Hutchinson, Dr. Swing, and myself.

"The os uteri was dilated by means of Barnes' dilators. They acted efficiently, and as the os dilated labor-pains began. Owing probably to uterine contractions induced in part by the examination made on Tuesday, and in part by the forcible dilatation of the os to-day, the sac containing the fœtus had greatly descended and approached the os.

"Ether was administered by Dr. Hutchinson. Upon auscultation of the abdomen the fœtal heart was still heard, though the sounds were feeble. The urine was withdrawn by a catheter.

"Then scratching through the structures covering the fœtus, I extracted the child, presenting the breech, by passing a blunt hook over the thigh. It was the right sacral posterior position of the breech. The placenta was also easily delivered, and with but little hemorrhage.

"After birth the child soon began to breathe, and its color became perfectly good. Its circulation and respiration, however, were feeble, and it only lived about ten hours. The development of the child was moderately good for a fœtus of eight months.

"Saturday, Oct. 19. Tenderness over abdomen. Slight delirium. Temperature high, but skin moist. Pulse about 112.

"Sunday, Oct. 20. Increase of pain in abdomen. Delirium continues. Pulse 116. Tongue moist and slightly coated. Skin moist.

"Monday, Oct. 21. Less abdominal tenderness. Mind more natural. Pulse 108. Tenesmus has occurred and causes considerable distress.

"Tuesday, Oct. 22. Diarrhœal discharges and still some tenesmus.

"Wednesday, Oct. 23. No tenesmus. Slept well. Pulse 99. Skin good. Mind perfectly right.

"Friday, Oct. 25. Continues to improve. No pain. Pulse 84. To-day she was able to pass her urine without the use of a catheter.

"Friday, Nov. 1. Gains strength. Is able to sit up in bed.

"After this she steadily improved, and on Saturday, Nov. 9, returned home. The treatment during these three weeks following the birth of the child consisted of diaphoretics, anodynes, and tonics, including sulphate of quinia, as the symptoms seemed to demand."

Treatment of Combined Intra- and Extra-uterine Pregnancy in Labor at Term.—As a rule labor progresses normally in these cases until the intra-uterine child is born. Loudon,[1] Pennefather,[2] and Satterthwait,[3] report that the extra-uterine tumor was not discovered until after the labor. Starley,[4] Pollak,[5] and Gordon,[6] state that the labor was normal in their cases. Deocene,[7] and Salle,[8] resorted to gastrotomy to remove the extra-uterine children at term, when intra-uterine pregnancy was discovered and the children removed by incising the uterus. But one difficult labor occurred amongst the twenty-one cases of combined intra- and extra-uterine pregnancy which the writer has examined. This happened under the care of Mr. Cooke,[9] of London, and he says that three methods of delivery suggested themselves to Dr. Greenhalgh and himself.

[1] Campbell, loc. citat. p. 65.
[2] Lancet, June 20, 1863, p. 688.
[3] New York Med. Journ., 1872, p. 387.
[4] Ibid., March, 1873, p. 299.
[5] St. Louis Med. and Surg. Journ., May 10, 1871.
[6] Western Journ. of Med. and Surg., Oct. 1848.
[7] Gaz. des Hôpitaux, 1852, p. 147.
[8] New Orleans Med. Journ., Oct. 1850, p. 727.
[9] Trans. Obstet. Soc. London, 1864, vol. v. p. 146.

These were displacement of the tumor and delivery by version, craniotomy, and Cæsarean section. The tumor so completely filled the brim, that its antero-posterior diameter was diminished to less than two fingers' breadth, and hence perforation was inadmissible. It was therefore determined to anæsthetize the woman, and to attempt to displace the tumor so that the child, felt above the brim, could descend. This was accomplished with some difficulty, after which the child was turned and safely delivered. This method of delivery may be available in some instances, while in others, there being room enough for its use, and the extra-uterine tumor being immovable, the perforator may be employed. If the pelvic diameters are so much encroached upon by an immovable tumor that there is no hope of delivery in any other way, the abdomen should be opened and the children removed by section of the sac and uterus, as has been done by Salle, with the result of saving both children and losing the mother, and by Deocene, who saved the mother and lost the children.

The last question for consideration in connection with this subject, is the proper method of treatment to be adopted after the safe delivery of the intra-uterine child. Primary gastrotomy has been recommended for the extraction of the extra-uterine fœtus. This treatment should be emphatically condemned. The risks of this operation during the parturient condition have been shown to be so great that, counting the child's life as equal to the mother's, more human lives will be saved by expectancy than by active interference. No matter how loud the beatings of the fœtal heart may be, the surgeon should withhold his hand until all hopes of the mother's life have been dissipated, when his art may intervene to save the child if it be still living.

Treatment of Labor in a Woman carrying an Encysted Child.—The same principle that guides the accoucheur in the management of labor in combined intra- and extra-uterine pregnancy will serve him here. Elevation of the tumor and extraction by version or the forceps, perforation, and the Cæsarean section are the resorts. The remarkable success of Gordon by vaginal section raises the question whether that operation had

not better be performed, in preference to the Cæsarean section, if the pelvic or the cephalic extremity of the child is engaged in the pelvis or at the superior strait.

It is an interesting fact, however, that these labors are rarely difficult. They have repeatedly terminated before the obstetrician could reach his patient.

Treatment of Extra-uterine Hernial Pregnancy.—Hernial pregnancy is more interesting as a clinical curiosity than of importance in its bearings upon the consideration of extra-uterine gestation. It is of some moment in connection with the operation of gastrotomy, however. Roberts has included Genth's, and Rektorzik's cases in his tabular statement of the results of gastrotomy. This we believe to be open to serious criticism. The operations which Gouey, Skirvani, Genth, Müller, Rektorzik, and Widerstein performed, there is reason to believe were by no means so grave as that of abdominal section for the removal of a child developed outside of the uterus, especially if the cyst is not adherent. In the operation for the removal of a child contained in a hernial sac, the abdominal cavity remains intact, even though the cyst has a peritoneal covering. The operator acts with more freedom, conscious that the blood and other fluids, liberated by his incisions, cannot find their way into the hidden recesses of an important cavity, there to decompose and set up peritonitis or to poison the blood by their absorption after decomposition. These operations have, therefore, been excluded in the study of the results of gastrotomy.

An examination of the few cases of extra-uterine hernial pregnancy which have occurred, seems to warrant the conclusion that gestation should be allowed to go to term, and that the child should be removed at that time by section of the sac, with the hope of saving both the mother and the infant. In this it differs from the other forms of extra-uterine gestation, which it has been shown are to be treated solely with regard to the welfare of the mother, and without any reference to the safety of the child. In all the cases, which we have been able to discover, the child has been removed by section of the sac, with the result of four recoveries and two deaths. Of

these, one, that of Rektorzik, may be fairly excluded, as the woman was past recovery at the time of the operation, and died comatose a few hours afterwards. The child, however, which was at term, was saved, and was healthy at the time the case was reported. Müller's patient died of internal hemorrhage. Skirvani likewise removed a living child, but it died in a few hours. These operations were all performed at term. Gouey and Genth also removed living, but not viable, children, the former operating when the woman was three, and the latter when she was between four and five months gone.

In the management of the placenta the same rules are to guide the operator as in gastrotomy. Gouey, Skirvani, Genth, and Müller removed it. The patient of the last died of internal hemorrhage, which might possibly have been avoided if the after-birth had been left. Genth did not fairly succeed in removing the placenta. After having partly separated it, he was forced to desist on account of the frightful hemorrhage which followed. In Gouey's case it separated almost spontaneously. In allowing the placenta to remain in extra-abdominal pregnancy, there is not so much danger as when the fœtation is at the same time extra-uterine and intra-abdominal, because in hernial gestations the fœtal sac is much more under control, and can be kept clean much more readily. The fluids resulting from the decomposition of the after-birth can be much more easily washed out, than when they are formed in, or gravitate into the deeper portions of the abdominal cavity.

INDEX.