

The causes and treatment of abortion.

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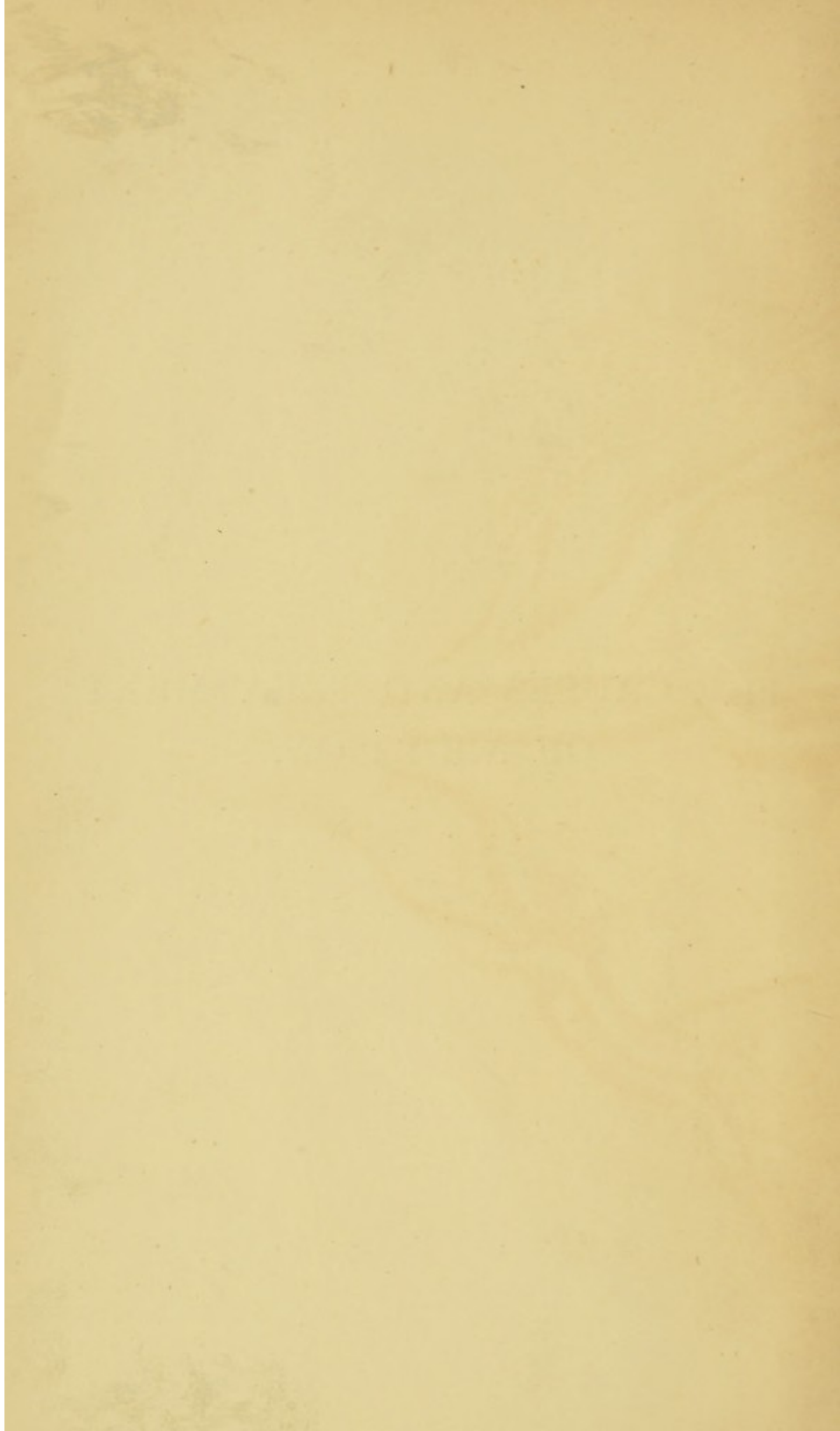


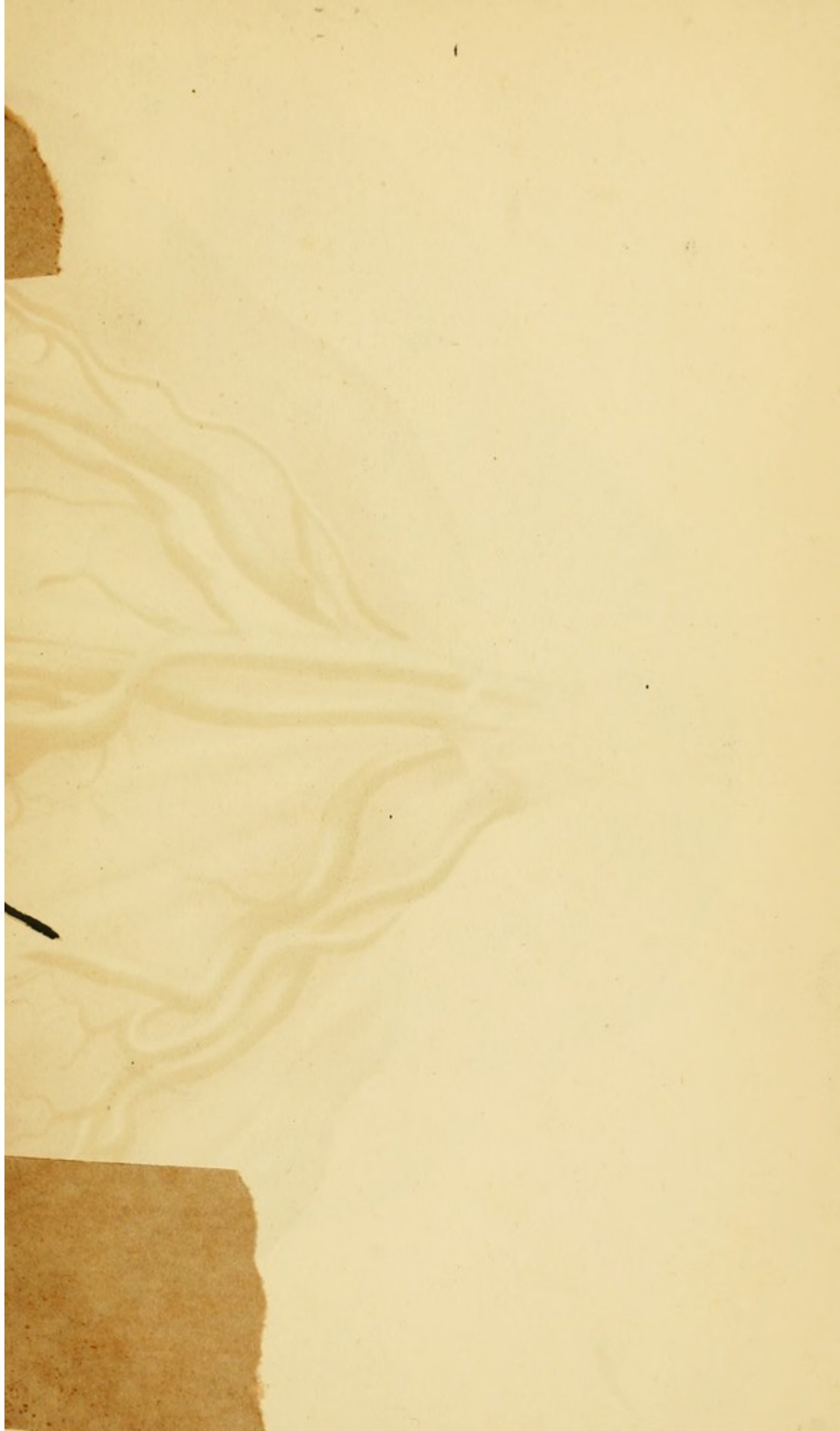
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THE CAUSES AND TREATMENT
OF ABORTION.







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THE
CAUSES AND TREATMENT
OF
ABORTION.

BY
ROBERT REID RENTOUL, M.D.,

L.R.C.P.ED., M.R.C.S., FELLOW OF THE OBSTETRICAL SOCIETY, LONDON.

WITH AN INTRODUCTION BY
LAWSON TAIT, F.R.C.S.

TWO COLOURED PLATES AND THIRTY-FIVE ENGRAVINGS.

EDINBURGH AND LONDON:
YOUNG J. PENTLAND.

1889.

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P R E F A C E.

FOR a number of years, I have devoted a considerable amount of time to the study of the Causes and Treatment of Abortion.

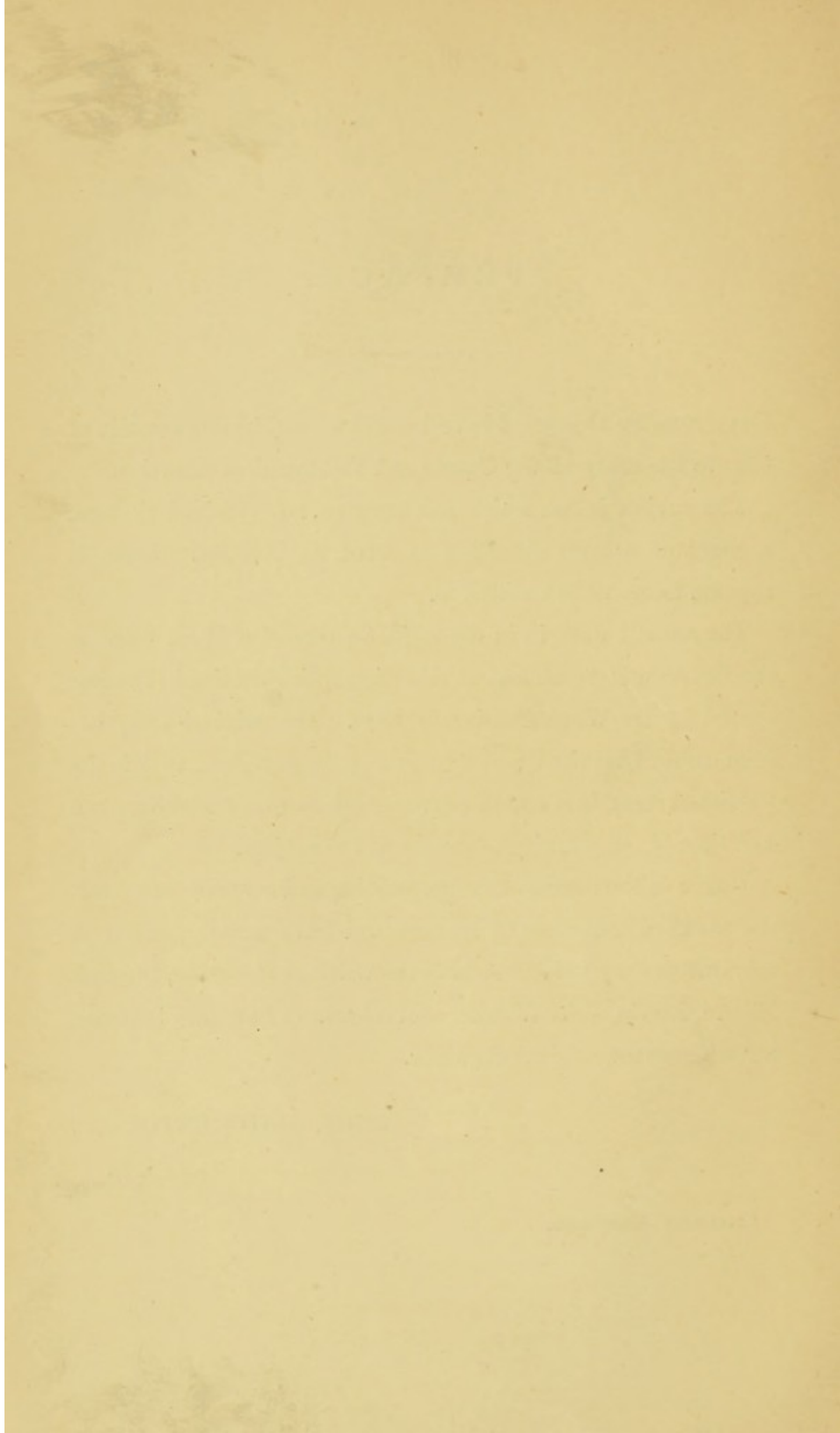
The subject is one which has, perhaps, not received as large a share of general attention as from its practical nature it appears to me to be entitled to.

The present work is, in the main, an extension of an essay on the Causes and Treatment of Abortion which obtained the prize offered by Dr Ward Cousins in 1886. The original essay has been carefully revised and brought up to date, and will in its published form, it is hoped, prove useful to many who have not had time or opportunity to devote to the subject.

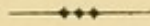
I have in the course of its preparation had occasion to consult the works of a number of authors, and have more especially to acknowledge my indebtedness to the writings of Barnes, Duncan, Martin, Parvin, Tait, Winckel, and others. I have also to thank my wife for the original drawings.

ROBT. REID RENTOUL.

LIVERPOOL, *March* 1889.



CONTENTS.

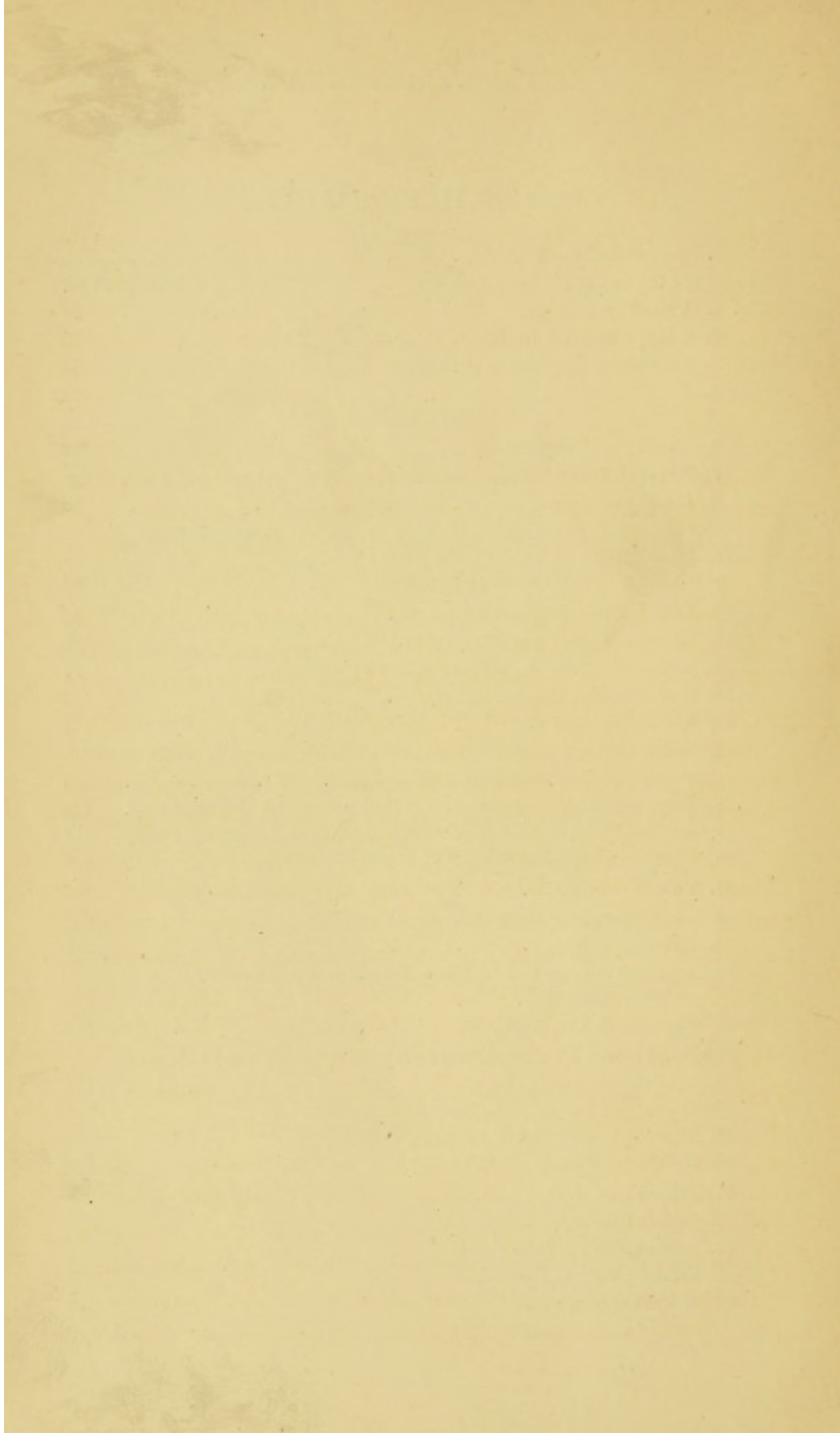


	PAGE	
INTRODUCTION,	xi	
CHAPTER I.		
DEFINITION AND FREQUENCY,	1	
CHAPTER II.		
HISTORICAL NOTICE,	7	
CHAPTER III.		
THE CAUSES OF ABORTION.		
SECTION I.—MATERNAL CAUSES.		
Affections of the Decidua—Hypertrophy—Atrophy—Congestion—Hæmorrhage—Inflammation—Congestion and Inflammation of the Uterus or Cervix—Fissure of the Cervix—Displacements of the Uterus—Hernia of the Pregnant Uterus—Adhesions of the Uterus—Rigidity of the Uterine Walls—Endometritis—Cancer of the Uterus—Placenta Prævia—Gonorrhœa—Fevers—Smallpox—Cholera—Noxious Gases—Metallic Impregnations—Alcoholism—Albuminuria and Bright's Disease—Lithiasis—Jaundice—Obstinate Vomiting—Over Suckling—Hæmophilia—Affections of the Circulatory System—Nervous Diseases—Surgical Operations,	19	
CHAPTER IV.		
THE CAUSES OF ABORTION.		
SECTION II.—FÆTAL CAUSES.		
Diseases of the Placenta—Hydramnios—Hydrops Amnii—Amnion—Weakness of the Amnion—Diseases of the Umbilical Cord—Inflammation of the Cord and Cystic Degeneration—Syphilis—Scarlatina—Heart Disease—Malformations,	75	
CHAPTER V.		
THE CAUSES OF ABORTION.		
SECTION III.—PATERNAL CAUSES,		131

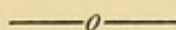
	PAGE
CHAPTER VI.	
CRIMINAL ABORTION, OR FÆTICIDE,	134
CHAPTER VII.	
ABORTION IN PLANTS AND ANIMALS,	144
CHAPTER VIII.	
THE SYMPTOMS OF ABORTION,	150
CHAPTER IX.	
DIAGNOSIS AND PROGNOSIS OF ABORTION,	164
CHAPTER X.	
COMPLICATIONS AND SEQUELÆ OF ABORTION AND THEIR TREATMENT.	
Pelvic Cellulitis—Peritonitis—Acute Metritis and Endometritis—Physo- metra—Tympanites Uteri — Salpingitis — Ovaritis — Phlegmasia Dolens—Pulmonary Thrombosis—Arterial Thrombosis—Tetanus —Prolapse of the Ovary,	179
CHAPTER XI.	
THE TREATMENT OF ABORTION.	
Prevention of Abortion—Prophylaxis—Treatment of Threatened Abortion —Complete Abortion—Incomplete Abortion—Retained Placenta— After Treatment of Abortion—Habitual or Recurring Abortion— Missed Abortion—The Induction of Abortion—Artificial or Justifi- able Abortion,	203
BIBLIOGRAPHICAL LIST OF WORKS REFERRED TO,	259
INDEX OF AUTHORS,	262
GENERAL INDEX,	266

LIST OF ILLUSTRATIONS.

	PAGE
Simple Congestion of the Placenta,	<i>Frontispiece.</i>
Placenta at the end of the twelfth week,	<i>Coloured Plate.</i>
Fig. 1. A Healthy Decidua,	20
„ 2. A Hypertrophied Decidua,	22
„ 3. Microscopic Appearance of Decidua,	23
„ 4. „ „ „	24
„ 5. „ „ „	24
„ 6. Atrophy of the Decidua,	25
„ 7. Polypoid Endometritis,	29
„ 8. Atrophy of Uterus,	35
„ 9. Placental Tissue, showing Granular or Slightly Striated Matrix,	87
„ 10. Placental Tissue, showing Connective Tissue, &c.,	88
„ 11. Decidual Cells in Fatty Degeneration,	93
„ 12. Villi in Fatty Degeneration,	94
„ 13. Myxoma Fibrosum of the Placenta,	96
„ 14. Section of a Tumour, showing Fibroid Structure,	97
„ 15. Hypertrophied Chorion Villus,	103
„ 16. Cystic Degeneration,	104
„ 17. Cystic Chorion, forcing its way through the Muscular Walls of the Uterus, through the Peritoneum,	106
„ 18. Villus of Placenta affected with “Disfiguring Cell Disease,”	110
„ 19. Section of Villi affected with “Disfiguring Granulation Cell Disease,”	111
„ 20. Knot in the Stage of Formation,	118
„ 21. Twisting of Cord,	119
„ 22. Twisting and Knotting of Cord,	120
„ 23. Twisting of Cord,	121
„ 24. Apparent Constriction of Blood Vessels of Cord, from Absence of Wharton's Jelly,	122
„ 25. Egg with Double Yolk,	130
„ 26 & 27. From a Case of Criminal Abortion, occurring at the end of the second month,	141
„ 28. Placenta of Twins, with Compressed Fœtus,	161
„ 29. Showing the Method of Plugging Vagina,	215
„ 30. Credé's Incubator,	219
„ 31. Fritsch's Dilators,	229
„ 32. Sloan's Dilator,	230
„ 33. Lawson Tait's Dilator,	231
„ 34. Emmet's Curette Forceps,	235
„ 35. Simon's Spoon,	236



INTRODUCTION.



NOTHING has more struck me during the quarter of a century in which I have now been engaged in the practice of Gynecology, than the extraordinary indifference with which women regard the premature death and departure of an ovum, after it has had its placental structure differentiated. I think that this is due, to a large extent, to the belief that any delay of menstruation, resulting in a little excessive disturbance when it returns, must of necessity be a miscarriage. So that we often find women giving a history of one or two pregnancies, and a long list of miscarriages, which closer investigation never gives evidence to justify. So that, ranking them really as what they were thought to be in the clinical investigation of the history of the patients, I am not in the habit of regarding any incident as an established miscarriage, unless some product of conception has been seen by some person competent, by experience, to give an opinion on the subject. Therefore, I disregard, to a very large extent, the stories that are told me on this subject by the patients. This makes what I have said at the beginning of this introduction all the more important, for, whilst it limits, probably, the number of miscarriages which take place, it brings into greater prominence the mischiefs that arise from true abortions. Of the evils that arise from miscarriage, we may say that they are primary and secondary, the primary resulting either in anæmia so serious as to involve actual loss of life, or a prolonged course of invalidism; or a blood-poisoning from the decomposition of the substances retained in the uterus. That this latter is a real

danger, there can be no doubt at all, but I am perfectly certain it is greatly exaggerated in the minds of the profession in these days of germ hunting.

A vast number of cases of persistent menorrhagia, and even of cases where it is alleged there have been actual retained pieces of placenta, are due to subinvolution of the uterus, which is a great deal more likely to result in the case of an immature uterus, than in one in which pregnancy has reached maturity. This explains to a very large extent the great amount of suffering which is met with, especially resulting from miscarriages. Women get up so long before they should—in fact, as a rule, they regard an abortion as hardly worth staying in bed for, and they are often found, in out-patient practice, to go about flooding for months, before they think it worth while to come for help. The larger proportion of these cases are known to be due merely to the subinvolution. It is my habit to test the fact in a very simple way: by giving them large doses of ergot, with chlorate of potash, and keeping them in bed for a few days. If the case be hæmorrhage, or mere subinvolution, this will be quite enough to relieve them of the prominent symptom; but if there be a retained piece of placenta, it will not be sufficient. In cases where hæmorrhage has been extreme, of course I do not indulge in any such experimental delay, but immediately explore the uterus by curette, or my “alligator” ovum forceps. In all cases where there appears to be any danger of intra-uterine decomposition giving rise to blood-poisoning, the immediate removal of all retenta is essential; but I am so disposed to regard this as an exaggerated danger, that I do not think the rule of interference with every patient in whom a miscarriage has been supposed, for the purpose of removing possible retenta, though it has much high authority behind it, can be anything more than a mischievous one.

Many of the cases that we have to deal with,—and I fear they are an increasing number,—are the result of abortion brought on with criminal intent, and I am frequently being applied to for assistance where this is owned to be the case, so that I cannot

come to any other conclusions than those indicated by Dr Rentoul—that the habit of criminal abortion is on the increase. How this is to be dealt with, is one of the still unsolved questions of medical jurisprudence, for I do not know any kind of prosecution which is more difficult to bring home to the criminal, than one based upon this charge.

The responsibility of advising artificial abortion, in any case, must always be regarded as one of the very gravest kind, not to be undertaken by any man single-handed, nor to be proceeded with, save on a written record of the agreement of all parties concerned.

In fulfilling the request which Dr Rentoul has made to me, to write a short preface to this book, I find it very difficult indeed, either to criticise, or to extend, what he has already written on this subject.

As an exhaustive discussion of a special branch of medical literature, I have seen nothing better in the English language, and the clearness of its expression, as well as the precision of its conclusions, place it far above the kind of productions with which we are favoured in most other languages than our own. There are many points upon which I might express difference, such as his remark, that the law should be mended, so that abortions and premature labours should be registered. I have been so long cognisant of the enormous practical difficulties that this would involve, that I have come to regard it as being without the range of practical polity.

Again, concerning the dangers of operating during pregnancy, my recent experience in ovariectomy has induced me to alter my mind altogether, and I should not hesitate, if need be, to perform any operation on a pregnant woman: for now I have removed, in a very large number of cases, ovarian tumours during pregnancy, and in only one case have I had a disastrous result, the misfortune in this case being due to the employment of a clamp.

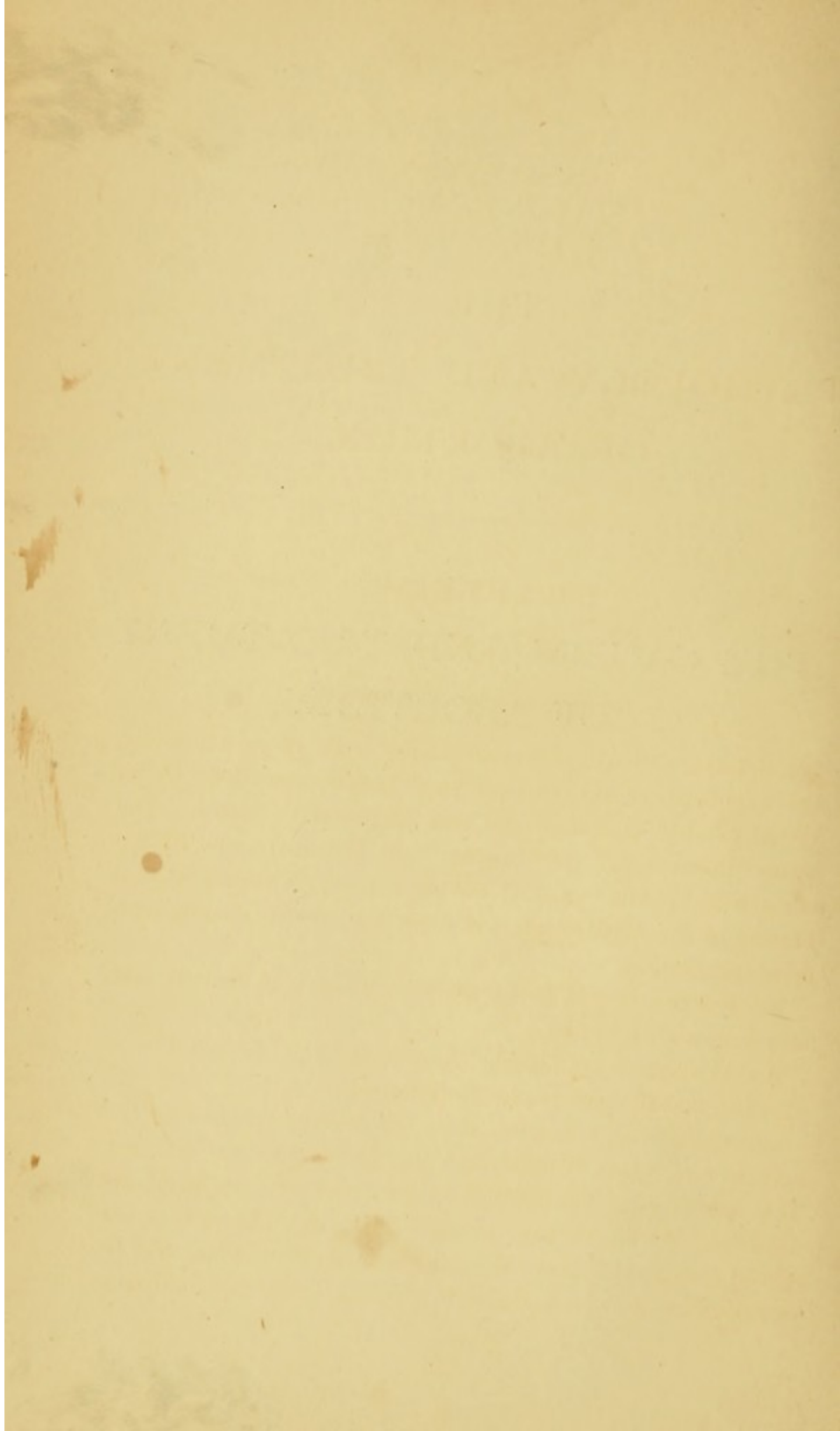
In other points I could express some difference of opinion from Dr Rentoul, as in his views concerning the influence of

microbes passing through normal and diseased placenta upon the mother; but I would rather leave such differences alone, in order to unite with him in his general line of argument, with which I have most absolute concurrence. That the conclusions which he indicates, and in support of which I desire to express my agreement, will not be universally accepted at the present time, I know full well, but to me it is a matter of the utmost satisfaction that they have been, to a large extent, substantiated in a line of research, widely different from that which I have myself pursued.

LAWSON TAIT.

BIRMINGHAM, *February* 11, 1889.

THE CAUSES AND TREATMENT
OF ABORTION.



THE PATHOLOGY AND TREATMENT OF ABORTION.

CHAPTER I.

ABORTION.

DEFINITIONS AND FREQUENCY.

DEFINITIONS.—By abortion is meant the arrest of gestation, and the expulsion of the embryo at a period antecedent to its viability—that is, before the end of the sixth month. The terms “miscarriage” and “mishap” are frequently used by the non-medical public to signify the same thing. The medico-legal bearing of the word is referred to in the section dealing with criminal abortion.

An abortion is said to be *Complete* when both embryo and membranes are expelled.

An abortion is said to be *Incomplete* when the embryo is expelled, and the membranes are retained.

An abortion is *Concealed* when the embryo perishes in the uterus, and when both it and the membranes are retained. This condition has been termed “missed abortion” by Matthews Duncan. M’Clintock has, however, shown that the term is not a good one, for that every woman who arrives at term, may be described as one who has missed aborting. Abortion is distin-

guished from premature labour by the fact, that in the latter the fœtus is expelled when it has attained viability. The terms "missed abortion" and "missed labour" differ in this, that in the latter the mature fœtus and membranes are retained in the uterus beyond the natural term of gestation,—the fœtus being born dead.

Artificial abortion includes both the *Justifiable* and *Criminal* varieties. I am not aware that the term "artificial abortion" includes only such cases as those when the fœtus is removed *per vias naturales*. Perhaps it also includes those in which the product of conception has been removed by cæsarean section.

The above definition is of value, because it allows one to make use of the expressions, "viable," and "non-viable," when speaking of abortion and premature labour, abortion taking place at a time when the infant is not able to carry on an existence independent of its mother. But it is to be understood that even a prematurely born child may not be able to exist independently of its mother for more than a few minutes.

The term "embryo" is applied to the infant in the womb during its first three months, while "fœtus" is used after this date, and up to the end of the sixth month.

Guillemont describes three kinds of abortion:—1st, Ovular, occurring before the twentieth day; 2nd, Embryonic, occurring before the third month; and 3rd, Fœtal, extending from the third up to the sixth month. When an abortion occurred before the seventh day, the ancients termed it effluxion.

FREQUENCY OF ABORTION.—Hegar says that one abortion occurs for every eight or ten births at term. Busch and Moster say that for every 5·5 labours at term, there will be one premature expulsion of the ovum. Whitehead states that of 2000 married women in a state of pregnancy admitted at the Manchester Lying-In Hospital, the sum total of their pregnancies already terminated was 8681, and of these one in seven had aborted.

TABLE I.

ANALYSIS OF NUMBER OF WOMEN WHO HAD AND HAD NOT
ABORTED.

WOMEN BELOW 30 YEARS OF AGE. (WHITEHEAD.)			WOMEN OVER 40 YEARS. (PRIESTLEY.)	
	Number.	Percentage of Whole.	Number.	Percentage of Whole.
Women who had not aborted,	1253	62·65	152	38·00
„ who had aborted. .	747	37·35	248	62·00
Total,	2000	100·00	400	100·00

TABLE II.

ANALYSIS OF PREGNANCIES IN REFERENCE TO ABORTIONS AND TO
FECUNDITY.

2000 WOMEN BELOW 30. (WHITEHEAD.)			400 WOMEN OVER 40 YEARS. (PRIESTLEY.)			
	Number.	Percentage of Whole.	No. per Woman.	Number.	Percentage of Whole.	No. per Woman.
Children, .	7459	85·92	3·73	1783	76·68	4·46
Abortions, .	1222	14·08	0·61	542	23·32	1·35
Tl. Pregnancies,	8681	100·00	4·34	2325	100·00	5·81

TABLE III.

SHOWING THE PERIOD OF PREGNANCY AT WHICH ABORTION OCCURRED IN 602 CASES. (WHITEHEAD.)

PERIOD OF PREGNANCY AT WHICH ABORTION OCCURRED.	NUMBER OF BIRTHS AT EACH PERIOD.
2 Months.	35
3 ,,	275
4 ,,	147
5 ,,	30
6 ,,	32
7 ,,	55
8 ,,	28
	Total, . 602

TABLE IV.

RATIOS OF ABORTIONS TO PREGNANCIES AND CHILDREN.

	WHITEHEAD.		PRIESTLEY.	
	Percentage.	Being about 1 in	Percentage.	Being about 1 in
Ratio of Abortions to Pregnancies, . . .	14·08	7	23·32	4½
Ratio of Abortions to Children, . . .	16·39	6	30·40	3½

Whitehead's figures were based on hospital cases, and therefore refer to one division of society only—the wage-earning classes. He also speaks of abortion having taken place at the "seventh and eighth" months, and therefore his figures must not be accepted as strictly accurate.

Priestley says that 400 women had been pregnant 2325 times, and of this number of pregnancies, 542 were abortions, and 1783 resulted in living children. He also states, that while

with the poor of manufacturing towns as many as 87 per cent. abort, only 62 per cent. of those in better circumstances do so. According to his tables, the proportion of abortions to pregnancies is one in four. Collins met with 393 "premature" cases in 16,414 women; Beatty had 21 "premature" cases in 1200; Churchill, 65 cases of abortion in 1705 deliveries; Madame Lachapelle, 116 cases in 21,960; and Deubel, 35 in 420; thus making in all 530 premature cases in 41,699 deliveries, or 1 in $78\frac{1}{2}$. Granville says that of 400 women, 128 had miscarried, and among these there had been 305 abortions; Bland states that of 515 mothers 147 had miscarried.

The above figures show considerable difference in the calculations of the various inquirers into the relationship of the number of abortions to pregnancies, thus:—

Hegar,	1 to every 8 or 10.
Whitehead,	1 to every 7.
Busch and Moster,	1 to every 5.5.
Priestley,	1 to every $4\frac{1}{3}$.

PARTICULAR PREGNANCIES.—Pluriparæ abort more frequently than primiparæ. Schröder says that 23 multiparæ abort for every 3 primiparæ. This may be owing to the presence of endometritis and other pathological conditions of the uterus. It is thought to be more frequent during the latter half, than during the first half of the fruitful period of woman's life. Tyler Smith considered the danger of aborting greater in the first than in the succeeding pregnancies among those of the upper classes.

PARTICULAR SEX.—Morgangé and Desmoreux suppose that abortion occurs oftenest with foetuses of the female sex, than with male infants.

PARTICULAR MONTHS OF GESTATION.—Table III. from Whitehead shows that more abortions occur during the third and fourth months than at other times. Boerhaave thought that the greatest number of abortions occur at a time corresponding with the monthly flow,—in the proportion of nine to ten.

Cazeaux says that abortions are most frequent at the second and third months; and Madame Lachapelle, at the sixth.

Abortions are more frequent in large cities than in villages.

In collecting statistics of abortion, it would be conducive to a more perfect accuracy than now is, if physicians differentiated between abortions and premature labours. It must, however, be recollected that the physician is generally called in only to treat those who abort at an advanced stage of gestation, and that little or nothing is known of those occurring at the first and second months. But the number must be immense. For the purpose of statistics it is a pity that all cases of abortion are not registered, after the plan carried out in relation to births, marriages, and deaths. No doubt such a law would give rise to concealments, and lead to disputes. It would, however, stimulate medical science to a closer study of the appearances of the ovum in the earlier weeks of gestation, and a closer description of the decidua of pregnancy.

Supposing the proportion of abortions be one in five, and that the birth-rate of England and Wales for 1883 was 890,722, this would give—for the same period—an abortion rate of 178,164. Such figures may not be exact, but they cannot be far from accurate. It may be argued that abortion is natural, but certainly the means taken to bring it about are most unnatural.

CHAPTER II.

HISTORICAL NOTICE.

THE history of abortion is incorporated with the history of civilised and savage life. Among a vigorous, healthy, and thinly populated people, abortion is rare; while in cities, where immorality, vice, and disease thrive, it flourishes, and with baneful effects. The early Greeks and Romans favoured and encouraged the procuring of abortion. Juvenal (about 120 A.D.) exposes the practice, comparing the condition of the poor with that of the rich:—

“ Yet they of birth the dangers undergo,
And all a midwife’s labours they endure
When poverty is cruel. On gilded couch
A true delivered mother rarely lies.
So brave her arts, so potent are her drugs,
Who renders women barren, and for hire
The human life—as yet unborn—destroys.”

Ovid (about 8 A.D.) dedicates the 13th and 14th Elegies to his mistress, who has been endeavouring to make herself miscarry, and says:—

“ By tender maids ’tis done.
But hark ! the risk appals.
For oft who slays her babe unborn
Herself a victim falls.”

The troubles of a family and the preservation of their figure seem to have induced the Roman ladies to resort to the procuring of abortion, although it is to be noticed that both Juvenal

and Ovid call attention to the wickedness of the act, and to the risk incurred.

Plato (about 440 to 345 B.C.) justifies it under certain circumstances. In Book V. a conversation is described, in which it is pointed out that the children of the guardians are to be handed over to State officers, when they may be nursed by attendants, except when the mothers are brought to nurse them. It then goes on:—"We said that the children ought to be the issue of parents who are still in their prime. True, and do you not agree with me that the prime of life may be reasonably reckoned at a period of twenty years for a woman and thirty for a man? I should make it a rule for a woman to bear children to the State from her twentieth to her fortieth year; and for a man—after getting over the sharpest burst in his race of life—thenceforward to beget children to the State until he is fifty-five years old. But as soon as the women and the men are past the prescribed age, we shall allow the latter, I imagine, to associate freely with whomsoever they please, so that it be not a daughter, or mother, or daughter's child, or grandmother; and in like manner we shall permit the woman to associate with any man, except a son, or a father, or one of their relatives in direct line ascending or descending, *but only* after giving them strict orders to do their best, if possible, to prevent any child, haply so conceived, from seeing the light; but if that sometimes cannot be helped, to dispose of the infant on the understanding that the fruit of such union is not to be reared." Or as Professor Jowett puts it—"And we grant all this—accompanying the permission with strict orders to them to prevent any embryo which may come into being from seeing the light; and if any force a way to the birth, they must understand that the offspring of such an union cannot be maintained, and to arrange accordingly." Aristotle (about 345 B.C.) also suggested that abortion should be enforced by law when the population exceeded certain limits. After stating that the proper age for a woman to marry is eighteen, and for a man thirty-seven, and speaking of the excess of population, he says:—"But if parents

have more children than the number prescribed, before life and sensation begin an abortion must be brought about, for what is right and contrary to right in such a case is determined by sensation and life." In his time abortion was sometimes induced by dilating the cervix with a roll of paper, or with a tube made of polished wood, and also by fumigating the uterus. The 59th Aphorism of Hippocrates refers to the latter custom:—"If a woman do not conceive, and wish to ascertain whether she can conceive, having wrapped herself up in blankets, fumigate below; and if it appear that the scent pass through the body to the nostrils and mouth, know that of herself she is not unfruitful." Various drugs were also introduced into the vagina by means of a funnel. Ambrose Paré in his work—23rd book and 48th chapter—gives a drawing, in two parts, one a cylindrical tube perforated at the uterine end, and with a tape attached for fixation; and the other, an urn-shaped vessel, which, when the lamp below is lighted, gives the vapour required.

Kleinwächter says it appears from the writings of Asphasia that abortion was resorted to by the Greeks in the 15th century in cases of contracted pelvis. For a time it fell out of use, when Justin Siegmundin advised it in cases of placenta prævia. Aretæus refers to tetanus as having followed abortion. Hippocrates, when speaking of retained placenta, advises that weights be suspended from the cord; but Celsus recommends the introducing of the hand into the uterus, and the removal of the placenta. Ætius, who wrote in the 5th century, shows that the ancient Egyptians fully understood how to prevent conception by unnatural means, and the procuring of abortion. Avicenna (11th century) III., XXI., 212, and Phases, Contin. VII., also speak of the different modes of procuring abortion.

In Japan, Arabia, Iceland, Madagascar, South Sea Islands, New Zealand, and many other countries, the same practice is carried on. In some cases the law of the land and not the individual, pronounces in favour of abortion. In Formosa, a woman is not allowed to bear children until she has attained her thirty-sixth year, and if she do, the priestess kicks her on the abdomen until

she aborts. In Old Calabar, Mr Clarke, a missionary, and Mr Hartjs, a West Coast African merchant, have told me that the native women put forth every effort to procure abortion if they consider themselves pregnant with twins, and if they cannot succeed in doing so they kill themselves. It is thought this action is due to the fact, that they consider it a disgrace to have more than one child at a birth, as otherwise they think themselves too like animals. In the Congo Free States, also, twins are killed. Native or black women hold that when they are pregnant to a white man a greater risk is run during their confinement. Hence she endeavours to bring on an abortion. In India, abortion is induced by a mother who is nursing her infant at the breast when she finds herself to be pregnant at this time.

But while in ancient, as in modern times, the procuring of abortion has been advocated, there have always been those who have strenuously opposed such a course.

Actions in connection with early midwifery have, in the light of later days, moved in a wrong direction. It is recorded that, in 1522, Dr Werth, of Hamburg, was burned alive, because, in his anxiety to study the nature of delivery, he put on a woman's clothes. In 1591, a poor woman was burned in Edinburgh because she used some charms to lessen the pains of labour. And as in the past there have always been men ever ready to sustain the purity of our profession, so it is to be hoped that to-day medical men, from the poorest to the richest, will not lower themselves by yielding to the unlawful and immoral cravings of any woman when she wishes to rid herself of her infant. In some cases the trial will be difficult to withstand.

It is with feelings of pride and pleasure, we, members of the medical profession know that the great father of medicine has laid down strict rules for our guidance. Writing about 340 B.C., Hippocrates gave the following oath:—"I swear by Apollo, the physician and Æsculapius, and health and all heal, and all the gods and goddesses, that according to my ability and judgment I will keep this oath and this stipulation,—to reckon him who taught me this art equally dear to me as my parents; to share

my substance with him and relieve his necessities if required ; to look upon his offspring on the same footing as my own brother's, and to teach them this art, if they shall wish to learn it, without fee or stipulation ; and that by precept, lecture, and every other mode of instruction, I will impart a knowledge of the art to my own sons, and those of my teachers, and to disciples bound by a stipulation and oath according to the law of medicine, but to none others. I will follow that system of regimen which, according to my ability and judgment, I consider for the benefit of my patients, and abstain from whatsoever is deleterious and mischievous. I will give no medicine to any one if asked, nor suggest any such counsel ; and in like manner I will not give to a woman a pessary to produce abortion. With purity and with holiness I will pass my life and practise my art."

Not only has Hippocrates condemned the use of various substances for causing abortion, but others have done likewise. The ancient Germans severely punished those who resorted to it ; and it is asserted that some coloured tribes in Africa permit the husband to kill his wife if she abort. In Sparta, in order to encourage the increase of population, he who had three children was exempt from night watch, while he who had four was not required to pay taxes. Among the Persians, the man who had the largest family was the most honoured.

Tertullian (about 230 A.D.) denounces the crime, and calls attention to the example shown by early Christians, who do not shrink from the duties and privileges of matrimony, saying, "for we Christians look upon the ovum as a man in embryo." According to this writer the method used in those days was that of puncturing the membranes.

The greater number of ancient and modern laws do not afford as much protection to the foetus in utero as is given to it after birth. It is not treated as a living being ; this, perhaps, is owing to the idea that it is not independent of maternal help. But the same argument practically might be said to apply equally to the baby a few hours after birth, for it certainly cannot do

without its mother's aid and support. Those who make our laws are only human, and their knowledge of medical matters must be limited. Hence it is that when the advice of members of the medical and clerical professions is not obtained, ridiculous laws may be made.

About 692, it was decreed by the Roman Empire that the procuring of abortion was murder, and punishable by death. The French at one time adopted this law, but afterwards it was repealed. Lecky says, when speaking of abortion—"Thus again the question of criminality of abortion has been considerably affected by physiological speculations as to the time when the fœtus in the womb acquires the nature, and therefore the *right*, of a separate being. The general opinion among the ancients seemed to have been that it was but a part of the mother, and that she had the same right to destroy it as to cauterise a tumour upon her body. The Roman law contained no enactment against voluntary abortion until the time of Vulpian. The Stoics thought that the infant received its soul when respiration began. The Justinian Code fixed its animation at forty days after conception. In modern legislation, it is treated as a distinct being from the moment of conception." Two exceptions might be taken to the above statement, one being the comparing of the fœtus to a tumour. Now in this case the comparison is not fair, for the fœtus is a natural growth, the tumour being morbid; one is physiological, the other pathological. The second is, that although the fœtus is treated as an independent being, the punishment for procuring its expulsion is very different from that awarded to those who take away the life of a person. Certainly if the fœtus were a pathological product it would be justifiable to remove it.

Speaking of the great efforts made by the early Christians to purify the tone of their age, he further says:—"The influence of Christianity, in this respect, began with the very earliest stage of human life. The practice of abortion was one to which few persons of antiquity attached any deep feeling of condemnation. In Greece, Aristotle not only countenanced the practice,

but even desired that it should be confirmed by law, when population had exceeded certain limits. No law in Greece, or in the Roman Republic, or during the greater part of the Empire, condemned it; and if, as has been thought, some measure was adopted condemnatory of it before the close of the Pagan Empire, that measure was altogether inoperative. A long chain of writers, both Pagan and Christian, represent the practice as avowed and almost universal. They describe it as resulting simply from licentiousness or from poverty, but even from so slight a motive as vanity, which made mothers shrink from the disfigurement of childbirth. They speak of a mother who has never destroyed her unborn offspring as deserving of signal praise, and assure us that the frequency of the crime was such that it gave rise to a regular profession. . . . In the penitential discipline of the church, abortion was placed in the same category as infanticide, and the stern sentence to which the guilty person was subject, imprinted on the minds of Christians more deeply than any mere exhortation a sense of the enormity of the crime. By the Council of Ancyra the guilty mother was excluded from the sacrament till the very hour of her death; and though this penalty was soon reduced, first to ten, and after to seven years' penitence, the offence still ranked among the gravest in the legislation of the church." The early Christians, moreover, thought that the crime of abortion was greatly aggravated by the fact that the children were unbaptised. Indeed it may be truly said that the early Christian church performed a great service to humanity, to the babe in the womb, and to obstetric medicine, when it issued so severe injunctions against the practice of abortion. Is she performing as noble a work to-day?

If, then, the ancients are to be condemned, how will the present day society stand its examination when its moral tone is inquired into? Is criminal abortion not rampant? Are there not large quantities of drugs bought and sold yearly for this purpose, and is the practice of abortion not now a profession? Do not women go to our hospitals in the hope that some

junior, in his desire to perfect himself in the art of instrumental examination, will pass the uterine sound? It is fully time we ceased pointing the finger at our neighbours in France and America, and looked into what is going on in our large towns. Ask any chemist how much medicine he sells yearly for the purpose of "bringing on the periods!" In our days, as in those of ancient Rome, one procures abortion because, as a lady of fashion, she cannot lose time in nursing her infant. The newly married belle owes more to society than to her womanhood, so she informs us. To retain the possession of her slender "waist," the infant is crippled in the womb. Engelmann says:—Many an unborn child is executed upon the plea of limited resources, because the family cannot continue to live in their accustomed luxury if an additional member should appear. Yet this one is done away with so that the visitor may be duly and fashionably entertained. Every one must notice that, although the number of marriages is on the increase, the number of births to each couple is decreasing, and also that no *satisfactory* explanation is forthcoming. Farr, in his time, estimated that there were 1,000,000 childless couples in England and Wales; and the remark made by an old doctor, that he always felt sad when he "saw a hen with but one chick at her tail," is very appropriate. One child sterility is suggestive. Instead of the number of cases of abortion undergoing a diminution, an enormous increase is taking place, and this is all the more strange, since our knowledge of the maternal, paternal, and foetal causes of abortion is steadily growing larger. It is not too much to suppose that for every arrest for this crime, at least 1000 cases escape public notice. Residents in the country districts, as a rule, have larger families than those residing in cities. It is alleged that in France and in America, and more especially among the wealthier classes, a stipulation is made—either before or at the time of marriage—as to the number of children who are to be permitted to arrive at full time—the doctrines of Plato and Aristotle being put into practice. Storer speaking on this subject says—"In every case that has come to our knowledge, this arrangement

has resulted in unhappiness to both parties, and in several instances has led to divorce. If a man treat his wife as a strumpet—even at her own solicitation—unfaithfulness in one or the other is almost sure to result.” There are a number of ladies who arrogate to themselves the right of deciding, not only how many children they shall have, but also of settling the question of the morality of forcible or unnecessary abortion. These persons must be looked upon as dangerous to themselves, and to those with whom they associate. To bear the last remark out, is it not generally the cute woman who, having herself had one or several criminal abortions induced, calls on her more moral friend and advises her to act as she directs. Cases are even known where women have trapped the unsuspecting dentist into extracting several teeth, so that the shock might induce an abortion. The forsaking of her offspring, the number of illegitimate births, of overlying, of miscarriage, of the refusal of wives to have children, and these coarse efforts to bring about an abortion—coupled with the fact that many externally religious mothers absolutely refuse to suckle their infants—all go to show that the womanly tone is severely affected, and that if it do not improve, a painful state of affairs must follow. The doctrines of political economists, the fear of childbed, social extravagances, and the various kinds of male dissipation, have, no doubt, much to answer for. However, women have a morality of their own to sustain, irrespective of that held by men. It will not shield their backsliding to blame men for all their faults. The reasoning power of the nineteenth century will hardly accept, as an excuse, the old statement made by the man, “You gave it me, and I did eat,” reversed. Nurses and midwives are also a frequent source of evil. The young monthly nurse, with a somewhat unreal training, goes to the home of the young wife, and with a morbid desire to display the education she has received—more especially that part concerned with the prevention of impregnation—corrupts the mind of the young wife and husband. Teachers and trainers of monthly nurses ought to give a thought to this. Tardieu says, that in 32

cases of criminal abortion, 21 were brought home to midwives. Look how some women entrap the young and inexperienced medical man—always avoiding the mature physician. It is a fairly common tale, that another doctor had brought on a miscarriage, owing to the fact that “the parts were too small,” and that the fear of losing her life had driven her to again consult a doctor! She will not be pleased either, if it be suggested that the next child may be smaller than the first, that subsequent labours are generally much easier, and that the induction of premature labour will be the best plan to follow.

For a considerable time there has been a strong feeling that many of the medical profession have not a due and proper regard for foetal life. It is to be feared that we do not sufficiently impress the fact of the sacredness of unborn life, because of the dread of giving offence to patients, or because of a want of moral courage. No doubt, it is not a pleasant task to expose so gross and so fearful a death-dealing monopoly, or to go into court and give evidence, and expose such crimes. The moral law on the subject must also be the only medical law, and the wilful killing of a human being *at any stage of its existence* must be censured in the most downright and gravest manner.

Even in the present day there are some who justify the act of foeticide by the statement that the child in the womb is not a living being. Perhaps some may say that no great benefit will be derived by a discussion of the question—Has the unborn babe a soul? but it is natural to suppose that, just as it has a physical, so it has a spiritual condition. Its formation is not a mere matter of guesswork, or the happy but accidental running together of two cells. Its development shows the carrying out of a Great Plan, although it may sometimes be disfigured by crime and disease. Moreover, the mere fact that the foetus has not breathed does not exclude its suffering, even while in the womb, no more than does the fact that it has breathed, exempt it from attacks of illness during its first year of extra-uterine life. Again, if the foetus *in utero* has not a living existence and soul, then to hasten its expulsion from the womb is a case of

“killing not murder.” Even, again, if it be argued that it is a part of the mother only, such a statement would not impress one with the necessity of removing it. A woman will not ask a surgeon to cut off or remove from her body, a finger, for instance, only because it is a part of her body. She will even strongly hesitate to give her consent to the removal of a diseased part. How much more then should she refuse to give her consent to the removal of a healthy foetus. Thus if we look at foeticide from the very lowest point of view, and do not consider the foetus as anything more than a healthy development of a part, we must come to the conclusion that to remove it is uncalled for, unjustifiable, and needless. If, again, it be argued that there is no harm in killing “a half living thing,” then by the same process of reasoning there will be no harm in doing away with “a half dead thing.” But if the latter is murder, so is the former. If one holds that life only begins at the period of quickening, and that the procuring of abortion before that time is not wrong, how will the use of such an argument help us? Is it likely that any educated man will take the statement of a woman who wishes to abort, who comes and says, “I have not yet felt the baby move”? Such evidence, if such it be called, to be used against the undefended infant in the womb, is palpably false, and would not suffice to convict a cat, let alone to condemn an infant. Hence, laying aside the absurd points advanced by those who complacently look on at the growing practice of foeticide, let us hold fast to the advice laid down, I think, by Sir James Paget—“Keep everything alive.” If this one great rule be acted up to, no practitioner will ever regret having done right in this respect. And if our kinder feelings be allowed to take us to what seemingly may be a step further, let us, as we now treat the young and helpless who are sick, extend the same benefits and blessings to those who still live in their mother’s womb. The foetus lives from the moment that junction of the ovule and sperm cell takes place. It moves, it grows, it secretes and excretes, it breathes through the placenta, and its tissues are built up and repaired, just as are our own. Its advancement

and growth internally are registered to our eyes by Nature's pointers on the dial of pregnancy—week by week, and month after month; these outward manifestations in the condition of pregnancy being prompted by the conditions within—all moving and recording in perfect harmony. Thus, if permitted, life leaps onward and forward—only to be brought sometimes to a premature close by man's or woman's unnatural action, or by inherited disease. The lessening of immorality and vice of all kinds, and the bringing before senior students, by their teachers, the fact that they, when young practitioners, will be selected by those who wish an abortion to be procured, means the decrease of foeticide. The moral tone of a nation can be sustained and elevated by the members of the medical profession. There is something pleasing in the Chinese legend that tells us how, when there was but one man and one woman in this world, the woman refused to sacrifice her virginity even that the world might be populated, and that the gods, extolling her purity, granted her the power to conceive beneath the gaze of her lover's eyes. To be an upright and honourable medical man is a difficult task, but the ideal is not so high that it is out of ordinary reach.

CHAPTER III.

THE CAUSES OF ABORTION.

SECTION I.—MATERNAL CAUSES.

IN this chapter the causes of abortion will be discussed under three sections, as follows:—First, when due to diseases or affections of the mother; second, when due to diseases of the fœtus; and third, when due to paternal causes. Criminal abortion, and abortion occurring in plants and animals, will be considered afterwards. The classification as given by Barnes will be, for the most part, followed.

MATERNAL CAUSES OF ABORTION.—Sufficient latitude for discussion must be given under this head. Many of the so-called maternal causes are, in reality, those belonging to the father. Again, diseases affecting the decidua—which is essentially a product of uterine development—might be noticed when treating of the diseases of the ovum, for it is not yet finally settled how much of the decidua, and what portion of villi, make up the placenta.

I. PELVIC DISEASES—AFFECTIONS OF THE DECIDUA.—The thickening of the uterine mucous membrane which takes place at the menstrual periods gradually disappears. When, however, the ovum arrives in the womb, and for some time before, or even when it implants itself in extra-uterine regions, it sets up increased uterine growth, so that the decidua becomes thick and vascular. In structure the normal decidua—according to Kölliker—is made up of amorphous ground substance, having round and fusiform cells embedded in it. Other large decidual cells are figured as being found. It is traversed in its entire

thickness by blood-vessels, which have a distinct wall, and it is perforated by the irregularly twisted tubular channels, which give it, when viewed from the inner surface, a sieve-like appearance. The tubular channels have no distinct walls, some being destitute of even an epithelial covering. As a rule these open on the free surface, while the deeper parts are continuous with the mouths of the utricular glands.

Those tissues which lie immediately under the decidua vera increase with its development. The muscular fibres enlarge,

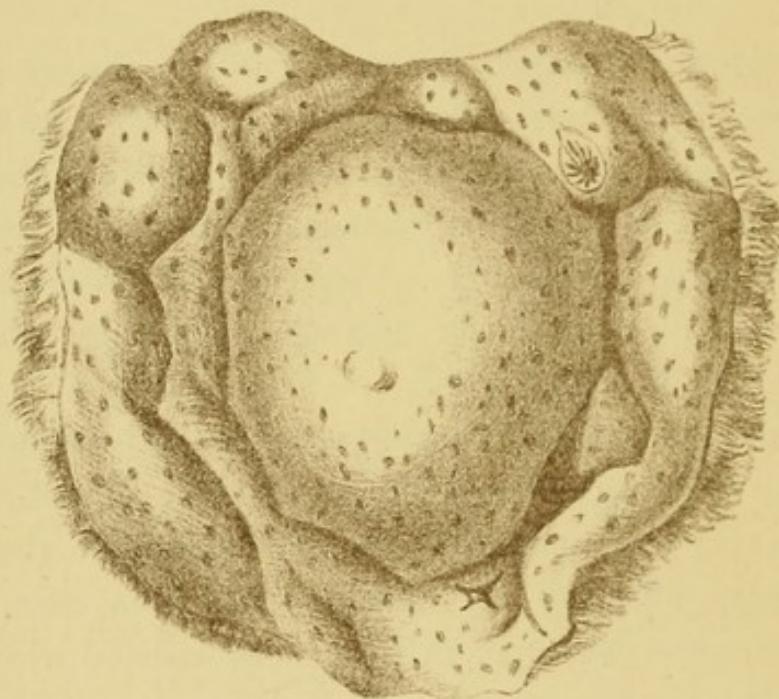


FIG. 1.—A healthy decidua. The ovum, covered by decidua reflexa, projects from the centre of the mass; only the internal surface of the decidua vera is seen. (Coste.)

the blood vessels become more numerous and tortuous, while the glands undergo great enlargement. Ercolani holds that there is no proper mucous membrane of the uterus, and that the decidua is a new growth. He further says that the tubular channels are formed over the mouths of the utricular glands, and that they are kept open by the constant discharge which takes place from the latter.

As the fœtus grows, the decidual cavity is finally obliterated. About the end of the sixth month the decidua vera and reflexa

adhere, and finally undergo thinning. That part of the decidua on which the ovum is attached—the decidua serotina—is divided into two layers—an outer and inner—by an enlargement of the contained glands which takes place. The glands of the inner layer soon disappear, while those in the outer remain. The inner layer is thrown off when the placenta is expelled, while the outer remains and is said to take part in the regeneration of the mucous membrane of the uterus during the puerperal state. In this outer layer, during the last half of pregnancy, large giant multipolar cells develop. Friedländer and Leopold hold that they grow into the chief veins of the serotina and the adjacent part of the uterine wall. By so doing they produce stagnation of the circulation, and thus are a factor in bringing about labour.

Having thus briefly stated the structure of the decidua, it will be more easy to understand how it is affected by the different diseases which may either originate in it or spread from the uterus. Repetition will also be avoided.

HYPERTROPHY OF THE DECIDUA.—Matthews Duncan has called attention to this diseased condition. In the majority of cases the decidua was much thickened, and presented to the eye an otherwise natural appearance. Some portions were paler than the general surface, while fatty degeneration was found here and there. Duncan says this hypertrophy is observed under two different sets of circumstances. In one, the hypertrophy is out of all proportion to the small ovum, thus giving rise to the idea that the ovum must have been blighted while the decidua continued to grow. This is the most frequent variety. Thus, a woman reports herself six weeks or two or three months pregnant. She then aborts, and discharges an immense decidual mass, having in one corner of it a substance no larger than a boy's marble. In the other case the ovum has grown to the size proportionate to the probable duration of pregnancy, but the decidua is even larger than what naturally appertains to such an ovum. The decidua vera normally attains its greatest development by the early part of the third month, having then

a total thickness of from four to seven mm. By the end of the fourth month it is only one to three mm. thick.

The membrane, when expelled entire, is somewhat triangular, corresponding in this respect to the shape of the uterine cavity; the outer surface is rough, and when placed in water shreds or flocculi are seen to float out from it. The inner surface is

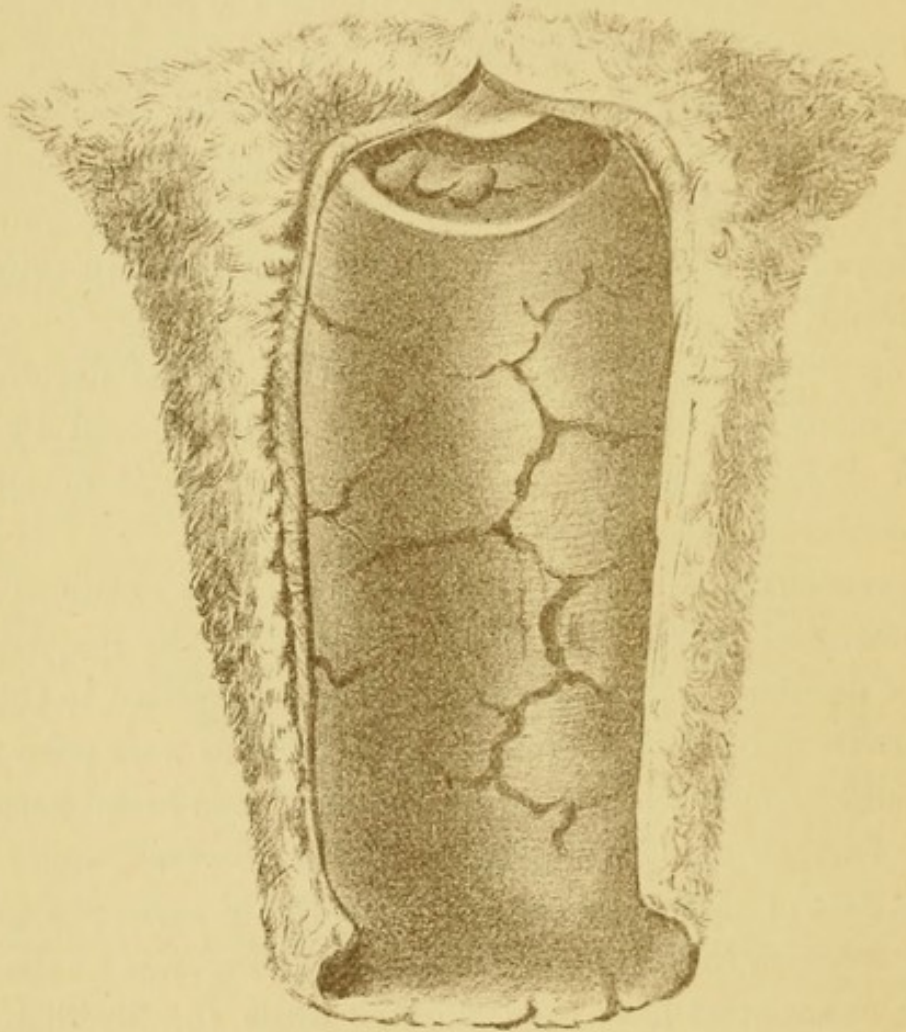


FIG. 2.—Shows a hypertrophied decidua. The ovum, covered by decidua reflexa, is seen adhering to the fundal portion of decidua vera. One wall of the decidua vera is laid open to show the interior cavity (Matthews Duncan).

smooth, and is studded with the apertures of the glandular follicles. It feels like a mucous membrane. A small ovum may be found occupying one of the corners, while the cavity may contain semi-solid material. Occasionally the outer surface is covered with blood clots. This sac may be expelled, either *entire* as it has lain in the womb, or it may have been

inverted during this process. It is to be remembered that the expulsion of such a sac does not necessarily mean that an abortion has taken place, as a similar membrane is expelled in membranous dysmenorrhœa. Exception is taken to this statement by some, however. In this latter disease the membrane is found to be of an organised material, which really consists of the modified lining of the uterus. Like the other, it may be expelled in the form of a triangular sac, having three openings

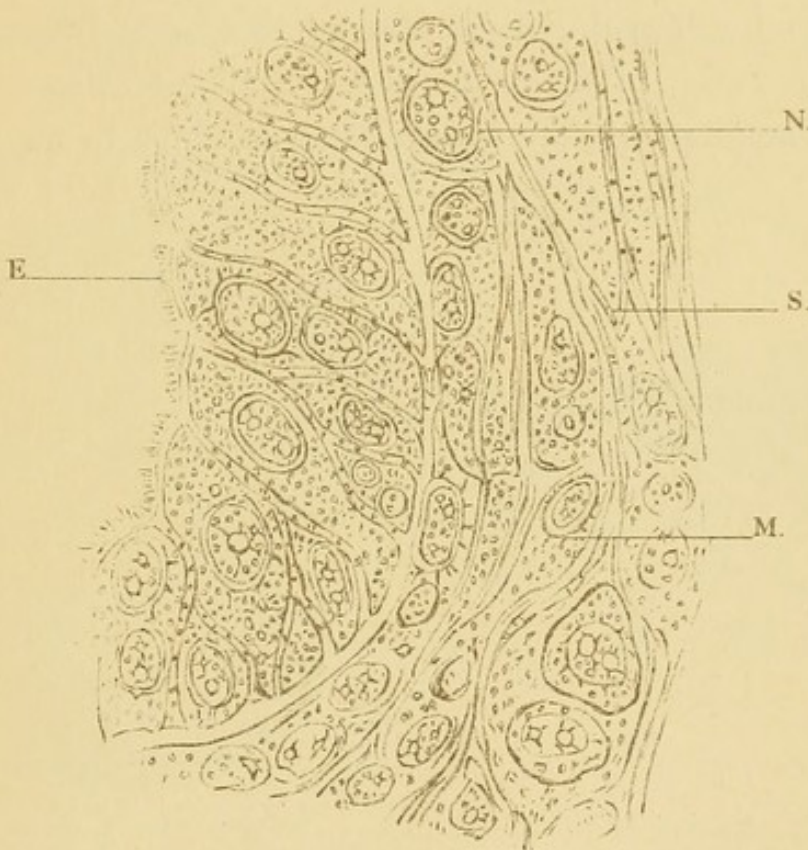


FIG. 3. —N. Nucleated medullary corpuscles transformed to basis substance, nuclei unchanged. S. Corpuscles split into spindles. E. Columnar ciliated epithelium of a utricular gland. M. Nucleated medullary corpuscles. ($\times 1000$.)

corresponding to the orifices of the Fallopian tubes and os. Morgagni thought it was a false membrane, and due to diphtheritic endometritis. Microscopically it is shown to be made up of elements similar to those found in the decidua of pregnancy. (See Fig. 3.)

A decidual membrane may not be discharged in its perfect shape. It may break down, and come away in pieces, or long shreds. Even in rarer cases, the decidua may be broken down

when discharged, so that it cannot be recognised by the naked eye. Eigenbrodt and Hegar found that occasionally the elements of the decidua can be recognised only by the aid of the microscope. Matthews Duncan says that appendages, having the appearance as if drawn out of the Fallopian tubes, are sometimes found attached to the decidual membrane. These are also structurally similar to the decidua, and are in reality parts of the tubes.

Hypertrophy of the decidua is said to result from endometritis, and subinvolution of the womb (Lusk). Some reflex action, no doubt, produces an over activity of the formative elements, consequently the membrane develops to an unusual



FIG. 4.

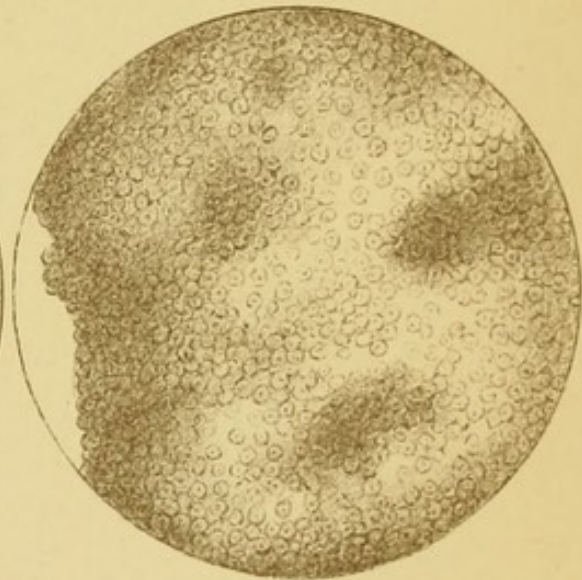


FIG. 5.

degree. It has been remarked that those women who have cast decidual membranes, cease to do so when sexual relationship between husband and wife ceases. Also, that the monthly period previous to its discharge has either been absent, or delayed. This subject will be again referred to when speaking of abortion due to defects of the male, and also in the section on diagnosis. Suffice it to say here, that when such a membrane is thrown off by a married woman, the event should lead us to suspect that abortion has taken place. Figures 3, 4, and 5, illustrate the microscopic appearance of decidua; the first is taken from Dr M. Greene's paper, published in the *American Journal*

of *Obstetrics*, 1882. Beautiful drawings of the decidua, as seen in the early months of gestation, are given on plate 34 in Hunter's work on the Anatomy of the Gravid Uterus.

ATROPHY OF THE DECIDUA.—Matthews Duncan describes this condition (see Fig. 6), and refers to a patient who had an imperfectly developed and undersized uterus. The ovum was a simple bag, sparsely covered with chronic villi, except where it was in contact with the decidua. It can be readily understood that if there is only a partial development of the decidua, the ovum will not be able to engraft itself to it, when the villi begin

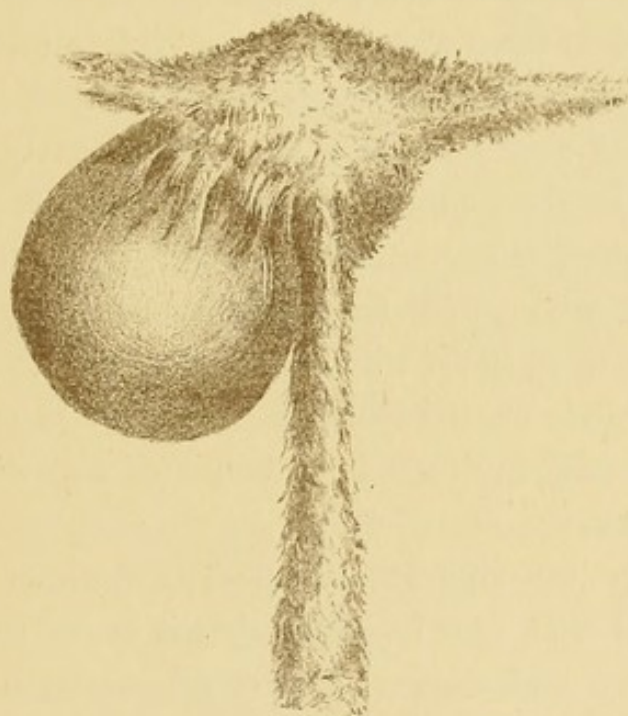


FIG. 6.—Atrophy of the decidua, showing the external surface of the decidua vera, and the ovum (Matthews Duncan).

to enlarge. The serotinal attachment may be so limited that the mere weight of the ovum may drag it downward, and so convert it into a long narrow pedicle. Priestley describes a case "where the ovule had evidently failed to get inside the decidual cavity, and began its development on its outer rough surface, attaching itself to the surrounding structures. The surrounding structures were partly the outer surface of the decidua, and partly the wall of the uterus, and for three-fourths of the circumference of the ovum the clear transparent chorion was quite uncovered, its villi being either atrophied or never

developed. The decidua seems in some instances to be detached from the uterine wall, and to lie so loosely in the uterine cavity that one can imagine the ovule, as it enters the uterus from the Fallopian tube, dropping between the decidua and the uterine wall." When the decidua is atrophied, it will not fill the uterine cavity. Consequently, the ovum being unsupported, it will drop into the lower or cervical region, and a primary cervical pregnancy take place. Not only may atrophy bring about such a condition, but it may result in giving so poor a supply of decidua that, even if the ovum take hold, the future placenta will be so small, as to be unfit to nourish the fœtus. Kussmaul, Hegar, and Dohrn have written on this very important subject.

CONGESTION OF THE DECIDUA.—It is supposed that this condition frequently exists, for in some cases of early abortion the decidual vessels are found engorged with blood, and when no other pathological changes are noticed. It is more likely to occur in those who suffer from plethora, disease of the liver, heart, or lungs, or in those who are subject to the various morbid states of the pelvic organs which has congestion as a prominent symptom. It may in itself be a cause of abortion, or it may lead to hæmorrhage.

HÆMORRHAGE OF THE DECIDUA.—The decidua is so abundantly supplied with blood vessels, that it is not to be wondered at that rupture and extravasations frequently occur. With each week of the further growth and development of the embryo, a new strain is put on the vessels. Emotion, or shocks, may so jar the uterus that the decidual tissue is lacerated, and with the consequence that clots are found either in the tissue of the decidua, or between it and the uterine walls. Occasionally blood flows into the decidual cavity, and detaches the embryo. At a later period, the maternal vessels in that portion of the decidua which afterwards becomes the placenta may rupture, and so interfere with the circulation in the villi.

It is considered by some that a pathological degeneration of the decidua is one of the causes of hæmorrhage. A fatty degeneration does attack that part of the decidua which does

not take a share in the formation of the placenta. If this invade the placental decidua, it would predispose it to decay. Ercolani held that the chief cause of extravasations between the decidua and chorion, was a fatty degeneration of the cells of the decidua serotina. When thus affected, they do not give the requisite support to the sinuses which contain blood, with the result that they give way.

INFLAMMATION OF THE DECIDUA.—This affection has received great attention from Virchow, Hegar, Schröder, and Spiegelberg. It is generally secondary to a similar state of the uterine mucous membrane. In inflammation and thickening of the decidua, there will always be a strong tendency for a portion of the thickened membrane to adhere to the uterine surface beneath. That portion, also, which takes part in the formation of the placenta, will also be much thickened and adherent. Not only, therefore, may disease of the decidua be a cause of death of the foetus, but it may lead to septicæmia and death of the mother. Various forms have been described by different authors, but the following four varieties are generally noticed.

(a.) *Acute Decidual Endometritis.*—This is the form which occurs in such diseases as cholera, and other affections where the maternal temperature attains a high degree. It is known as “hæmorrhagic endometritis,” and is often fatal to the foetus, owing to the fact that extravasations occur.

(b.) *Chronic Diffuse Decidual Endometritis.*—In this condition there is a thickening of the membrane, involving the entire decidua, or only a part of it (Schröder). Spiegelberg says the hypertrophy consists in a development of connective tissue, which thickens and indurates the membrane. The arrangement of such tissue may give rise to the appearance of cysts, and the result is that, when conception occurs, the membrane cannot supply a proper nidus for the reception and growth of the ovum. In some cases the disease is more chronic, consequently pregnancy goes on to term.

Priestley calls attention to a condition which differs from the above. In it the membrane is much thickened and hypertrophied

and its structure firmer than normal. The outer surface does not exhibit any of those floating filaments seen in healthy decidua, but it is more or less nodular, and shows indications of being slowly separated from the uterine walls. The decidual cells are increased, and at the same time split up and are otherwise deformed. There is a copious exudation, which is at first amorphous or granular, but soon degenerates into fat. He thinks it the result of a low form of inflammation, involving eventually the decidual cells and blood vessels in the same morbid changes.

A variety of chronic diffuse endometritis is the adhesive endometritis of Braun. It, however, occurs in the later months, and attacks the utero-placental membrane. It may produce adhesions between the placenta and uterus. It is said to cause pain and tenderness in the walls of the uterus, giving rise to what was known as "uterine rheumatism." The foetal movements also produce pain. It may be produced by chills, syphilis, or overwork.

(c.) *Tuberous, or Polypoid Decidual Endometritis*.—This seems to be a more advanced condition of the above described. The membrane is thickened to twice or thrice its ordinary depth, while projections, like polypi, protrude from the free internal surface. In this disease the decidua vera is generally affected, its outer surface is rough, and covered with blood. The growths have either a broad base, or are pedunculated. No openings of uterine glands are found on their reddened surface, but these are well marked in the intervening portions of the mucous membrane. In the matrix of fibroid tissue, enormous cells, of the shape of a lentil, are found. The pathological changes which take place in the chorion and foetus are secondary. The causes of the hyperplasia are not fully known, but syphilis, chlorosis, too frequently recurring pregnancies, and previous endometritis may produce it. (See Fig. 7.)

(d.) *Catarrhal Decidual Endometritis (Hydorrhœa)*.—As a rule this affection does not complicate pregnancy in so far as being a cause of abortion. Considerable diversity of opinion has been expressed regarding the locality from which the

secretion takes place. It does not often occur prior to the sixth month. The accumulation of fluid may take place slowly, or more rapidly. If there be a sudden gush of water from the womb, its muscular fibres may be set into action and the fœtus expelled.

Some authorities hold that the accumulation of these "false waters" takes place between the chorion and amnion, and that the escape is due to laceration of the former. Ruysch—that it is due to rupture of the lymphatic vessels; Bomher—that it escaped from an abortive ovum; Naegele, Dubois, and others—

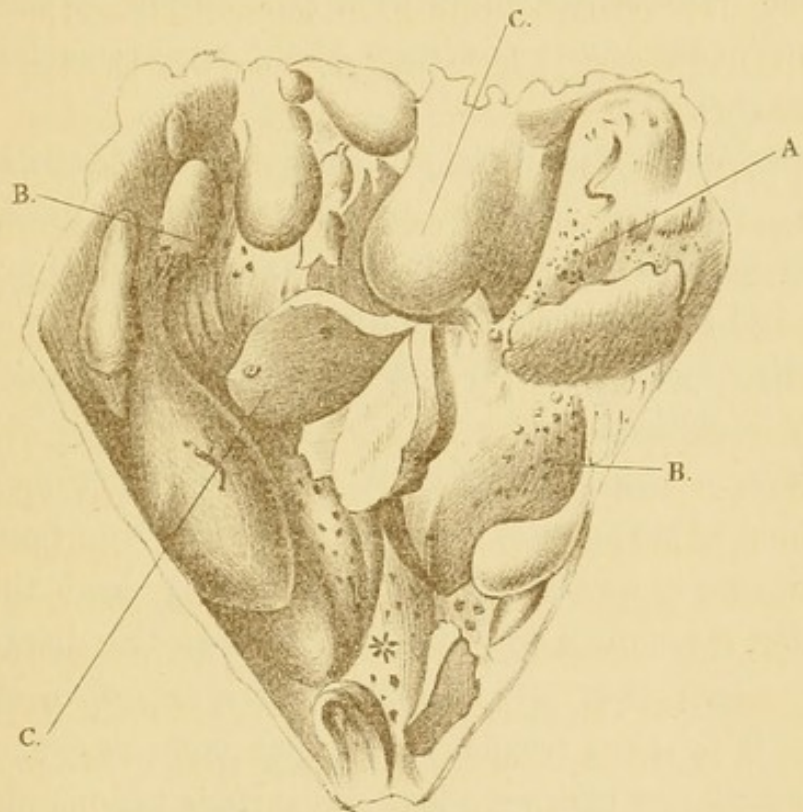


FIG. 7.—Polypoid endometritis (Virchow). A, Fine apertures of the glands.
B, Larger apertures of the glands. C, Protuberances or polypi.

that it comes from the glands in the inner surface of the uterus. Others, that it comes from the decidual cavity, from a hydatid, or from an œdema of the tissues of the womb. The affection is described in "Traité des Accouchements," by Tarnier and Budin. Naegele supposes that the liquid accumulates between the womb and the membranes, and that, as it increases in quantity, it gradually detaches the two, until at last the fluid, having made a way for itself, reaches the mouth of the womb and is then discharged. Barnes says that the amnion is more permeable to

fluids than the chorion. Consequently a certain quantity may collect between the two. The chorion may next rupture and so let out the fluid, while the sac of the amnion will still remain full and tense.

It is to be remembered that the amnion may have a lamelated structure, consisting of several layers with intervening spaces. One of these may rupture, with the result that there is a watery discharge. And if several layers burst in succession, there will be several such like flows. Tarnier speaks of "amniotic hydrorrhœa," due to a perforation of the amniotic sac far up in the uterine cavity. About seventy such cases have been recorded.

Priestley refers to a variety of catarrhal endometritis in which there is a sero-sanguineous, or dark grumous discharge. It generally indicates chronic disease going on in the foetal envelopes, and frequently ends in abortion.

The other local or pelvic diseases which may produce abortion will now be noticed.

CONGESTION AND INFLAMMATION OF THE UTERUS OR CERVIX.—Hyperæmia of this organ, in so far as it may be a forerunner of the two above mentioned conditions, may lead to abortion. Congestion is common in pulmonary and cardiac diseases, and it will be shown that abortion frequently occurs in these complaints. It is also a frequent accompaniment of tumours of the uterus, tubes, and ovaries, when the various venous plexuses are compressed and the blood current interrupted. Whitehead says that it causes abortion in one of every twenty-five cases. Bennet taught that inflammation of the cervix caused much ill health in woman. He and Whitehead traced 275 cases of abortion occurring in 375 women, to this complaint. Inflammation determines the flow of blood to a part, and this again may be followed by extravasations. Along with this, the nervous influences produced on the system generally by this disease must react on the foetus. Richet says that when the ulcer takes on a fungous character—when the lips of the cervix are excavated, and bleed readily when touched—abortion fre-

quently happens. Congestions of the cervix are often accompanied by a similar condition of the ovaries and surrounding organs. Whitehead says, that of 378 cases of abortion, 275 had disease of the lower part of the uterus.

FISSURE OF THE CERVIX, AND DEEP LACERATIONS may, according to Bennet and Whitehead, be a cause of abortion. Schwartz of Halle has also called attention to this, and recommends stitching the cervix, so that the occurrence of future abortions may be lessened. So also has Emmet.

The following table shows how lacerations of the cervix tend to produce abortion:—

NOEGGERATH'S CASES.			MUNDÉ'S CASES.			
No. of Abortions.	Not Lacerated.	Lacerated, 3rd Degree.	Not Lacerated.	Lacerated, 1st Degree.	Lacerated, 2nd Degree.	Lacerated, 3rd Degree.
1	16	8	25	21	25	25
2	8	0	4	7	9	12
3	0	2	0	2	2	4
4	0	4	2	3	1	2
5	0	0	1	1	3	1
6	0	0	0	0	2	0
7	0	2	0	1	0	1
Total.	24 Aborted 32 times.	16 Aborted 44 times.	32 Aborted 46 times.	35 Aborted 65 times.	42 Aborted 80 times.	45 Aborted 81 times.

(WELLS.—*American Journal of Obstetrics*, 1888.)

DISPLACEMENTS OF THE UTERUS.—Graily Hewitt says, that setting aside syphilis, the most frequent cause of abortion is flexion, and that when one hears of a woman having had a considerable number of miscarriages, it may be taken for granted the patient is suffering from a flexion of the uterus. Antiflexion is said to be a more common cause of abortion than retroflexion, but this is chiefly due to the fact that impregnation rarely occurs in the latter complaint. He gives an analysis of 296 cases where there was either retroversion or flexion; 235 of these had borne children, and of these, 81 were sterile, 57 were absolutely sterile, and 24 had had abortions. Of the 235, 100 had retro-

version, and 135 antiflexion. All such cases should, however, be subjected to a careful diagnosis, for they may be complicated with ulceration, endometritis, or syphilis. Some hold that a tendency to abort may be foretold whenever there is a decided retroflexion. Winckel says, that it is not exactly the antiflexion which, *per se*, causes the mischief, but the train of inflammatory symptoms, such as endometritis, salpingitis, oophoritis, and parametritis.

The retroversion may be "complete," or "incomplete," according as the womb is entirely or partially contained in the true pelvis. Denman and others at one time thought this condition was produced by distension of the bladder, but Tyler Smith showed this theory of causation to be wrong. It is now generally believed to be a continuation of a previous condition, but it may be produced by straining, adhesions, or tumours. The condition is relieved by abortion taking place, more especially when reposition cannot be effected. Abortion does not seem to accompany those cases of antiflexion associated with pendulous belly.

PROLAPSE OF THE UTERUS, either as a partial or complete condition, may be a cause. Generally the prolapse precedes the impregnation, and the womb ascends instead of coming down. The details of some cases, however, show that it may follow impregnation. Protal has recorded such. The usual result of complete prolapse is abortion before the fifth month.

RUPTURE OF THE UTERUS may occur as early as the third month of gestation. The fibrous and fatty degenerations, and those diseases which lead to thinning of the uterine walls, may predispose. Criminal attempts to procure abortion may be another cause. Direct violence may cause laceration, followed by abortion.

COMPLETE LACERATION OF THE PERINEUM.—Emmet gives a table of 53 cases. Of these, 7 miscarried.

HERNIA OF THE PREGNANT UTERUS may occur either as an umbilical, inguinal, or femoral form, and commonly ends in abortion. In such cases there will be a history of pregnancy, but the uterus cannot be found in its usual place. Murray

records a case where more than two-thirds of the uterus protruded. Olivier records another.

ADHESIONS OF THE UTERUS.—These were, at one time, thought to be a frequent cause of abortion. Following attacks of pelvic or abdominal peritonitis, or other inflammation of the pelvic viscera, the uterus is bound down. However, this idea is somewhat exploded, as it is found that when the uterus begins to enlarge and rise out of the pelvis, the bands are put so much on the stretch, that they undergo a process of thinning and elongation; so much so, that they may almost disappear with the constant stretching and friction always going on in the abdominal cavity. The pain in such complicated cases of pregnancy is sometimes severe. If the retroflexed or verted uterus is bound down by adhesions, abortion is likely to result, as the womb cannot rise. Large hard effusions occurring in cellulitis may interfere with the course of gestation. The use of the hot vaginal douche, the painting of the vaginal roof with tincture of iodine, and the application of glycerine plugs, combined with the administration of iodide of potash, will help to do away with the adhesions. The "dry treatment" suggested by Engelmann might be tried. He uses tampons of wool, impregnated with either iodine, 5 per cent.; boric acid, 15 per cent.; tannic acid, 7½ per cent.; and alum, 10 per cent. for cases of displacement of the uterus, combined with inflammation or ulceration; while the os, cervix, and vaginal roof may be dusted with such powders as bismuth, alum, or diluted iodine.

SUBINVOLUTION of the uterus, by causing flexions, or by not affording a proper amount of support to the ovum, may be a cause of abortion.

RIGIDITY OF THE UTERINE WALLS.—Some few maintain that there is such a condition, and that the proportionate expansion of the uterus with the fœtus does not take place. The result is that the embryo is expelled. Matthews Duncan seems to dispute this view. Speaking of the feeble powers of the uterus, bladder, and rectum, to expel their contents by their muscular action, he says, "In the case of the uterus, you might suppose it would

require a greater force to expand it than can be afforded by retained mucus, but everything we know tends to show that only a minute force is required to do it. The growth of the ovum in the uterus can exert only a slight force, and the uterus during pregnancy is not replete." His experiments on the force required to dilate the cervix with bougie, laminaria, sponge tents, &c., show it to be so small, that it is difficult to measure the force when acting slowly and continuously. Irritability of the uterus is, by Meigs, thought to be a cause of abortion.

CONTRACTIONS OF THE UTERUS.—It is known that uterine contractions occur during pregnancy, while it has been stated by Rindfleisch, that clonic contractions take place during menstruation. Possibly they are present also during infancy. They are detected, as well, in the puerperal uterus. If they are excessive at any of these times, pain is complained of. During pregnancy, they may readily be found if the hand is placed on the abdomen and kept there for some time. Here they are unaccompanied by any pain. In rare cases, however, the physiological passes into the pathological—the contractions become severe, recur frequently, and last for some time. So the patient complains that she can obtain no rest. The sleep is disturbed by them, or they may come on while she is taking exercise. If the hand is placed over the abdomen during "a pain," the uterus will be found to become hard and to remain so for some time. Gendrin has pointed out that they may give rise to accidental hæmorrhage, more especially when the contractions are local, and occur at the site of placental implantation.

ATROPHY OF THE UTERUS.—This condition might be a cause of the premature expulsion of the embryo, though it is more likely to entail sterility. Duncan relates a case of its infantile state in which the uterus measured only one inch and a half. It naturally occurs at the climacteric, or it may be congenital. It may be a consequence of rapidly succeeding labours. Dr W. Whitehead records a case in which the uterus and ovaries completely disappeared after labour. Emmet gives a case where menstruation was suddenly arrested by a strong emotional

shock in a woman aged thirty, and where it never returned, as atrophy of the uterus followed. (See Fig. 8.) Lawson Tait has called attention to the fact that the incomplete development of the sexual organs often arises from the effects of disease in childhood, and particularly of scarlet fever and smallpox. May atrophy of the ovary be a cause of abortion? Taking it for granted that the male element, or spermatozoon, may not have sufficient power to vitalise the ovum to such an extent that it may develop into a perfect and mature child, it might be supposed that an immature ovule may be similarly affected. Super-

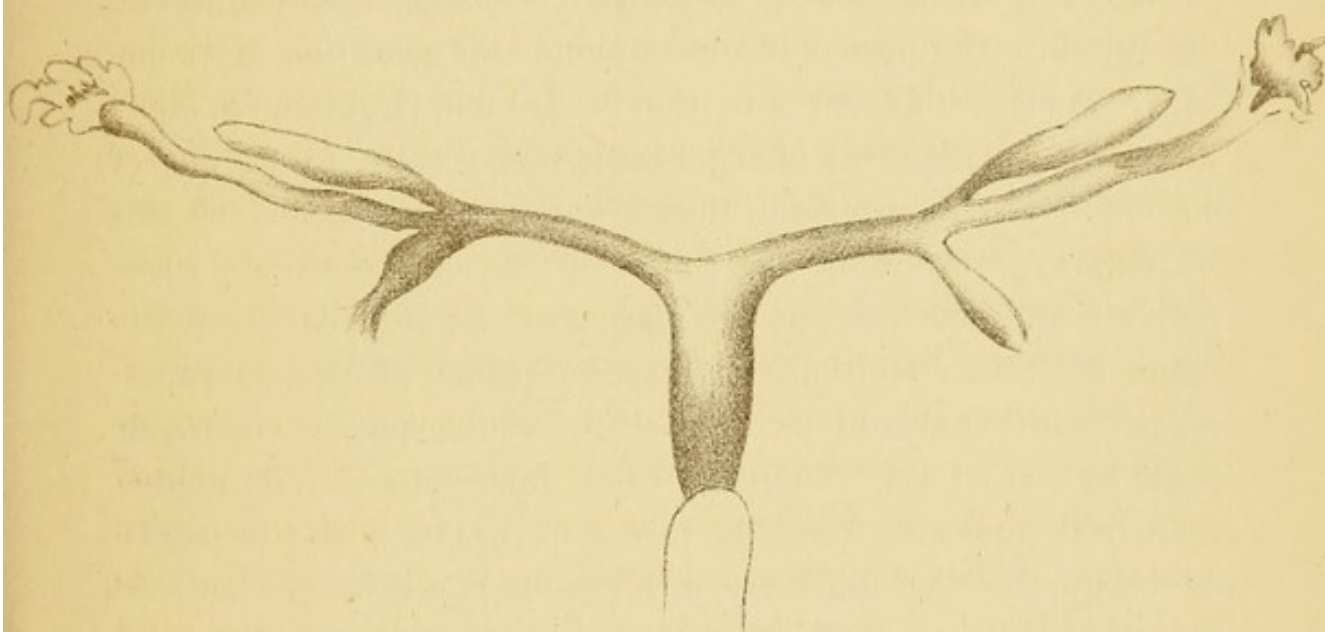


FIG. 8.—Atrophy of Uterus. (From Martin's Atlas.)

involution will be more likely to cause sterility than to produce abortion.

ENDOMETRITIS.—This, as elsewhere stated, must be a frequent cause of abortion. The decidua will be liable to take on a similar process, and the ovum will have difficulty, not only of engrafting itself, but also of recovering from the frequent recurrences of the disease, especially in liver and heart affections. In cases of habitual death of the foetus, Schröder thought that chronic endometritis was a frequent cause; while others have pointed out that chronic metritis, with its resulting increase of fibrous tissue, prevents the uterus from expanding with the growth of the foetus.

SYPHILIS OF THE UTERUS.—Langston Parker has described a distinct form of syphilitic metritis. Excluding the presence of primary lesions on the os and cervix, the various secondary eruptions of papules, and the erosions and ulcers are sometimes seen on this part. It has been stated that syphilitic erosions are situated some way from the os, while those due to metritis are in close contact with it. The former are arranged in segments of circles. The papules are smooth, and of a greyish-white colour, and may be single, or multiple and join with each other. Martin and Fourcauld have described the cervix as being enlarged, congested, and indurated and accompanied by ulceration. The former states he found this condition in 47 out of 97 women admitted into the St Lazare Hospital in eight months. Enlargement of the tonsils was present in 34 out of 47 cases. It is supposed that eruptions of a secondary and tertiary type occur on the inner surface of the womb, these giving rise to affections of the placenta. As regards the treatment of this condition, vaginal injections of permanganate potash solution should be used daily, while specific treatment must be carried out. If the uterus is enlarged and indurated, a mercurial suppository may be placed in contact with the mouth of the womb every third day, or a pencil-shaped bougie inserted into the cervix. A useful suppository may be made by mixing ten grains of mercurial ointment with one drachm of coca butter.

TUBERCLE OF THE UTERUS.—It will be unlikely for abortion to occur in this disease, for not only is the fundal region of the uterus generally affected, and so the usual site of placental insertion diseased, but the discharge, which usually accompanies the disease, will kill the sperms and so prevent conception.

CANCER OF THE UTERUS.—When this fatal disease is complicated with pregnancy, abortion may follow. This, however, is a rare event, for the disease is more frequent in those who are approaching the menopause. West collected 74 cases of cancer complicated with labour. In 41, death soon followed labour, 33 recovered from the effects of labour, and 47 of the children succumbed. Dr Cooke is reported to have shown a uterus

which contained some foetal bones. Nine months before she had had an abortion. It is supposed that the expulsion of the dead embryo was prevented by a cancerous growth in the vagina. Emmet, in his work, gives a table. It shows that there were 9 women who had 1 child each, and 7 of these had 1 miscarriage each; 4 women had 2 children each and 1 miscarriage each; 10 had 3 children each and 12 miscarriages in all; 2 women had each one miscarriage and no children; and 11 who had only 1 child each had been pregnant 18 times. In the aggregate, 51 women had 228 children, and 44 miscarriages, or, on an average, 2.58 each. In 32 cases the cancer was confined to the cervix, and in 21 to the body of the uterus.

TUMOURS.—Fibroids may be found either in the womb, in its walls, or external to the uterus. Tanner gives a table of 113 cases of fibroids and 46 of polypi. Eight of these had been pregnant, but had always aborted. Barnes says that generally, if the tumour project from the external walls, they are the most harmless; that tumours growing in the walls or projecting into the uterus provoke spasm, hæmorrhage, and abortion; that tumours growing in the fundus, or above the ovum, are least harmful, while those growing below “Bandl’s ring”—that is, the well-marked ridge which divides the body of the womb from the lower uterine segment,—are especially dangerous during gestation. Generally, the growth of the tumour goes on proportionately with the growth of the womb, so that pregnancy is cut short by abortion. In twelve ovarian tumour cases complicating pregnancy, Barnes says, five went on to term and two aborted. In Tait’s case abortion also followed after operation.

EXTRA-UTERINE FŒTATION.—In some cases the ovum may pass from the tube into the uterus, and then be expelled from it as an abortion. Puech states that the expulsion of the foetus *per vias naturales* has been observed once or twice only. Parvin quotes Maschka, proving, by a *post-mortem* examination, that a cyst in interstitial pregnancy may rupture into the uterus. A woman aged 29 years died suddenly, when interstitial pregnancy, with rupture of the uterus, was found. The body of

the foetus had passed by this opening, and had been removed, while the head, which was separated from the body, remained in the sac. Dr Gervis describes a case where a foetus, in Douglas's pouch, passed by the uterus and vagina. In the "Obstetrical Transactions," vol. ix., Braxton Hicks describes a case of intermural pregnancy. The woman aborted at the fourth and a half month, and the head of the foetus was expelled the day after the body. No placenta was cast. She again aborted, and no placenta was expelled. When the hand was introduced into the uterus, a laceration in the wall was detected. A *post-mortem* examination confirmed the previous statement. When an ordinary pregnancy is complicated with an extra-uterine gestation, premature expulsion of the uterine foetus may occur, just as it may happen when complicated with ovarian cysts, enlarged liver, cystic disease of the kidney, hydatids, ascites, or malignant abdominal growths.

When pregnancy occurs in one horn of a two-horned uterus, abortion may follow, and the same event may take place when the ovum is fixed in the lower segment, or in the cervical canal. The latter kind are, as Barnes says, "abnormal, and ectopic, but not strictly extra-uterine." In *primary cervical pregnancy*, where the ovum drops down through the cavity of the womb, and fixes itself to this part (cervical), abortion is the issue. And in *secondary cervical pregnancy*, when the ovum is expelled from the uterine cavity, but lodges in the cavity of the cervix, pregnancy may go on until the third month, when the part will no longer tolerate further dilatation. This secondary condition is said to be more common in pluriparæ than in those who have had only one child. It would be satisfactory to know what is the cause, or causes, of these two conditions. Are they due to a want of decidua, or does the decidual cavity not bear the proper proportions to the size of the interior of the uterus? Does the ovum in *all* cases drop down into the lowest part of the body of the uterus from the tube, and is it floated up to its proper level by an accumulation of fluid secreted by the decidua? The secondary form may be produced by jumping, or jolting of the

body. Perhaps the contractions of the uterus which take place during pregnancy may be a cause, more especially if these are so severe as to cause pain.

PLACENTA PRÆVIA.—When the ovum is fixed on the lower uterine segment, this condition is present. Barnes holds it is more than probable that some cases of presumed ordinary abortion at the third and fourth months, are in reality due to this cause. Generally, however, placenta prævia is not recognised sooner than the fifth month. Dr H. Thompson describes a case of placenta prævia, where hæmorrhage occurred at the sixth month. She was delivered at the ninth month of a mummified fœtus, the mother attributing the condition to a fright she experienced in the early months of pregnancy.

HÆMORRHAGE.—It is scarcely correct to say that this is a cause of labour, for, like pain, it is generally a sign of some previous affection. The bleeding which comes from a congested condition of the os, does not as a rule cause abortion. It may, no doubt, cause such a low state of health that the embryo perishes. It is to be remembered that a local hæmorrhage causes a determination of blood to that part. In pregnancy there is high arterial tension, and if the pressure at one spot is lessened, the blood will flow in the direction of the least resistance. It has been shown that a large quantity of blood must be lost before the arterial tension is lowered. The so-called accidental hæmorrhage may be due to violence, shock, or emotion, or may be due to diseases of the liver, or heart, or to smallpox, albuminuria, and acute atrophy of the liver. A dead fœtus, disease of the decidua, placenta, or membranes, also act as causes. Increased contractions of the muscular fibres of the uterus may cause the utero-placental vessels to give way, and so cause effusion. Gendrin says the muscular structure of the womb is disposed in two layers, and that their relationship with the vascular channels accounts for the influence which their contraction exercises in causing hæmorrhage. Spasmodic contractions, causing local congestions, may lead to rupture of the weak vascular plexus, a collection of blood may take place, and

the foetus, not having a sufficient blood supply, will die from asphyxia. Goodell, speaking of concealed accidental hæmorrhage, says, that of 106 cases collected by him, 54 mothers perished; and of 107 children, only 6 were saved.

GONORRHOEA.—The influence of this affection in producing abortion may here be noticed. Perhaps there may, in such cases, be a strong element of mental shock, for the wife who finds out that she has been given a venereal complaint by her husband, must suffer both in body and mind. Ricord says that of every 1,000 men, 800 have had gonorrhœa, and further, that 90 per cent. go uncured. Of every 100 women who have married men who have been formerly attacked by gonorrhœa, scarcely 10 remain healthy. The semen of those who have had gonorrhœa is often of a yellowish tint, or sometimes greenish, and may contain pus corpuscles and large granular cells. Noeggerath calls attention to the ill results which follow when a man with latent gonorrhœa marries. In 1872 he had tabulated 81 cases. Of these, 31 became pregnant, 23 were delivered prematurely, and 5 had miscarriages. Consequently, not every third woman had a full born child. Of 66 other cases, 7 miscarried. He says that perimetritis is very frequently caused by it, and that when we find a copious, greenish-yellow secretion in the upper part of the vagina, accompanied by a red eroded narrow rim round the os, with signs of previous pelvi-peritonitis, such as tenderness of the parts above the vaginal roof, contracted utero-sacral and broad ligaments, and swollen and distended ovaries, with the fact that the discharge is almost incurable, or recurs when seemingly cured, and with inflammation or swelling of the valvo-vaginal gland orifices, we may strongly suspect latent gonorrhœa. Add to this the history of the husband's health, and the fact that there is frequently no spermatozoa in his seminal fluid, and the case will be greatly cleared up.

These statements of Noeggerath have been the cause of much anxious discussion, and Peaslee has said that, if true, "a modification of his paper should be found in every Sabbath school library throughout the land." No doubt gonorrhœa is a terribly

common disease, and sadder still is the fact, that its widespread prevalence seems to make men careless and fearless of it and its consequences. Before giving permission to a gonorrhœal patient to marry, an olive-shaped bougie should be used, so as to find out if there is any tenderness of the urethra or stricture, and it is to be noted that the epididymis is frequently affected. Another very useful test is to ask the patient to pass his water into a clean glass cylinder. If flocculi are seen to float in the urine, it often points to an inflamed state of the tubes of the prostate or urethra. Bernutz supports the above statement, and says that it was the cause of abortion in 28 out of 99 cases of pregnancy. West and Aran credit gonorrhœa with being the cause of cellulitis in 62 cases in 100 affected. Lawson Tait says that it may cause ovaritis just as it produces epididymitis, and that occasionally the poison seems to travel up the tube to the ovary without giving any external signs of discharge. Whitehead also called attention to gonorrhœa as a cause.

The treatment of gonorrhœa, when this disease occurs during pregnancy, is very unsatisfactory. The vagina and vulva should be thoroughly washed out with a solution of corrosive sublimate—all the various crevices receiving extra attention. The vaginal walls should be dusted with iodoform, and then gently packed with iodoform wool. This dressing may be repeated every second or third day, according to the quantity of discharge. A discharge is generally more difficult to cure in a woman than in a man. Hunter related the case of a girl who had been two years in the Magdalen Hospital, and who infected a man who had connection with her immediately after leaving the charity.

It may not be out of place to call attention to the disgustingly unclean state in which some men keep their sexual organs. These are scarcely ever washed. The long and constricted foreskin, the frequent accumulation of smegma, and the presence of balanitis, with its discharge of matter, goes on. Granted this man marries, and in having sexual intercourse drags back his foreskin, then depositing all this dirty mass in the upper part of the vagina—what result may be expected?

These remarks on local or pelvic diseases acting as a cause of abortion will now be brought to a close, while notice will next be given to—

II. POISONS IN THE MOTHER'S BLOOD.—Barnes divides these into three classes—first, communicated or heterogenetic; and second, products of morbid action—autogenetic; while under the third he speaks of anæmia, over-suckling, obstinate vomiting, Bright's disease, lithiasis, and jaundice.

FEVERS.—How do fevers bring about abortion? 1st. It is known that a temperature of 105° F., if sustained for some time, will kill the fœtus; and the latter, acting as a foreign body, will be expelled. 2nd. The fœtus may be poisoned by the particular poison which causes the disease in the mother, such as smallpox and syphilis. 3rd. The muscular fibres of the uterus may be so irritated and excited to contract, that the fœtus is expelled either dead or living. 4th. The utero-placental circulation may be disturbed, and congestions, effusions, and hæmorrhages result. 5th. The maternal blood may be saturated with carbonic acid and the fœtus asphyxiated. 6th. Two or more of the above conditions may go together, and so act on the life of the fœtus. It is now well known that the pulse rate of the fœtus and its temperature also vary with that of the mother. When one recollects how the immature fœtal heart beats 120 strokes per minute, and that the maternal pulse rate may increase to over 130—that of the fœtus increasing in direct ratio—it can readily be understood that the fœtal heart may fail through sheer exhaustion, as well as by pyrexia. Fiedler found that the pulse curves of the mother and fœtus were parallel. These points will, however, be more fully discussed when speaking of diseased conditions of the fœtus.

TYPHOID FEVER is a frequent cause of abortion. It generally takes place at the end of the second or third week, especially if the crisis occurs with hæmorrhage. Rokitansky and Niemeyer thought that pregnancy conferred almost entire immunity from enteric fever. Barnes quotes Barratte's 94 cases, where the proportion of abortions was 57 to 60 per cent. In Duguyot's

62 cases there were 40 abortions. In an epidemic at Bâsle, 83 per cent. ended in aborting; while in an outbreak occurring at Vienna, 56 per cent. followed the same course. Kaminski had 98 cases collected, and pregnancy was interrupted in 63. Of Zülzer's 24 cases, 14 aborted, and of Scanzoni's 10 cases, 6 aborted. Griesinger observed 5 cases occurring in pregnancy, and all aborted, while 3 of the mothers died. Liebermeister reports 18 cases in the hospital at Bâsle, 15 aborted and 6 died. Charpentier gives a table of 322 cases, 182 aborted or miscarried. Savidan records 31 cases, with 5 maternal deaths. Murchison says that of 14 cases 10 recovered, and 8 of these 10 aborted. The 4 who died miscarried. Typhoid fever is more fatal to the foetus than to the mother.

SMALLPOX.—Dr Gayton states that of 26 pregnant women attacked with confluent smallpox, all aborted. Those suffering from the discrete form do not, as a rule, suffer in this way. Serres noted 23 aborting of 27 attacked; while Smellie, in his "Midwifery" (New Syd. Soc.), relates cases. In *Il Morgagni* for December 1887, Sangregorio published statistics which he collected from the hospital at Milan during three years and a half. Of 72 cases, 31 miscarried and 26 died. Of the 72, 7 suffered from varioloid, with 1 miscarriage; 40 had discrete variola, and 10 miscarried; 22 had the confluent form, of whom 17 miscarried. In the hæmorrhagic variety there were 3 cases; all of these miscarried and died. The prognosis, therefore, to mother and foetus is bad, being more so the severer the attack. Every pregnant woman who is attacked with smallpox does not abort, neither is the foetus always affected with the disease. Serres knew of 22 non-variolus infants born of mothers who suffered from smallpox during gestation. Again, the foetus may suffer from smallpox and yet not succumb; while a more interesting phenomenon is when the foetus suffers although the mother escapes. In this last mentioned condition the mother is supposed to be only a *conveyer* of the poison. Vaccination of the pregnant woman does not interfere with the process of gestation. Abortion is more likely to occur during the stage of

suppuration when the maternal temperature is highest. Many pregnant mothers, however, who suffer from variola do not infect the foetus; only a minority do so. Mild cases of varioloid may be followed by foetal infection. Again, the mother, although showing no signs of variola, may be delivered of an infant suffering from small-pox, or in twin cases only one foetus may suffer.

SCARLET FEVER increases the liabilities to abortion, more especially if it be accompanied by albuminuria or convulsions. O. Shansen has recorded 7 cases, and in 4 of these pregnancy was interrupted.

CHOLERA.—Although this disease often speedily terminates the life of the patient, abortion frequently takes place. Tarnier says that of 52 pregnant women attacked, 25 aborted, and that it generally occurs in those who remain ill for over twenty-four hours. Of 25 who aborted, 16 recovered and 9 died. Bouchut states, that abortion is more likely to occur in those who have arrived at about the fifth month of pregnancy, and that it is rare in those who are only one month advanced. This disease is not always transmitted to the foetus, and it is thought that when abortion occurs, it is due either to cramps of the abdominal or uterine muscles, or to the profuse discharge from the bowel drying up the sources of nutrition. Others suppose it due to shock, asphyxia, or to the stagnation and coagulating of the blood. It may be here mentioned that Devilliers recommends the induction of labour in those pregnant and suffering from cholera, as of 27 who were attacked and who did not miscarry, 21 died; while on the other hand only 9 died of the 25 who aborted. Briquet quotes Bouchut and Millot as having stated that 54 out of 120 pregnant women seized with cholera aborted, and that in the majority it was supposed the foetus had died before its expulsion. Simon, in the 9th Report of the Medical Officer to the Privy Council, p. 433, says:—“From our earliest knowledge of the disease it has been on record, that when pregnant women have cholera, the intra-uterine offspring almost invariably dies; and more recently, in proportion as the anatomy of the disease has got to be better studied,

cases have accumulated giving detailed evidence in support of an opinion which has for some time been entertained, that the infant in such cases dies of true cholera infection. It may, I think, be assured for certain that the death of the foetus is death by cholera, and that the foetus is infected by its blood; and since its blood is a mere derivative from its mother's blood, the fact seems to be beyond dispute that the mother's blood has cholera contagion in it."

MEASLES.—B. de Tourcoing gives a table of 15 pregnant women who suffered from this affection, of whom 8 aborted. It is rare for the infant to be born with the rash on it. Bourgeois says that of 15 attacked, 8 aborted or were delivered prematurely (*Mém. de l'Académie de médecine*).

INTERMITTENT FEVER.—It is by some thought that pregnant women enjoy an immunity from ague. Göth reports 46 cases, 19 ending in abortion or premature labour. Stokes, of Dublin, stated that the disease may be transmitted to the foetus, and that it may have convulsive movements. Pitre Aubanis also relates two cases. Both were born with hypertrophied spleens, and their attacks coincided, both as to day and hour, with those affecting the mother. Jacquemier, Russel, and Hoffman relate similar cases. Some have suggested that the quinine given to the mother caused her to abort, but Tarnier says he has given it in doses of ten, twelve, and even fifteen grains in twenty-four hours, and with no ill effects. Other medical men, practising in malarious districts, have also given large doses. This disease may lead to abortion either by pyrexia, by mechanical pressure by a large spleen, or by inducing maternal anæmia. Autopsies of foetuses show the characteristic lesions of the affection. Bonfils (*Thesis, Paris, 1885*) says that this fever affects the foetus by interfering with its development—the weight of one was 5000 grammes below the normal, and the length, 10 centimetres less than normal.

RELAPSING OR SPIRILLUM FEVER.—Nearly all the pregnant women attacked with this disease abort. Of 41 treated by Smith, Jackson, and Tennent, all but one aborted. (*Murchison*.)

Albrecht reports a case where the woman gave birth to a seven months child on the day of the relapse. The child died eight hours after birth. A *post-mortem* made thirty-eight hours after, showed the spirochæte to be present in large numbers in the blood of the heart, some of them being alive. Weber collected 63 cases; in 23 of these pregnancy was interrupted.

YELLOW FEVER.—Millot says that in the yellow fever epidemic of 1804 all the pregnant women died of black vomit, and many miscarried. Dr Bemiss of New Orleans says that those pregnant women who recover from an attack bear children who are protected from future attacks of yellow fever.

TYPHUS.—In this disease about one half abort. Murchison says that of 107 cases 49 aborted, and 9 died between the tenth and fourteenth day of the disease, while 98 recovered. Russel observes that of 49 attacked 15 aborted.

DIPHTHERIA.—The action of this disease in causing abortion has been discussed before the Academy of Medicine, Paris. Several cases in which abortion occurred have been recorded. The question has been asked, Does the disease act by a localisation of germs taking place in the placenta? There is reason to suppose this is true.

ERYSIPELAS AND INFLUENZA have caused abortion, but I am unable to quote any figures, or report any cases concerning it.

SYPHILIS.—This disease is a very frequent cause of abortion. The virus may kill the foetus by its intensity, or death may be due to a cachectic state of the mother, to disease of the womb or placenta.

Gaspar Torella, in 1495, believed in the propagation of syphilis from parents to offspring. Ferrius, in 1553, held that the disease might be conveyed by the semen or ovum, or by imbibition from the mother infected after conception. The disease is generally contracted from the husband. The mother may, however, be infected by the foetus, as is illustrated by the *choc en retour*. The law of Collis, which holds that a mother who bears a syphilitic infant is never known to be infected by it, although she suckle it, lends weight to this statement. When the mother

suffers from early syphilis *before* conception, the foetus almost always suffers, but if the mother be infected *several years* before, the child often escapes, owing to the gradual wearing out of the disease. The tendency of all diseases—syphilis included—is towards spontaneous recovery, nature being her own physician. When the healthy mother is infected *during* gestation, the foetus may escape, or it may be diseased; if the latter, then it is by the utero-placental circulation. Hutchinson has described such cases. It is a matter of repeated observation, that if the mother is infected during the *later* months of gestation, the foetus has a greater chance of escaping. Some hold that the disease may be transmitted at any time of intra-uterine life, but Ricord and others hold, that when infection takes place after the seventh month, the foetus is likely to escape. The argument as to whether the mother can poison the foetus prior to the manifestation of the general symptoms of syphilis—that is, during the primary stage—is not as yet decided.

The mother may affect the foetus in one of two ways. First, she may have been inoculated prior to conception. Here the system is imbued with the poison; all the tissues and organs suffer, and with the result that the ovum is tainted *while in the ovary*,—it is a part of the maternal tissue. Second, she may be free from disease at the date of conception, but is infected during conception. In this case the ovum is diseased in the uterus,—*infection in the uterus*. In both cases the maternal blood carries the poison, but in the latter the virus must pass by the placenta. If a specific bacillus be discovered, as some hold that it has, it may throw some more light on this disease as it affects the foetus.

Kassowitz says that when the father suffers, and when the disease is not cut short by a course of mercurial treatment, it is a very rare occurrence for a live foetus to be born until three years have elapsed from the date of infection. But the power of transmission may last for over fourteen years. Whitehead describes a case of *secondary* syphilis occurring sixteen years after the primary attack. Kassowitz says that healthy children

begin to appear about ten years after infection, but this must vary with the intensity of the poison, and with the power of the individual system to throw the poison off. Hensch gives a case where a syphilitic child was born twenty years after the mother's infection. The fact, therefore, remains that the syphilitic poison gradually but slowly becomes attenuated, and finally, in the tertiary stages, loses its infective properties. At first it often destroys the foetus within the six months of intra-uterine life. Next, the second, third, fourth, and fifth infants may be carried to the seventh or eighth month. Then a child may be born at full time which will show symptoms of inherited syphilis at the second or sixth week, and soon die. Finally, in seven or eight years' time a fairly healthy infant may be born, which will survive, but which may show signs of disease when seven or eight years old, syphilitic keratitis, &c. Weil thought that the usual duration of transmissive power was ten years, and a minimum of seven years, when uninfluenced by treatment.

It has not yet been decided what the pathological lesions are which determine abortion. Death may be due to syphilitic disease of the lungs, liver, or other viscera. It has been stated that no pathognomonic lesions are ever discovered before the seventh month in the foetus. When the placenta is affected, it suffers sometimes from fatty or other degeneration. These, by interfering with the utero-placental circulation, cause death. (See Affections of the Placenta.) The breaking out of syphilitic disease may cause its death. Irrespective of this, the foetus may be destroyed by the pyrexia which sometimes accompanies the breaking out of secondary symptoms in the mother, or in one of the recurring eruptions. A temperature of 105° F. is generally fatal, but the body heat in syphilis does not, as a rule, exceed 104° F., although it has been observed to rise as high as 107° F.

When the mother is syphilitic and carrying twins, the foetuses may be differently affected: one may be born dead, and with syphilitic symptoms, while the other is plump and healthy; or again, both may be born alive, and of these one is suffering from active syphilis, while the other is delicate. At present the

cause of these differences is unknown. Such cases have a parallel in twin pregnancies where one child is born suffering from variola, while the other is apparently free from any taint. In order to show the fatal effects of parental syphilis on the offspring, the following figures are given:—Whitehead, in his work "On the transmission of some forms of Disease," p. 303, says, that out of 256 deliveries of syphilitic women, 110 terminated prematurely, in 5 at two months, in 30 at three months, in 13 at four months, in 4 at five months, in 10 at six months, in 39 at seven months, and in 16 at eight months. Fournier says that, of 414 pregnant syphilitic women, only 260 arrived at term. It must not, however, be supposed that all abortions occurring in syphilitic women are due to this disease. Priestley also gives some statistics. The following table is taken from Berkeley Hill's work. It shows that of 330 syphilitic births, 111 were born dead, 80 died in less than six months, or a total of 191 deaths, or 58 per cent. Others have calculated that the death rate ranges from 30 to 35 per cent.:—

TABLE V.

Source of Syphilis.	No. of Families.	Total Pregnancies.	Premature Births.	Born Dead.	Born Alive and Died under Six Months.	Total Died from Syphilis.
Father, . . .	43	105	25	26	21	47
Mother, . . .	10	40	18	18	5	23
Father and Mother, .	23	76	39	28	24	52
Uncertain (if both, or which), . . .	43	109	45	39	30	69
Totals, . . .	119	330	127,38%	111,33%	80	191,58%

Active syphilis in the mother is generally more fatal to the child than when the father suffers. Maternal syphilis, again, does not cause barrenness, but has slightly the reverse effect. It is an opinion held by many, that a syphilitic husband can have connection with his wife without infecting her; in other words, that she is infected *through* the ovum.

Treatment.—The importance of prolonged and careful treatment is now fully recognised. If a woman has been infected by her husband, and if she suffer from the earlier symptoms, both should undergo the same course of treatment. At the same time every effort should be made to avoid sexual intercourse, so that conception may not take place. The treatment will be general and specific. Everything should be done to improve the healthy action of all the glands. Wholesome diet, good clothing, gentle exercise, and a regular life should be recommended. The patient need not be told of the disease from which she suffers, but such hopes should be held out as will induce her to carry out the treatment. It is always to be remembered that syphilis is a chronic fever, “a fever diluted with time,” and that, therefore, chronic treatment will be required. Discredit will be brought on the physician if this point be not fully explained. When secondary symptoms are present, mercury will be prescribed, provided the patient is not too weak, or suffering from albuminuria, or degeneration of the liver, kidney, or other organ. It has been found that the anæmia of syphilis is to a great extent removed by a course of mercury when given in small doses. There is a direct increase in the number of red blood corpuscles. Some combine the hydrarg. cum creta with one or two grains of reduced iron. If there be great constitutional debility, then the iodide of potash or the sodium salt may be given, and it can be combined with spirits of ammonia and cinchona. The maxim “Iodide relieves, mercury cures,” should be remembered.

Generally, the best plan is to continue the course of mercury until all the symptoms disappear, and for two or three weeks longer. Then a pause of four or five weeks should be allowed, during which, tonics such as “Easton’s” syrup, may be given. At the end of this time, a second course should be begun, and continued with for three months. Again another pause—to be succeeded by another course—until a period of twelve months has elapsed from the date of infection. From this time on, the patient should be carefully watched, and, on the slightest approach of any symptoms, such as cutaneous eruptions, mucous

patches, or fissures or cracks on the tongue or angle of the mouth, the treatment should be recommenced.

Appearances showing that the system is under the influence of the drug, should be noted. If the gums around the teeth become tender and slightly swollen; if the breath be fetid; or if there is a coppery taste in the mouth, and the saliva somewhat profuse in quantity, then the mercury has taken full effect, and the treatment should not be carried on with such vigour as to increase the intensity of these symptoms. In a few persons these symptoms may not follow the use of the usual doses of mercury, and then the quantity may be carefully increased. During all this time, the mouth and teeth should be kept scrupulously clean. An alum wash may be used, and a soft tooth brush. If there be any caries of the teeth, they should be stopped or extracted. The urine should be examined from month to month, so as to note the presence or absence of albumen. If it be detected, and its presence be not explained by the occurrence of pregnancy, then the administration of the drug should be, for the time, suspended. Each physician has his favourite prescription, or preparation, and so the various combinations of mercury are used, and generally, with equally good results. The solution of the perchloride of mercury, in half-drachm doses, is often used. It may be given with water, after meals, or combined with the solution of the perchloride of iron, and solution of arsenic (Tilt). Some combine the perchloride with iodide of potash, and so obtain a fresh solution of the bin-iodide of mercury. When the perchloride is given in pill, it should be made up with the sugar of milk. When inunction is used, half a drachm, or a drachm, may be rubbed in every night into some part of the body, such as the axillæ, popliteal spaces, or inside of the thighs, or into any of those regions where the skin is soft and thin. Inunction into the same parts should not be carried out night after night, as the skin becomes tender, and a form of eczema, or mercurial rash, may be brought out. Care should be taken to wash the skin with soap and water. Hairy parts of the body should be

avoided, as the hair follicles may suppurate. While using the ointment, the patient should sit before the fire, and the friction continued for 15 to 20 minutes, the skin being well washed before anointing. The patient may carry on the course for six or seven weeks. Some who object to the inunction may spread a drachm on the inside of the sock, and thus, while walking, rub it in in this way. Different preparations are used. Some prefer the oleate of mercury, of a strength varying from 20 per cent., 10 per cent., to 5 per cent. At present it is used with the natural oil, lanoline, and when so, it is stated that only half the usual proportion of mercury should be added, as the lanoline increases the absorptive power of the skin.

When the Vapour Bath is used, either calomel, or the green iodide, in quantities varying from 30 to 60 grs., may be used. Generally, the bath is taken twice or thrice weekly. The patient should be kept in a warm room, and clothed with flannel. Some one should, on the first few occasions, remain with the patient while using the bath, as symptoms of fainting may occur. This form of administering mercury is said to be the least disturbing to the patient's health of any of the methods used.

When subcutaneous Injections are given, a solution of four grains of the perchloride to the ounce of distilled water is used, with the addition of 80 grains of chloride of sodium. Not more than ten drops should be administered, and 1-20th of a grain is a sufficiently large dose. The syringe should be scrupulously clean, as pain, induration, and abscess may follow. The solution should be fresh and filtered.

When Iodide of Potash is prescribed, it may be given in about 5 grain doses daily, with water, and after food. Some recommend it to be combined with liquor arsenicalis, so as to prevent the iodic acne; while, to check the coryza, Hiron advises the addition of equal parts of the nitrate of potash, a somewhat depressing mode of treatment. Both the iodides of sodium and ammonium contain more weight of iodine than the potash salt, and are not so depressing.

In some cases of weakness, the syrup of the iodide of iron,

combined with cod liver oil, should be administered. Some strongly recommend a course of baths at Aix-la-Chapelle, or a stay at Aix-les-Bains, or Ems.

When mucous patches are present, they may be dusted with a powder composed of equal parts of calomel and oxide of zinc. Affections of the tongue may be treated with a gargle of weak solution of permanganate of potash; or by applying with a brush a solution of nitrate of silver (ten grains to the ounce).

Treatment of the Pregnant Woman.—Löwy, at the General Hospital of Vienna, carried out the plan of mercurial inunction. Of 99 syphilitic women, 39 were subjected to a regular course of medication, while the remainder were untreated. Those who were treated had 75·6 per cent. of living children, while those who were untreated bore 75 per cent. of decomposed fœtuses. These figures prove the utility of this treatment. At one time it was thought mercurial inunction was the cause of abortion. Lewin and others have disproved this. Remembering how sensitive the stomach of the pregnant woman is, no one should hesitate to give the inunction plan a fair trial, if the stomach do not tolerate mercury when given by the mouth. It should be carried on for three months, or until ptyalism appear, and after a short interval another course should be carried out. The mercurial treatment of syphilis often brings about the happiest results. Fournier relates a case of a woman who bore seven dead children in succession. During her eighth pregnancy she was treated, and bore a healthy child. Also a ninth healthy infant. During her tenth pregnancy no treatment was resorted to, and the child died of syphilis when six months old. She had an eleventh healthy child when treated.

PUERPERAL POISON.—It is well known that pregnant women are liable to contract puerperal septicæmia, and that this may be followed by abortion. Garimond has called attention to this, and so has Hervieux. Therefore, in times of puerperal epidemics, pregnant women should be careful to keep away from the neighbourhood of such cases. Lawson Tait has called attention to the occurrence of acute pelvic peritonitis in women,

after attacks of scarlet fever and smallpox. It has, for a considerable time, been known that, in mumps and scarlet fever, male children are likely to suffer from inflammation and atrophy of the testicle. He cites one case of a woman who had been married four years and had had two confinements. She was pregnant when seized with a rigor and fever. There was pelvic pain and double acute ovaritis, with symptoms of threatening abortion. She aborted on the fifth day, and went through an attack of confluent smallpox. In some cases the ovaries atrophied, and in others super-involution of the womb took place. Mégrat has collected thirteen cases, Schröder and Scanzoni have also called attention to it. Of the thirteen mothers, 7 died, and 2 went on to term, while the others aborted at the fifth, sixth, seventh, and eighth month. Of twelve embryos, ten perished.

NOXIOUS GASES.—Breslau relates a case where two women slept in a room of a lying-in hospital. Both were deeply poisoned, rendered insensible, and the fœtus of one was killed. The gas was the product of the destructive distillation of wood, and contained carbonic oxide. In one of the Algerian campaigns it is stated that five hundred Arabs were suffocated in the caves of Dahra, in 1845. A considerable number of pregnant women were among them, and some aborted, as fires had been lighted at the mouths of the caves. The maternal blood stream may be so saturated that the fœtus is asphyxiated. Brown-Séguard, in his experiments on animals, after he had destroyed the lower portion of the spinal column, and then placing a ligature round the trachea, showed the effect of carbonic acid on the uterus. When the ligature was tightened, the uterine fibres began to contract, and when it was relaxed, they stopped. He explained that the contractions were due to the highly venous state of the blood. On this theory, an explanation of the cause which promotes the beginning of labour has been built up. At the ninth month, the uterine fibres have arrived at their maximum of irritability. The uterine sinuses contain a large quantity of blood, and hence muscular fibres contract. In doing so, the venous blood is partly driven out, consequently contraction

ceases and relaxation begins. The sinuses again filling, contractions again begin. Brown-Séquard found that he could inject large quantities of carbonic acid into the bowel, without doing any harm, in non-pregnant persons. When it passes by the venous system, it seems to be innocuous, but when introduced into the arterial system, through pulmonary inhalation, it acts as a poison. Bergeon, of Lyons, has lately recommended the injection of either carbonic acid or sulphuretted hydrogen into the bowel of those who are suffering from phthisis. It would be interesting to know how this plan of treatment affects the uterus of the pregnant woman.

The action of other gases as causes of abortion is not well known. Barnes says he has been able to trace abortion to the action of *sewer gas*.

METALLIC IMPREGNATIONS.—As communicated or heterogenetic causes of abortion, these substances vary in their power to act for ill. A few of the most important will be noticed.

Lead.—Mr B. Baker calls attention to a paper of M. Paul's in the *Archives générales de médecine*: 4 women had 15 pregnancies, and in 3 there were 10 abortions, 2 premature births, these soon dying, 1 still-born, and 1 delivery at term, the child dying the same day. He also—in order to prove that the cases are not coincidences—gives the history of five women who had given birth to nine children before they were exposed to lead poisoning. After these mothers had gone into a type-cleaning work, they had eventually 36 pregnancies, and of these 26 were abortions between the second and sixth months, 1 premature child which soon died, 2 still-born, 7 at full term, of whom 5 died before the end of the second year. In another instance, a woman who had had 5 abortions left the type-polishing work, and soon after recovery had a healthy child. M. Paul also thinks that the father has a much greater influence upon the offspring than is generally supposed when he alone labours in the lead works. He supports this theory by mentioning the cases of 7 women who had nothing to do with lead, but whose husbands had. These had 32 pregnancies, and in this number

there were 11 abortions, 1 still-born, 8 at full time who died in the first year, 4 in their second year, 5 in their third year, while 2 lived. Baker relates one case where the hæmorrhage after abortion appeared to increase after the administration of the iodide of potash. The woman had a blue line on her gums. In cases of lead poisoning, it is supposed that it kills the foetus, or that it causes the muscular fibres of the uterus to contract in the same way as it acts on the intestinal muscles. It is not yet decided in what way the mother, when not working with lead, is made to suffer. Is it by the seminal fluid, or simply by inhaling particles of lead from her husband's clothes?

Mercury.—Ad. Lizé has observed the influence of this metal upon workpeople engaged in hat manufacture in which mercury is used. He divided his cases into three series:—1st. In which the men were engaged to the exclusion of their wives. Of 10 pregnancies, 2 issued in still-born children, 3 died in infancy, 5 survived in a sickly condition, and 1, born before the father worked in mercurials, was healthy. 2nd. Where husbands and wives were both exposed. Of 14 pregnancies, there were 5 births at term, 5 still-born, 2 died before the third year, 4 before the fifth year. 3rd. Where the women only were exposed. Of 7 pregnancies 3 ended in abortion. In Von Ziemssen's Cyclopædia it is stated that pregnant women suffering from mercurial poisoning may abort. Casper quotes Salomon as recording two cases of abortion following mercurialisation of the system.

VEGETABLE SUBSTANCES causing abortion.—When these drugs act as irritants, they will generally produce abortion. Others, such as ergot, quinine, and strychnine, will act on the uterus, and cause it to contract. Dr Hardy found that when ergot had been given, and where after its administration the foetal heart beat under 100 per minute, the child was generally born dead. The effects of ergot have been greatly exaggerated. It has been found that it does not often act on the uterus when containing the foetus. It has, however, been stated that abortion has become much more frequent in New Zealand in cows since the introduction of rye grass.

Tobacco.—Parvin says that those who work in tobacco manufactory are thought to suffer from abortion owing to the action of the drug.

ALCOHOLISM.—There is a prevalent idea that this may be a cause. Many believe in the effects of gin in bringing on the menstrual flow. No figures, however, are yet forthcoming as showing its effects on the fœtus. By acting on the liver, it may cause congestion of the pelvic viscera.

This finishes the notice of those heterogenetic poisons which may act as causes of abortion. Some of the autogenetic will now be considered, as

ALBUMINURIA AND BRIGHT'S DISEASE.—Albuminuria may bring about abortion, first, by favouring the extravasation of blood owing to the hæmorrhagic tendency induced; second, by producing a condition favourable to the retention of the refuse left by the oxygenation of the maternal and foetal tissues, these retained products poisoning the embryo; and third, by furnishing this poison, which may act on the uterine muscles. Hewitt describes the case of a woman who aborted in six successive pregnancies where there was albuminuria and convulsions. Recently Winter has shown a relationship between nephritis and the premature detachment of the placenta in three cases. In albuminuria following kidney disease, Dr J. D. Maclaren observed that the disappearance of the albumen from the urine may coincide with the death of the fœtus. There would seem to be a well marked relationship between albuminuria and kidney disease on the one hand and diseases of the placenta on the other. Fehling has examined the urines of a number of gravidæ, and in those in which albumen was found he discovered infarctions of the placenta, these being generally due to hæmorrhages. It is supposed that hydramnios, white infarction, and myxomatous degeneration of the placenta, are connected with kidney disease, but it has not been yet settled as to which condition is the primary affection. Fehling has described cases of habitual abortion occurring in kidney disease when the four events of pregnancy, anasarca, albuminuria, and

foetal death occurred at each pregnancy. He found atrophy of the villi of the chorion and spherical infarcts of the placenta. The infiltration of the villi and vessels of the umbilical cord with small cells, as met with in syphilis, was absent, there being no trace of syphilis in the foetus. Barnes has called attention to the complications of albuminuria and convulsions with hydatiform degeneration of the chorion. It is known that the foetus may suffer from a convulsion similar to that from which the mother suffers. In eclampsia, the temperature may remain at a high point, and so destroy the foetus. According to Parvin, the foetal mortality is about 50 per cent. in such cases. Braun thinks that it is the uræmia which causes death, for if the child is born alive a quantity of urea comes from the cord, while if it is born dead carbonate of ammonia is found in the escaped blood. He further states that the foetal mortality in albuminuria is about 80 per cent. When the maternal convulsions are due to uræmia, the temperature may fall to 86° F., while in those due to epilepsy, the body heat rises considerably.

When a pregnant woman suffers from acute parenchymatous nephritis of pregnancy, she is likely to abort. German physicians have inquired more fully into the causes of this complaint than others. It is now, however, generally recognised that this disease does *originate* during pregnancy, usually setting in about the fourth and fifth months. There are chiefly three theories concerning its origin: 1st, that it is due to a blood crisis; 2nd, to mechanical pressure of the uterus on the abdominal veins; and 3rd, to the additional tax thrown upon them. It attacks primiparæ more frequently than pluriparæ. In multiple pregnancy, the tendency to nephritis is marked. Indeed Litzmann thinks that in doubtful cases he can decide against a twin gestation if no albumen is present. When this disease sets in, it generally does so without fever, without local symptoms, and with little disturbance of health. Dropsy of the limbs may be noticed, and this is to be distinguished from the œdema of the limbs and vulva, which sometimes occurs, by an examination of the urine, and by the fact that in nephritis the face and hands

may be affected. The urine is diminished, contains albumen, a little blood, and hyaline casts. No dropsy may be present. The disease may subside or may cause convulsions, and it has been noticed that these are more violent and more frequent, as well as being often attended by amaurosis and maniacal excitement. Amaurosis is said to be a frequent symptom, and also neuralgic pains in the region of the kidney. About 30 per cent. attacked with eclampsia die; abortion may follow, and even well developed and seemingly strong children die during or soon after delivery. In order to establish the existence of this disease, pregnancy must first be diagnosed and a previous nephritis excluded.

LITHIASIS.—Barnes says that in several cases this was the only condition to which the abortion could be referred. In it there is probably retention of refuse matter, owing to defective action of the liver and kidneys. Tyler Smith has pointed out that in some cases there is a habitual occurrence of large quantities of *triple phosphate* in the urine of the mother, and that when this phosphatic diathesis exists, fatty degeneration of the placenta, in successive pregnancies, has occurred. *Renal colic*, due to gravel or stone, may be a cause of abortion. In Troja's work, the case of a woman is reported who aborted fourteen times. A patient of Simon's aborted twice—once at the end of the fourth month, and once at the end of the fourth week. Here the intense pain present in an attack of nephritic colic may be a large factor in causing abortion.

JAUNDICE.—The ordinary or simple jaundice which may occur in the early months of pregnancy is not a cause of abortion. But the malignant jaundice which accompanies acute yellow atrophy of the liver is a powerful cause. Nearly two-thirds of the cases attacked abort. Charpentier gives a table of 68 cases. 42 miscarried, and of these 30 died, while 26 were delivered at term. Barnes says that of 21 recorded cases the disease generally occurred during the first pregnancies, and that in almost all the cases abortion took place. Dr M'Dougall described a *post-mortem* in which the placenta was found to be firmly united to the uterine wall, small abscesses being scattered over its

surface. In this malignant form hæmorrhages are very likely to occur, and it is probable that a similar uterine effusion may take place. Generally the liquor amnii and the fœtus are stained a yellow colour. Tarnier and others have described a peculiar fatty change in the liver which takes place in pregnant women, and as a normal process. It is easy to understand how, under the severe test of pregnancy, this condition may pass the border land which divides the physiological from the pathological. Matthews Duncan also calls attention to this parenchymatous degeneration. He thinks "that a woman suffering from ordinary jaundice runs considerable risk of aborting or miscarrying." The jaundice may be the *direct* cause, the infant when born being fresh, alive, and free from the colour of the bile stain—that is, supposing the jaundice has lasted a sufficiently short time. Or, on the other hand, the jaundice may kill the child, the abortion being a secondary result. When this is the case, the fœtus, membranes, and perhaps the liquor amnii are coloured with the bile pigment. According to Traube, when the constituents of the bile are present in excess in the blood, a lowering of the temperature and a great slowing of the heart's action occurs.

In *icterus gravis*, or acute yellow atrophy, or, as it is sometimes called, cholæmic eclampsia, there is, in those cases which survive sufficiently long for the morbid results to be developed, complete fatty degeneration of the hepatic cells. Some ascribe the poison to death of the fœtus, but the reverse is thought to be true. Others think it due to uræmic poisoning. The fœtus is almost always born dead and decomposed. Acute atrophy may also be due to septic infection, parenchymatous hepatitis, and phosphorus poisoning.

According to Bardinet, this disease may be epidemic, and he describes one as having taken place at Limoges, where 13 pregnant women were attacked. He described three kinds of this affection: first, the simple; second, the semi-malignant or abortive; and third, the malignant. Churchill cites the description by Dr. St. Vel of an epidemic of jaundice which occurred in

the island of Martinique in 1858. It attacked the various races and sexes, and was further remarkable for the fact, that it acted fatally *only* to those who were pregnant. Of 30 women attacked, only 10 went to full term, 20 aborted, and all died. According to Murchison, pregnancy must be regarded as a predisposing cause. So are grief and intense anxiety. Frerichs refers to 22 cases, of whom one-half were attacked while pregnant. In these the disease is likely to occur at the third to the sixth month. It is thought that epidemic catarrhal jaundice may pass into acute yellow atrophy.

The symptoms of malignant jaundice are of such importance as to demand a notice. They evidently all point to a retention in the mother's system of the waste products usually excreted by the liver and kidneys. The prodromal symptoms are slight, as there may be only a trivial jaundice, with only a slight rise of temperature. Then, in several days, cerebral symptoms may set in, such as headache, difficulty of speech, convulsions, delirium, and coma. The temperature may rise to over 105° F., and be subnormal before death. The pulse is small and frequent; the urine is scanty, and may contain albumen and blood, bile pigments, casts, leucin, and tyrosin. Urea is scanty or absent. The cerebral symptoms, and the dull yellow colour of the skin, will be of diagnostic value. So will the tenderness over the liver, and the rapidly diminishing area of dulness. Vomiting may occur, and the vomited matter may be mixed with bile, mucus, and perhaps blood. The line of hepatic dulness may be lessened by one-half in the course of seven days. It is well to remember that the temperature may be subnormal from the beginning. It should not be mistaken for acute phosphorus poisoning. The question of inducing premature labour should be gravely considered in such cases, more especially as this disease is almost always fatal to the mother.

DIABETES.—Matthews Duncan calls attention to this affection as a cause of abortion. Fifteen women had twenty-two pregnancies, all except one were multiparæ. "In seven of nineteen pregnancies in fourteen mothers, the child died during the pregnancy,

having in all of these reached a viable age. Hydramnios was frequent, and in one case sugar was found in it." The dead foetus was sometimes very large. The subject of diabetes and abortion has not yet been well worked out.

OBSTINATE VOMITING.—In this affection the refuse matter of the tissues is left in the body, and these not having any supply of genuine material, feed "on its own degraded tissues." The vomiting which generally occurs in the early months is a reflex or sympathetic action, due, it is thought, to the stretching of the uterine muscular fibres. But the severe, grave, or irrepressible vomiting may be due to a dead foetus being retained *in utero*, to a diseased placenta, or to a hydatiform degeneration. In some few cases the persistent vomiting is due to yellow atrophy of the liver. Gueniot gives a table of 118 cases of grave vomiting. Of these 72 recovered and 46 died. Of those who recovered, 20 aborted spontaneously, and 21 after the induction of abortion by artificial means. In this form death of the mother may occur suddenly and unexpectedly. Hewitt discusses the subject, and there gives two tables. In the first table, of twenty-three cases where the condition of the body of the uterus was observed and recorded, 11 died, and 20 recovered. Of the 11 deaths, 3 occurred after induced abortion, and of the 20 recoveries, 6 occurred after artificial, and 1 after natural abortion. In all cases of vomiting, it is well to examine the urine; indeed, it should be a rule to examine the urine in cases of vomiting, convulsions, and convulsive-like attacks. If vomiting is due to chronic or acute uræmia, purgatives, and the use of the hot bath and blankets, or the wet pack, will do good. Tincture of iodine, in one drop doses, and also creasote, has been strongly recommended for cases of vomiting due to kidney disease.

Vomiting may induce abortion in different ways. It may, by interfering with nutrition, bring about such a state of maternal weakness, that the foetus is starved. Barnes thinks that it induces or aggravates disease of the kidneys and liver. Thus, jaundice, or albuminuria, may result. When the vomiting *begins* at, or after, the fifth or sixth month, it is generally presumed

that it is caused by the death of the fœtus, or some affection of the membranes, such as excessive amount of liquor amnii, disease of the kidneys, blood poisoning, or alcoholism. Dewees has said that "very sick women rarely abort." Still, anything which produces a deterioration of the maternal health, increases the risk of abortion. Matthews Duncan has well said, "there are vomitings *of* pregnancy, and vomitings *in* pregnancy." When in medical charge of a Line steamer, on a voyage to Australia, one of the passengers suffered from such a severe form of continued sea-sickness, that she was confined to her berth all the time. She recovered on landing. Another woman had severe vomiting. She was delivered of a dead five-months' fœtus, and finally recovered, although she had a bad attack of puerperal fever. These two cases illustrate Matthews Duncan's statement. It may be here mentioned that Dr A. Flint, in the *American Practitioner* for 1878, records a case of severe vomiting, where the patient was fed by enemata only, for sixteen months. This mode of feeding, combined perhaps with the administration of predigested foods, as recommended by Sir W. Roberts, may do much to lessen both the maternal and fœtal mortality.

OVER-SUCKLING.—Barnes states that the factors which may produce abortion in this complaint are,—first, blood degradation, or anæmia, and its attendant empoisonment; second, malnutrition of the embryo, and its uterine attachments; third, the tendency to blood, and serous exudations; and fourth, the double eccentric irritation of the diastaltic function, proceeding from the uterus and breasts. Among a considerable number, it is a very prevalent idea that prolonged nursing prevents conception. Perhaps, however, the opposite is nearer the truth, for impregnation and expulsion of the ovum may frequently take place. The effects of putting the child to the breasts causes contraction of the muscular fibres of the womb. This has been pointed out by Tyler Smith, who showed that it was a reflex act, due to irritation of the mammary nerves. Another cause of abortion in such cases is, that the system cannot support three beings. One must be thrown off, and this, the least important.

ANÆMIA, HYDRÆMIA, CHLOROSIS, AND PROGRESSIVE PERNICIOUS ANÆMIA.—Any of these conditions may be a cause of abortion. In pregnancy, the number of red blood corpuscles is lessened, and the quantity of fibrin increased, but this condition may pass into the pathological. The action of the liver, in destroying the red blood corpuscles in pernicious anæmia, is not yet understood. Acute anæmia, when due to a sudden loss of blood, may cause the uterine fibres to contract. One would suppose that in *fainting*, the blood stream may become so slow as to favour the occurrence of thrombosis in the maternal sinuses. In the pernicious form, the fatty degeneration of the muscles of the heart, the intima of the arteries, and portions of the capillary walls of the ovum, may be a cause of abortion. The hydræmia may be followed by œdema of the inferior extremities, abdomen, and labiæ, the tension being sometimes so great as to threaten gangrene. Thus, the natural watery condition of the blood may proceed too far. Stoltz calls it “serous cachexia.” If there be œdema of the limbs, and general effusion in the serous cavities, the foetus may die. In this variety we seldom discover albumen in the urine. Cazin relates the case of a cook, who always knew when she was pregnant, by the condition of the varices in her legs. By compressing these, she readily produced abortion. In some rare cases of severe hæmorrhage, due to rupture of the veins, abortion has been induced by it (Parvin’s “Obstetrics,” page 244). An aphorism of Hippocrates is, “If a woman with child be bled, she will have an abortion, and this will be the more likely to happen, the larger the foetus.”

IN PUERPERA HÆMORRHAGICA, the bleeding is sometimes intra-uterine. It is a rare affection, and consequently seldom complicates pregnancy. Dr Phillips describes a case where a woman, six months pregnant, was attacked. It began with colic, followed by a petechial rash, and epistaxis. On the fifth day, labour set in.

HÆMOPHILIA.—In this affection there appears to be a want of power in the blood to coagulate, and a pathological condition of the walls of the blood vessels. There is a strong and marked

tendency to hæmorrhages, especially from the nose and uterus. Three cases of abortion, due to this disease, have been recorded by Kehrer. If the patient's health suffer to a dangerous extent, the induction of abortion has been recommended. Gusserow and others have advised this measure also in progressive pernicious anæmia.

TRICHINOSIS.—Abortion not infrequently occurs in this affection, but pregnancy may go on to full term. In such cases, trichinæ have never been found in the fœtus. Intestinal worms, by setting up severe reflex irritation, may be a cause.

SEVERE ITCHING OF THE SKIN.—Maslieurat-Lagemart is cited as having published the case of a lady who, in eight successive pregnancies, suffered from such violent itching, that premature labours occurred thus, 4 at the sixth month, 2 at the seventh month, 2 at the eighth. The itching was diffused over the entire body. The severe form of pruritus may be so intense as to cause ill health.

IMPETIGO HERPETIFORMIS.—In this disease papules of various sizes appear on the skin, and sometimes on the mucous membranes. In twelve recorded cases, ten terminated fatally. The emptying of the uterus does not appear to exert any favourable influence on the mother's behalf.

CONSTIPATION.—Whitehead relates a case where, for three days, a woman passed fæces to the extent of 15 to 20 lbs.

LEUCORRHŒA.—Whitehead says that in his 2,000 cases of abortion, 1,116 had leucorrhœa. This is now considered more a symptom than a disease.

OVER-FEEDING.—This is said to cause abortion more frequently than under-feeding. It is said that fat women often abort, and are frequently sterile.

CARBONIC ACID FROM ASPHYXIA.—In those pulmonary and other diseases, when the æration of the blood is interfered with, such as pneumonia, heart disease, and in the dying, the quantity of carbonic acid may be so great as to stimulate the uterine muscular fibres. It may be explained by Brown-Séguard's theory, already described.

DIARRHŒA.—Sir Richard Croft was of opinion that this is a frequent cause of abortion. Others consider it to be only an accompaniment. It is certain that a great many take large doses of

Epsom salts, so as to bring about an early abortion. Diarrhœa is, however, often a symptom only, and not a disease in itself.

With these remarks, the consideration of the Auto and Hetero-genetic causes of abortion will terminate, while some of those diseases which disturb the maternal circulation, so as to produce abortion, will be considered.

III. AFFECTIONS OF THE CIRCULATORY SYSTEM WHICH MAY CAUSE ABORTION.—Barnes and others have shown that there is a condition of high arterial tension during pregnancy. Excessive vascular tension, when it comes on suddenly, may end by causing the woman to abort.

PLETHORA by causing congestion of the capillary vessels distributed upon the internal surface of the decidua, or, at a later period, by leading to rupture of one of the utero-placental vessels, may act similarly. In most women of plethoric habit, the menstrual periods are usually profuse. Even when the embryo is in the uterus, there is always a tendency on the part of the uterus to take on periodic activity. It is probable that Burns refers to this when he says, "The process of gestation may be stopped, even before the fœtus, or vesicular part of the ovum, has descended into the uterus, and when only the primary vessels are formed. In this case, which occurs within six weeks after impregnation, the symptoms are much the same with those of menorrhagia."

HEART DISEASE.—The pregnant woman's heart works for two, and her lungs also. The normal hypertrophy may itself lead to valvular derangements. Angus Macdonald has devoted considerable attention to this subject. He goes so far as to advise that marriage should be forbidden, especially to those suffering from stenosis of the mitral orifice, and of aortic incompetency. Cases are given where abortion occurred. In his work on "Heart Disease in Pregnancy," at page 91, the case of a woman, æt. 21, who was, on account of her heart affection, recommended not to marry, is described. Her heart symptoms became aggravated after marriage and impregnation. She aborted about the fifth month, her death occurring thirty-six hours after. In another, suffering from mitral stenosis, and troublesome cough,

and who married at eighteen, abortion occurred at the fourth month, and she died soon after. He also relates the case of a girl, æt. 23, who suffered from aortic insufficiency, with mitral obstruction following an attack of rheumatic fever. Her first pregnancy was natural, but, on becoming so for the second time, she aborted about the fourth and a half month, the fœtus having been dead for some time. Mitral regurgitation may also cause abortion. When this valve is affected, the respiratory system suffers deeply. Cough, expectoration, hæmoptysis, and œdema, all interfere with the proper æration of the maternal blood. The blood is also thrown back on the liver, consequently congestion, hæmorrhoids, and dropsies, may result. Farr has observed an intensely red colouration of the ovaries in cardiac disease, while Lawson Tait has traced intractable menorrhagia, which apparently had its origin in valvular disease. It can be readily understood that when the vascular tension is altered, the placental circulation may be interfered with, while congestions and extravasations take place. The perfect æration of the maternal blood will soon suffer, and with it the fœtus. The occurrence of abortion frequently gives relief to the high vascular tension. The treatment of heart disease, when accompanied by abortion, has been referred to under "Treatment."

LUNG DISEASES—*Pneumonia*.—This disease frequently induces abortion. Jürgensen says, that of 43 such cases admitted into the Vienna Hospital, 25 miscarried. Dr Scroggie describes a case where the fœtus of five months was expelled with the membranes entire at the crisis of an attack of croupous pneumonia. The maternal temperature at the time was 106° F. Chatelain reports 39 cases of pneumonia; 10 of these aborted spontaneously, and 9 were artificially induced. The discovery of the pneumococcus by Friedländer, and the positive statements of some, that pneumonia occurs epidemically, and is also an infectious fever, may help to explain why abortion so frequently accompanies this disease. There is no doubt but that it occurs at certain seasons, that it prevails in localised areas, and that it is sometimes contagious. It also, on the other hand, has

a tendency to recur. Grisolle and Andral have related cases where this happened as often as fifteen to twenty-two times in the same person. Dr Foulis relates the occurrence of an epidemic of pneumonia, when 115 persons, residing in a limited area, were attacked. Pneumonia and ulcerative endocarditis sometimes occur together, and so aggravate the danger. Lancereaux reports a case where a woman, *æt.* 23, aborted at three and a half months. She had a rigor and pneumonia on the eighth day, and aborted on the twenty-fourth. The temperature was normal on the twenty-sixth, but eight hours after this the temperature was 104° F., while on the following four days her temperature was remittent, with occasional rigors. A *post mortem* examination showed the presence of pneumonia, while the mitral valve had a large vegetating ulceration, which contained many pneumococci. Salicylic acid and sulphate of quinine are strongly recommended. The question, Can pneumonia be transmitted to the foetus *in utero*? has not been yet decided. Of late there has been a strong tendency to look upon the disease as belonging to the class of blood poisons. Dr Strachan records a case of pneumonia occurring in an infant. The diagnosis was verified by a *post mortem* examination made twenty-four hours after its death. It is thought by some that the occurrence of abortion in this disease is favourable to the mother's recovery. Does the loss of blood act as the remedial agent in such cases, or is it the breathing space gained by the emptying of the uterus?

Pleurisy.—Ricaud states, that of 13 cases of pleurisy only 2 aborted. If it be double, with high temperature and effusion, abortion is likely to take place.

Peritonitis.—Megrat has recorded 13 cases which occurred during pregnancy. When the inflammation is generalised, it invariably is accompanied by death of the foetus, unless sudden maternal death takes place.

Phthisis.—It is generally conceded that this disease does cause abortion. Barnes calls attention to the fact, that those who suffer from this complaint or from scrofula have often calcareous concretions in their placentæ. I have witnessed a case

of abortion occurring—in a lying-in charity—in a woman in the last stage of phthisis. The foetus was dead, and the mother died six days after. Lawson Tait says that there occasionally is a chronic ovaritis in phthisis, although the usual tendency is to atrophy and amenorrhœa.

DISEASES OF THE LIVER.—Abdominal and thoracic tumours may be a cause of abortion. They may compress the veins, and so bring about passive congestion. Ascites or hydroperitoneum may be due to pressure of tumours or to disease of the liver, as chronic congestion, hydatids, &c. It may also accompany diseases of the heart and kidneys. It rarely occurs before the fifth month of gestation. If the amount is small, little or no harm will follow, but if in quantity, serious symptoms may appear. It is sometimes accompanied by dropsy of the amnion, and in such cases abortion is very likely to occur.

IV. CAUSES OF ABORTION ACTING THROUGH THE NERVOUS SYSTEM.

EPILEPSY.—Abortion may occur, more especially if the attacks come on in frequent succession.

CHOREA.—Barnes quotes from a collection of 39 cases. In 15 of them abortion or premature labour came on. Of 17 fatal cases, in 5 mothers spontaneous abortion preceded death. Chorea does not in itself cause the death of the foetus, but by causing shock or asphyxia, it may bring about abortion. Perhaps the foetus may suffer from chorea while in the womb. Lately Queirel, of Marseilles, published a record of 67 cases of chorea occurring during pregnancy. Of these 39 died and 28 recovered; 29 miscarried. The mortality among those who miscarried was 66 per cent., and 50 per cent. in those who did not. Chorea is likely to recur in those pregnant women who have suffered from this affection during childhood.

SHOCK, &c.—It is said that various psychological influences may be a cause of abortion. Is the *tendency to abort* due to nervous feelings? Schröder says that, independently of demonstrable pathological conditions of the maternal organism, some individuals are of so irritable constitution, that they have a predisposition to abort, and that the least trouble or anxiety brings

this on. There is a tendency to abort at the extremes of life. It is a familiar observation that a woman who has previously aborted is much more likely to do so in subsequent pregnancies. It is true these may be due to an irritable state of the womb, just as there is irritability of the bladder calling for its frequent emptying. This explanation will not satisfy every one, for not a few remain unconvinced unless there is a pathological condition observed. But *must* the body be diseased before it die? Is there no real "falling asleep"? Fear may be a cause. It is said that Nero lighted his palace gardens by burning the early Christians, and that many aborted. The siege of Paris has also shown that fear may produce abortion. Baudelocque relates that he was called to 62 cases of abortion, or threatened abortion, occurring after an explosion at a powder mill in Grenelle. Smellie said—"Abortion may likewise be occasioned by uncommon longings for things that cannot be soon or easily got, or such as a woman is ashamed to ask for, especially in her first child, viz., different kinds of food and drink. These appetites, if not gratified, sometimes produce a miscarriage, and indeed are supposed to affect the child in such a way that the body of it shall be impressed with the marks resembling the figure or colour of what the mother longed for." As regards "mothers' marks," I think very few women would ever think of them, if it were so arranged that the mark marred their own appearance instead of the infant only! However, in cases in which there is an arrest of growth, the date of the supposed fright should be accurately noted, so that a comparison may be made between this and that period of development of the part which has been arrested in its growth. Speaking of the effects of fear, it has been stated that entire herds of cows have been known to abort with dead foetuses after unusually violent thunderstorms.

CONSANGUINEOUS MARRIAGES.—There is no evidence to support the idea that abortions are more frequent among these than any other.

BATHING.—Parvin, of Philadelphia, cites Laurence, of Arkansas, as holding that abortions are produced by the use of hot baths at

the Hot Springs. Tardieu doubts if this is a cause, while Kormann thinks that it may. Tarnier has proposed the use of hot baths in some cases of hæmorrhage in abortion, so as to deflect the blood stream.

INTENSE COLD.—I recollect one case where a woman aborted about the sixth month, when the cold was excessive, the water in the meter and pipes being frozen. The cold seemed to thoroughly chill her system. It is a common idea among some nurses that the cold, frosty weather hastens the occurrence of labours. Cold is a cause of abortion among animals.

EXCESSIVE SEXUAL INTERCOURSE.—Tidy thinks that the sterility of prostitutes is apparent, not real, for that they frequently abort at very early periods of gestation. He confirms this statement by saying that when they marry, they frequently become fruitful. Flandrin states that pregnant cows, mares, and sheep miscarry in about 24 to 36 hours after sexual connection. Whitehead was of the same opinion. Depaul considered that two-thirds of the spontaneous causes of abortion were due to sexual intercourse, while Miguel says that nine in every ten are due to it. It is to be remembered that the sexual act is complicated with great emotion, and irritation of the vagina, abdomen, and breasts. Excessive sexual intercourse may weaken the male element, and in this way propagate a feeble embryo.

MASTURBATION.—Hewitt thinks this may occasionally be a cause. Lawson Tait records cases where the practice had been continued for years during married life, and so also does Spitzka. The introduction of substances into the vagina would act as a cause.

GOITRE.—The relationship between the thyroid gland and the uterus is recognised. In some rare cases during pregnancy this gland enlarges, and to such an extent, that the mother cannot lie down, being threatened with asphyxia. Here, either tracheotomy or the induction of abortion may be necessary.*

* The relationship existing between the thyroid gland and the uterus has been known from the earliest times. Not only does it enlarge during pregnancy, but also at the menstrual periods. The Roman matron placed a chain round the young wife's throat before and after the nuptial night, so as to find if the marriage had been completed.

ADOLESCENT AND CLIMACTERIC ABORTIONS.—There is a strong tendency to abort at the extremes of life. Conception may occur when the womb is not sufficiently developed to carry on gestation to a successful issue. Whitehead has shown that very early marriages are followed by abortions. While Serres says that young prostitutes often abort. At the climacteric also the same may take place, owing to the commencing degeneration of the structures of the womb. It will also be due to the fact that the change of life may be accompanied by free hæmorrhages.

Priestley says that the proportion of abortions is greater among elderly than among young women, and that the older period is more productive of pregnancies than the younger, in the proportion of four to three. Burns says, "it is well known that women can only bear children until a certain age, after which the uterus is no longer capable of performing the action of gestation, or of performing it properly. Now it is observable that this incapacity or imperfection takes place sooner in those who are advanced in life before they marry, than in those who have married and begun to bear children earlier. Thus we find that a woman who marries at forty will be very apt to miscarry, whereas, had she married at thirty, she might have borne children when older than forty, from which it may be inferred that the organs of generation lose their power of acting properly if not employed, than in the connubial state." Abortion may, as before stated, be due to an infantile state of the uterus.

VIOLENCE AS A CAUSE OF ABORTION.—Blows, falls, contusions, railway travelling, excessive fatigue, working at sewing machines, may bring about laceration of the utero-placental blood vessels. In one case a young woman struck her abdomen against a table. She aborted two days afterwards, the dead fœtus presenting an ecchymosis on its back. Burdach relates the case of a woman who had received a blow on the abdomen; when the child was born, it was found that its leg and forearm bones had been broken, but had united at acute angles. Women who have been severely pressed in crowds have been known to abort as a consequence. Unless there is some maternal or fœtal disease

present, it is truly wonderful how much injury a woman can undergo without aborting.

As regards the injuries inflicted *directly* upon the ovum, Tardieu divides them into two classes. 1st, *Indirect means*, as bleedings. Taylor says it is thought that abortion has been caused by frequent bleeding from the arm. If there are the cicatrices over any important veins, it will confirm an opinion. Medicines: Trousseau says it is a public fact that women who pick saffron suffer from frequent attacks of uterine hæmorrhage. Electricity has also been used. 2nd, *Direct methods*, such as the use of sounds, bougies, stilets, and the introducing of fluids into the uterus. The uterine sound is a common instrument in procuring abortion. Some women go from one medical man to another, "to have their womb examined," as they say, but in reality to have the ovum detached. Emmet has lately protested against the frequent use of this instrument. In very few gynecological cases do we require to supplement the digital examination with the use of the sound.

SURGICAL OPERATIONS.—The question, "Should operations be performed during pregnancy?" has been often discussed. Given a patient with fairly healthy tissues, and a sound urine, of proper specific gravity, and free from albumen and sugar, the surgeon need not hesitate to operate; with this qualification, however, that the operation be not on the sexual organs. Cohnstein collected eleven cases of herniotomy, the patients being from three to six months pregnant. Three aborted soon after the operation, one died of peritonitis, and seven went on to term. Wounds of the abdomen, involving the peritoneal cavity, have generally caused abortion. In gunshot wounds of the pregnant uterus, Parvin has collected three cases, and recorded them in the "International Encyclopædia of Surgery." Pregnancy was arrested in all, and only one child was born alive. In six cases of tracheotomy two aborted, but three mothers died within forty-eight hours. Four cases of amputation of limbs are recorded, one woman died of septicæmia, and two aborted. Twelve cases of ovarian tumours have been operated on during pregnancy.

Barnes thinks that the administration of chloroform seems to tend to abortion. Cohnstein's statistics of all kinds of operations—not excluding those on the sexual organs—gives 45·5 per cent. of the cases as terminating in abortion. Massot's statistics of 131 operations of all kinds gives forty abortions as occurring, or 30 per cent. Lawson Tait has operated on some thirty pregnant women for ovarian tumours, only one aborting. In this one the clamp was used, and the pedicle sloughed up to the uterus. She died an hour after aborting. Dr D. Mann gives the following table. In 94 operations there were 20 abortions and 4 maternal deaths:—

ABORTIONS AFTER VARIOUS OPERATIONS.

Nature of Operation.	No.	Abortions.	Deaths.
Venereal warts of vulva,	19	3	—
Do. of vagina,	3	—	—
Elephantiasis of vulva,	2	—	—
Sarcoma of vulva,	1	—	—
Lipoma of vulva,	1	—	—
Cyst of vulva,	1	—	—
Abscess of the vulvo-vaginal gland,	5	1	1
Unruptured hymen,	1	—	—
Polypus of vagina,	4	1	1
Cyst of vagina,	1	—	—
Abscess of vagina,	1	—	—
Stenosis of vagina,	1	—	—
Ant-Elytrorrhaphy,	1	—	—
Vesico-vaginal fistula,	5	2	—
Urethral caruncle,	5	—	—
Dilatation of urethra for stone, &c.,	5	—	—
Cystotomy,	2	—	—
Recto-vaginal fistula,	2	—	—
Stricture of rectum,	1	1	—
Fissure in anus,	3	2	—
Fistula in ano,	1	1	1
Ruptured perineum,	7	1	—
Polypus of cervix (small),	3	1	—
Polypus of cervix (large),	7	3	1
Lacerated cervix,	6	2	—
Cancer of cervix,	6	2	—
Total,	94	20	4

EPIDEMIC ABORTION.—Velpéau mentions such as having occurred in 1811, 1816, and 1821. Such occurrences seem to be more frequent among animals. Nothing is yet known of the causation. Some meteorological influences may be at work. It is a common idea that the incoming of frosty weather hastens the beginning of labour. Tarnier quotes Saneorette as saying that the women who live on the summit of the Vosges are very subject to abortion, and that they descend to the plains when they wish to avoid this accident. Perhaps also, the zymotic poisons may, by entering the maternal system, and directly affecting the fœtus, act as a cause. Barnes quotes from the “Clinique des Hôpitaux des Enfants, 1842,” where it is stated that if the south wind prevails in winter, if the season is rainy and the spring cold, pregnant women are liable to abort, and if they go to their time, the children are languid and feeble. (See Abortion in Animals, page 145, *et seq.*)

SYMPATHETIC ABORTION.—Pregnant women, when approaching term, may experience uterine pains when they are in the presence of others who are in labour. This phenomenon has also been noticed in cows. From this it is deduced that a pregnant lady doctor would do well not to conduct confinements. It has also been stated that menstruating women should not either perform, or be present at, *post mortem* examinations, owing to the fear of septicæmia setting in.

DEATH OF THE MOTHER.—It is well known that a woman may plead unconsciousness of delivery, and also that the infant may be born during an attack of maternal convulsions. If a multiparæ with a large pelvis and a small fœtus die, all these will favour the expulsion. The subject of *post mortem* parturition has been discussed by Aveling in the “Obstetric Transactions” of 1873. He formulated the following conclusions:—That the uterus might expel its contents after death, even when no symptoms of natural parturition are discovered before death. Also, that there may be a contractile power in the uterus itself which remains after death. Expulsion may occur some hours after death, when it is due to the pressure of gases on the uterus,

caused by putrefaction. He further stated that the infant may live for some hours in its dead mother's womb.

If the saturation of the maternal blood with carbonic acid causes uterine contractions, this might give rise to expulsion of the foetus soon after maternal death. A writer has spoken of "the last vital act of nature to perpetuate herself," when such occurrences take place.

CHAPTER IV.

THE CAUSES OF ABORTION.

SECTION II.—FŒTAL CAUSES.

How do diseases generally arrest the life of the fœtus? Magendie and Savory proved that when noxious substances were introduced into the body of the fœtus directly, they were conveyed to the mother. Previous to this, the reverse was known to be true, *i. e.*, that the fœtus might suffer when supplied with impure or foreign substances in the mother's blood. Savory has related his experiments in "*The Lancet*." They bear out Colles's law, that, although the fœtus may become syphilitic through the father, still, the mother may be infected by the fœtus.

Savory experimented on dogs, cats, and rabbits. He used a solution of strychnine, made by dissolving twenty-four grains in seven drachms of water, and one drachm of acetic acid. In his first experiment, a pregnant bitch was chloroformed. Her abdomen was opened, and the uterus partly drawn out. This was divided over the fœtus. The amnion was then punctured, and the fœtus allowed to escape. It was received on a napkin, but remained in connection with its mother through its cord. Its abdominal wall was next carefully punctured with the needle of a hypodermic syringe, and ten drops of the strychnine solution injected into the peritoneal cavity. The fœtus soon became tetanic. A second incision was next made over another part of the uterus, but the fœtus was not drawn out. The side of its chest was wiped dry, and ten drops injected. Finally, the first fœtus was returned into the womb, and the incision sutured. In about nine minutes from the time of using the first injection, the mother was seized with twitchings, which

increased in severity. In twenty-five minutes she was dead. Five minutes after death, her abdomen and womb were again opened. There were four fœtuses present. The two which had been operated upon showed no signs of life, while the two others were lively.

A further use of his experiment may show why the mother sometimes suffers so little from the carrying of a dead fœtus in her womb. He chloroformed a cat, and after it was dead, opened her abdomen and womb. Two fœtuses were then extracted, their cords having previously been tied. Each fœtus had then injected into it ten drops of a solution of strychnine. They were now introduced into the peritoneal cavity of another cat, and allowed to stay in for more than twenty minutes. No symptoms of strychnine poisoning followed. It should be added that Magendie says, "I have often injected very active poisons into the vessels of the cord, directing them towards the placenta, but I have never seen the mother suffer from the effects of them."

Magendie introduced camphor into the veins of the pregnant bitch. He found that the blood of the fœtus had, at the expiration of fifteen minutes, acquired a distinct smell of the drug. Quadrupeds, carrying their young, were made to take four ounces of madder root with their food. This colouring matter was found in the serum, urine, liquor amnii, teeth, and bones of the fœtus (Mussey). Granville says, that in his experiments with six pregnant women, these took nightly, and for seven days, fifteen grains of rhubarb powder. At labour, some of the liquor amnii was kept. A little of the fœtal blood was also drawn off before the cord was tied. Some of the urine was also saved. Each of the secretions appeared tinged with the yellow root, and bore the smell of it.

Reference has already been made to the different modes by which the fœtus suffers in those maternal diseases which are a frequent cause of abortion. Hohl found that an increased maternal heat gave rise to an increase of the fœtal heat, and also, that a quick maternal pulse rate, was followed by a similar

condition in the fœtus, and *vice versa*. Löhlein, in a case of maternal erysipelas, counted the fœtal heart beats at 200 per minute. The limits of survival at high temperatures lie between 40° and 41° C. Runge placed pregnant rabbits and bitches in a heated stove. When the temperature in the vaginæ of the mothers did not exceed 41°, the fœtuses were born alive, but if the temperature reached 41·5° C., they perished. The animals were placed in a well ventilated box, which could have the air in it raised to a temperature of 122° F. The animals generally died in forty minutes of "heat stroke." The fœtuses *in utero* were always found dead when the temperature was not high enough to kill the mother. The animals were killed when the temperature varied from 39° to 42° C. When the uterus was opened, the fœtuses generally were found dead, and always so when the temperature rose to 106·7°. The fœtuses were always found to be alive when the maternal temperature was not higher than 104° F.

Runge concludes:—

1st. That the temperature of the fœtus is habitually higher than that of the mother, and continues to hold this relationship in fevers, &c.

2nd. That if the temperature of the mother is only raised for a short period to 41·5° C., it is fatal to the fœtus; and

3rd. That the fœtus dies of increased heat, when the latter does not prove fatal to the mother.

Doléris has shown that, if the temperature of the pregnant animals experimented on rose *slowly, and not within one hour*, to 105° F. or 106° F., the fœtus bore the heat well, and was unaffected by it. Runge afterwards found that if the temperature was raised, even very gradually, to 109° F., the mother suffered from heat stroke, and the fœtus died. Preyer ("Physiologie des Embryo," 1884) in one instance noted a temperature of 111·2° F. in a fœtal guinea pig. It lived for eight minutes, or until it was removed from the uterus. The above statements show that a sudden rise of the maternal temperature is much more dangerous to the fœtus than when the rise is gradual.

This high temperature may kill the foetus simply by "heat stroke," or by causing granular degeneration of the muscular fibres of the heart. It may also be due to an acute congestion of the foetal organs, which sometimes accompanies maternal fevers. Winckel remarks that it is probable the foetal warmth rises in quicker proportion in the foetus, because the liquor amnii becomes overheated, and so ceases to control the foetal temperature. It has been suggested that the heat causes coagulation of the myosin of the heart, but it has been stated that a temperature of 140° F. is required to coagulate the substance. The naturally greater heat of the foetus may be explained by the greater activity of its glandular organs, for, the greater this activity, the greater the heat produced.

Priestley, in his experiments performed in the Physiological Laboratory of King's College, has shown that the temperature of the maternal uterus was higher than that of her vagina, while the temperature of the foetus was higher than either. Thus:—foetal 99°, uterine 98·40°, and vaginal 98·2.

The effects of carbonic acid on the foetus has been already alluded to.

It is not yet known whether the placenta acts as a barrier to the different germs of disease, so as to prevent their passage into the foetal blood, but it is held by some that such a passage may take place. Lebedeff says, in order that microbes may pass from the placenta through the villus, the latter must have been deprived of its epithelial covering; while Koubassoff holds that the placenta must be in a diseased condition if the microbes *fail* to pass. It is now known that when the epithelium is removed from portions of the adult body, such as the pharynx, or respiratory tract in the lungs, pathological conditions have a much better bed for taking hold and developing, than when the surface is entire. Gast and Behm have found that the vaccination of pregnant women shortly before delivery, does not affect the subsequent vaccination of the children. Bollinger found that the anthrax bacillus was unable to pass the placenta. Strauss and Chamberland hold strongly to the view that the bacillus

anthracis can and does pass. Koch says that in rare cases the tubercle bacillus infects the fœtus *in utero*. Kaltenbach has reported a case where a woman had an attack of erysipelas in one of her limbs on June 19th. Her temperature was 102·2° F. It left her on July 1st. On July 15th she was confined. The fœtus had its scalp, neck, and thorax covered with thick scales of epidermis, peeling off in pieces, exactly resembling the desquamation seen in scarlet fever and erysipelas. Both mother and child recovered. Pasteur took some blood from a sickly new-born infant, whose mother had suffered from supposed puerperal fever. From this he cultivated a microbe, having the form of a vibrio. From the mother's blood no cultivation could be obtained, and, at her death, no lesion of the genital organs could be found. She, however, had an old hepatic abscess, and in pus taken from this he discovered the same vibrio. It is evident then that much more evidence must be produced before one can prove that pathogenic micro-organisms pass from the tissues of the mother across the placenta to the fœtus.

Lizzoni and Cettani of Bologna have lately published the records of a careful examination of a fœtus of five months, which was expelled by a woman suffering from cholera. It was born on the third day of her illness. No definite comma bacilli were found in the blood, but by means of plate cultivations, colonies of Koch's comma bacilli were grown. The authors conclude that the disease can be transmitted from the mother to the fœtus by the blood.

Evidence has been given to show that the fœtus may be affected by drugs, when introduced into the maternal system. Bryer has laid it down—

1st. That easily diffusible substances in solution may pass from the maternal to the fœtal blood.

2nd. That the oxygen is given off from the maternal hæmoglobin to the fœtal hæmoglobin.

3rd. That sodium, indigo sulphate, and potassic iodide, may pass from the maternal blood to the amniotic fluid, without passing through the fœtal circulation.

4th. That diffusible substances may pass from the fœtus to the mother.

5th. That oxygen may pass from the foetal hæmoglobin to the maternal hæmoglobin, if the latter contains little or none.

6th. Certain substances in solution probably pass, in small quantities, from the liquor amnii into the maternal blood.

7th. That formed elements probably pass in the normal placenta, only when they are very small, more especially through the agency of leucocytes, or by increased blood pressure.

What are the effects of drugs on the fœtus? Gusserow detected iodine in the liquor amnii, and in the urine of the newly-born infant, after having administered iodide of potash for two weeks before labour to the mother. Benicke, in 1875, gave salicylic acid to twenty-five pregnant women during labour, and detected this substance in the urine of the child, even after birth. P. Ruge and A. Martin have confirmed the accuracy of this experiment. Ritz injected cinnabar into the blood of a pregnant bitch, and afterwards found the red particles in the blood of the fœtus. Fehling injected woorara poison into the jugular vein of two rabbits, and one dog, maternal life being kept up by the use of a tracheal tube and artificial respiration. In this experiment the fœtuses did not show any signs of poisoning. In another case, he continued the administration of chloroform until respiration was suspended. He then carried on artificial respiration for eighteen minutes longer, and, at the end of this time, opened the abdomen and uterus, and found the fœtuses unaffected. Zweifel gave chloroform to five women during labour, and found traces of it in the placenta and blood of the fœtus. He also instituted experiments to show that the fœtus breathed through the placenta. He opened the abdomen and uterus, then shut off the supply of air to the mother. Immediately the fœtus began to breathe violently, both umbilical arteries and vein becoming engorged and purple. When the mother was again given a free supply of air, the vessels of the cord returned to a bright red, and the fœtus breathed naturally. It is believed that the salts of opium will pass from the maternal

to the foetal blood, and affect the foetus *in utero*. Two milligrammes of atropia have been given to a mother three hours before labour; the child was born with dilated pupils, which would not react to light. In another case, when the pregnant woman was given hypodermic injections of morphia, the foetal heart became less frequent and arhythmic. Fehling and Kormann also think that the salts of opium affect the foetus. Cases, however, are known where the mother had the "opium habit" while carrying her infant, and where the foetus did not suffer. It is supposed that here it also contracted the "habit," and so escaped. Some physicians, who have given morphia during labour, have thought that the child, when born, was suffering from poisoning,—its pupils being contracted, and its breathing slow and laboured. In such cases, great care must be taken not to confound this with symptoms due to asphyxia. If narcotics, says Hodge, affected the foetus as readily as they do the infant, the calling of the abortionist would soon be gone, for every woman could easily destroy her own offspring while yet in the womb. Fortunately, the Creator has wisely guarded against this; even those drugs reported as abortifacients only act on the maternal tissues, and frequently kill her. Pollak has shown that when 15 grains of quinine were given to a woman in labour, the urine of the child, born one and a half hours after, showed the presence of quinine. Runge found similar results. This passage of various substances must be either hindered or permitted by the maternal blood pressure; by the fineness of the substances introduced; by the quantity introduced; and by the condition of the medium existing between the uterus and placenta. There is no doubt but that the materno-foetal placental septum allows various substances to pass. The double layer of cells may collect and discharge various drugs from the maternal to the foetal blood. Again, one would suppose that only a limited quantity of material could pass. Why, for instance, will a full dose of medicine, given to the mother, not poison the foetus? Why can she take mercury, and still the foetus not suffer? It may be that only a *minimum* quantity passes through, or that

the foetus becomes accustomed to it. But why, then, does the first dose not act injuriously? Perhaps its nervous and other systems are at this time less impressionable. Proof of this might be drawn from those cases where the mother takes large quantities of opium during pregnancy, and where the foetus does not suffer; but were she to put the babe to her breast, and it took some of her milk, death would take place in a few hours. Gusserow compares the human ovum with the chick in the egg, both being comparatively independent of the mother. The foetus has a respiration of its own—through the placenta; it has a thermogenic function, having a body temperature some 1.4° F. higher than the mother; also a secretory function, whereby sebum is constructed and deposited, urine formed, meconium, and also liquor amnii.

An extensive field for research is open in connection with this subject. Much information can be procured by watching the effects of drugs on infants born under difficult or diseased conditions. If, for instance, forceps be used when the child is born in a half-dead condition, it will be of little use in seeking for symptoms when a dose of morphia, quinine, or chloroform has been given at this stage of operation. Effects must also vary with the age of the ovum, as, up to the beginning of the third month, the placenta is undeveloped.

Again, a much fuller knowledge of the means by which the foetus secures its nourishment must be obtained. How is the foetus nourished, and does it obtain its food through the placenta, or from the liquor amnii? It cannot live alone on the oxygen it receives from the maternal blood. Ahlfeld (Marburg) has shown that the liquor amnii contains a large quantity of albumen, and he asserts that the foetus swallows this in large quantities, and so nourishes itself. He further shows that the meconium contains numerous downy hairs (lanugo) and vernix casiosa,—these having been swallowed. Certain movements which, he says, are due to sucking and swallowing by the foetus, have been recalled by means of funnels placed on the abdomen, and connected with Marey's drum. If the liquor amnii contains

a large quantity of albumen, it must draw this supply from either the maternal or foetal circulation. If from the latter, then the foetus must suffer from a physiological albuminuria. Again, does the foetus urinate?

Having made these preliminary remarks, a consideration of the envelopes of the foetus will now be taken up, while the diseases of the embryo, which may cause abortion, will be again referred to.

DISEASES OF THE PLACENTA.—The affections of the decidua have been already described. When referring to the different affections of the placenta, some short remarks will be made on the maternal and foetal portions, which combine to form this important structure. It is not until the third month that the placenta begins to be a distinct organ, and not until the end of the third month, or the beginning of the fourth, that it is complete. This fact has an important bearing on the symptoms and treatment of abortion.

Congestion of the Placenta (see Frontispiece).—This may be either an acute or chronic affection, and may affect either the maternal or foetal portion, or involve both. When it occurs in the later months, it will be difficult to say what part is attacked, but, in the earlier weeks, when the foetal and maternal constituents are not so intimately blended, it will be less so. It is supposed that maternal congestion is more frequent in the early weeks, while the foetal and mixed varieties occur more frequently in the later months. Barnes says that the foetal congestion in its simplest form is best seen in delivery at full time, in the placenta whose cord has been ligatured immediately after delivery of the child. Here the veins on the foetal surface are enlarged, full and tortuous, while the vessels of the villi are enlarged and filled with corpuscles.

The *causes* of congestion may be local and general. Anything which interferes with the return of blood from the uterus, as tumours, diseases of the heart, lungs, or liver, may be a cause. The placenta has well been compared to the lung in the adult, and, as the latter is frequently congested, so is the former.

Barnes illustrates this by describing two cases, in which the proper oxidation of the blood was interfered with. When the muscular fibres of the uterus contract, the circulation of the foetus is interfered with, while the pulse in the cord falls in frequency and power. If the trachea is compressed, the animal is asphyxiated. Congestion may interfere with the health of the foetus by interrupting the blood stream, and by rendering difficult the proper aeration of the blood. Further, it may pass into inflammation or hæmorrhage. In simple congestion, the nutrition of the foetus may be interrupted, and the elimination of its products checked.

Placentitis, or Inflammation of the Placenta.—This may be either an acute or chronic affection. Brachet compared it to inflammation of the lung. Some dispute its existence, and ask, How can there be inflammation in a tissue destitute of capillaries and nerves to control their calibre? There are, however, foetal capillaries. Sir J. Simpson describes three stages,—first, congestion; second, exudation of coagulable lymph; and third, formation of purulent matter. Either the parenchyma or membranes may be attacked, or both. Either one or several lobes may be attacked at the same time. Hering says the decidua cells swell, and split up into a network of connective tissue, while yellow and white septa pass between the cotyledons. Not only may inflammation originate in the cells of the serotina, but it may, according to Maier, begin in the adventitia of the foetal arteries. The villi are at first swollen, but, at a later stage, are compressed, and either become fatty, or undergo atrophy. New granulation tissue is formed, which may be nodular, or diffused, and as the disease progresses the connective tissue increases greatly in quantity, while the maternal and foetal vessels are first compressed, and finally have their lumen obliterated so as to form hard whitish cords. Effused lymph may be deposited either on the foetal or maternal surface of the placenta, or in its substance. In the latter case, there will be induration. When it occurs on the maternal surface there will be adhesions, and, if deposited on the foetal surface, there may be increase of the liquor amnii, and perhaps bands

connecting it with some part of the foetal body. Bands of connective tissue have been found penetrating into the uterine tissues, thus rendering the separation of the placenta impossible.

The inflammatory exudation in rare cases breaks down and forms pus. Consequently abscesses may form and set up pyæmia in the mother or foetus. Many hold that no real pus is formed. Purulent matter has, however, been found on the uterine surface of the placenta, and in the uterine sinuses. Bouchut, in one case, found two abscesses of the size of a pigeon's egg beneath the foetal surface, and in another placenta several smaller ones. Cruveilhier speaks of purulent infiltration of the placenta.

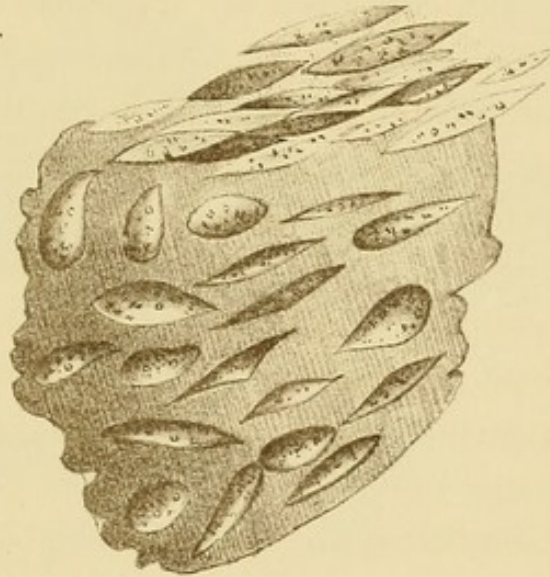


FIG. 9.—Placental tissue, showing granular or slightly striated matrix with elongated decidual cells, constituting the first stage of interstitial placentitis (Hegar and Maier).

Effusion of blood sometimes follows, either on the foetal or maternal surface.

Hegar and Maier, in a memoir on this subject, say that the inflammation begins in the formation of soft granular exudations, and ends in induration and disorganisation. Normally the decidual tissue consists of elongated cells, embedded in amorphous inter-cellular substance. These cells, in inflammation, undergo a great development, while the inter-cellular substance is converted into fibroid tissue. Further, the blood vessels and villi may undergo atrophy and degeneration, owing to the compression made on them. They then form nodules or cords which are

embedded in the placental tissue. Hegar says this pathological change has a close resemblance to the changes seen in cirrhosis of the liver. (See Figs. 9 and 10.)

Placentitis has a tendency to recur in subsequent pregnancies, as it generally depends for its cause on a morbid condition of the mucous membrane. Schröder and others do not regard it as a true placentitis, but as a chronic endometritis affecting the mucous membrane primarily, and extending from this to the

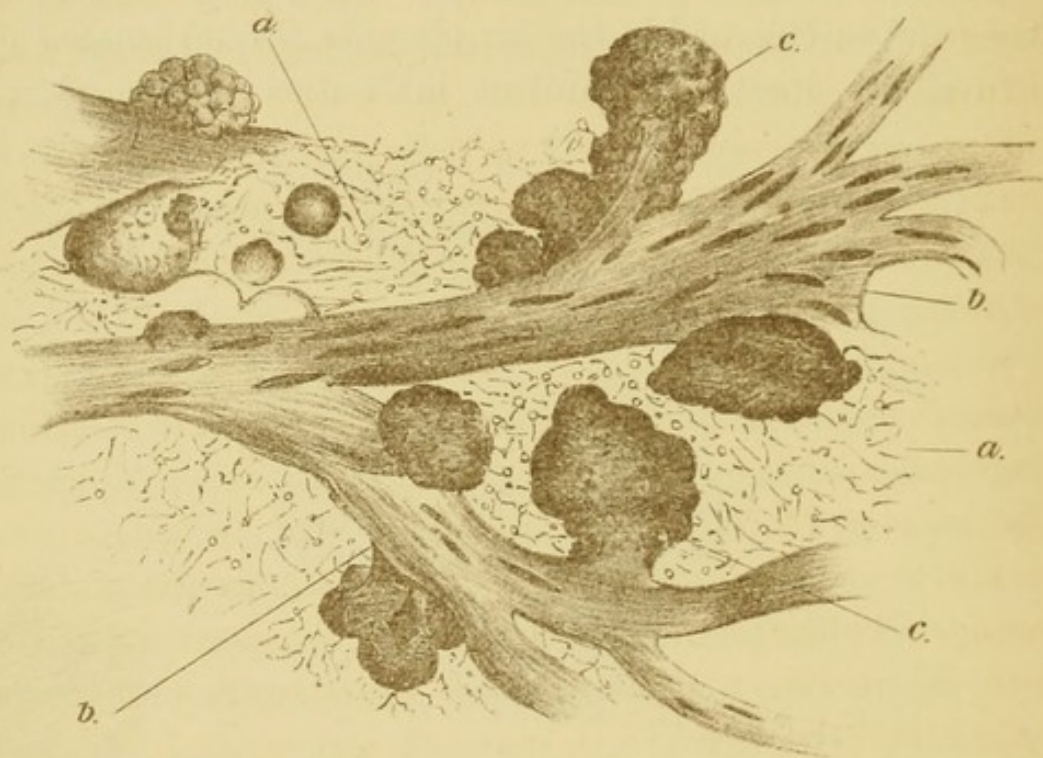


FIG. 10.—*a*, Strong development of connective tissue, taking the place of the earlier cellular formation seen in the normal placental tissue. *b*, Indication of vessels obliterated by the growth of connective tissue. *c*, Extremities of villi atrophied and in fatty degeneration (Hegar and Maier).

placenta. Barnes says, it is quite possible the maternal portion of the placenta may suffer along with other mucous membranes, as in smallpox and scarlet fever. Certainly it is frequently met with in decidual endometritis and metritis.

Beside leading to abscess or apoplexy, the inflammatory action may pass on to hepatization, induration, or sclerosis. Hypertrophy of the serotinal decidua is sometimes observed. The material effused between the uterus and placenta may become thick and organised, as sometimes happens in pleuritis. The

subject has also been treated by Dr Wilde in the sixth volume of Ryan's *Lond. Med. and Surgical Journal*. It has been stated that atrophy generally follows exudation, while hyperplasia and hypertrophy follow an attack of uncomplicated inflammation. The sclerosis may be found in *nodules* of varying size, which are formed by circumscribed areas of connective tissue. They should not be confounded with transformed or old blood clots. The nodules are found on either the maternal or foetal portion of the placenta, and are sometimes followed by calcareous degeneration, or a deposit of pigment. As regards the effects of this disease on the child, these will vary, according to the amount of placental tissue involved. If only one lobe suffer, no ill results will follow. The foetal blood runs to the clusters of villi, just as that of the fish is driven to the gills. If many are injured the foetus suffers, owing to the non-æration of the blood. Its ill results may also be seen in the adhesions which take place between the placenta and the uterus, the mother's life being here severely involved.

Sclerosis of Placenta.—Neumann says that in this disease, the villi develop so much that they encroach on the maternal sinuses and obliterate them. Meyer, while not agreeing with this, describes a process in which there is a hypertrophic proliferation of the connective tissue of the placenta and subsequent induration. The blood-vessels are compressed, while the placenta finally becomes smaller. He says that in the normal placenta there is only a small amount of connective tissue.

In chronic inflammation there is a formation of connective tissue, and a thickening of the coats of the blood-vessels, which may eventually obliterate their lumen. This has a serious effect on the heart of the foetus, for it may give rise to hypertrophy, and perhaps patency of the valvular orifices. Women who suffer from this affection generally complain of a dull or burning pain at the seat of the inflammation, while vomiting and other febrile symptoms may occur. It has been said to follow tight-lacing and injuries.

Hypertrophy of the Placenta.—Dr Heman describes a case

in which the placenta weighed more than four pounds. The foetus at birth was dead and decomposing. The affection is frequently associated with dropsy of the placenta, ascites, and anasarca of the mother and foetus. Stein has noted a placenta which weighed over six pounds. The normal placenta—in a fully developed condition—is about three quarters of an inch in thickness at its centre, and gradually thins off towards the circumference. Its diameter may vary from six and a-half to eight inches, and its circumference—which is often irregular in outline—to about twenty-five. It generally weighs about twenty ounces. Barnes says that the average area of the fully developed placenta, when attached to the inner wall of the uterus, is about seventy to eighty square inches. This uterine arc, it may be added, lessens to about eight or nine square inches after the womb has contracted.

Atrophy, or Extreme Thinness of the Placenta (Placenta Membranacea), may follow placentitis, or disease of the chorion villi. It may be a consequence of an imperfect development of the decidua. I have, in a case of abortion, seen a placenta so thin as to be almost transparent. The foetus was about four months old, and macerated. It has been stated that an almost constant relationship exists between the weight of the placenta and child. Gassner demonstrated this by weighing the two in succession. This relationship is not to be wondered at, as, for all practical purposes, the placenta is the golden link which binds the mother to her child *in utero*.

Placental Phthisis.—This affection has been described by Sir J. Simpson and others. The former says its first stage is not an increase either of cell structure or of connective tissue, but that there is an exudation or deposit thrown out among the villi. A kind of hepatization is thus produced, which may be either partial or general, according to the amount of disease present. Some of the masses are dense, while others undergo a process of disintegration in their centre. This softening may attack the blood-vessels, so that extravasations may be found in the centre. In the order of successive changes the disease runs a course somewhat similar to phthisis of the lungs. Thus, there is first solidi-

fication, and second, softening and hæmorrhage. In some cases the exudation does not break down, but forms fibroid connective tissue. A notable feature is hypertrophy of the contractile coats of the foetal blood-vessels. Lawson Tait regards this as a compensatory effort on the part of the arteries, to overcome the obstruction in the extremities of the villi. It is generally a chronic disease, but may run an acute course, and so lead to the death of the embryo.

Gangrene of the Placenta.—Simpson described this condition. There is no gangrenous odour, owing to the fact that the air is excluded. It takes the form of "dark and mortified portions enclosed in a limited deliquescent mass of bloody and pasty matter." The placental surface of the site of the disease is usually depressed, and umbilicated in the centre. The surrounding placental tissue is inflamed, and may contain extravasated blood. This must be a particularly rare condition.

Calcareous Degeneration, and Deposits.—Barnes calls attention to the observation, that such deposits are met with in the placentæ of healthy women. In such cases it must be regarded as a deposit due simply to an excess of calcareous matter supplied to the foetus. It may, on the other hand, be associated with scrofula, tuberculosis, and poor living. It is sometimes met with in the walls of the foetal villi. Thus, arresting the circulation, it may lead to abortion. Such a deposit gives an opaque appearance to the villi. The calcareous deposits which are sometimes found on the maternal surface of the placenta do not seem to be of the same nature, though the two may co-exist. Dr Champneys has described a placenta which exhibited fibrinous degeneration of the uterine, and calcareous degeneration on the foetal surface. A simple calcareous deposit may so irritate the uterus as to be a cause of setting up muscular contraction and abortion. Mr H. Thomas described a placenta which was studded over with deposits of a calcareous matter. It was obtained from a woman, aged 22, in whom antepartum hæmorrhage had occurred at the seventh month of pregnancy. The foetus was dead, and the cuticle peeled off.

Tumours of the Placenta.—These are of rare occurrence. Galabin showed a placenta in which a tumour, about the size and shape of an adult heart, was placed. It was encapsuled, and, on the uterine side, it was covered by a complete layer of placental tissue. I have seen one case, in which a beautifully clear watery cyst was lying on the maternal surface of the placenta. It was the size of a pigeon's egg. In this case, the mother went on to full term, but had a threatened abortion, with some hæmorrhage and pain, at about the third month. Old extravasations of blood must not be mistaken for new growths.

Œdema. or Dropsy of the Placenta.—This affection has been described by Meckel and Gierse. Here the placenta is pale, swollen, and infiltrated. Simpson says that this disease must not be confounded with the white, blanched, and anæmic condition often observed in cases where the fœtus has died of peritonitis, or other foetal disease, and where the placenta has been retained in the uterus for some time after the death of the child. Nor should it be confounded with fatty degeneration. Dropsy is not a common affection. The pale, heavy, and friable placenta is full of water. If suspended for some time, a quantity of serous fluid will drain off. It may co-exist with hydræmia of the mother, with ascites, or anasarca, due to heart, kidney, or liver disease. It has been found associated with dropsy, and peritonitis of the fœtus, and with excess of liquor amnii. Dropsy of the placenta entails hypertrophy of the villi, and some degree of fatty degeneration may occur. If a primary condition, it generally leads to the death of the fœtus.

Fatty Degeneration of the Placenta.—This is a very serious disease, and in proportion as it involves a part or the whole of the structure of the placenta, so does it threaten or cause the death of the fœtus. It should be recollected that a deposit of oil globules takes place in the placenta in the majority of those diseases which affect it. Indeed, many now regard fatty degeneration, not as a primary condition, but as a phase only of disease. It may attack both the foetal and maternal structures, and it is difficult to state which is the first involved. Barnes

and Kilian have fully described it. Pathologically it is the same as fatty degeneration of the adult tissues. It should not be confounded with fatty metamorphosis, a condition which may be met with in cases of "retained placenta." This latter attacks the entire maternal and foetal structures, the whole organ being then pale in colour, and very friable. (See Fig. 11.)

Fatty degeneration may attack one or more cotyledons. These



FIG. 11.— Decidual cells in fatty degeneration (Barnes).

portions are generally of a pale yellowish colour, and very friable. In the *Medical Times*, March 19, 1853, will be found a full description by Barnes of this disease, and also remarks by Hassall and Druitt. In one case, he says, the foetus was about five months old, when the mother was conscious of its death, in her womb. The maternal surface of the placenta was deeply divided by sulci. Its general aspect resembled brain, both in colour and subdivision. All the lobes had a pale yellow glisten-

ing appearance, like fat, while in the sulci it was pink and red. All the foetal placental circulation had ceased. He farther says that fatty degeneration is far from being an uncommon event. I have seen a case where the mother, who had had a previous abortion, carried her child to the eighth month. Movements of the foetus then ceased, and in four weeks afterwards she was delivered of a dead child, whose cranial bones and scalp were loose, and whose cuticle peeled off. The entire placenta was of

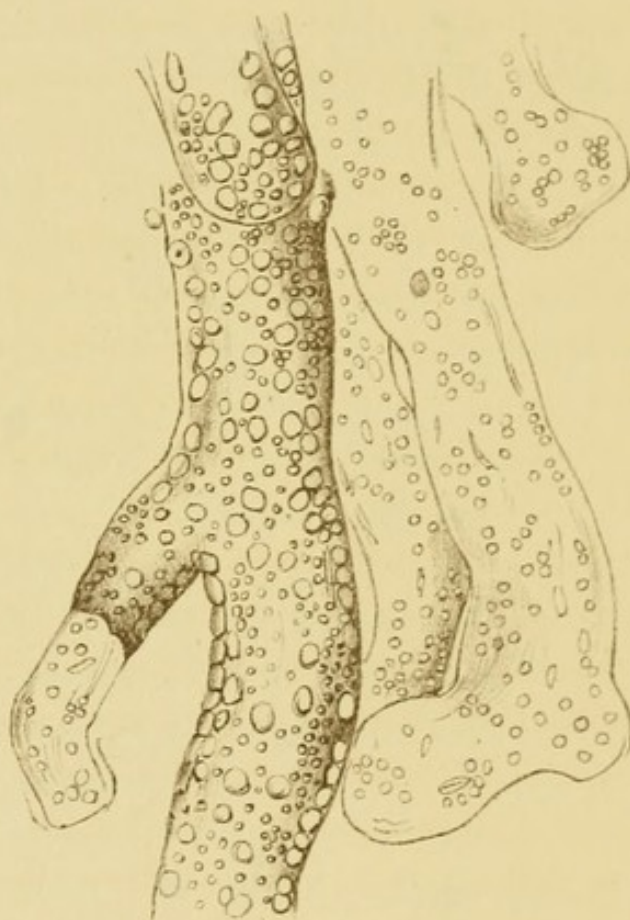


FIG. 12.—Villi in fatty degeneration (Barnes).

a white colour, especially so on the maternal surface. No doubt many children are born alive and healthy when the placenta is partially affected, but its action on the life of the foetus before it arrives at the end of the sixth month is now chiefly being discussed.

If a small portion of the affected placenta be immersed in water, the tufts of the villi do not expand as healthy tissue does. A microscopic examination shows that the villi are opaque and of a yellow colour, containing minute spherules of oil. (Fig.

12.) The chorion is also altered, while the vessels are empty of blood. The decidual cells are studded with spherules of oil. A lobe, which to the naked eye appears healthy, may be shown by the microscope to be affected. Histologically it is to be remembered that the villi are at first simply cellular in structure and destitute of blood vessels. Next there is connective fibro-nuclear tissue—derived from the mesoblast—developed in its interior, while finally small arteries derived from the allantois enter into it. Or, as Virchow put it, each villus is composed of the same tissues as those which give rise to Wharton's jelly in the umbilical cord, there is a framework of mucous tissue, and the external epithelial covering.

When the fatty degeneration begins in the chorion, or fœta membranes, and is extensive, the circulation is interrupted and the fœtus perishes; and when the utero-placental supply is cut off, the placenta atrophies. If the decidua is primarily diseased, it is probable that *the mother* is suffering from some affection, and the abortion is likely to occur earlier than when the embryonic portion is involved.

Sometimes we find hæmorrhage accompanying this disease, when small clots, varying in size from a millet seed to a bean, may be found in the centre of the fatty cotyledon. It was at one time held that the death of the fœtus preceded this degeneration, but now it is known the reverse is the case. The causes of fatty degeneration are not yet well known. Barnes says it may be due to defective vital force of the embryo, or to a defect in the mother's blood, or to both. It is likely to recur in future pregnancies. Druitt, seems to think that an organ like the placenta, which has only a limited life duration, may eventually undergo either fatty or calcareous degeneration. He calls attention to the fatty circular layer which is generally seen in all full-time placenta, and gives some figures of villi loaded with oil and earthy matter, which disappeared when some acid was poured on to them.

Myxoma Fibrosum of the Placenta.—In this rare affection the stems and villi are enlarged by a fibroid hypertrophy taking

place. Some of these may so enlarge as to form distinct tumours in the placenta. (See Fig. 13.) Virchow thinks the disease due to a transformation of the mucous elements pertaining to the villous structure into fibroid tissue, instead of the soft myxoma seen in cystic disease. This affection is more frequently seen in mature placentæ, consequently it does not often lead to abortion. Here the villi, instead of becoming cystic, undergo a fibroid degeneration.

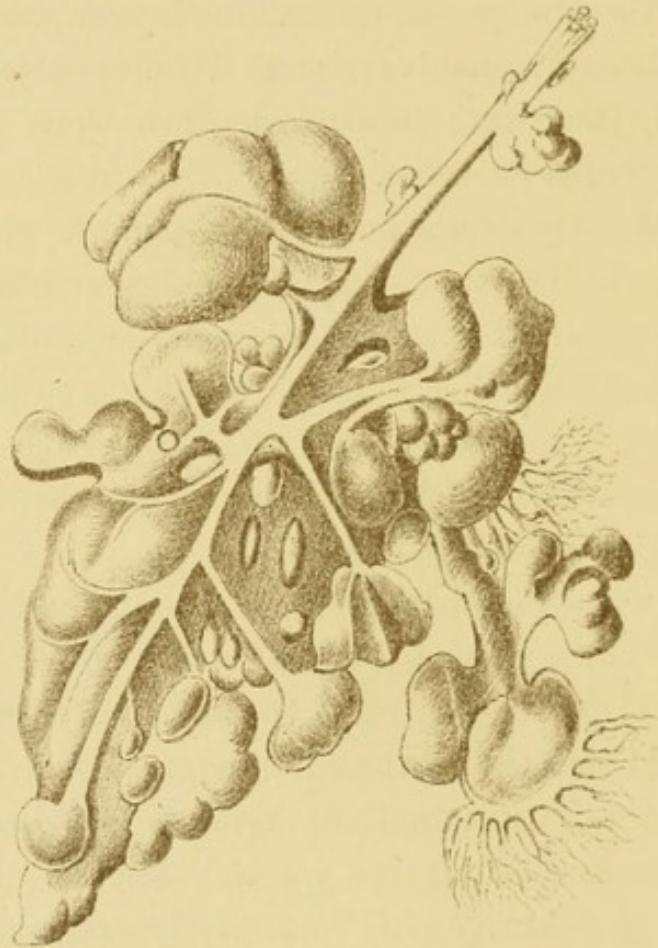


FIG. 13.—Myxoma fibrosum of the placenta (Virchow, after Storch).

Effusion of Blood into the Placenta: Placental Apoplexy.—Effusion, or extravasation, may take place either into the tissues of the placenta, or on its maternal or foetal surfaces. Jacquemier says, that up to the third month, when blood is effused it has a great tendency to spread over the surface of the chorion, owing to the anatomical arrangements of the parts here involved. Up to the second month the foetal and maternal

portions of the future placenta are loosely connected with each other. The villi are loosely implanted in the crypts or depressions of the decidua between the tubular glands, and can be easily withdrawn. After the end of the third month the villi enlarge, and give off many branches, consequently it is impossible to separate the foetal and maternal parts without lacerating them. To the naked eye, a section of normal placenta presents an appearance somewhat like that of a sponge, made up in great parts of villi. Between these villi are the irregular vascular spaces, or lacunæ, which contain the maternal blood. The curling arteries bring the blood to the placenta, and on their way, they not only continue their tortuosities, but they divide and subdivide freely; this condition providing against a too sudden rush of blood to the placenta. On entering the placenta, they push a thin layer

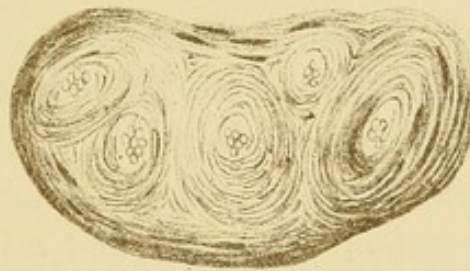


FIG. 14.—Section of a tumour showing fibroid structure (Priestley).

or investment of decidua before them. At their finer subdivisions they are formed of only an endothelial lining and a little connective tissue. Finally, they open, without the intervention of capillaries, into the sinuses, lacunæ, or maternal blood spaces. The sinuses again open into veins, which are for the most part found on and near the maternal surface of the placenta. The blood returns by the slanting venous sinuses—the utero-placental sinuses. Both the coiled arteries and slanting veins are torn across when the placenta is separated from the uterus. The arteries perforate the placenta obliquely, and are more numerous towards the centre. They generally run along its external surface for about one-third of an inch before disappearing into the placenta. The arteries do not anastomose. Regarding the foetal vessels, these, on arriving in the substance of the placenta, divide

and subdivide dichotomously. They anastomose freely together, so that if one is injected, the others also are filled. Finally, they divide into tufts or villi. These blood vessels, when entering, carry before them a thin investment of chorion. It is to be remembered, however, that some consider this to be a decidual covering. Each tuft or villus may at first be regarded as an independent centre of respiration. They hang down into the sinuses, and are bathed in the maternal blood stream. Further, each offshoot pushes before it the wall of the sinus, so that the former is completely surrounded. Coste thought the villi wore through, or caused an absorption of the walls of the lacunæ, so that they were absolutely suspended in the blood-stream, without the intervention of the wall of the sinus. According to Quain's "Anatomy," the foetal villi, from an early stage, have a distinct external covering of epithelium, which may be considered chorionic. When they become vascular they contain connective tissue, and fine blood-vessels; therefore, these vessels of the villi which retain their capillary size are at first separated from the blood in the maternal lacunæ by (*a*) the epithelial investment of the villus, and (*b*) by the wall of the lacuna, which latter consists of a thin outer layer of decidual cells and an inner epithelial layer—the original lining of the capillaries from which they are thought to spring by a process of expansion. The epithelium of the villi soon atrophies, so that eventually the foetal capillaries are separated from the maternal blood-vessels only by the thin-walled lacuna, through which an exchange of gases and nourishment goes on. Kölliker and Goodsir say the epithelial investment of the villi is not derived from the lacunæ, but that they retain their original chorionic epithelium. They also hold that the lacunæ are not dilated capillaries, but independent spaces, developed in the decidua. This much having been stated, the subject of rupture of these vessels will be proceeded with.

HÆMORRHAGE occurring in the early months may be confined to the decidua, or it may extend to the decidual cavity. Occasionally the chorion is ruptured, and the cavity of the amnion

is filled. In such cases, the embryo may be absorbed. When the hæmorrhage occurs between the third and fourth months, the effusion does not extend so far, but is likely to be confined to the placental region. Gendrin has found effused blood between the chorion and amnion. In this case, it is probable the blood came from the utero-placental vessels. An effusion of blood, although fatal to the fœtus, may not at once bring about abortion. Consequently, when it occurs, the clot is found to have partly lost its colour. A limited effusion may not interrupt the course of gestation.

Occurring after the middle period of intra-uterine life, the hæmorrhages do not extend beyond the margin of the placenta, but are circumscribed and confined to the lobes, or lobe, in which they take place. They always, however, show a tendency to extend towards the fœtal surface of the placenta.

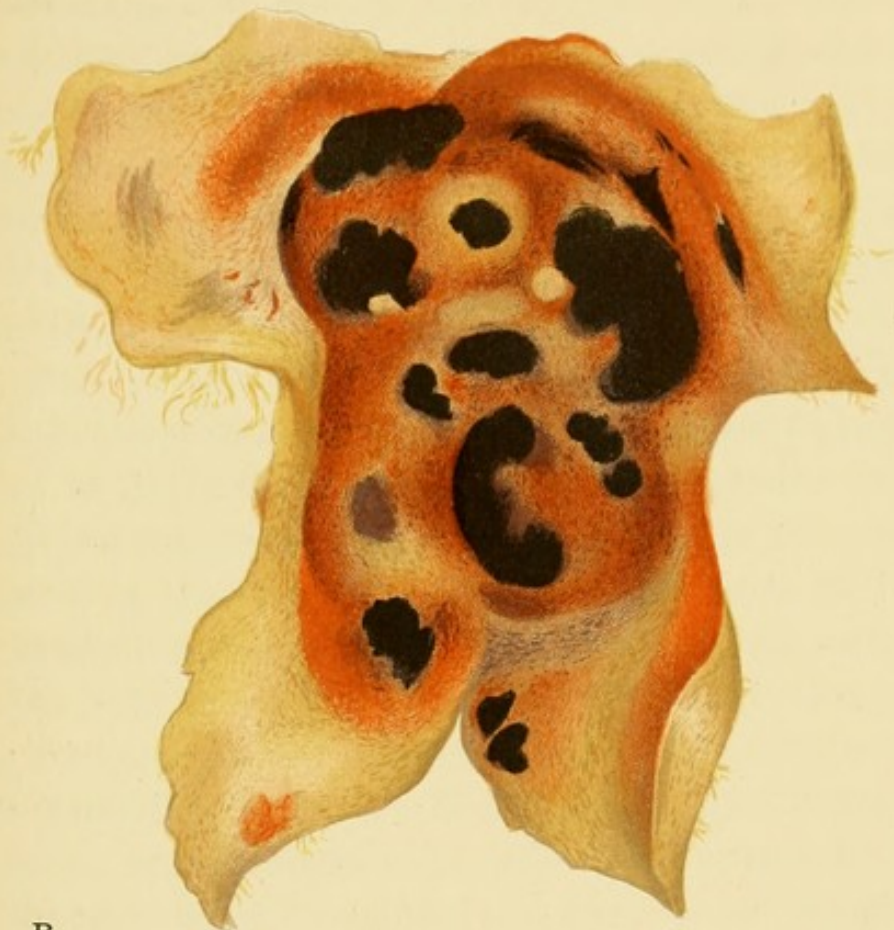
Jacquemier has described three varieties of hæmorrhage. In the *first*, there is no cavity formed by the blood, it simply infiltrates the tissues. In the *second* variety, the blood forms a very irregular cavity, prolonged in various directions, while the adjacent tissues are infiltrated and stained. If the blood be effused near the centre of the placenta, it may pass along the cord for a few inches. Such hæmorrhages may be numerous, or there may be only one. In the *third* form, the cavity is regular, and well defined. There may be several such, and, judging from the appearance of the blood, they are produced by hæmorrhages which occur at subsequent dates. These vary in size from a hemp seed to a pigeon's egg, and may be situated at various depths in the placenta, some occurring more towards the external and others to the fœtal surface. The tissue surrounding the clot is generally healthy, but occasionally it is affected with fatty degeneration. The suffused blood separates into two portions. The serum disappears, and the fibrin which remains becomes firmer and smaller in extent, and loses its colour. It was at one time thought that this fibrin was transferred into masses resembling pus, and tuberculous matter. Barnes says, as the contracted fibrin cannot distend the original cavity previously filled with

clot, a space is left between the wall and the fibrin. He calls these spaces apoplectic cysts. They are generally found on the foetal surface.

When a hæmorrhage is progressive, the *foyer* may be observed to be composed of several definite strata, or layers concentrically disposed, and resembling the layers seen in a partly obliterated aneurism. The centre is occupied by fluid, or partly coagulated blood, and the circumference is made up of condensed fibrin. This condition was described by Cruveilhier, and termed by him placental apoplexy. During some effusions, blood may collect between the uterus and placenta, thereby detaching a portion of it.

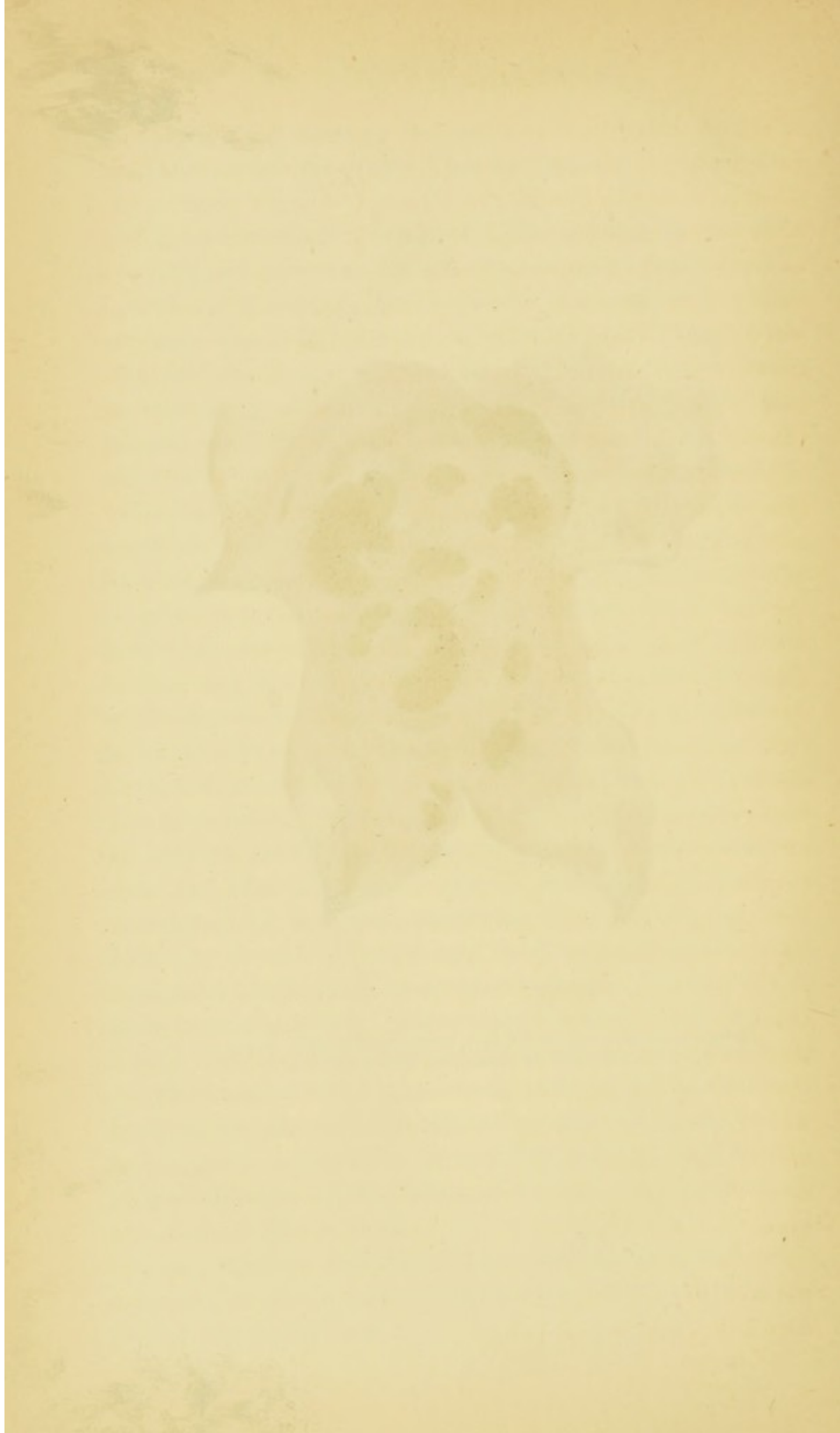
The Causes of hæmorrhage are not yet well known. It has already been shown to occur in fatty degeneration of the placenta, and with those conditions which conduce towards congestion and inflammation of the uterus. Fatty degeneration of the decidua, or of that portion of it which is not used up in forming placenta, may be a cause. Ercolani holds that the true cause of hæmorrhage between the decidua and chorion is fatty degeneration of the cells of the decidua serotina. These do not then give the minute blood-vessels the proper support, hence the rupture and extravasation. It may accompany disease of the heart, liver, and kidneys, pneumonia, pleurisy, exhausting chronic diseases, fevers, and some uterine and ovarian complaints. A blow or other injury, or a sudden contraction of the uterus, as from shock, may cause it. Verdier says the fibrous changes met with in placentæ, are due only to an extravasation of blood, and the changes resulting from it. Bustamente, who wrote on this subject in 1848, held that the masses of blood are not due to rupture and extravasation, but to thrombosis occurring in the maternal sinuses of the placenta. He pointed out that the circulation in the maternal sinuses must be very slow, and that it is easy to bring about stasis, by the slowing of the maternal circulation, as by fainting, or loss of blood.

Other authorities hold that no extravasation takes place without some previous degeneration of structure. Charpentier, in his Essay, holds similar views.



R

Placenta at the end of the twelfth week, shewing multiple hæmorrhages into its substance, and beneath the amniotic covering.



The extravasation is, in the majority of cases, from the maternal system; and some cases are on record where, along with this, there have been apoplexies in other parts of the body in the same patient. Latour records the case of a woman who died of cerebral apoplexy, after spontaneous abortion, when she was twenty-eight years old. Priestley relates the case of a lady who was anxious to have children, and who lost three successively in the last half of gestation. In each pregnancy, uterine hæmorrhage came on, apparently without cause. No disease of the child, or placenta, could be detected, but the spiral arteries in the centre of each maternal lobule were found to be in a state of fatty degeneration. In the fourth pregnancy, she went to the eighth month, when uterine hæmorrhage again began. The child was born alive, but, one hour after, convulsions and coma attacked the mother, and she died with all the symptoms of apoplexy of the base of the brain. C. Robin is among those who insist that pathological changes precede extravasation. He has pointed out that some of the villi do not contain vascular loops, but that their centre becomes fibro-cellular. In these, fine granules and distinct drops of oil are seen. This fibro-fatty change is, he holds, a normal process. It may however pass into the morbid, by its extending to other villi and there interfering with the circulation, extravasations next following. It is held by some that the clots become organized and form distinct neoplasms in the placenta (Virchow and O. Weber).

The Symptoms of hæmorrhage will vary with the quantity effused, and the extent of placenta involved. If it be limited, there may be nothing but a passing pain; if moderate in extent, then the signs of internal hæmorrhage will be present. There will be a feeling of weight and uneasiness in the region of the uterus, and perhaps a fixed, or intermittent pain which may extend down the thighs. If the hæmorrhage is severe, then the symptoms of abortion will occur. Blood may appear externally, and pains set in. Convulsive movements of the fœtus may be followed by a period of time when neither the fœtal heart nor movements will be heard or felt.

The Treatment will consist in rest, medicine to allay the pain and nervousness, and perhaps lead or gallic acid. Counter irritation, applied to a remote part of the body, might be of service. The hæmorrhage is likely to recur. If abortion is inevitable, the usual course must be followed. Is not abortion sometimes a conservative process, in so far as the mother's life is concerned, and also that of the human race? It would greatly add to our knowledge of placental disease, if this organ, with the membranes and cord, were carefully and systematically examined; transverse and vertical sections being also made at the same time.

CYSTIC DEGENERATION.—Hydatiform degeneration, myxoma, or vesicular mole. In this disease the villi of the chorion suffer, consequently it may occur before the formation of the placenta. If so, the villi, being uniformly developed around the whole of the periphery of the ovum, its entire circumference is studded with round vesicles attached by pedicles. If it begin after those villi not engaged in the formation of the placenta have atrophied, it will naturally be confined to the placental region. The development of the villi into cysts arrests the function of that portion of the placenta attacked. In some rare cases however, a fully developed child has been born, even when the placenta contained a number of cysts. Graily Hewitt and others held that this cystic transformation is the consequence, and not the cause of the death of the fœtus, and that in fact it is nothing more than a degeneration. It is more probable that when the embryo dies, the developing forces are diverted exclusively to the villi, and so conduce to their greater activity of growth. The fact that all the villi are affected—even those not engaged in the formation of the placenta—has been used as an argument in favour of the theory that the disease does not originate *after* the death of the fœtus.

Normally, each villus has two essential portions, (*a*) the epithelial covering—exochorion; and (*b*) a body of mucous tissue—endochorion. Before the allantois is developed, each villus has a small canal, open at its base, but terminating in a *cul de sac*. Afterwards a branch of the umbilical artery and vein

penetrate into it. Virchow says the villi are formed by a continuation of the jelly of Wharton. Two different statements have been made as to what portion of the villus is primarily affected. Ercolani and Müller say it is the epithelium which is the first to be affected. The villus is next filled with cells. The connective tissue—mucous tissue—increases in quantity, and the villus is distended. The cells may liquefy and fluid collect. With this degeneration the tissue takes on a very active growth, and increases rapidly in bulk. The capillaries generally undergo occlusion and atrophy. Blood-vessels are sometimes found in the main stem. If the fœtus continue to live, a very dense and fine capillary network may sometimes be found within the

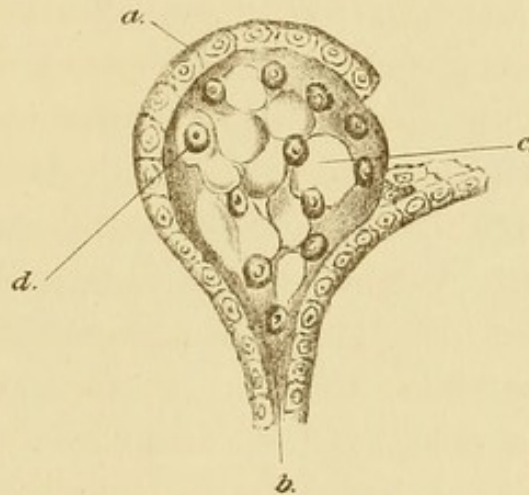


FIG. 15.—Hypertrophied chorion villus. *a*, Epithelial covering. *b*, Connective tissue. *c*, Network spaces filled with serum. *d*, Nuclei of cells. (Martin's Atlas.)

degenerated villus. The fluid in the villi contains mucin and albumen.

Virchow holds that the morbid process begins in the interior of the villus, endochorion, or inner layer of the chorion, and which is a continuation of the jelly of Wharton, and not in the epithelium. The proliferation of the epithelium he regards as the expression of a regular and normal development. The buds, noticed by Virchow, on the external epithelial covering which contain transparent cavities he calls "physalides." Single large dilated cells containing hyaline liquid, he terms "physalifores." He looks on them as accidental products. Priestley thinks that, in the first stage at least, large cells with fluid contents fill the villi, and that this is the beginning of the

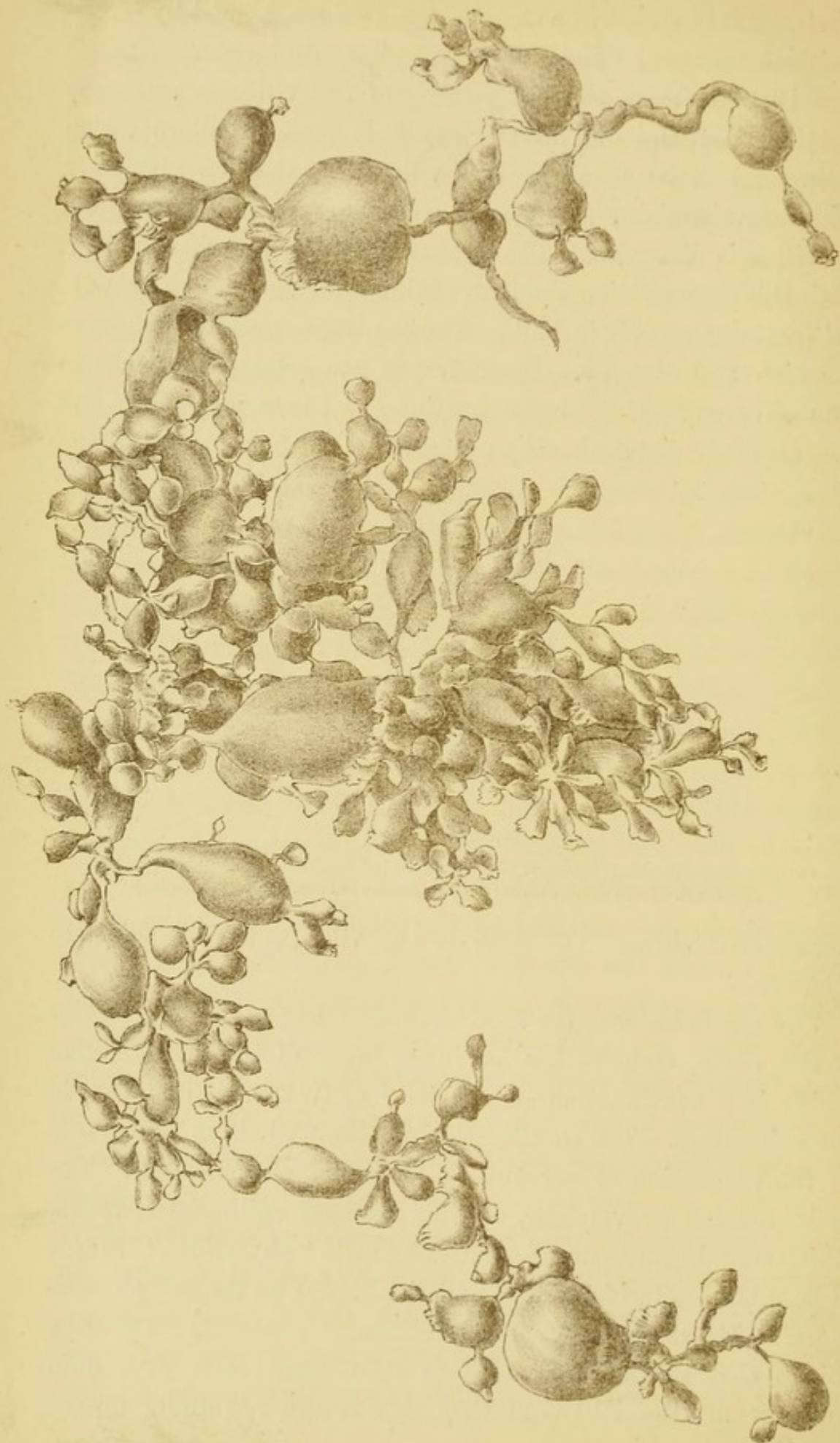


FIG. 16.—Cystic degeneration. As seen when floating in water in a shallow basin.

disease. Later, these cells form themselves into spaces traversed by connective tissue, and containing fluid. It will be remembered that the embryonic tissue of the allantois surrounds the whole circumference of the ovum, between the exochorion and the amnion. Both Virchow and Ruysch have found these cyst-like bodies in the umbilical cord. In a few cases the jelly-like material normally present, and situated between the amnion and chorion, may greatly increase in quantity, and even when the villi remain healthy. In one case (reported in the *Wiener Med. Presse*, 1867) the stratum was from 4 to 5 mm. thick. Granville, in his work, "Graphic Illustrations of Abortion," 1834, seems to describe a condition where a development of tissue between the chorion and the amnion had taken place. Granville says there were a number of sub-anniotic lumps, and that they were richly covered over with blood-vessels.

The old idea that this disease is an hydatid growth is now given up, as no secondary cysts are found inside a mother cyst, nor are hooklets or any other parts ever detected. It must, however, be remembered that a true hydatid of the uterus may occur. Grailey Hewitt records such cases. Therefore, when in doubt, a close examination should be made for hooklets, or heads. Another ancient theory, that the affection was a mere dropsical effusion, has been abandoned, also, that the cluster of cysts resembles a bunch of grapes. The accompanying drawing (Fig. 16) shows well the varying sizes and shapes which they take. Thus one cyst has another sprouting from it, then another from the former, and so on. One large cyst may spring from a smaller one, or it may be joined to it, without any intervening stalk. There is no true stalk joining the cysts with the parent stem, as is seen in a bunch of grapes. In Parè's "Surgery," it is stated that the Countess Margaret, daughter of Florent, fourth earl of Holland, and spouse to Count Herman of Heneberg, on Good Friday, in the year of our Lord 1276, and of her age 42, brought forth at one birth 365 infants, whereof 182 are said to have been males, as many females, and the odd one an hermaphrodite, who were all baptised, those by the name of

John, these by the name of Elizabeth, and in two brazen dishes,
by Don William, Suffragan Bishop of Trèves!!

In some rare cases the villi have forced themselves into the



FIG. 17.—Cystic chorion forcing its way through the muscular walls of the uterus,
through the peritoneum. (Spiegelberg.)

uterine wall by the uterine sinuses, and have formed so strong adhesions, that the diseased structure cannot be removed. This may ultimately cause atrophy of the uterine tissue at that spot. (See Fig. 17.) Volkmann has described this condition. In one

case the villi had penetrated the fundus, reaching the peritoneum. Krieger reports a case where the disease was followed by a fatal peritonitis. In all such cases, therefore, great caution should be exercised in injecting fluids into the uterine cavity. When the chorion adheres to the uterine wall, then the pregnancy, instead of terminating prematurely, may be abnormally delayed to the twelfth or thirteenth month (Schröder). In such cases great care must be observed when manipulating the uterus.

The question, Can cystic degeneration of the villi occur in the uterus of the unimpregnated female? is almost always answered by a decided negative. Such cases, however, have been discussed before a law court, and lately Moore Madden has stated, that he is not quite certain that such a condition may not exist in the virgin.

The Causes of the disease are obscure. The hyperplasia may be due either to irritation produced by the decidua, or to disease of the ovum. It is supposed that when the decidua is diseased, and the foetal villi cannot penetrate it, they then take on a morbid development. Hecker has suggested that it is due to the absence of the allantois, while Schröder thinks it may be caused by an absence of the blood-vessels of that structure. Others think it due to disease of the placenta. It is a condition which may recur. It is always the result of sexual impregnation. It is to be remembered, especially in a medico-legal sense, that a portion may be left behind in the womb, and be expelled at some future time. So M'Clintock says. Thomas gives a drawing of a glandular polypus consisting of hypertrophy of the nabothian glands. The growth measured $4\frac{1}{2}$ inches long, and $2\frac{7}{8}$ inches in diameter. It filled the vagina completely, and consisted of grape-like masses. The case is mentioned so as to draw attention to this vast form of growth, and that it may not be confounded with the vesicular mole. It is thought to follow kidney disease. Others hold that it is a degeneration of a portion of placenta left behind in the uterus at a previous pregnancy. One case I know of where the mother had had two previously healthy children. On the third occasion, when she considered herself pregnant, she expelled almost half a bed-

chamberful of cysts. Since then she has been delivered of a fine healthy child. Madame Boivin saw but one case in 20,375 deliveries. It may be mentioned that the celebrated Beclard was born with an accompanying placenta which had undergone a partial cystic degeneration. Therefore, if one or two cysts are discharged, too active treatment must not be put into force. Dr J. Williams, describes a placenta which presented on its foetal surface a cyst the size of a Tangerine orange, at the base of which was a tumour apparently fibrous, and the size of an almond. This cyst does not seem to be the product of cystic degeneration of a villus.

Symptoms.—Generally the uterus is either too large or too small for the period corresponding to the supposed length of pregnancy. The symptoms are usually those accompanying an early pregnancy, but no foetal heart can be heard, or any foetal movements made out. Death of the foetus follows, and does not precede, the cystic degeneration, neither is ballottement present. Generally, at about the fourth month or later, there may be watery discharges, while repeated hæmorrhages from the womb may take place. Pains may be felt, and a discharge of cysts either from the uterus, or at the vulva, will confirm the diagnosis. Occasionally the entire mass has been expelled enclosed in a sac which consists of the decidua, so that the latter has to be opened in order to see the structure within. In the centre of this mass a cavity is sometimes found, and in it the foetus. But, if the degeneration has begun at an early embryonic stage, the foetus suffers from solution, and the liquor amnii is absorbed. The amniotic cavity is generally found filled with a soft, yellowish, granular and spongy substance. Smellie says, "Should the embryo die some days before the ovum is discharged, it will sometimes be entirely dissolved, so that when the secundines are delivered there is nothing more to be seen. In the first month the embryo is so small and tender, that the dissolution will be performed in twelve hours, and in the second month, two, three, or four days will suffice for this purpose." Sometimes a rudiment of the umbilical cord is detected in the mass.

At a later period a fœtus has been expelled with the cysts. Hypertrophy of the decidua and fatty degeneration are constant accompaniments of this disease.

The Treatment consists in emptying the womb, provided there is a certainty that no live fœtus is present. We are, so far, powerless to prevent the growth of the degeneration.

SYPHILIS OF THE PLACENTA.—This disease as it affects the placenta is not fully worked out, though Virchow, Zilles, Fränkel, and others have done much to throw new light on the subject. Fränkel has tried to prove by the appearance of the placenta, when the disease springs from either the father or from the mother, by referring to the part affected. In the majority of his cases, 17 in all, the disease had originated in the fœtal villi, the maternal portion being almost unaffected. Many, however, hold, that direct evidence of either paternal or maternal syphilis cannot be obtained by studying this organ, and that some, more especially the German school, are disposed to magnify the influence of syphilis as a cause of disease. When syphilis attacks the extra placental portion, Virchow terms the affection *endometritis decidualis*, and *endometritis placentaris gummosa* when the decidua serotina is involved. Here the placenta is invested on the maternal side by a somewhat close and thick decidual layer, from which in several places hard nodules, of a wedge-shaped form, sink into the substance of the lobules. The nodules consist of a whitish fibrous capsule, containing a reddish or yellowish soft material. At certain places, when the capsule has attained an unusual thickness, yellowish cheesy points may be observed. Processes of fibrous tissue ramify from the nodules, and form a framework which may compress the villi. The microscope shows a close, large-celled connective tissue, in which clusters of young cells may be found, some undergoing fatty metamorphosis. The villi are seen to be enveloped by this tissue, and may have their structures altered. Calcification of the new tissue may follow. The number of gumma may vary from one to four. The case described by Hervieux, where he found from 15 to 18 nodules, is doubted.

Mewis has described a case in which a tumour, the size of an apple, and hard in consistency, was found on the uterine surface of the placenta. On section, fluid blood escaped, and a few gaping vessels were seen. Under the microscope, the periphery of the tumour was seen to be composed of tissue, with large oval nuclei, and round cells. The vessels were partly dilated, and some contained thrombi. The central part of the tumour was made up of tissue containing nuclei and round cells, undergoing caseous degeneration.

In **ENDOMETRITIS PLACENTARIS VILLOSA**, the foetal portion of the placenta is affected. Here the placenta is large, often exceeding

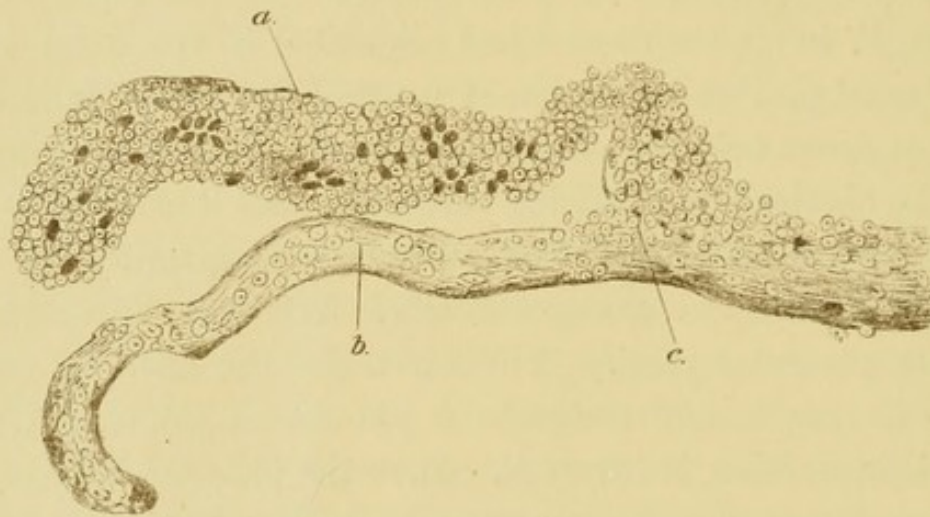


FIG. 18.—Villus of placenta affected with "disfiguring cell disease" (Fränkel). *a*, Portion of villus covered with granulation cells. *b*, Normal villus deprived of its epithelial covering by maceration. *c*, Junction between sound and diseased structure.

thirty ounces in weight. It is also tough and dense. The uterine surface may have lobular markings, owing to thickening of the decidua. Both amnion and chorion may be thickened, opaque, and adherent to each other. On section, the colour of the affected part is pale yellowish grey, like the brain. In some cases, patches of blood may be met with. The microscope shows the villi to be thickened, opaque, swollen, and club shaped at the ends. They are filled with round and opaque or spindle-shaped cells, with granular contents, and are closely packed along the course of the capillaries. (See Figs. 18 and 19.) These cells may undergo fatty degeneration. In transverse sections, the walls of the blood-

vessels may be observed to be thickened, and the lumen charged with blood corpuscles, or they may be so compressed as not to contain any. Lastly, the vessels disappear, and all traces of them are lost. Thus, the villi are filled by the cell proliferation from the walls of the capillaries, while the epithelial investment of the villus degenerates. Zilles gives a similar description. He says that the syphilitic placenta is large and massive as compared with the weight of the foetus. It is yellowish white in the diseased

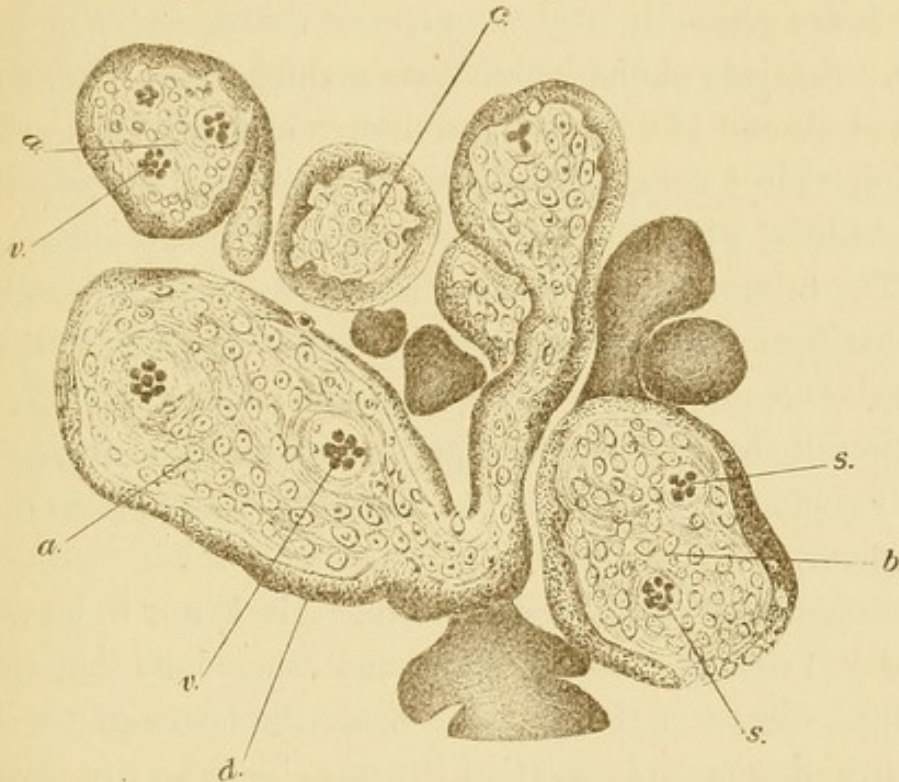


FIG. 19.—Section of villi affected with "disfiguring granulation cell disease." *a*, Luxuriant cell development in the interior. *v*, Lumen of blood-vessels with hypertrophied walls. *b*, Villus in which only a trace of blood-vessels can be seen, as at *s s*. *c*, Villus without trace of vascular canal. *d*, Epithelial covering. (Fränkel.)

parts, whilst it is tougher, firmer, and more friable than the normal placenta. Gummatous nodules are found, somewhat wedge-shaped, with their bases in the decidua, these varying in size from a pin-head to a walnut. On section, the gummata have their structure arranged in a lamelliform manner, the external layers being firmer, having a greyish-yellow colour, while the centre is soft and fluid. The centre is of a yellowish-red, or orange yellow colour. If complete degeneration of the central part has occurred, an irregular cavity is found. The

decidua of the uterine surface is greatly thickened, and opaque. It shows yellowish-white spots. Nodules may be found under the amnion. The umbilical vessels are thickened, and nodules may be found in the tissue of the cord itself.

Microscopically, the decidua contains a large quantity of fibrin, in which are numerous small, round, granular cells. These may be so numerous that the large cells are destroyed. The *nodules* on the decidua have their nucleus composed of small granulation cells, which are generally oval, angular, or round, and generally nucleated. Sections of the gummatous nodules show them to be composed of altered villi, fibrin, and masses of small cells. The *villi* are joined in a compact mass, and surrounded by granular, reticulated fibrin, while the blood-vessels and the epithelium are absent. The intervillous spaces are rich with small cells, while others contain round cells and blood corpuscles. The villi are club shaped, and may show traces of calcification. Sections, at the insertion of the umbilical cord, showed that the pathological condition extended directly into the umbilical vessels from those of the chorion.

With such definite pathological changes, it is not to be wondered at that Virchow, Fränkel, Zilles, and others hold that there is a syphilitic disease of the placenta, while the latter states, that with due training and observation the practised eye can readily detect it. Placental syphilis is generally associated with syphilis of the fœtus. The former may be affected throughout its entire thickness, or only the maternal or the fœtal portion may suffer. Zilles says—(a.) If the mother is affected at the time of fecundation, not only shall we have a syphilitic fœtus, but also a placenta affected throughout its entire thickness, while the cord will also suffer. (b.) If the semen alone carry the virus, there will be fœtal syphilis, and usually also of the fœtal membranes. It may, however, extend to the maternal portion, and to the blood of the mother. (c.) If the mother is infected a short time before conception, and the impregnation be by a healthy man, and if anti-syphilitic treatment be used, a healthy child may be born, and the maternal surface only affected.

Virchow has described a case of abortion at about the third month, where the chief change was in the maternal part. The decidua had been formed on a part of the uterine wall which was affected with endometritis papulosa and tuberosa. He thinks the tubercles were condylomata. Ercolani says that a form of disease, regarded as analogous to these condylomata, occurs also in the placenta, but that such is really an angioma. It is probable, however, that the lining of the womb may suffer and present local specific appearances in the general syphilitic infection. If any doubt exist as to whether the placenta is syphilitic, signs of this disease should be sought for in the fœtus. Wagner asserts that, in syphilitic fœtuses, there is a band of tissue between the shaft of the long bone and the epiphysis. Other corroborative signs may be found in the father or mother.

HYDRAMNIOS, HYDROPS AMNII, AMNIOTUS.—This is a disease the existence of which has been denied by some. Mercier and others have described an inflammation of the amnion where it was vascular, and the contained vessels highly injected. A large quantity of fluid had also collected. He also states that the interior of the amnion was covered with layers of false membrane. The fact that the amnion is sometimes found to be opaque and thickened, and that bands of lymph exist which may bind one part of the fœtus to the membranes, lends weight to the inflammation theory. It is difficult further to understand how those acute cases of polyhydramnios occur unless some inflammatory action be present.

When speaking of the formation of bands, it should be remembered that they may follow oligohydramnios, that is, where there is a deficiency of the liquor amnii. Here also, adhesion of single cutaneous spots may occur, forming the so-called "Simonart's bands." Schröder, speaking of bands, says that the active movements of the fœtus may cause the amnion to be rolled up in the ovum, and so form cords which compress the umbilical cord, and cause the death of the fœtus. Here the amnion ruptures, but the fœtus is still protected by the chorion. Dr R. Lee, in his work, "Pathological Observations on the Diseases of the Uterus,"

figures a foetus with placenta and cord. A band stretches from the placenta to a nævus occupying the scalp and dura mater. (See also *Med. Chirurg. Trans.*, vol. 22, p. 300.) When bands form in oligohydramnios, and if more fluid collects, the foetus floats off, and the bands of lymph being put on the stretch, elongate.

Hydramnios may be acute, subacute, or chronic. In the acute form, the fluid collects in a few days, or in two or three weeks. Montgomery, in the *American Journal of Obstetrics* for 1883, reports such a case. This great accumulation interferes with the action of the lungs and heart of the mother, and often provokes premature expulsion of the foetus. In some cases, however, the child may not be born until term. Perhaps, in this case, the membranes rupture high up towards the fundus, consequently, tension being relieved, premature labour is not induced. Ingelby relates the case of a woman who, during her pregnancy, lost large quantities of watery discharge. Afterwards, he examined the membranes, and found them ruptured in two places, one by the presenting head, and the other near the edge of the placenta. Tarnier also figures a somewhat similar case. The quantity of fluid which may collect varies. The normal quantity is from three to four pounds. Generally, at the ninth month the weight of the liquor amnii is inversely proportional to that of the foetus. Baudelocque says the amount present varies from five to thirty pints in this disease. Delore holds that polyhydramnios exists when the quantity exceeds four and two-tenths of a pint. It has been known to exceed fifty-two pints. Kidd, of Dublin, limits the affection to those in which the fluid exceeds two quarts.

Causes.—These are obscure. Dareste has discussed the connection, or relationship, which some foetal deformities bear to this affection. It occurs more frequently in multiparæ than in primiparæ; more frequently in cases of monstrosities than with healthy children; and more frequently with female than with male children. Spiegelberg calls attention to this last fact. Lawson Tait says that, in eight cases, seven out of eight were with twins, which, he adds, is far too great a proportion to be a matter of accident. The eighth occurred in primiparæ. Often there was

some albuminuria, and perhaps convulsions. It occurs about once in a hundred and fifty births. In M'Clintock's thirty-three cases, twenty-five of the children were females, nine were still-born, and ten died within a few hours. Here, it may be added statistics show that there are more male than female children born. Depaul records a case which occurred in an extra-uterine pregnancy. In a few rare cases of twins, polyhydramnios was found with one child, while oligohydramnios accompanied the other. The etiology of the disease is, by some, considered to be due to too great a secretion of urine by the fœtus, to an excessive action of its sweat glands, and to disease of the fœtal kidneys. Some have detected the presence of urea in the liquor amnii, but others, such as Odling, have not. It has been found associated with diabetes, and fœtal rachitis (Bode). Gervis says that it may be due to inflammation of the amnion, to disease of the placenta, or to a dyscrasia of the maternal blood. Jungbluth thinks it may be due to the fact of the vasa propria remaining open instead of closing in the last months of pregnancy. It has been thought to be due to syphilis. Some, as Sallinger, hold it to be a product of the fœtus; Scanzoni and Schröder, that it is due to disease of the mother; while Virchow says it may be due to both. Some suppose the fluid to be the liquid portion of the blood. Werth's theory is that a large or hypertrophied placenta absorbs more fluid from the maternal blood than is necessary for the fœtus, and that this brings about hypertrophy of the fœtal heart and kidneys, a fœtal polyuria resulting.

It is very probable that the condition is due to some resistance offered to the fœtal circulation in the fœtus, placenta, or cord. Sallinger has found that an increased internal pressure within the umbilical vein gives rise to a transudation of fluid through the amnion, and that the amount which transudes is directly proportionate to the pressure. Hence it would be supposed that any disease of the fœtus or its envelopes giving rise to an increase of blood pressure may be a cause of hydramnios. Nieberding has traced one case to premature obliteration of the ductus arteriosus. Such a condition must force more blood into

the lungs, and increase the blood tension in the right side of the heart. Truzzi reports a case in the clinic of Porro, where there was a membranous insertion of the umbilical cord, and thinks that this condition, by interfering with the circulation, may be a cause. But a disturbance of the circulation through the umbilical arteries is held by many to be a prominent cause. Spiegelberg thought it might be due to disease of the decidua vera, when its numerous vessels give rise to a transudation which might take place into the amniotic cavity. Cirrhosis of the foetal liver, interstitial hepatitis, and hypertrophy of its heart may be a cause. When tension becomes great, capillary transudation will follow. Regarding the normal formation of the liquor amnii there are three theories: first, that it comes from the foetal skin; second, from its kidneys; and third, from the capillary network described by Jungbluth, and known as the vasa propria of the chorion-bound membrane of the placenta, just lying beneath the amnion, and anastomosing with the umbilical vessels. Some have stated that varicosities and venous thrombosis are sometimes a cause. Until it is known whether the liquor amnii is either a material, foetal, or placental product, it will be difficult to decide the cause of this affection. There are many reasons to suppose that it is secreted by the foetal surface of the placenta, and exudes into the cavity of the amnion.

The *diagnosis* will be mainly between ascites, and accumulation of water in the uterus. In hydramnios the uterus is high up, but in ascites it is more depressed than usual. The feeling of fluctuation and resonance on change of posture are more marked in ascites, and there will be an absence of the foetal heart sounds and movements. The rhythmic contraction of the uterus as described by Braxton Hicks can be detected in this complaint (see general diagnosis). It might be mistaken for a rapidly growing ovarian or parovarian cyst. M'Clintock states that the maternal death rate is high, and that the affection is likely to recur.

The Treatment will vary with the cause. Should the accumulation be rapid, Playfair has suggested that the fluid be drawn off by an aspirator. Tillaux has a case noticed, when he tapped

the uterus through the abdominal walls with a trocar. He drew off seven litres, and afterwards closed the wound with collodion. The future of this case has not yet been published. In such an operation, one would be careful to make out the region of placental insertion, and to avoid this when passing the trocar. If the foetus is dead, and abortion threaten, no efforts should be made to check it. If the membranes are punctured and labour induced in this way, it has been recommended that these be punctured high up, so that the fluid may drain away slowly, thus preventing any collapse by the too sudden emptying of the uterus.

EXTREME WEAKNESS OF THE AMNION.—This might be a cause of abortion, the membrane giving way under violence, or the pressure of sexual intercourse. In the previous condition, Jacquemier relates a case where a woman was kicked. Soon after there was a rapid accumulation of liquor amnii. The membrane was found to be thickened, and traversed by abundant vessels. The contained fluid was cloudy, and whitish in colour. Flakes of curd-like milk floated in it, these being portions of false membrane detached from the free surface of the amnion.

DISEASES OF THE UMBILICAL CORD WHICH MAY CAUSE ABORTION.—That the foetus may pass through a loop of the cord, and so unwittingly bring about its own death, is a recognised fact. The most frequent cause of this is an undue length of cord. Normally it measures about 20 inches, but Tarnier cites Schneider, as having seen one which measured $3\frac{1}{4}$ yards. The cord may so tightly encircle a limb that a stricture results, and so, interrupting the circulation, the foetus suffers. As regards the frequency with which this accident happens, Meyer states, that in 3587 deliveries, the cord was found encircling some part of the body in 685 cases. Although knots on the cord may become so tight during labour as to place the life of the child in imminent danger, they seldom do so during pregnancy.

True knots were found by Heckel once in 266 cases, and by Elsasser once in 202. As many as three knots have been found on one cord. The ancients thought that the fecundity of a woman could be foretold by the presence of these knots,—the more knots

the more children. If these were at equal distances, then the duration of time between the different pregnancies would be equally distant!

Twins have been known to destroy one another by one having passed through a loop of the other's cord. Perhaps the amniotic bands which are said to follow attacks of amnionitis may be a cause, as well as those cases where the cord is inserted into the



FIG. 20.—Knot in the stage of formation.

membranes, or bifurcates before insertion, or is fixed into some other part of the child's body other than the umbilical region. In Martin's "Atlas of Obstetrics and Gynecology," some such illustrations will be found. (See Fig. 20.)

True knots must be differentiated from false ones. The latter are generally due to local accumulations of Wharton's jelly. Dr Gordon describes a case, when a four months foetus and placenta

were expelled. There was a knot on the cord, and atrophy on each side of it.

In torsion, or twisting (see Figs. 21, 22, and 23), Späth men-



FIG. 21.—Twisting of cord (Martin's Atlas).

tions three cases where the death of the fœtus was brought about by the cords being twisted until they were reduced to the thickness of a thread. There is no doubt but that, in the early months of pregnancy, when the fœtus is suspended horizontally,

it may revolve in the arc of a circle of which the point of insertion of the cord is the centre.

Spiegelberg refers to torsions as of two kinds, "præ-mortal" and "post-mortal." The first is caused by the movements of the fœtus, while the second results from the movements of the mother. Dohrn relates a case, where a woman was delivered of a dead fœtus, whose cord was twisted 28 times. D'Outrepont says, that great torsion of the umbilical cord may determine the death of the fœtus by impeding the circulation. Kleinwächter says,

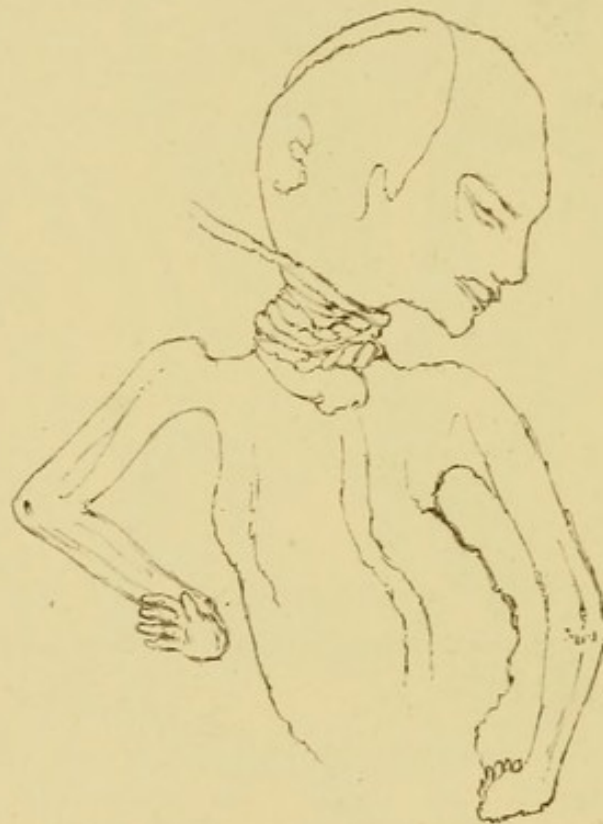


FIG. 22.—Twisting and knotting of cord (Martin's Atlas).

that when fine thrombi are found in the vessels of the cord, these indicate that the torsions have taken place suddenly. When a short tense cord is twisted, it may be completely lacerated across, so that the fœtus lies unattached in the uterus.

The *stenosis* of the cord which results from twisting, or torsion, compression, or knots, may lead to laceration. Sein and Mauriceau hold this view. Guillemont gives a case where the fœtus was three months old, and when the umbilical cord was tightly stretched. It was half lacerated through near its origin at the

navel. Deneux cites cases where he found a cord with rupture of the umbilical vein and effusion of blood into its tissues. Neage, Delamotte, and Leveret, describe similar cases of rupture and hæmorrhage. It may be complicated with other diseased conditions of the vascular system, of the placenta, or fœtus. When the rupture occurs before the discharge of "waters," the hæmorrhage is termed by Tarnier "Intra-Amniotic." Tarnier has asked the question, "If the umbilical cord is too short, can it drag

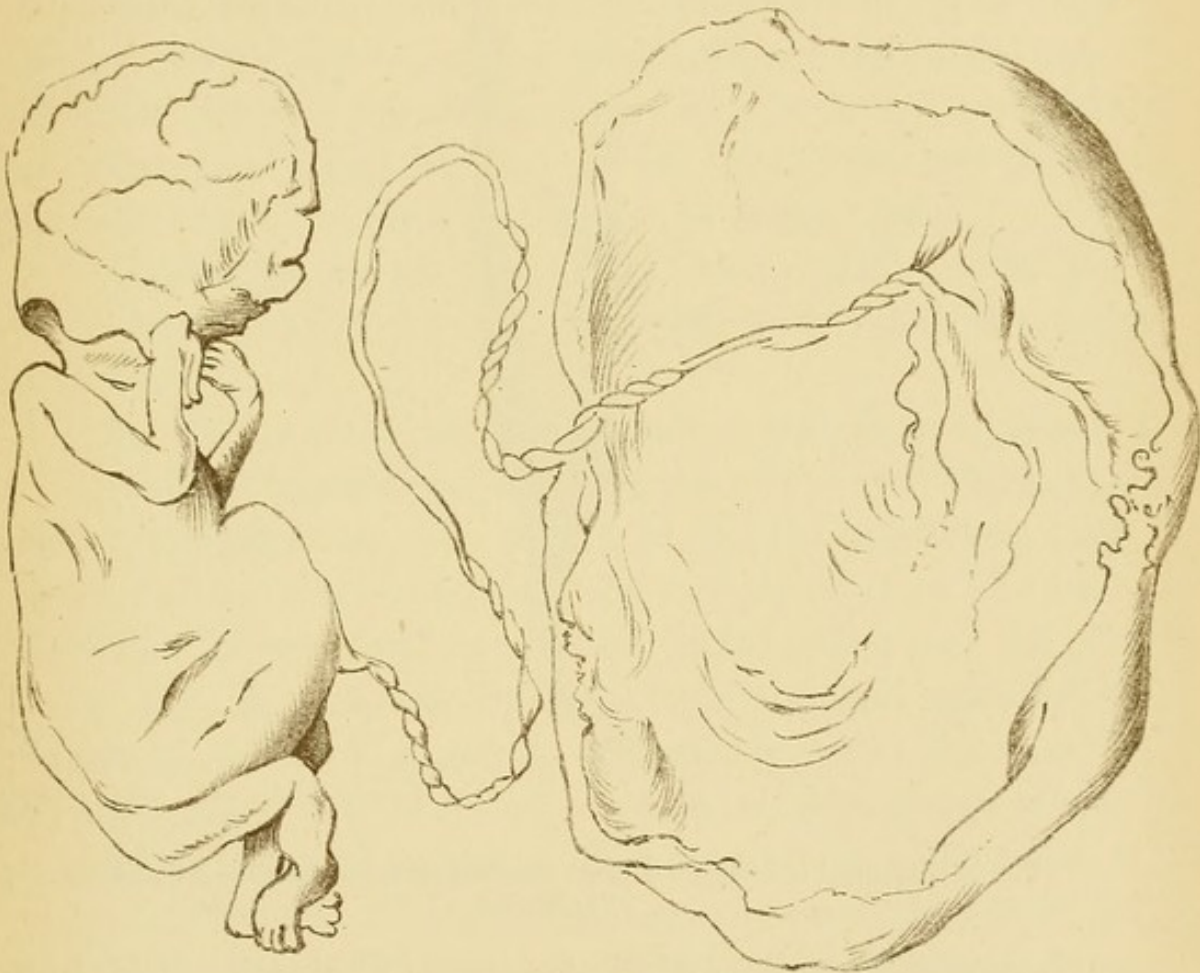


FIG. 23.—Twisting of cord (Martin's Atlas).

off or detach a portion of placenta or rupture itself?" A cord has been known to measure three to four inches in length, and cases have been recorded where the placenta has almost appeared to be inserted into the umbilical region of the child. In some cases a portion of the cord is of so small a circumference as to lead to the mistake of supposing it to be a stenosis of the blood vessels. Parvin calls attention to this, and says that it is due to an absence of Whartonian jelly. (See Fig. 24.) The injection

of fluid into the vessels of the cord will clear up any doubt, for if they are pervious they will allow it to flow through easily. Martin St Ange records a case of strangulation of the cord, due to its being compressed by the legs of the foetus, which were spasmodically crossed over each other.

Narrowing of the vessels of the cord may occur in syphilis, owing to the thickening of the intima. According to Hyrtl, this may also be due to periphlebitis.

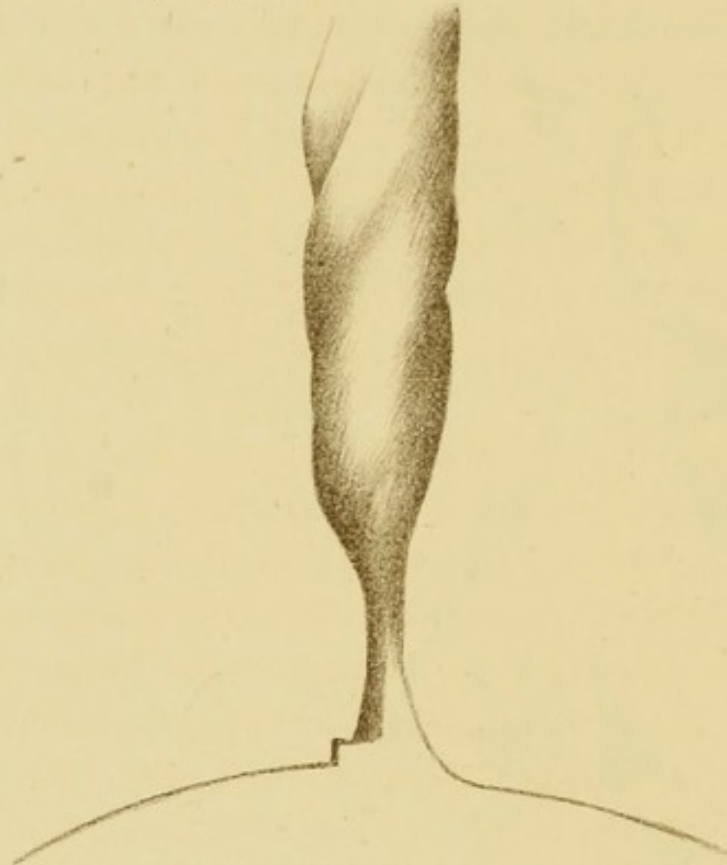


FIG. 24.—Apparent constriction of blood vessels of cord, from absence of Wharton's jelly (Parvin).

In syphilis of the umbilical vessels, Birch-Hirschfeld have described the inner coat of the umbilical vein as affected with cell proliferation. The stenosis so produced has been supposed to cause the death of the foetus. Ödmansson has described cases in which there was thickening and calcification of the intima of the veins and arteries, and that this extended into their branches.

It is now well known that the syphilitic poison affects the arteries and veins of the adult and infant. The diseased condition begins in the tunica intima and tunica adventitia, the muscular

layer being affected by the extension of the disease. The new growth begins between the endothelium and the fenestrated layer, while the free surface of the endothelium remains unaffected. First, there is an increase of the nuclei of the endothelium, which, by forming a mass, thrusts in the endothelium and so narrows the lumen of the vessel. By an extension of the disease, not only may the entire circumference of the vessel be affected, but it may progress along the course of the vessels, and involve their branches. Later on, small capillaries are found in the new growth, while a new layer of elastic tissue may be found immediately external to the endothelium. Thus there are two layers of fenestra enveloping the new material. Lastly, the new growth may undergo fibrous, fatty, or calcareous degeneration.

INFLAMMATION OF THE CORD AND CYSTIC DEGENERATION have been described by Ruysch, but those affections are of very rare occurrence.

If the cord is ruptured in the womb, it must be in a diseased condition, for the power of sustaining a fair weight by the healthy cord is considerable. Dr Neville, of Dublin, has taken some trouble to decide this question. He experimented on 125 fresh and full time cords, and on the part twelve inches near the placental end. In 100 cords, from which the blood had been allowed to escape, the average tensile strength was 12·5 lbs. In 25 cords, in which the blood had not been allowed to flow off, the average breaking strain was a little over 11 lbs. The cords of male children had an average strength of more than 5 lbs. as compared with that of females. When the cord ruptured under the strain, this occurred on the aspect of the cord where the umbilical vein projected in a varicose manner. The thin, straight, wiry cords, with few varicosities, and little Whartonian jelly, were the strongest. Jenkins describes a case where there was a perforation of the cord, about half an inch from the navel end, opening into the umbilical vein. Hæmorrhage had taken place into the amniotic sac. The rupture was due to fatty degeneration of the cord. Another cause of rupture is varicosity of the vein.

Having already made some remarks regarding the different modes by which the foetus is affected by disease and by drugs when it is in the uterus, and having noticed briefly those conditions of the envelopes which may cause abortion, other of the diseases which may affect the foetus will now be considered. The question might be asked, Supposing the father and mother are healthy, can the foetus suffer from hereditary disease? In extra-uterine life cases are known where the child resembles neither the father nor mother, but where it presents perfect counterparts of a grandfather or grandmother, this being known as *atavism*, or reversion. Do similar results take place in intra-uterine life, but in diseased conditions? Supposing, as Darwin states, that in certain diseases, necessarily confined to the male sex, the child inherits a disease which its maternal grandparent had, is such not a case of a healthy father and mother having a diseased infant?

Observations have shown that the foetus is liable to suffer from almost all those diseases which attack the child. It, no doubt, inherits these from either parent, but other influences may be at work. Smallpox, measles, ague, pemphigus, erythema, strophulus, hydrocephalus, pleurisy, pneumonia, abscess, œdema, goitre, tubercle, syphilis, peritonitis, iritis, worms, jaundice, hernia, calculus, rickets, fractures, dislocations, amputations, and deformities may each attack it.

When the dead embryo or foetus is contained in the uterus for some time after death, certain changes may occur.

1. LIQUEFACTION.—This may take place when the foetus is one to two months old, the embryo being completely dissolved. Here the liquor amnii is thick and opaque. Cystic degeneration and fleshy moles may at this time be found.

2. MUMMIFICATION.—Here the soft tissues are hard, condensed, dried up, and lessened in size. It becomes a dull grey colour, and the liquor amnii disappears, leaving a greyish deposit behind. This condition occurs most frequently in a foetus of three to four months old.

3. MACERATION.—In this process there is no putrefaction, but

the decomposition goes on slowly. The skin or cutis is detached in large pieces, the tissues are softened, and it may be moulded by pressure into any shape.

4. PUTREFACTION.—This takes place when the air is admitted, as when the membranes are ruptured. It may progress rapidly. M'Clintock says he has seen it occur during delivery, and before the child was quite born. Here the abdomen of the fœtus is distended with gas, and the tissues are emphysematous and crackling. The other tissues are softened and swollen. The head enlarges, and cranial bones feel loose. The slightest force on handling it may be sufficient to detach a leg or arm. An exceedingly unpleasant odour may be given off. In such cases gas may accumulate in the uterus, and the mother suffer from symptoms of putrid infection.

5. CALCIFICATION.—A dead fœtus may be retained in the uterus for a long time. Sappey communicated to the Academy of Sciences in Paris a case observed at the hospital at Quimperlés, in which a *post-mortem* examination of a woman, æt. 84, showed a fœtus, about six months old, enclosed in a calcareous envelope in the uterus. It must have lain there for fifty-six years, pregnancy having been diagnosed when the woman was twenty-eight years of age.

SYPHILIS is, as yet, one of the most fully described diseases of the fœtus. Ruge says that 83 per cent. of premature and still births are due to syphilis, derived either from the father or mother, or both. This is a very high percentage, more especially when it is recollected that it does not include those numerous syphilitic infants who live. The theory of the unity of syphilis and rachitis has many supporters, but is also opposed by many. Syphilis may affect the skin, mucous membranes, and other tissues and organs of the body. The skin may be so deeply affected that it peels off. The lungs and liver may suffer from gummata. These neoplasms, or collection of cells, eventually degenerate and break down, and in more advanced cases cicatrices may be found. The bones may be affected, especially at the junction of the shaft with the epiphysis. Barnes says it

may be stated roughly, but far from absolutely, that the impress of the father's fault will be especially marked in diseased states of the embryo, foetal chorion, and amnion, while, if the foetus has contaminated the mother, the decidua and maternal portion of the placenta will be more likely to suffer. Bärensprung held that when syphilis was passed from the mother to the foetus, the lungs of the latter were likely to suffer, and that when the poison was derived from the father, the liver, spleen, suprarenal capsules, and peritoneum of the foetus would be involved. Those views, however, are not held by many. In syphilitic disease of the bones, or osteochondritis, Wagner, Virchow, and Parrot have noticed that the affection begins at an early period of foetal life. It has its chief seat at the junction between the shafts of the long bones and their epiphyseal cartilages. This seat of junction becomes thickened, irregular, and uneven. It differs from the affection known as rickets, for in syphilis there is comparatively little increase of the normal "zone of proliferation," whereas the "zone of incrustation of cartilage" is greatly enlarged. It forms a thick, dense layer, and is homogeneous, but friable, white, and opaque like mortar. Large processes project from it into the substance of the cartilage beyond. As the affection advances, this layer becomes separated from the shaft by a soft or even semi-fluid, greyish red, or yellowish material, consisting of granulation tissue, which may shade off into pus. Another feature is the formation of new bone (osteophyte) round the outside of the shaft, in the neighbourhood of the epiphysis. The affection is widely diffused throughout the body, but is said to be most marked when the growth of osseous tissue is naturally most active. The lower end of the femur and humerus are the parts most commonly implicated. After birth, and in very rare cases, this soft material between the shaft and the epiphysis increases so much that they are detached from each other, and even form fluctuating purulent swellings beneath the periosteum. This is attended with so little pain, that the disease may be mistaken for paralysis. It is known as Wegner's sign. Ruge has shown that the liver in the newly-born infant weighs one-

thirtieth of the total body weight, but that in syphilitic infants it may amount to as much as one-twelfth or more. He also showed that the spleen is the one three-hundredth part of the total body weight. Lomer has pointed out that this organ is also much enlarged. These three signs, when taken along with the others, detected in either parent, will greatly tend to strengthen an opinion as to whether the fœtus has died from syphilis.

MEASLES.—Thompson, in Ziemssen's "Handbook," vol ii., has collected six cases where the infants were born with a rash of measles on them.

SCARLATINA.—Dr Leale, in the *Medical News* (1884), has reported a case which occurred in an infant whose mother was suffering from scarlet fever. Dr Saffin, in the *New York Medical Record* (1886), also mentions a case where the mother nursed a person suffering from scarlet fever while she was pregnant. She suffered only from a sore throat, and was delivered of a child, whose body showed a typical scarlatina rash. This was followed by desquamation.

PERITONITIS may be a cause of intra-uterine death. There is not only an effusion into the peritoneal cavity, but the various abdominal organs, such as the liver, spleen, and intestines, may be attached to each other by flakes of lymph. The cause may spring from the mother, she being exposed to chills, fatigue, or injury. Strangulation of the intestine, closure of the urethra, and retention of urine in the fœtus, have been observed to occur. The disease does not appear to be due to syphilis.

HEART DISEASE.—During fœtal life an endocarditis may occur in the conus of the right ventricle—less frequently in the left—and produce very great contraction of the newly formed tissue. Osler states that he has seen fatty degeneration in the wall of the right ventricle, with stenosis of the pulmonary artery in a newly born infant. Lawson Tait describes a fœtus which had anasarca. The scalp was lifted up from the cranial bones and the pleural, pericardial, peritoneal cavities, and also the tunica vaginalis contained fluid. The ventricles of the brain did not contain more fluid than usual. The liver and kidneys were free from

disease. Dr Sawyer of Birmingham examined the lungs and pleuræ. There was no direct communication between the two auricles. The valve of the foramen ovale was large enough to completely cover the opening, so that it looked like a fossa ovalis of the adult. There was no disease of the placenta, although it was large and œdematous. The cause of the dropsy seemed to be due, therefore, to the premature closure of the opening between the two auricles. During intrauterine life, the valves of the right side of the heart are more frequently affected by disease than are those of the left. This is chiefly owing to the fact, that more work is performed by the right ventricle.

PNEUMONIA.—A few cases when the fœtus has suffered from this disease are recorded. Geyl's explanation is, that improper æration of the fœtal blood takes place. The respiratory centre in its medulla—supplied with blood containing an excess of carbonic acid—is stimulated, and an inspiration takes place. In doing so the fœtus draws in some of the liquor amnii, and with the result that catarrhal pneumonia is produced. Other diseases of the fœtus have been spoken of when discussing the maternal causes of abortion.

CONVULSIONS may occur in the fœtus. The mother may be conscious of the violent movements of the child, and may not feel them again. They may result from tubercular meningitis, ague, strychnine, or disease due to the mother. Reference has already been made, when discussing the maternal causes of abortion, to the statement of Braun, that if some of the blood be drawn from the umbilical cord of an infant, whose mother has suffered from uræmic convulsions, this blood will, if the fœtus be born alive, contain urea; but if it be dead, carbonate of ammonia will be detected.

INJURIES TO THE FÆTUS may cause its death, or may lead to the formation of bands, the result of inflammation, which may compress the child. Dr Laister refers to a case in which the mother at the third and a half month had a severe fall. She gave birth to twins, one of them being dead. One of the feet of the dead fœtus was found to be attached to the body by a lymph deposit in the form of a band.

MALFORMATIONS.—Defects in the development of the fœtus are sometimes associated with disease of the placenta, amnion, and chorion. They may be produced by a deteriorated state of the mother's blood, and therefore here a nervous connection between the fœtus and mother may not be necessary. The influence of a high temperature, and the presence of microbes and their products, may so alter the blood-stream that it is unfit to act either as an oxygen carrier, or as a nutritive fluid.

MALFORMATIONS OF THE INTESTINE.—Dr J. R. Chadwick describes some cases of abortion where an umbilical hernia was present. In one of these the hernia contained only bowel, which was kept in its place by intra-abdominal pressure. The umbilical ring was open. In the second case, the ophalmo-mesenteric duct had not withered, but had retained a strong connection with the bowel, so that the latter, as is normally the case, could not fall back into the abdomen. In a third, the sac contained, beside bowel, a part of the liver, one kidney, and stomach. Some of these cases, he adds, were complicated with imperforate anus, evidently owing to the fact that the tension on the bowel at the umbilical ring prevents the lower and closed end from coming in contact with the depression which makes the future anus.

FŒTUS IN FŒTU.—Ovum in ovo. Barnes calls attention to a specimen in the Munich Museum, where the chest of a man contained a nearly fully developed fœtus. Dr S. Taylor describes a specimen where an included ovum was found in a child eleven months old. It was the size of a duck's egg.

Ramsbotham calls attention to such cases. Thus, in the *Gentleman's Magazine*, the case of a child is described who had a large tumour extending from the perineum to the toes. When it burst, a hand and foot and "florid fleshy" material was discharged. Richerand also mentions the case of a lad, aged sixteen, who had a tumour on the left side of his abdomen. It burst, and a fœtus was found in it. M. G. Young describes the case of a child who died when nine months old. In the tumour in its abdomen, an imperfectly developed fœtus was found, it being almost covered with sebaceous matter.

Mr Highuron, in 1814, opened the body of a boy, æt. fifteen years. It contained the body of an imperfectly developed fœtus.

M. de Saint Donat, in 1733, described a case where a fœtus was found in the scrotum of a man. Velpeau, in 1840, removed the rudiments of a fœtus from a man's right testicle. Barnes describes a similar condition. A pullet, half-bred between a dorking and cochin, laid double eggs. The inner shell was a red colour, while the outer shell was a dull, chalky white. Two yolks inside one shell may frequently be seen, but it is rare to meet two perfect eggs, one within the other. (See Fig. 25.)

Mr Macnamara, in his work on Diseases of Bones and Joints, refers to the case of an infant who at the time of birth had a

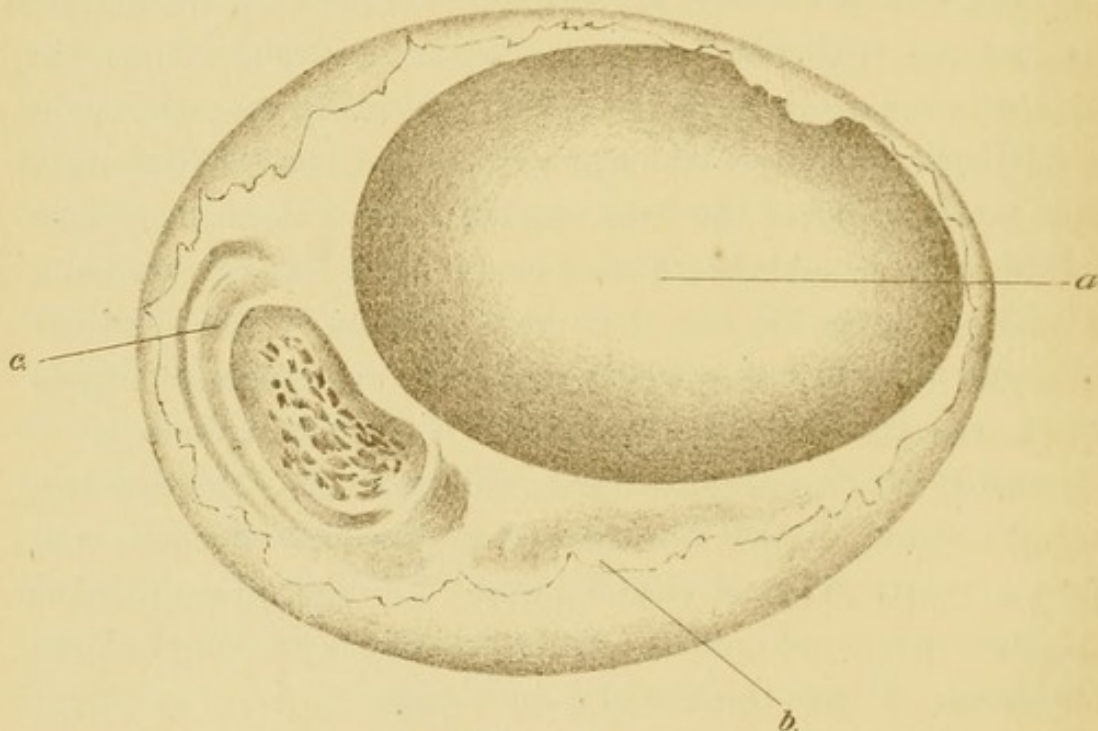


FIG. 25.—*a*, Inner egg of a reddish colour, the cochin egg. *b*, Albumen of outer egg surrounding yolk of its own egg and the cochin egg. *c*, Yolk of outer or Dorking egg lying in larger end. (Barnes. *Obstet. Trans.*, vol. iv.)

well marked tumour on the sacral region. This when removed was found to contain cartilage, some being partly ossified, and muscular tissue. He adds, there can be no doubt but that the tumour originated in an ovum which had been impregnated but had not arrived at maturity. This blighted ovum, at an early stage of its development, had become attached to the fœtus, of which it subsequently formed a part, increasing in size with the fœtus, and after birth growing in proportion to the infant. The tumour measured 12 inches round its largest part, and 14 inches from before backwards.

CHAPTER V.

THE CAUSES OF ABORTION.

SECTION III.—PATERNAL CAUSES.

THE one great paternal disease which causes abortion is syphilis. Sufficient has already been said on this subject when treating of maternal syphilis.

Devilliers has shown that there are two distinct parts in the sexual act. Thus, a man may fertilize, but there may be no following development. The procreating power is distinct from that of development. A man's whole sexual force may, in fact, be spent on the one act of fertilising. He also states that the faculty of development is relative. Thus, a weak man may impregnate a robust woman. She by her strength, gives the necessary vitality to the ovum, so that it develops and grows. Instances are known where a woman has aborted with a first, and has had children to a second husband. This shows that there is "incomplete sterility" on the part of the husband, as well as "absolute sterility." Sterility, as defined by Matthews Duncan, is a condition of a woman who fails to bring forth a child. In absolute sterility, there is neither abortion, miscarriage, or child. In "absolute sterility" there is a failure *at conception*, in "sterility" there is a failure, not to conceive, but to add to an increase of the population. Similar conditions seem to exist in the male. It is said that about one in every six cases of sterility is due to the husband (see Gross). Lawson Tait relates the case of a lady who cast off complete and closed decidua. In one specimen, "a little pedunculated button of white substance, which undoubtedly was an arrested ovum," was found in the cavity.

She again married twelve months after, and had, in succession, four healthy children. Other instances are recorded, where a woman has aborted with a first, and has had children by a second husband. Priestley relates a case where a man, the subject of slight albuminuria, married a young girl in perfect health. She had one child, but aborted in three subsequent pregnancies, the man becoming weaker and weaker, until he died of uræmia. Dr Frank, of Cannes, has related the history of a diabetic man who married a young healthy woman. The first child was born alive. After this, the wife had a series of abortions, generally about the fourth and fifth month.

It is important to remember that a man may be fruitful at one time, and sterile at another; in other words, there is evidence to show that the seminal secretion of the same individual changes from time to time. Thus, the absence of spermatozoa is, by itself, to be regarded as a proof, neither of previous sterility, nor of the impossibility of subsequent fruitful intercourse (Tidy). The effects of disease on the male sexual organs are, in some cases, very strange. Fedore pointed out that it is quite possible for certain diseases to produce such an alteration in the constitution, that a previously impotent man may eventually be cured of this complaint. He gives the case of Avenyoes, who stated he had been without offspring during the whole of his youth, but became a father after recovering from an acute illness. Zacchias also relates the case of an artisan, who lived twenty-four years without having children, and whose wife became pregnant to him after his recovery from an acute disease. Cazeaux lays stress on the statement that when the seminal fluid is weakened by excess, prostration, premature decay, old age, abortions are likely to occur. The wives of men who are suffering from lead poisoning—even when the former are healthy—are said to be more liable to abortion.

Gross, in his work, also calls attention to this condition. The state of azoospermism may be temporary, and due to sexual excess or fatigue. Acute and chronic diseases, or advanced life, also impair the fertility of the spermatozoa, as has been shown

by the investigations of Duplay and Dieu. In some cases, the sperms are small and short, or may be wanting in liveliness of movement. The head may not be much larger than the tail. Sometimes one sees a case when a man, after an attack of illness and a fair convalescence, succeeds in impregnating a wife, with whom he has previously failed. A table is given by Gross, showing the several ages at which sperms have been detected in the seminal fluid—

Of 25 sexagenarians,	spermatozoa	were	discovered	in	17.
„ 75 septuagenarians,	„	„	„	„	42.
„ 51 octogenarians,	„	„	„	„	19.
„ 4 nonagenarians,	„	„	„	„	0.

The effects of syphilis, and of lead poisoning, have been elsewhere referred to.

CHAPTER VI.

CRIMINAL ABORTION, OR FŒTICIDE.

THE English law makes no discrimination between abortion, miscarriage, or premature labour. In fact, all labours occurring before full time, are premature. Lately, Mr Justice Hawkins threatened to commit a medical man for contempt of court if he persisted in speaking to the jury of these different divisions. By the sec. 43, Geo. III., chap. 58—known as Lord Ellenborough's Act—the procuring, or attempt to procure abortion, it being known that the woman was quick with child, was a felony, and punishable by death, and without benefit of the clergy. If, again, a person attempted to procure an abortion on a woman who was not pregnant, the person could be punished by pillory, fine, whipping, or transportation. The Geo. IV., chap. 31—Lord Lansdowne's Act—also enacts that the procuring of abortion on a pregnant woman is a felony, and punishable by death. The Statute Will. IV., and Vic. I., chap. 85, prescribes transportation for not less than fifteen years.

The law on the subject now stands thus: 24 and 25 Vic., chap. 100, sects. 58 and 59. “58. Every woman being with child, who, with intent to procure her own miscarriage, shall unlawfully administer to herself any poison, or other noxious thing, or shall unlawfully use any instrument, or other means whatsoever with like intent, and whosoever, with intent to procure the miscarriage of any woman, *whether she be or be not with child*, shall unlawfully administer, &c., shall be guilty of felony, and may be kept in penal servitude for life, or for not less than three years, or imprisoned for any term not exceeding two years, with or without hard labour, and with or without solitary confinement. 59. Who-

soever shall unlawfully supply or procure any poison, or other noxious thing, or any instrument or thing whatsoever, knowing that the same is intended to be unlawfully used or employed with intent to procure the miscarriage of any woman, whether she be or be not with child, shall be guilty of a misdemeanour, and, being convicted thereof, shall be liable, at the discretion of the Court, to be kept in penal servitude for the term of three years, or to be imprisoned for any term not exceeding two years, with or without hard labour."

It will be observed that *an attempt to procure is* punishable, as is an attempt followed by the *expulsion of* the child. Even supposing the fœtus should be a monster, the law is the same. Again, the consent of the woman operated upon is immaterial, such not condoning the offence. If death follow a criminal abortion, the crime is wilful murder, and the penalty death, although the operator have had no intent to destroy life. If, however, the instrument or drug used be not a dangerous one, and not used to destroy life, the crime might be manslaughter. Usually, the person operated upon is an accomplice of the abortionist, and so their evidence cannot be relied on.

Generally speaking, criminal abortion is commonest at the second, third, and fourth months, as it is about this time a woman begins to feel certain she is pregnant. Orfila thought that criminal abortion was most frequent in the first two months of pregnancy. Devergie mentioned the third to the fourth and a-half months, as the time when efforts were made. Tardieu investigated thirty-four cases: twenty-five occurred in from the third to the sixth month, five in the first two months, and four in the seventh to eighth.

Is criminal abortion on the increase? Thomas, in his work on "Diseases of Women," calling attention to the prevention of conception and the induction of abortion, says, "The practice is becoming exceedingly common, as every physician is aware, so common indeed, that in the older portions of this country (America) unfortunately, it must be said, that among the more civilised and educated, it is by no means usual to meet with large families.

That this criminal practice constitutes a prolific source of uterine disease, no one engaged in gynecology can for a moment doubt." Emmet, speaking on the same subject, says, "There lies a great missionary field throughout our land, and one in which only the medical profession can accomplish anything towards bringing about a healthier moral tone in regard to the marital state, and it is equally applicable to both man and wife. But, before we can exercise the full influence, we shall have to purify our own ranks, for we have many wolves in sheep's clothing among us. If the testimony of the sufferers is to be accepted, it is evident that we have more abortionists in the profession than out of it." Some years ago, the American Medical Association offered a prize for "a short and comprehensive tract for circulation among females, for the purpose of enlightening them upon the criminality and physical evils of forced abortion." It was awarded to Professor Storer, of Boston, for his essay, "Why Not" (see Historical Notice).

The multitude of drugs bought at the druggists, so that the buyers may "bring on their periods," must be legion. The frequency with which the uterine sound is used must also be a prolific source of evil. Women at present go from one hospital to another, every month, so that some one of the staff "may examine their wombs." Cases are known when such "women" have reminded the practitioner, that he did not examine them in the same way as another medical man had. The uterine sound is a very powerful instrument of danger. Does its utility out-balance its harm? Can two well-trained fingers not get on without it? The ordinary gum elastic sound—an instrument which allows a woman to procure abortion on herself, and by her own help—is now becoming well known. It is said to be an American invention, but of this I am cognisant, that it lies on an instrument maker's shop counter for sale, and is often sold by him. I think lecturers on medicine, and on diseases of women, do not sufficiently impress on their students the danger of their, in any way, incriminating themselves by using uterine instruments when there is the very slightest suspicion of pregnancy existing. The precept,

“Be as wise as serpents, and as harmless as doves,” should be inculcated.

Tidy says that abortion may be discussed under three heads—

1st. Natural abortion, which has already been considered.

2nd. Artificial abortion, *i. e.*, that including miscarriage and premature labour.

3rd. Criminal abortion, or fœticide.

Artificial abortion has been recommended under the following:—

a. In extreme narrowness of the pelvic brim.

b. In rare cases of obstinate vomiting.

c. In pregnancy complicated with insanity.

d. In some general and local diseases, as fevers, cancer of the uterus.

e. In some cases of placenta prævia, with severe hæmorrhage.

f. In rupture of the uterus.

g. In narrowing of the soft genital passages.

h. In some cases of Bright's disease of the kidneys.

This operation may be performed in various ways. It is not now proposed to discuss in detail the performance of such. They may be—

a. By puncturing the membranes.

b. Administering drugs.

c. By separating the membranes from the lower portion of the uterus.

d. By passing a bougie between the membranes and uterus, and keeping it retained for some time.

e. By inserting tupelo, or sponge tents, in the cervix, or by using Barnes' bags.

f. By galvanism.

g. By irritating the breasts, by various methods.

h. Injecting carbonic acid in the uterus.

i. By injecting cold or warm water into the vagina or uterus.

For the guidance of those who are about to induce premature labour, Tidy lays down three very important rules—

1st. Do not induce premature labour, or abortion, without the most mature deliberation.

2nd. Do not undertake it until after consultation with a second medical practitioner.

3rd. In all cases to have the full consent, *in writing if possible*, of the husband or guardian.

When called to a case of abortion, the physician should always note—

1. The examination of the woman during life, or (*b*) after death.
2. The substances expelled from the uterus.
3. The instruments or drugs in possession of the accused.
4. The contents of the stomach and bowels should be kept when a *post mortem* is made, and also the vomited matter.

The recent signs of delivery, appearance of the uterus and vagina, and the age and condition of the fœtus, should be fully described.

Medico-legal examination of mother. (*a.*) Temperament. (*b.*) As to predisposition to abort, and the period at which abortion has commonly occurred. (*c.*) The general state of health, as syphilis, anæmia, uterine disease, excessive menstruation, sexual intercourse. (*d.*) Whether the woman be ill or well formed. (Note pelvic malformation, effects of tight-lacing.) (*e.*) Signs of recent delivery, or the expulsion of uterine contents. (*f.*) Whether any cause can be assigned to account for the abortion, *e. g.*, violent coughing, undue excitement, septic poisoning, violence, administration of drugs. (*g.*) Note all injuries on the genital organs, and consider whether they might be self-inflicted.

Examination of mother, *if dead*. Note, 1. The necessity for care not to mistake the effects of menstruation for those produced by abortion. 2. Avoid injuring the parts by the knife, or otherwise during the autopsy. 3. Consider the possibility of injuries being self-inflicted. Note the existence of any marks of violence on the abdomen or other parts, also the condition of the genital organs, noting also all inflammations, rents, tears, perforations, &c. If the uterus is injured, it should be preserved. Note also:—

1. The condition of the passages—relaxed, or otherwise.
2. The condition of the os—virginal, or gaping.
3. Vaginal secretions, and if present, their character.

4. The general appearance of the breasts—presence of milk, form, areola.

5. Whether there be any signs of irritant poisoning in the stomach, or if there be inflammation of the bladder, kidneys, rectum, &c.

6. Whether the viscera generally indicate loss of blood during life.

Examination of the product of conception:—

a. Nature of the supposed product of conception.

b. Consider whether there is evidence of a diseased condition of the membranes, or of the placenta (see Diseases of these structures). (In criminal abortion, the products of conception are more likely to be expelled in a mutilated state; whereas in unavoidable cases, such as those due to fatty degeneration, the ovum is generally expelled entire.)

c. If a fœtus is found, determine whether it was born alive, also its possible age, and the cause of its death.

Examine all the drugs and instruments.

It is to be remembered that the expulsion of masses of cystic degeneration of the chorion always point to the fact that conception has occurred at some time in the woman, and that a portion may be expelled some months after the birth of the child.

The following Table shows the length and weight of the fœtus at different ages:—

Age.	Height.	Weight.
1 to 1½ months.	$\frac{3}{8}$ ths to $\frac{5}{8}$ ths inch.	15 to 46 grs.
1½ to 2 „	$\frac{3}{4}$ ths to 2 inches.	77 „ 155 „
2 „ 3 „	2 to 4 inches.	6 drs. to 1½ ozs.
3 „ 4 „	4 „ 6 „	1½ ozs. to 4½ ozs.
4 „ 5 „	6 „ 8 „	6 „ 8 „
5 „ 6 „	10 „ 12 „	8 „ 12 „
6 „ 7 „	12 „ 14 „	15 „ 32 „
7 „ 8 „	14 „ 16 „	2 to 3 lbs.
8 „ 9 „	16 „ 18 „	3 „ 5 „
at term.	18 „ 20 „	6 „ 7 „

G. W. Callender has given the following Table:—

Age in weeks.	Length of the foetus in inches.
3	·12
6	· 4
7	· 5
8	· 7
9	{ · 9
10	{ 1· 1
	{ 1· 5
12 to 16	{ 2· 3
	{ 3
	{ 3· 5
	{ 3· 7
	{ 3· 8
16 to 20	{ 4· 0
	{ 4· 3
	{ 4· 7
	{ 6· 5
20 to 24	6· 7
	7·
	{ 9·
	{ 10·

These Tables would be much more perfect, if the area and weight of the placenta at the different months could be stated.

Measurements of the uterus, and weight, at different periods of gestation:—

At the end of the third month, $4\frac{1}{2}$ to 5 inches in length, 4 in breadth, and 3 in thickness.

At the end of the fourth month, $3\frac{1}{2}$ inches to 6 in length, 5 in breadth, and 4 in thickness.

At the end of the fifth month, 4 to 7 inches in length, $5\frac{1}{2}$ in breadth, and 5 in thickness.

At the end of the sixth month, 8 to 9 inches in length.

It weighs a little over 1 oz. at virginity, while at the fifth month it weighs from 14 to 15 ozs. (Engelmann). In early pregnancy the cervix is thickened, elongated, soft, velvety, and somewhat of a deep bluish wine colour. The cervix contains mucus, and the uterus is slightly anteverted, and is lower in the pelvis than usual.

Figures 26 and 27 are introduced to show an embryo and membranes; expelled eight weeks after conception.



FIGS. 26 and 27.—Criminal abortion occurring at the end of the second month. The ovum—the size of a hen's egg—was expelled entire and surrounded by decidua and clots. These have been removed so as to show the villi springing from the chorion. The sac was opened and the embryo taken out. The embryo measures one inch in length; the upper and lower extremities are developed; the finger and toes are present but still webbed. The eyes, mouth, and umbilical cord are easily seen.

MEANS USED TO PROCURE CRIMINAL ABORTION.—These may be considered under two divisions: 1st, By violent exertions; and 2nd, by the administration of drugs. Or they may be divided into mechanical and medicinal. Under the first may be included direct injury to the abdomen, long walks, rolling down hills, having the abdomen trampled upon or beaten, over-tight lacing. Tarnier mentions a kind of stays used by an abortionist. They measured about 21 inches in circumference. (The abdomen of a pregnant woman is about 39 inches.) Needles, sounds, and probes are among this class. In India, the professional abortionist or Dhæes insert a twig of a tree, measuring from 6 to 8 inches long, and smeared with asafœtida, into the womb. Bleeding from the arm has also been used. Severe cough and the straining following the use of emetics may act as violent

exertions. Goodell once showed a galvanic bougie composed of two metals which was used by an empyric to produce abortion.

Dr Hemingway (U.S.A.) records two cases where a darning needle had been used to bring on abortion. In one of them, "a lady friend who was visiting the patient, deliberately ran across the room and jumped upon the patient's stomach." Another is recorded in the 18th vol. *Am. Journ. Obst.*, where a mother allowed a hairpin to slip into the uterine cavity on the 5th day of March, and from which it was removed on the 29th of the same month, abortion, accompanied by high temperature, and fetid discharge resulting from its introduction. In another, a hairpin, $4\frac{1}{2}$ inches long, was removed from the uterus, having been in for some hours. Here, no abortion occurred. In the same volume, a case is related where a woman procured abortion on herself, a view of her own parts being obtained by means of a mirror laid upon the floor. Partridge describes a case where a woman had introduced a hairpin into her womb, and where he had to dilate the cervix before he could remove it. She died nine days after of peritonitis. Thomas (*Am. Journ. of Obst.*, vol. 6) relates the case of a woman who passed a wire of $17\frac{1}{2}$ inches up her vagina into her right lung. She died of pneumonia and pleurisy.

Drugs may be given, which are supposed to have the effect of stimulating the womb to contract. Pereira says that *ecbolics*—*ekbolion*, a medicine causing abortion—excite the uterine muscular fibres directly, while *emmenagogues* stimulate the vascular system. Among *ecbolics* are ergot, borax, and *actea racemosa*. Taylor says that abortionists often use a mixture made up of the watery extract of aloes, and ferric chloride, giving this in large doses.

Among vegetable preparations, the following have been used:—squills, quinine, belladonna, pilocarpine—the alkaloid obtained from jaborandi—when given, may cause contractions of the uterus, and so induce abortion; sarsaparilla, hellebore, yew, laburnum, grains of paradise, saffron, guaiacum, broom, fern, *actea racemosa*, digitalis, lignum vitæ, tansy, aloes, balm, horehound, camomile, wormwood, borax, mugwort, cantharides, juniper, juice of bamboo

leaves, milk hedge, and other euphorbiaceous plants, chiretta, moolum, extract of cotton wood, carrot seeds, savine, ergot, saffras, pennyroyal, hierca picra ("hickery pickery"), holly bitter—made of one part of canella bark and four parts aloes—croton oil, elaterium, gamboge, and colocynth.

Among mineral substances the following have been used:—epsom salts, arsenic, corrosive sublimate, cyanide of potassium, sulphate of copper, and iron. In Taylor's *Medical Jurisprudence*, cases are given when the mother died after taking too large a quantity of arsenic. In another, four and a half ounces of metallic mercury were taken, with the result that the mother suffered from tremors and paralysis, but did not abort.

CHAPTER VII.

ABORTION IN PLANTS AND ANIMALS.

LITTLE or nothing is known regarding the question—Does abortion occur in the different families of the vegetable creation? However, from what has been written, these seem to have their life complicated by diseases, just as do the members of the animal kingdom. A specimen becomes extinct in the course of years. Some are perfectly sterile. Propagation of their kind depends either on self-fertilization or on cross-fertilization. It may be, as with animals, that a flower may be fertilized with pollen of so feeble a kind that it is fertilized and nothing more, the additional power given for development being absent. The act of breeding in and in leads to as disastrous results as it does in man. Sprengel and others have shown that self-fertilization leads to worse results than cross-fertilization, and that all the arrangements which favour the latter—such as visits of birds, bats, beetles, flies, moths, bees, slugs, worms, and wind or water-borne material—have the best and most highly developed offspring. Müller refers to this matter particularly. Herbert, in 1837, said—“I am inclined to think that I have derived advantage from impregnating the flower from which I wished to obtain seed with the pollen from another individual rather than from its own. The law that “no organic being fertilises itself for a perpetuity of generations, but that a cross with another individual is occasionally—perhaps at very long intervals—indispensable”—points to the fact that plants have their cycle of existence and also disturbances as well as animals. “Whenever plants which are the offspring of self-fertilization are opposed

in the struggle for existence to the offspring of a cross-fertilization, the latter have the advantage."

Fritz Müller has also shown, in the case of the various orchids, that they are not only sterile to their own pollen, but even that the pollen and stigma of the same flower act as fatal poisons to one another. Darwin says, "Nature abhors perpetual self-fertilization."

In the origin of flowers and gradual supremacy of certain plants, there is a constant growth and development of the stronger over the weak. It is most probable that in their efforts Nature sometimes fails to reach the full term, and so unripe fruit results. Darwin speaks of sterility, aborted organs, and monstrosities of plants, but does not refer to abortion. Over-nourishment or manuring of plants leads to growth of tissue, and conduces to imperfectly developed fruits, leaves, or flowers.

Barnes says the wonderful changes undergone by the plant during inflorescence, fertilization, and fructification, present many points of analogy with the corresponding processes in animals. Who can see without wonder the upspringing of the stamens to join the pistil in the barberry at the slightest touch. It is strangely suggestive of the reflex function in animals.

ABORTION IN ANIMALS.

Fleming, in his work on "Animal Plagues," gives many instances where abortions occurred. Thus, after the Tarentian war pestilences were numerous. In 278 B.C. an epidemic—known as the "Abortus Epidemicus"—took place, and was very fatal to pregnant females and cows at Rome. "The foetus was killed in the womb and discharged from it." In 1662 another epidemic arose. *Post-mortem* examination showed the liver to be full of hydatids. Sheep suffered, and the animals in the womb were found to have the same diseased appearances—their livers being similarly affected.

Abortion in animals occurs if the foetus is expelled at a time when it has not attained sufficient development to carry on an independent existence external to the parent.

Abortion may be said to take place in solipeds when the foetus is expelled 40 days before the normal period; in the bovine species, 35 days; in the sheep and goat, 20 days; in the pig, 15 days; and in the bitch and cat, 7 days. St Cyr says it may be acknowledged that abortion has taken place when the foetus is expelled in the mare before the 300th day of gestation, and in the cow before the 100th day. Most animals retain their foetuses although they may be subjected to considerable violence. The mare and cow are the most likely of animals to abort. Baumeister and Rueff state that in France, in a dairy containing Durham cows, and with 100 pregnancies, there were 17 abortions; while at Hohenheim it appears that one-fifth of the cows aborted. Among 5864, only 26 aborted, or 0.433 per cent.

Abortion may be sporadic, or epizootic.

According to Fleming, the causes of sporadic abortion may be either external or internal.

EXTERNAL CAUSES.—Cold seems to be a strong influence, more especially when it is of sudden application. Thus, a cold or wet night in autumn, followed by a hot day, will be more injurious than a few days of continued cold. Toggia said it was most difficult to prevent pregnant cows from aborting in cold and damp localities, and when heavy fogs lasted for some days. Food of bad quality is another cause. Putrid water, and the eating of ergot of rye, sedges, and "horse tails," is injurious. Delwart says that for twenty years all the cows in a herd of thirty aborted each year. The cause seemed to lie in the too great quantities of grains and balls of cereals given. When roots replaced this diet, twenty-five healthy calves were subsequently born. It is doubtful if ergot, when consumed by pregnant cows, is a common cause of abortion. In 1721, epidemic ergotism raged in Silesia, and here the King of Prussia issued an edict forbidding the use of rye when tainted with ergot. Traube, who described an epidemic which occurred in Hesse in 1770, noted that many consumed

diseased rye, and in no case did any abort. Fleming says that in Brandenburg (1835) abortions among cattle were unusually frequent in the brandy districts, in consequence of the forage given them being mixed with brandy lees. Frozen food or drink, or food covered with frost or snow, may be a cause. St Cyr mentions that Gelle had witnessed nearly one-fifth of a flock of sheep abort immediately after drinking from a pond, the ice on which had been broken to water them. Huvellier mentions the case of a rich grazier who owned ten brood mares, one-half aborted every year because they were sent three times each day to drink cold water. Often, after drinking, they trembled, had colic, and aborted. Excessive exercise, kicks on the abdomen, excitement, fear, as by dogs hunting sheep, may cause abortion. Fleming relates a case where a fat bitch aborted through frequently ascending and descending a steep staircase. Sexual intercourse is a cause, and has been elsewhere referred to. However, this must be rare, as pregnant females seldom permit intercourse. Bleeding may cause it. So may vaginal operations and examinations. Professor Bouley performed the operation of castration on three pregnant cows. All aborted inside two days, and one died. Wild animals when kept in confined places are said to abort.

INTERNAL CAUSES.—Cough, bronchitis, enteritis, pleuro-pneumonia, diseases of the uterus, and tumours in the abdomen. Among many there is a prevalent idea that some defect of the male is a cause. He may be either too old, or have covered too many. Aristotle says—"When a horse copulates with an ass, or a he ass with a mare, abortion is more frequent than between congeners—a horse with a mare, or two asses together. In birds' eggs it is often observed that these are not hatched, owing to imperfect impregnation on the part of the male. In acute febrile diseases, the foetus may be killed by the high temperature. Death of the foetus may also result from hydrocephalus, ascites, and chlorosis. Pleuro-pneumonia may be a cause, as the foetus may be affected with this disease while in the womb. Hydramnios and other morbid affections of the foetal envelopes

may occur. The presence of several fœtuses may be a cause. A fœtus may die and be retained in the uterus for some time. It may also not be expelled until the other fœtuses are born at term. It may be here mentioned that Zundel speaks strongly of the use of chloroform in about three drachm doses for a cow.

EPIZOOTIC OR INFECTIOUS ABORTION.—In this variety all or nearly all the animals on one pasturage, or even over a large area of country, abort at the same time. Not only may this take place on one occasion only, but it may go on recurring for a succession of years, thus constituting itself a scourge, and doing great harm to agriculture.

Such epidemics have been known to occur from the earliest times. Those occurring up to 800 A.D. are described in Fleming's "Animal Plagues." One occurring in Chalons in 1784, when nearly all the cows and mares aborted; another in Germany in 1777, when all the cows and pigs aborted. The "abortus epidemicus" of 278 B.C. carried off many children.

Causes.—It is said to be most frequent in wet years, and when damp and damaged forage is given. The presence of ergot of rye may cause it. It has been stated that abortion in New Zealand among cows has become much more common since rye grass was introduced. Zundel says that any anæmia of the animals particularly favours the multiplication of bacteria and micrococci in the genito-urinary mucous membrane. Professor Norcard speaks of an epidemic of abortion among cows which is essentially propagated by infection. Franck, of Munich, showed that epidemics depended on the presence of microbes. Locality seems to have an influence. Henze says that in the department of the Nièvre (France) abortions are very few in the arrondissement of Clamecy, while in others they occur frequently. It has often been observed that when one cow among a number aborts, all the other pregnant cows abort in succession, until almost all have miscarried. Also when a newly purchased cow has been introduced among a herd and aborts, all the other cows may follow in aborting. If, again, pregnant cows are introduced into stables in which other cows have previously aborted, the

former are very liable to abort. These remarks point to the fact that some epidemic influence is most probably at work when these abortions occur. Franck, of the Veterinary School at Munich, has discovered the presence of a minute fungus similar to the *leptothrix buccalis*. He has shown that abortion may result if the mucous membrane of the vagina be smeared with matter from the expelled membranes of one which has been delivered. The fact that retained membranes, in some animals such as the cow, may be expelled only when decomposition sets in should be remembered, for if these be left in the same stable where there are other pregnant cows, the bacteria from such may, by entering the others, cause abortion. It is to be feared that the dirty state in which the feeding troughs and surrounding drains of stables are often kept may be a frequent cause of abortion. In Tarnier's second volume, an epidemic of abortion is referred to. The cattle on both farms aborted. On using an antiseptic wash to the genitals of the animals, the epidemic was extinguished.

CHAPTER VIII.

THE SYMPTOMS OF ABORTION.

THE symptoms of abortion vary to a great extent, more especially if the contents of the womb are expelled during the first or second month, or towards the sixth. They will also vary according as the foetus, or placenta, is primarily diseased; for when the former dies first, the process is slower, less blood being required, all the parts, uterus, placenta, and foetus, gradually shrink, a slow involution taking place.

When abortion occurs shortly after the first month, the pain and hæmorrhage may not be much in excess of that experienced at an ordinary menstrual period, more especially if the patient has usually suffered from dysmenorrhoea. The ovum may then be expelled during micturition or defæcation. It may be taken for granted that it is only the usual periodic flow, but a few days delayed. The discharge of blood is trifling. Both it and the pain soon pass away, and the woman, apparently in good health, neither tells her physician nor calls in a nurse, but proceeds with her daily duties.

When abortion occurs at a later stage, the symptoms are somewhat similar to those experienced at term, only the progress made is slower, for nature does not proceed so quickly, having been called upon to act when the uterine muscular fibres are undeveloped. Generally *the pains* are felt in the hypogastric region, or they may begin in the loins and extend round to the front, coming and passing off in regular systole and diastole. If the uterus is so far developed as to have risen above the pubes, it may be found to harden during contraction. The pains increase

in frequency and power as the os dilates, and as the foetus is being expelled. When severe, the membranes may rupture, and a discharge of liquor amnii take place. (This event will be more marked, if abortion take place at the fifth or sixth month.) When this occurs all hope of arresting the progress of abortion may be given up, and, consequently, the "threatening" passes into the "inevitable" form. There should, however, be strong evidence of rupture having taken place, as frequently, the patient, her nurse, or friends, confound it with the escape of urine during a pain. Accompanying the pains there may be a feeling of languor, irritability of the bladder, chills, and a sensation of weight in the pelvis. There may be attacks of excitement or hysteria. Burns, in his work on Abortion, says:—"I may also add, *cæteris paribus*, we shall find that the further the pregnancy is advanced beyond the third month, and the nearer it approaches the sixth, the less chance is there of abortion being accompanied, but the greater of its being succeeded, by a nervous affection." When hysteria occurs during abortion, symptoms of feverishness may arise; as it does in those cases of inexplicable pyrexia, or perverted thermogenic metabolism. When the pains are not rhythmic in character, but are of a "colicky" feeling only, this is said to point to the distension of the uterus with blood. The presence of this continuous feeling of stretching or dilatation is more marked when concealed bleeding takes place in the later months of pregnancy, and will then be accompanied by the outward signs of loss of blood, such as faintness and blanched appearance. When there is continuous pain, the membranes will be felt to be tense. It should be remembered that abortion may occur, and still be unaccompanied by either pain or hæmorrhage.

As regards *hæmorrhage*, this will vary in quantity and appearance. It is generally preceded by a thin mucous, or watery discharge from the vagina, and may continue for two to three days. The bleeding may or may not begin after the pains have set in, but when the quantity is copious, not much time will elapse before active contractions take place. In abortions at the third and fourth month, the hæmorrhage generally continues from the

beginning to the termination of labour. In this respect it differs from what occurs in labour at term. In the former case, the placenta or a portion of it is separated at an early stage, owing partly, as Tarnier says, to the want of flexibility of the placenta, which prevents its extension and retraction, and also to the thickness of the placental decidua, and to the large amount of plastic matter between the lobes. In labour at term, it is very unusual for hæmorrhage to take place at the placental site during the second stage, but where such occurs, a clot of blood is generally found on the maternal surface of the placenta.

When abortion results from sudden violence, as when a woman falls on her nates, perhaps the first symptom noticed is a sudden gush, or discharge of blood. The ovum may escape with it, one sharp pain having been experienced before the expulsion. To this condition of affairs the French apply the term *avortement instantané*. But the time occupied from the beginning to the termination of labour varies greatly, from six or twelve hours to ten days or more.

The *quantity* of blood lost will vary. If the uterus is small, then the quantity of blood is of little amount. With an undeveloped uterus, the bleeding will detach the ovum, and consequently labour will soon terminate. It will also vary with the time occupied, provided the bleeding is continuous. Tarnier says he has known a discharge continue for six to ten weeks, and without interfering with gestation. On the other hand, it may be so profuse as to cause pallor of the face, vomiting, and a tendency to syncope. Thus, the amount discharged is of more moment than the time during which the hæmorrhage continues. The quantity lost, coupled with the duration of the flow, may to an extent give a fair idea of the amount of separation which has taken place between the placenta and uterine wall. The hæmorrhage will do the least harm when its seat is near to the mouth of the womb; and the greatest, when it is near the fundus, and cannot escape externally. Smellie, Ruysch, and Botal, have recorded cases where the blood has passed through the Fallopian tubes and into the peritoneal cavity. The hæmorrhage

is less to be feared at the sixth month, as at this time the decidua is more easily cast off. At a time when the placenta is not formed, that is, before the end of the second month, the hæmorrhage comes from the entire uterine surface, while at a later month it is derived from the placental site.

The bleeding takes place from the maternal vessels. Consequently, when the early ovum is expelled, the outer layer of the decidua vera is often covered with clots. Sometimes however the blood bursts through this and during the early months may escape into the cavity of the decidua. It may finally rupture the chorion and amnion, and so fill the amniotic cavity also. In the earlier writings on midwifery, when an ovum was expelled with the surrounding blood clot quite fresh, it was called a "blood mole;" and when the clot was older, the term "fleshy mole" was used.

In some cases of abortion where the hæmorrhage is "concealed," no blood, but only a thin serous fluid may appear. Sometimes this "accidental hæmorrhage" is in reality due to a partial detachment of a placenta prævia. This may be proved afterwards by noting, that the rent in the membranes caused by the presenting part is very near to the edge of the placenta. When the placenta is implanted in the fundal region of the uterus, the rent in the membranes is usually central.

When the cause of abortion has been the application of a direct force to the womb, such as a blow on the abdomen, the symptoms will generally point first to the death of the fœtus. Little or no pain is felt, and events seem to go on as usual. Then, perhaps in ten or twelve days, the movements of the child, which up to this date have been felt by the mother, become weaker and finally imperceptible. At the same time, those signs which are present in the early months of pregnancy, such as morning sickness, enlargement of the breasts, and progressive increase in the size of the abdomen, disappear. A cold uneasy feeling in the hypogastric region, and a sensation of weight in the neighbourhood of the womb, may be complained of. If the uterus be examined from time to time, the striking observation

will be made, that a woman apparently going on in her pregnancy has a womb which is either stationary, or diminishing in size, instead of growing larger. There is, however, a very important exception to this statement, for when a dead foetus decomposes, the womb will not become smaller, but larger, *tympanitis uteri* being produced. In such cases there will be symptoms of fever, bad smelling discharges, and escape of gas from the uterus. In a multipara this alteration in the figure will be more noticed. In such cases the dusky hue of the vagina and vulva, usually seen in normal pregnancy, and known as Kluge's test, fades, this fact being confirmed by the observations of M'Clintock, Barnes, and others. If the foetus has survived the fourth and a half month, the heart sounds, which may have previously been heard, are now no longer to be detected. The foetal and umbilical souffle may be absent. Also, when the stethoscope is pressed over the uterus in a pregnancy beyond the fourth month, one will not detect the "*choc foetal*" of Pajot, that is, the double sensation produced to the ear of a shock and quick sound, a tactile and auditory impression at the same time. This absence of sounds, taken with the above symptoms, will give considerable aid to one when endeavouring to decide the question, "IS THE FŒTUS DEAD OR ALIVE?" Gassner has stated, that the progressive loss of weight by the mother is a sign that the foetus is dead. Cohnstein has stated, that a higher temperature of the uterus, when compared with that of the vagina, is a symptom of pregnancy. Also, that when the uterine temperature is not higher than that of the vagina, the death of the foetus may be suspected. Priestley has suggested, that if the cervix be fairly well dilated, the index finger when pressed up to the foetal thorax, may fail to detect its heart beat. Abdominal palpation may be found useful. Negri, in one case, was able to make out a sensation of crepitation over the region of the foetal head, and so diagnosed the death of the foetus. Braxton Hicks' sign is still present when the foetus is dead in the uterus (see Diagnosis). He also states that if the uterus is very flaccid, but hard at one part only on making palpation, it is likely that the foetus is dead.

When the foetus is dead, and hæmorrhage is supposed to have taken place into the uterus, it is considered that the presence of a slight brownish discharge invariably shows that a clot has formed in the womb, and has decomposed. In such cases, the sense of smell will aid the sense of sight. Further signs of death of the foetus may be brought forward when a vaginal examination is made. Some hold that in such cases the liquor amnii is of a dark colour, and of a thicker consistence than usual, especially when the foetus has been dead some time. If the *head* of a fairly well developed foetus present, the bones of the head and scalp are to the touch of the finger flaccid, loose, emphysematous, and creaking. If at the same time a portion of the cuticle peel off, it is most probable that the foetus is dead. Still, it must be remembered that the skin may be gravely affected in syphilitic infants. If the *breech* present, it will be found that the anus is relaxed, and does not contract when the examining finger is pressed into the bowel. The thermometer in the rectum of the foetus will also show a loss of heat. If an *arm* present, there will be no pulse felt in the artery, and if the palm of the hand is irritated with the finger, it will not close on it. The same remarks apply to *footling* cases, except that when the sole of the foot is irritated—in the live infant—its toes are extended. If the *umbilical cord* can be felt, it will be found pulseless. The history of the patient will help us to arrive at a definite conclusion, as when there have been previous abortions from syphilis, or some placental disease.

SYMPTOMS OF MISSED ABORTION.—When the foetus dies, and is retained in the womb, it is practically a foreign body. Consequently, its presence is calculated to set up uterine contractions. The circulation in the villi ceases—these and the decidua shrink. Then the cavity of the ovum collapses. This lessening in volume is followed by a re-arranging of the relationship of the walls of the womb to the foetus, so much so that the villi of the chorion may be drawn out from among the maternal blood-vessels. Consequently, a solution in the continuity takes place, and hæmorrhage occurs. With all this, the dead foetus may remain for two

to four weeks in the womb, and cases have been recorded where it has been retained until the ninth month. Generally, the placenta, like the fœtus, ceases to grow, but it may continue to develop. It follows that in such cases the loss of blood is much less than when the healthy placenta is expelled. This is owing to the fact that the placental circulation has been gradually becoming less and less.

When the dead fœtus is retained in the womb, and for some time after its death, the woman is said to have had a missed abortion. Matthews Duncan, in his "Clinical Lectures," devotes a chapter to this subject. Some object to the term "missed," for, as Churchill pointed out, every woman who has arrived at term has missed aborting. Still, the term is generally adopted, and will be retained until a better one is introduced. In these cases, the term missed abortion is used to express *the date on which the fœtus died in the womb*, and not the date on which it was expelled. By remembering this, medico-legal questions of great gravity, and those affecting family happiness, will not be imperilled. Duncan illustrates this by referring to the case of a woman who was delivered, *at* the fifth month of pregnancy, of a fœtus which was about two months old. If, he says, the medical adviser were to tell her husband that his wife had been delivered of a two months' child, his rejoinder might be, "That cannot be my child, for I have been away from home for five months." When the fœtus was expelled, it presented the appearance of a nearly dry mass having a brownish colour. Both the fœtus and membranes are concealed by the placenta which envelops them, they being rolled up in a parcel-like form. Generally, the dead fœtus, when expelled, is mummified or macerated. In very rare cases, it has undergone calcareous degeneration, thus forming a *lithopædion*. It is very seldom putrid, although decomposed. If however air has been admitted, putrefaction will follow, when symptoms of fever will spring up generally accompanied by a dark fetid discharge, which may be mixed with shreds. If such a patient is not speedily attended to, she will rapidly succumb to a general blood poisoning of the system.

The term "concealed abortion" has been applied to the above occurrence. In these cases the term "concealed" is useful, for the septicæmia may be so severe as to obscure the fact that the foetus has died, and is retained in the uterus. A close inquiry, however, into the history will tend to clear up matters of doubt. If air be not admitted, the dead foetus is generally retained for nine months, but it may remain for a much longer period.

VAGINAL EXAMINATION IN THREATENED, OR INEVITABLE ABORTION.—If a vaginal examination be made in a case of threatened abortion, occurring from the third to the sixth month, the vaginal walls will be found to be relaxed and lubricated with mucus. The uterus is also lowered in the pelvis, and there will be a dilatation of the vaginal roof, due, it is stated, to the contraction of the muscular fibres in the broad and round ligaments, pulling the roof upwards and outwards, while the uterus descends. (E. Martin.) The examining finger will generally have difficulty in making out the usual demarcation between the cervix and body of the uterus. Tarnier says that when the well-marked line, or depression, generally felt between the body and neck of the womb disappears, there is no hope of arresting the progress of the abortion. This sign is due to the contractions of the muscular fibres of the uterus, which obliterate the notch. Schwartz has lately called attention to this condition, where the cervix is taken up and forms with the uterine body a common cavity. When the examining finger is pressed up to the os it is generally found softened and dilated. The presenting part of the foetus, a clot, or membranes may be detected. It has been stated that if the presenting part become tense, smooth, enlarged, and forced down towards the os during a pain, it may be considered that it is the ovum which is felt by the finger.

If the progress of abortion is not arrested, the pains increase in severity, the cervix dilates, and the foetus, with perhaps the membranes, is expelled. Strict instructions should be given to the nurse to preserve all substances discharged, for only by a close examination of everything can we come to the conclusion that the womb has emptied itself of its contents. All doubtful

substances should be placed in clean water for twenty-four hours, as by such means simple clots of blood are generally dissolved. In a clot, we may sometimes detect the small bladder-like ovum, with the fine hair-like villi covering it. The villi may be more clearly brought to view, by floating the ovum in a basin of water. In abortions occurring at the second to the third month, the ovum may come away in a mass, but after the fourth month the embryo is generally expelled, and the membranes retained for some time after. The early ovum is usually surrounded by half-coagulated blood. It may therefore resemble a clot, and, to the untrained eye, attract little attention, more especially so if it be considered to be only a postponed menstrual period. Occasionally a complete cast of the interior of the uterus is thrown off, the embryo in such cases being with difficulty recognised. Here the decidua is thicker and more vascular than that which is found in cases of membranous dysmenorrhœa.

In some rare cases, the fœtus is expelled with the amniotic cavity entire, and then the chorion, placenta, and decidua follow, separation between the chorion and amnion having thus taken place.

When the placenta is expelled, it should be carefully examined, so as to make sure that no part of it has been left in the uterus. Fragments of decidua are frequently discharged along with it, and perhaps for a few days after. If it be kept in mind that it is not until the end of the second, or beginning of the third month, that the placenta commences to develop, and that this is not complete until after the third month, the physician may save himself considerable anxiety. When abortion takes place some time after the occurrence of hæmorrhage, the placenta is usually quite fresh looking, but differs from the ordinary appearance by the striking pale colour of the villi, and its somewhat firmer consistency. If the fœtus is retained for a longer time after its death, then the placenta is frequently found to be inordinately developed when compared with the size of the fœtus as it has been nourished through the utero-placental arteries.

SYMPTOMS OF INCOMPLETE ABORTION, OR RETAINED PLACENTA.—The symptoms already described are those which generally take

place when the abortion is "complete," that is, when the embryo and membranes are expelled. But when the fœtus alone is born and the membranes are retained, then the abortion is "incomplete," and the case may become considerably complicated. In such, the contractions of the womb are strong enough to rupture the membranes and expel the fœtus, but not the placenta. And, as the embryo has but a thin and delicate cord, this is easily broken, consequently when the uterus retracts and the cervix closes, there may be no substance found presenting.

The placenta may be retained for eight, twelve, or more days. A case is recorded when it was expelled three months after the fœtus. Dr Fd. W. P. Jago relates a case where a placenta was retained 123 days. "In all cases," wrote Burns, the placenta is retained longer after the expulsion of the child in abortion than in labour at full time." Usually, however, pains come on in a few hours or days, and with them a slight discharge of blood. These contractions finally detach the placenta, which now lies loose in the womb, acting as a foreign body. With this detachment there is generally, as before stated, an accompanying hæmorrhage, for the placenta prevents the womb from completely closing and compressing the bleeding vessels. Here a digital examination will detect a partially dilated os, while generally the placenta will either be found presenting, or partly hanging into the vagina.

A retained placenta has been known to undergo various modifications of development, the most common being "the fleshy mole." Aristotle calls attention to these products of conception, when he says, "Or, having had sexual intercourse, and to all appearances conceived, the size of the uterus increased, and everything at first went on regularly . . . when she produced a large mass of flesh they call a myle." On the other hand it may be absorbed. Naegele and others describe this absorption of the retained placenta. Such an occurrence was at one time doubted. It was suggested that as the retained placenta broke down, it passed off in the discharges, or that it had been expelled, during straining or defæcation, without the knowledge of the woman.

Analogy supports the statements made regarding absorption, for it is well known that the dead foetus, both in extra- and intra-uterine gestation, has been absorbed to a very great extent. Therefore, why should not absorption of the placenta take place?

In those cases of multiple conceptions, when one foetus dies, both it and the membranes belonging to it may be expelled. But, on the other hand, it may be retained to full term, its liquor amnii being absorbed. As the development of the live child progresses, the dead foetus and membranes are pressed against the uterine walls. It may thus be so thinned out, and partly absorbed, as to receive the name of *foetus papyraceus*. (See Fig. 26.) Braun, M'Clintock, and Späth, have shown that abortions occur much more frequently in pleural than in ordinary pregnancies.

The more common symptoms, however, in incomplete abortion are generally these:—A woman comes to her physician complaining that she is suffering from a severe and weakening discharge, which has been troubling her for the last few days or weeks. On inquiry, it will be found out that she thinks there has been a “mishap” or miscarriage some time ago. On making a bi-manual examination, the womb is found to be larger than it should be. It is also probably tender on pressure. The os is soft and dilated, while a portion of the placenta or membranes may be found presenting. The breasts may have been enlarged, and milk may have escaped from them.

In such cases, when the placenta remains in the uterus, having been wholly or partially detached, it may undergo decomposition. Consequently the discharge, if there be any, is offensive. When absorption takes place, the patient complains of pain and shivering, the pulse may rise to 120 or 130, the tongue is coated, the bowels relaxed, and the lochia has an extremely bad odour. The stomach is irritable, and may reject all the food taken. The heat of the body may vary from 102 to 104° F. Sometimes the abdomen is swollen and tympanitic, while restlessness and delirium set in. In such cases exclusive attention must not be given to the uterus, for inflammation of the peritoneum, ovaries, or broad ligaments may be going on. Or, more rarely a pre-

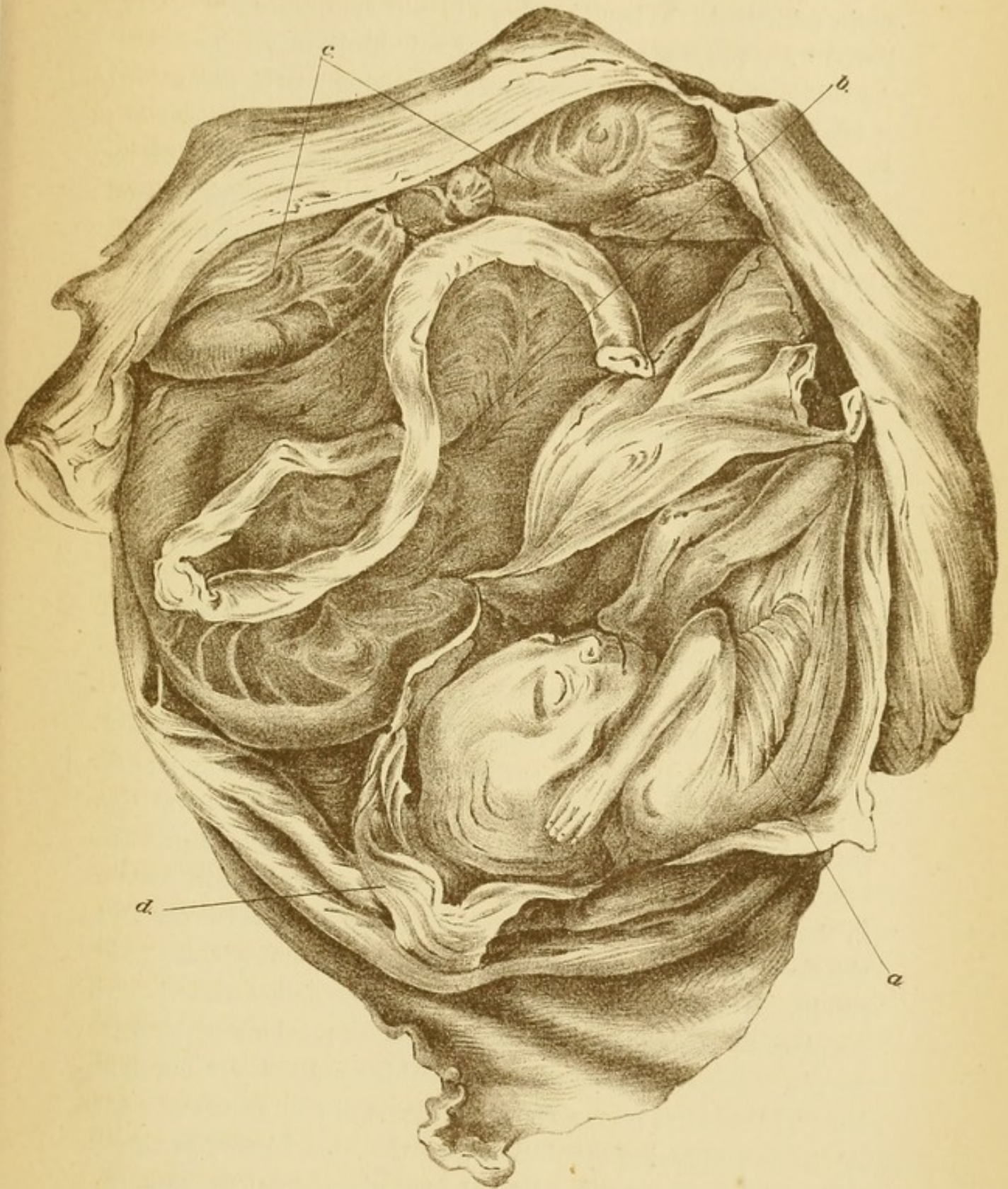


FIG. 28.—Placenta of twins with compressed fetus (from Martin's "Atlas").
a, Macerated female embryo, at about the fourth month of pregnancy. *b*, Placenta of other fetus—a feeble male child, born alive at term. *c*, Extravasation of blood in the placenta. *d*, The membranes of the dead embryo which were in the same bag with the surviving fetus.

viously inflamed structure, or some latent affection may have again rekindled. When the above urgent symptoms are not relieved by appropriate treatment, a fatal result may soon follow. As before stated, when abortion occurs during a twin pregnancy, it is generally found that the fœtus has died some time previous to expulsion. Both pain and hæmorrhage may cease after its birth, while the living fœtus is retained until term. Abdominal and vaginal ballottement, the hearing of the fœtal heart sounds, and the larger size of the abdomen, will call the attention of the physician to the fact that there is a twin or multiple pregnancy. A vaginal examination may also detect a bag of membranes presenting. These symptoms will therefore induce one to use all gentleness, and to avoid any strong efforts at removing the placenta.

ADHERENT PLACENTA.—Sometimes the placenta is not expelled because it has not been separated from the uterine walls. When it is not expelled after fairly strong uterine contractions, the suspicion will be aroused that it is adherent. Generally adhesion of the placenta is due either to an inflammation of the placenta, or to a previous endometritis. If only a small surface of the placenta be adherent, the inflammation must have been strictly localized, but if the entire surface is attached, then the opposite is the case. When the endometritis has been more general, then not only the placenta but the membranes are adherent. This latter condition is occasionally seen when the placenta remains in the uterus but will not advance any farther, and is owing to the fact that the adherent membranes will not yield. Other conditions are, where the placenta though detached, is held in its place by the adhesion of the contiguous portions of the membranes. The symptoms pointing to this condition are not definite. If there has been a constant fixed pain in a defined region of the uterus during pregnancy, or if there is a history of chronic endometritis or injury, we have grounds at least for supposing that there may be adhesion. Braxton Hicks has also pointed out that when using his test for pregnancy, *i.e.*, feeling for the rhythmic contraction of the womb, one part of the uterus is

felt to remain hard, while the general mass relaxes. This hard portion marks the position of the placental insertion. In all doubtful cases the stethoscope should be used, so as to decide whether the position of the pain and the region of placental insertion correspond. The hearing of the uterine souffle may help in pointing out the position of the placenta. The fact that adhesion is likely to occur in subsequent pregnancies should be borne in mind. Braxton Hicks has recorded a case where the placenta was found to be adherent in five successive pregnancies. There were neither signs of inflammation nor nodules, but he thought that the adhesions were due to an imperfection of the natural processes, "whereby the decidual membranes are shed from the uterine surface and fixed on the ovular membranes." When the finger is introduced into the uterus, and the latter depressed by the other hand, more information may be gained. Sometimes there may be great difficulty in making out the edge of a closely adherent placenta. By tracing the remaining stump of the cord to its insertion, a fair means may be secured of finding the central portion. The further signs of adherent placenta will be fully noticed in the chapter on "Treatment," while those conditions of the inner surface of the uterus which may be mistaken for it will then also be discussed.

ABORTION OCCURRING DURING FEVER, OR INFLAMMATORY ATTACKS.

—As already stated, when speaking of the causes, abortion frequently follows some of the above complaints. It may be suspected to take place when the maternal temperature reaches 105° F., when there is imperfect æration of her blood, or when the system is poisoned by any specific fever. In typhoid fever the crisis of the disease is sometimes marked by a discharge of blood from the uterus. The symptoms are generally similar to those occurring in an ordinary abortion.

It is however to be remembered, that a woman may pass through and recover from an attack of fever, and in two or three weeks after abort with a dead foetus.

CHAPTER IX.

THE DIAGNOSIS, AND PROGNOSIS OF ABORTION.

IN some cases there will not be much difficulty in deciding the question, "Has pregnancy occurred?" If so, the age of the conception may be fairly reckoned by counting from the last menstrual period, and by referring to the usual signs of early pregnancy. The opposite, however, is often the case, as all know who have been called to decide whether or not a child is contained in the womb. The law of this land recognises this difficulty, for it allows a woman sentenced to death to demand a postponement of her execution until a definite answer can be given as to whether she is *enceinte* or not.

DIAGNOSIS OF PREGNANCY.—The chief signs are, cessation of menstruation and morning sickness following sexual intercourse; enlargement of the breasts, and dark colouration of the areolæ. The uterus feels larger and heavier than usual, while it may be anteverted. The vaginal portion is softened. The uterine *souffle* may be heard if the stethoscope be placed immediately above the pubes, or Poupart's ligament on either side. The foetal heart sounds, ranging from 120 to 160 per minute, may be heard. Palpation of the abdomen may allow the uterus to be detected. At the end of the third month, the fundus rises above the pubic symphysis; at the end of the fourth month, it is half way between the pubes and navel; at the end of the fifth month, it is near to the navel; and at the end of the sixth month, it is a finger's breadth above the navel.

Two other very valuable signs remain to be described, viz., those of Braxton Hicks and Hegar. In 1871, Hicks called attention to the fact that the uterus from the third month and onward

undergoes a periodic contraction and relaxation—a systole and diastole. The contraction recurs at intervals of five to twenty-five minutes, and it lasts for one to three minutes. It may be recognised either by the hand or by the gastrograph. M'Clintock, of Dublin, had previously referred to this sign. The contractions are said to empty the uterine sinuses of the contained blood when it is surcharged with carbonic acid. Somewhat similar contractions are found in cases of soft and rapidly growing fibroids, but they have not the same constant or spontaneous character. Tait believes this to be the only absolute sign of pregnancy, and states that he has never been able to detect this rhythmic contraction in soft myoma. As a sign, it is even present when the foetus is dead in the womb. It is not yet finally decided as to whether it is present in cases of extra-uterine foetation. It is present in cases of hydramnios. Hicks has also described a condition of the uterus occurring about the fifth month, in which it is very flaccid—"scarcely to be felt, except at one part, where a firm lump is to be felt" in the interval between the contractions. He has found this condition frequently associated with death of the foetus. If the hand is kept on the womb for a sufficiently long time, the entire mass is felt to contract. The more solid portions mark the position of the placenta. If we wish to detect the contraction before the fourth month, the mother should be placed on her back, and bi-manual examination employed. No force should be used, and the hands should be made to exert an even pressure on the uterus. After the fourth month, abdominal palpation alone will be generally sufficient.

Hegar has stated that the lower uterine segment becomes soft, thin, and compressible during pregnancy, while at the same time the cervix and body of the uterus present to the touch a hard sensation. This thinning may be so very marked that the enlarged body and cervix might appear to be two separate and distinct tumours. In order to detect this sign, the index finger of the one hand is introduced within the rectum as far as the third sphincter, while the thumb of the same hand is placed upon the vaginal portion. The index finger passes up above the utero-

sacral ligaments which mark the boundary between the cervix and lower uterine segment. With the other hand placed upon the abdomen, pressure in a downward direction is made, so as to make the uterus—body, lower uterine segment, and cervix—come into touch with the finger in the rectum. In one case the fact of a woman being pregnant was detected at the seventh week.

Ballottement is also another valuable sign after the fourth month of pregnancy. Compared, however, with the two preceding signs, it is of little value. To practise internal ballottement, the mother lies on her back, and has her thighs well flexed on the abdomen. The index finger of one hand is passed up into the anterior vaginal roof, at the junction of the cervix and body. With the other hand, pressure from above is gently made in a downward direction. Next, the finger in the vagina suddenly and quickly presses the uterus upward and forward. This makes the foetus float upward until it strikes the fundus, where the impact may be detected by the hand. In one or two seconds the foetus gravitates downward, when, the finger in the vagina being held fixed, the tap is felt.

Where abortion occurs during the first weeks, it will be difficult to find a trace of the ovum. There may be a discharge of decidua, and if this is carefully examined, a small white pea-like ovum may be detected. It must, however, be remembered that decidua may be discharged under two other conditions, namely, in dysmenorrhœa and in extra-uterine gestation. In cases of membranous dysmenorrhœa, the pain generally comes on first and the hæmorrhage afterwards, the opposite being generally the case in abortion. Also, there is absent that gush of watery fluid which occurs in some cases of abortion; and further, the early signs of conception have not appeared. The pain in membranous dysmenorrhœa is of little value, for it goes on until the cervix is sufficiently dilated to allow of the decidua being expelled. The decidua of menstruation differs from that of pregnancy, for in the former it is thinner, less vascular, and not so large. In the former also the interglandular cells are small, round, and almost completely filled by the nucleus, while in

decidua vera the nucleus remains small. Lawson Tait asks, "Do instances ever occur of the uterus of *a virgin* throwing off its mucous surface at the menstrual period, so that its glandular structure can be recognised in the shreds?" He seems to be sceptical on the point. Speaking of membranous dysmenorrhœa, Winckel says, "These membranes show a smooth reddish inner surface, upon which the orifices of the utricular glands may be seen by the naked eye, and an external rough, uneven surface, which appears as though torn from its connections. It occasionally contains blood clots. It is of unequal thickness, is usually very thin and almost transparent at the points where the walls join each other, and somewhat thicker at those portions where the mucous membrane has not been uniformly exfoliated. In addition to this peculiarity, the membrane shows the changes characteristic of endometritis, therefore the term endometritis *dessicans* is not inappropriate. In many cases the discharged membrane is a complete sac, containing three openings corresponding to the *os uteri*, and the orifices of the tubes. Microscopically we see the utricular glands and the small celled structure of the interglandular tissue, which is easily differentiated from the large irregular decidual cells of pregnancy. That we have not to deal with the product of an abortion is shown by the absence of villi. Sometimes this exfoliative endometritis is associated with an exfoliative colpitis—large pieces of membrane, consisting of nucleated pavement epithelium, are discharged, and these are followed by tenacious fibrinous portions like those thrown off after the application of a concentrated solution of alum, yet I have seen such a colpitis *dessicans* occur in a virgin who had not used injections." These (latter) membranes are discharged at irregular intervals wholly independent of menstruation, though more frequently during the flow. (See Figures 3, 4, and 5.)

DIAGNOSIS OF THE AGE OF EXPELLED FŒTUS.—Engelmann says, that in the first three to four weeks the ovum may be cast off at the next monthly period, and no one, even the mother, be conscious of the event. In the third to the fourth week, the

ovum is a delicate, cyst-like body, about the size of a *hazel-nut*, and about half an inch in diameter, surrounded by the clear chorion. At the sixth week, the ovum is about the size of a *pigeon's egg*; at the eighth to the ninth week, about the size of a *hen's egg*; at the twelfth week, about the size of a *goose egg*. In the second month, it is covered by the chorion, and surrounded by the decidua reflexa. In the third month, it completely fills the uterine cavity. In order that a more accurate opinion as to the age of the infant may be formed, the following points must be noted.

First Month.—Waldeyer described an ovum which was exactly four weeks old. With membranes, it was about the size of a pigeon egg, had a length of 19 mm. (.75 in.), a width of 16.5 mm. (.6 in.), and weighed 2.3 grms. (35.4 grs). The length of the embryo, from the summit of the posterior cephalic curve, in a straight line to the caudal curve, was 8 mm. (.3 in.). The head and trunk formed one mass, the visceral arches were distinct, and the limbs scarcely indicated. (It may be mentioned that the term "embryo" is applied to the product of conception during its first three months of intra-uterine life, and the term "fœtus," from the end of the third up to the termination of the sixth.) Thompson has described an ovum which he calculated was twelve to thirteen days old. The embryo was 2 mm. long, and the chorion had thin and simple villi.

Second Month.—During this month, the ovum reaches to about the size of a hen's egg. The visceral clefts close, with the exception of the first. The umbilical ring is somewhat contracted, and contains a few loops of intestine. The limbs separate into their three divisions. The villi are larger, and more so at that part which in the future goes to form part of the placenta. (See Figs. 26 and 27.)

Third Month.—During this month, the ovum is about 9.5 to 11 cm. (3.75 to 4.25 in.) long. The chorion loses a large part of its villi, and the placenta, though small, is distinct. The embryo is 7 to 9 cm. (2.75 to 3.5 in.) long, and weighs about 30 grms. (460 grs.). The neck separates the head from the trunk, while

the mouth and nasal cavities are separated by the palate. The umbilical cord measures about 7 cm. (2·7 in.), and becomes twisted. The fingers and toes lose their webbed appearance, the umbilical ring is smaller, and the intestine retracts within the abdomen.

Fourth Month.—The fœtus is from 10 to 17 cm. (4 to 6·75 in.) long, and weighs about 55 grms. (850 grs.). The placenta increases in size, and the cord is more twisted. The mouth, nose, eyes, and ears have attained their proper shape. Its sex can be made out, and hairs begin to form. The intestines contain meconium, and the fœtus, if born, may live for four hours, without, however, making respiratory efforts.

Fifth Month.—The fœtus measures from 18 to 27 cm. (7 to 10 in.) in length, and weighs about 273 grms. (8½ oz.), while the umbilical cord is nearly 12 in. long. The liquor amnii exceeds the fœtus in weight. The skin is covered by *vernix caseosa*, and the eyelids begin to open. If the fœtus be born at this time, it may make an effort to breathe, but it will die in a very short time. "Fœtal movements" may be felt by the mother.

Sixth Month.—The fœtus is 28 to 34 cm. (11 to 13·5 in.) long, and weighs about 676 grms. (23½ oz.). The umbilical cord is inserted higher up in the abdomen. The eyelids are open, and eyelashes and eyebrows more distinct. If the fœtus should be born, it may live from one to fifteen days, but not much longer. The above measurements are those of Hecker, and are to be found, along with those of Toldt, in Spiegelberg's "Midwifery" (New Syd. Soc. Ed.). (See also tables in Chapter on Criminal Abortion.)

Cases of supposed habitual or recurring abortion may sometimes be diagnosed by the fact that a life of celibacy, or absence from home, puts a stop to the discharge of the supposed "clots." The history of membranous dysmenorrhœa before marriage will help to confirm the diagnosis.

MENSTRUAL CLOTS, BLOOD CLOTS, FIBRINOUS MOULDS, AND INTRA-UTERINE COAGULA.—Such clots may be triangular in form, and consist of one layer of coagulated blood. Scanzoni says that

when blood is effused into the uterine cavity it is always completely removed before the next menstrual period, so that the next following clot does not enlarge the previous one, as by forming layers.

A menstrual clot, if retained some time, may be discoloured when expelled. Matthews Duncan relates a case where he removed "a rounded, scarcely triangular blood clot, having an area of a shilling, and about one and a half lines in thickness." It was placed in close apposition to the cervix uteri. Graily Hewitt relates a case in which a blood clot, the size and shape of the vagina, was occasionally expelled after the menstrual periods. It was found that the aperture in the hymen was very small, consequently, as the discharge was profuse, it could not escape as quickly as it collected.

Matthews Duncan says there is interesting evidence of the patency of the Fallopian tubes, in the fact, that in the intra-uterine clots discharged in some cases of metrorrhagia they bear at their upper angles long coagula, drawn out from the tubes, these hanging from the main clot. In this way clots vary in size and shape. The question has been asked, "Can the healthy uterus be dilated by a menstrual clot beyond its ordinary dimensions?" This is doubtful; Duncan, however, thinks that it may, even to the size of a hen's egg.

Puerperal uterine clots or coagula coming away some days after labour should not be mistaken for abortion. Their size will be according to the capacity of the uterus, while their colour will vary, as will their consistency, according to the length of time they have been contained in the uterus. Matthews Duncan relates an interesting case, where a clot was expelled on the twenty-second day after delivery, it having the shape of the uterine cavity. On its upper, or fundal surface, there was a lacerated aperture, and five days after a fibrinous polypus was removed from the fundal region, it having evidently projected into the clot.

In examining the various substances expelled from the uterus, it is well to allow them to remain in water for twenty-four hours or more. By this time the blood will have dissolved or loosened

from about a portion of placenta, decidua, or ovum. The microscope will show no elements of uterine mucous membrane in ordinary blood clots, and they are readily broken down, whereas fibrinous material is not. Drs. Hart and Barbour have shown that when the inner surface of the uterus has been removed by the curette in some uterine diseases, a microscopic examination of the material thus removed will show large decidual cells, or fragments of the chorion villi, thus bearing out the supposition that a previous incomplete emptying of the uterus has taken place.

Montgomery has said that expelled material may be: first, an early ovum; second, a mole; third, a uterine hydatid; fourth, membrane in dysmenorrhœa; and fifth, membranous formation from the vagina. All these substances should be examined when floating in water.

FIBRINOUS POLYPI.—These are generally detected some time after labour, and cause a considerable loss of blood. They are usually polypus-like in shape, and often contain ovuline tissues, either in the pedicle or near the attachment to the womb.

RETENTION OF MENSES.—In these cases there may be periodic and spasmodic contractions, thus simulating those of labour. A history of amenorrhœa, and an abdominal and vulvar examination will help to decide. The bladder is sometimes distended, and there is inability to pass urine. There may be symptoms of fever, due perhaps to irritation, or to absorption of the menstrual blood. It should be remembered that a case has been described by Matthews Duncan where the vagina was closed, but where the spermatozoa worked their way to the uterus by the rectum, and through an opening in the posterior wall of the vagina.

DISTENSION OF THE BLADDER.—In pregnant women, this condition may give rise to pains like those experienced in threatening abortion. The peculiar elongated and pyriform shape of the abdominal swelling, as marked out by the over filled bladder, and perhaps a history of constant dribbling of urine, will, with the use of the catheter, clear up the case.

MALIGNANT DISEASE OF THE CERVIX UTERI may give rise to

hæmorrhage. A fetid discharge may accompany this, thus giving rise to the suspicion that there is either a decomposing fœtus, or a retained placenta. An examination of the cervix will decide.

DIAGNOSIS OF TWIN CONCEPTIONS.—As one fœtus may be expelled while the other is retained to full term, it is necessary to be careful, so that the other fœtus is not disturbed. The fact that two hearts can be heard, is positive evidence. The binaural stethoscope, with separate chest pieces, may allow one to hear both hearts at the same time. In 1819 Lænnec published his treatise upon mediate auscultation, and two years later Mayor of Geneva described the fœtal heart sounds. The different shape of the abdomen, and the making out by abdominal palpation of two fœtal heads, will help to confirm an opinion. A vaginal examination made after delivery of the fœtus may detect the other fœtus, or its membranes presenting. If its heart sounds can be made out, the diagnosis is confirmed. Litzman has stated that the presence of albumen in the urine of the mother very frequently points to a pleural gestation.

Budin has lately stated, that in cases of multiple pregnancy the position of the fœtuses and the membranes may present three varieties. If, for instance, a vertical and transverse section of the uterus be marked out, in one case the two ova are placed side by side, one in the right, and the other in the left half of the uterus. In the second variety the ova are placed one above and the other below, one occupying the superior, and the other the inferior segment. In the third case, one occupies the ventral, and the other the dorsal position of the uterus—one in front of the other. The first variety has generally two placentæ, and the membranes are always distinct, in the second variety there may be two or more, while in the third there are usually two placentæ.

EXFOLIATION OF THE LINING OF THE BLADDER.—The inner coat of the bladder may be expelled. Wells and others record cases where it appears to have slipped, and to have been passed by the urethra. Exfoliative cystitis is accompanied by the expulsion of portions of the bladder walls, but in a few cases an entire cast is shed. There is generally a cystitis preceding this expulsion,

with the result that the mucous membrane is swollen and thickened. It is well to remember that this condition occurs more frequently when there is a backward displacement of the uterus. By the microscope, there is a difficulty in discovering any bladder epithelium, this having previously disappeared; but fibrous tissue and, in deeper degrees, muscular tissue and blood-vessels, may be found. The expulsion of shreds, along with a history of retention of urine, will help to clear up the diagnosis. If the catheter meets with any obstruction in our introducing it, and if the membrane protrudes at the urethral orifice, our opinion is confirmed. This condition must not be confounded with *inversion of the bladder*. The latter is of more frequent occurrence in children than in adults, and a careful search may show the openings of the ureters, and urine issuing therefrom.

Similarly, an exfoliation of the vaginal mucous membrane must not be mistaken for any intra-uterine substances. It may be thrown off in flakes, and in large quantities. Tyler Smith terms the condition "epithelial vaginitis,"—it shows flat epithelia, while that from the uterus is columnar.

TRUE HYDATIDS.—These may burst from the liver, into the peritoneal cavity, and from this pass through the wall of the uterus, and from it into the vagina. (Graily Hewitt.) If hooklets and other portions are found, it will prevent one from confounding it with a case of cystic degeneration of the chorion.

FLOODING AT THE CHANGE OF LIFE.—It has elsewhere been remarked that abortion may occur at this time, therefore it is expedient that a careful examination be made of all substances expelled. Usually, at this time of life, the periods have been gradually becoming irregular, both as to quantity and time. Other nervous symptoms may also have made themselves felt.

HYDROMETRA.—Here there will be a discharge of water, which may come away either in a gush, or go on trickling for some days. It is not often accompanied by uterine contractions. The os is generally not affected, but the condition, when accompanied by pregnancy, may pass into one of abortion.

IN HYDATIFORM DEGENERATION, and when uterine contractions

have set in, the one sign giving evidence of this condition is the detection of the cyst-like bodies, either in the cervix or vagina. The fact that there may have been repeated hæmorrhages during the previous months, and that neither the mother has felt the foetus move, nor the physician detected the foetal heart sounds, may help us to arrive at a definite finding.

EXTRA-UTERINE GESTATION.—In these cases there is very frequently uterine contraction, and a discharge of blood from the vagina, with expulsion of decidua,—symptoms frequently present in abortion. Generally, the patient considers that she is pregnant. Suddenly she experiences great pain in the abdomen, this being followed by prostration. The pains, when not due to rupture, are frequently caused by contraction of the foetal cyst. The pains may also subside, and in a few days recur. The hæmorrhage may consist of coagulated blood combined with discharge of decidua, the latter coming away *en masse*, or in shreds. The abdominal tumour is generally elastic, and fluctuates, while abdominal ballottement may show that it contains a solid body. Foetal movements and heart sounds may be detected. A vaginal examination generally shows the uterus to be displaced to one side. The tumour may be felt at the side of the uterus and the foetus detected in it. When the cyst bursts—and this occurs in about one half of the cases—there will be pain, and often metrorrhagia, but there will also be great shock, an unusual occurrence in abortion. A vaginal examination may detect a sense of fulness—when the cyst has burst—behind the uterus. Rupture generally occurs between the third and fourth month. The fact that symptoms of abortion, such as pain, hæmorrhage, and discharge of decidua, have previously occurred, when taken along with the signs of rupture of the cyst, will help to clear up the case. Cases are recorded where there has been extreme thinness of the uterine walls, and where this condition has been mistaken for extra-uterine pregnancy. Lawson Tait says he knows of six such cases. If this thinness be accompanied by a deficiency of liquor amnii, the movements of the foetus and its different parts will be even more clearly made out.

PROFUSE MENSTRUAL PERIODS.—Graily Hewitt says, that when there is a discharge of blood from the generative organs in a case where menstruation has been previously absent for a month or for two or three months, and in a woman whose age and social condition do not forbid the idea of pregnancy, we should always have our suspicions aroused as to the occurrence of abortion. An examination of the material expelled will help to clear up the case. If milk appear in the breasts after the occurrence of a gush of blood, it may be gravely suspected that an abortion has taken place. Sometimes, by the third month, if gradual pressure is made from the circumference to the centre of the breasts, milk may be made to flow. And if, with this, all the other symptoms of pregnancy disappear, then our verdict is strengthened.

PROGNOSIS.

CAN THE PROGRESS OF A THREATENED ABORTION BE ARRESTED ?
This point will be partially settled by answering other questions, such as: Is the foetus diseased, or is it dead? Does the mother suffer from a disease which is likely to inflict an injury to her offspring? Is the placenta diseased? If any of these conditions are present, the sooner the abortion is over, the better will it generally be for the mother.

If the membranes have ruptured, or if any part of the ovum has been discharged, then abortion is inevitable. Rare cases have been recorded where a portion of the decidua has been discharged, yet abortion did not follow. Attention should be paid to a sign referred to by Tarnier, namely, where the notch between the cervix and body of the uterus has disappeared. Duncan, Spiegelberg, and others have recorded cases where the os was dilated, and where the presenting part could be felt, yet the symptoms passed away, and pregnancy went on to term.

Generally, the occurrence of uterine contractions is of more serious import than the escape of blood. This, however, will

depend on the situation of the bleeding point, for, if the blood cannot escape, or comes from the fundal region of the uterus, the relationship of the placenta to the uterus is likely to be disturbed. The conditions become more grave when blood escapes along the Fallopian tubes into the peritoneal cavity.

When the ovum has implanted itself in the cervical region of the womb, or when abortion is the result of placenta prævia, the ovum will be expelled.

A foul discharge from the vagina generally foretells an inevitable abortion. When abortion threatens in fever, or in acute inflammatory affections, it is rarely arrested. In Duguyot's sixty-two cases of typhoid fever, forty aborted. In an epidemic of the same disease at Bâsle, eighty-three per cent. ended in aborting. And in cholera, scarlet fever, typhus, typhoid, and relapsing fever, pleurisy, pneumonia, phthisis, syphilis, certain diseases and displacements of the uterus, affections of the decidua, placenta, and embryo, abortion is seldom arrested in its course. These remarks will be confirmed by referring to those made on the maternal causes of abortion. Abortion is likely to take place if the maternal temperature rises to 105° F.

AS REGARDS THE DANGER TO THE MOTHER, if she is free from disease, and is careful to rest for some weeks in bed, her life will not be imperilled. It is well known that sub-involution of the womb not infrequently follows abortion, but with due care this may be avoided. Winckel says, that in our studies of the origin of uterine myomata, we must always consider the influence of a local irritation, which affects the uterus, either directly or indirectly, such as abortions, with their causes and consequences. Chronic inflammation of the lining membrane of the uterus may follow, but this may lead more frequently to ill health than to a fatal termination. The occurrence of any of the puerperal fevers tends to weigh down the scales against the mother. Hæmorrhage also exposes the patient to fresh risks. The prognosis is more grave when the uterus has been severely handled, as when there has been an adherent placenta, and more especially when a portion of it cannot be removed. Some hold that between the

third and fourth month is the most fatal period at which abortion can take place.

It is no exaggeration when one states that the prognosis, as regards the life of the mother, will be influenced according as the physician and nurse have adopted and used strict antiseptic precautions. The statistics of lying-in hospitals lend weight to this statement.

In criminal abortion, the maternal death rate is very high. This is not to be wondered at, when the means adopted and the force often used are considered. Tardieu found that in one hundred and sixteen criminal cases, sixty died. No doubt so high a mortality is partly due to the very poor nursing which such cases receive. There is also a mental influence at work, for such often suffer from great mental depression.

I am not acquainted with any statistics referring to the proportional death rates occurring in those who abort either at the beginning or end of sexual life. Matthews Duncan has shown that the number of maternal deaths is higher in the first and last confinements. The influence of abortion on the maternal mortality—when the abortion is due to disease of her system—varies. Thus, Gueniot gives a table of one hundred and eighteen cases of grave or irrepressible vomiting. Of these, seventy-two recovered, and forty-six died. Of those who recovered, twenty aborted spontaneously, and twenty-one after the induction of abortion by artificial means. Abortion due to heart disease is frequently fatal to the mother. Tarnier records twenty-five cases of women who aborted when suffering from cholera. Of these, sixteen recovered, and nine died. Although pregnancy occurring in phthisical cases does not appear to hasten the progress of this disease, still, it is generally believed that it advances more rapidly after abortion. When occurring with cancer, it hastens a fatal issue.

Habitual abortion does not, as a rule, threaten any very grave consequences to a woman. It, however, eventually tells on her system.

Dr Sansom, when speaking of infective and non-infective ulcera-

tive endocarditis, suggests that the ulcerative variety is, as it were, grafted on to the ordinary form of valvular disease, and further, that it is caused by the presence of specific organisms derived, perhaps, from puerperal or other poison. If this is so, then a much graver prognosis would be given in cases of abortion when complicated with valvular endocarditis.

The prognosis in heart disease will depend to a large extent on the accompanying signs, such as dropsy, impeded circulation, and difficult breathing. Supposing the diseased condition of the heart does not become worse as pregnancy advances, and if the above symptoms do not appear, then a more favourable prognosis may be given. It has been stated that puerperal endocarditis is more liable to follow in those who labour under an ordinary valvular complaint. The treatment carried out will also greatly influence the recovery of the patient. (See Chapter on Treatment.)

CHAPTER X.

COMPLICATIONS AND SEQUELÆ OF ABORTION, AND THEIR TREATMENT.

SOME of the complications of abortion have already been referred to, such as adherent placenta, and sub-involution of the uterus.

Dr T. H. Berks describes two cases when severe diarrhœa and vomiting followed. In one of them, he suspected that the symptoms were due to poisoning.

The following description refers to those diseases which may occur after abortion.

PELVIC CELLULITIS, OR PARAMETRITIS.—Emmet says, that of forty-six cases of cellulitis, over twenty-five per cent. acknowledged having undergone criminal abortion. He thinks the proportion actually larger. West estimated that seventy-seven per cent. of all peri-uterine inflammations result from labours and abortions. Gallard and Bernutz placed the proportion at forty-four per cent. Emmet thinks that cellulitis almost always takes place after criminal abortion. He also adds, "it is a melancholy fact, as shown, that of forty-six women who suffered from cellulitis and could assign a cause, over twenty-five per cent. acknowledged to have undergone criminal abortion. Thomas, of New York, says, "Parturition or abortion produces, according to statistics, from one-half to two-thirds of all the cases. Even this large proportion, I believe, falls short of the truth." Thus, cellulitis is a frequent after-result of abortion, and especially so after the criminal form.

Cellulitis may be said to be a more or less conservative effort on the part of Nature. Generally, whenever an acute inflammation occurs, the blood poisoning is less severe than when there

is a general depression, owing to a slow absorption of decomposing matter. This disease is frequently complicated with inflammation of the pelvic peritoneum. In fact, all the tissues adjoining,—uterus, peritoneum, veins, connective tissue, with lymphatics and their vessels,—may be involved. Hence many doubt the existence of a cellulitis, pure and simple, when occurring in the puerpera. Barnes says this complaint generally results from irritating matter being carried into the blood. Laceration of the cervix, or some local irritation, may be a cause. The venules and lymphatics are the direct recipients of the foul material. From these it passes into the tissue of the uterus, and finally into the cellular tissue of the broad ligaments and investing peritoneum.

Pathology.—There is first congestion of the parts. The connective tissue becomes sodden and gelatinous, and there is an abundant infiltration of small cells. Next, there is an effusion of serum and lymph, which may eventually be absorbed, or, on the other hand, may break down and form an abscess. Sloughing, and phlegmonous erysipelas are rarely met with. The swelling is hard and irregular to the feel. It is as “hard as a board,” and the familiar simile of the uterus being fixed in the pelvis, as if liquid plaster of Paris had been poured in and allowed to set, is concise and expressive. The effusion of plastic matter often tends to limit the disease.

Symptoms.—These generally appear about the third day, when absorption and activity begin in the puerpera, or it may not occur for some weeks. Again, it may set in one, two, or three months after abortion. In this latter case, the woman may have no acute symptoms, but only feel feeble, nervous, and depressed. There will be no pain, but a feeling of throbbing, tension, and weight about the pelvis, and especially after taking exercise. There is generally loss of appetite, and a slight rise of the temperature towards evening.

In the acute cases there is very frequently a distinct rigor, or there may be several, but less marked. The pulse will be from 120 to 130, and the temperature 103° to 104° F. The tongue is furred, and there is headache, and perhaps noises in the ears.

Constipation may alternate with diarrhœa. There may be a feeling of great fulness in the pelvis, bearing down, or dragging, and a desire to frequently pass water. Dr W. Grigg says, that in his experience of cellulitis after delivery, the first symptom has invariably been pain on micturition, this being either transient, or persistent for a few days. Excessive perspirations are common. If the ovaries are involved, nausea and sickness are generally present.

When the attack is sub-acute, the feverish symptoms may be absent, the temperature and pulse being normal.

Physical Signs.—During the first, or congestive stage, the vagina feels hot, and perhaps swollen. An œdematous spot may be detected. Great sensitiveness may be elicited at one spot, perhaps on one side of the uterus, if bi-manual examination be used. In the second stage, or that of effusion of lymph, a tumour as large as a walnut, goose's egg, or orange, may be felt in one of the broad ligaments, or in the tissue around the cervix. As the pregnant uterus rises out of the pelvis, a great hypertrophy of the pelvic connective tissue takes place, so as to fill up the situation previously occupied by the womb. In all cases, the entire "pelvic roof" should be examined slowly, and piece by piece. This roof is marked out by an imaginary straight line, passing backwards from a point just under the pubic arch, through the cervix uteri, at the attachment of the vagina, to the sacrum. Above this plane, the organs of reproduction float "in an atmosphere of cellular tissue" (Nonat).

The effusion will generally fix the uterus. Thomas says, "Fixation is by no means so complete, so universal, as in pelvic peritonitis. I feel satisfied that I have seen two unquestionable cases in which no fixation of the uterus existed at all. This, however, is rare." The effusion may surround the womb, may be on one or both sides, or in front, or behind. Barbour has called attention to the presence of cellular tissue between the bladder and uterus. If effusion occur in this region, the uterus will be pushed back into the hollow of the sacrum. If at the side, or behind, the effusion will push it to the opposite side, or forward, towards the

pubes. The rectum may be constricted by a collar-like effusion, which surrounds its front and sides. In the majority of cases, the broad ligaments are the parts affected, but the swelling is most frequently on that side of the womb on which the placenta has been attached, or on the side corresponding to the laceration in the cervix. A rectal exploration will also allow the finger to examine the swelling more closely.

Pelvic cellulitis forms a phlegmon just like the ordinary carbuncle, or boil. The inflammation may extend along the pelvic brim, towards the psoas muscle, and up towards the kidney. It does not extend downwards, along the vaginal walls, but it frequently passes along the round ligaments, and, more rarely, down the thigh. The inflammation and exudation also frequently extend along the abdominal walls, presenting a broad, hard mass, and limited in front by the linea alba. The seat of evacuation of abscess is most commonly above Poupart's ligament. It is supposed that the pelvic fascia limits the disease inferiorly. Matthews Duncan says that the extension may, however, be either mechanical or vital.

Where the urine is examined, albuminuria is frequently detected, some holding this symptom due to the extension of the inflammation to the connective tissue around the kidney. Pressure over one or other iliac region frequently elicits pain. The patient generally lies on the affected side, and the thigh of this side is usually retracted. Extension of the limb is painful and difficult, this being, perhaps, due to neuritis, or inflammation of the psoas and iliacus muscles. Generally, uterine involution is checked, and the discharge, if present, is altered, and offensive.

As before stated, the induration may gradually disappear. But it may break down into pus. Then this abscess may, if not relieved, burst and open either into the bowel, or bladder, vagina, or groin. In some rare cases, it has been known to pass down the thigh, or burst into the peritoneal cavity. Suppuration may occur from the tenth to the fourteenth day, dating from the beginning of the disease. There may be one or more centres of suppuration, and in some cases the abscess is so large as to extend

half way up to the umbilicus. When pus forms, shiverings or rigors occur and the pulse is weakened. The temperature, if not already high, may run up to 104° to 105° F., while the patient is bathed in a profuse cold perspiration. Diarrhœa and vomiting—due to efforts at elimination—may be present. If more pus forms, a repetition of the above symptoms takes place, while the patient loses flesh and appetite, and sinks into a state of prostration, the pulse sometimes being 120 and weak. If the abscess is about to burst, the hard mass becomes softer, and the skin over it is first red and next of a bluish colour. According to M'Clintock, an abscess collected in 37 of his 987 cases. When cellulitis is accompanied by septicæmia, or when the patient is reduced by hæmorrhage, the chances of suppuration taking place are increased. Recurrence of rigors and fever generally mark its advent. A vaginal examination may detect a soft boggy spot. In a few, the pus, when it escapes into Douglas's pouch, may become encysted, leaving a cretaceous mass behind.

Diagnosis.—The disease should not be mistaken for hæmatocele, extra-uterine pregnancy, fibroid tumour, malignant disease, retroflexion or version, faecal accumulation, abscess, small ovarian cyst, or early pregnancy.

Treatment.—Those causes which are likely to produce cellulitis should be avoided. No force should be used in removing the fœtus or placenta. If the cervix is lacerated the vagina should be washed out daily, while the patient should be kept in bed for even a longer period than that usually recommended for normal labour. Some advise that six to twelve leeches should be applied over the lower part of the abdomen, or around the anus. If the patient is strong, great relief may follow such a plan, but generally she is weak. Cold, in the form of crushed ice, and applied in a bladder over the lower part of the abdomen, is recommended. Hot fomentations, with laudanum sprinkled over, are soothing, while morphia suppositories may be given when the pain is severe. The catheter should be used if required. The vagina and uterus should be irrigated if there is any rent of the cervix or decomposing material present in the womb. If the lower bowel is

loaded, an enema of oil and warm water should be given, and its regular evacuation provided for by giving some aperient, as required. A mixture, composed of liquor ammon. acetat., potass citrat., and tinct. of aconite, will help to reduce the fever, though the aconite should be used sparingly, and its action be very closely watched. Some recommend the administration of blue pill with opium, or the hydrarg-cum-cretæ combined with Dover's powder. Emmet strongly advises the use of the hot vaginal douche. It should be used for one hour, morning and evening. He thinks that by its use we may cut short the attack. The temperature of the water should be from 110° F. to 120° F. If vomiting is troublesome, bismuth and hydrocyanic acid may be tried, and a mustard poultice applied to the region of the stomach. Ice, and iced champagne, soda water and milk, or the various preparations of peptonised milk, milk gruel, chicken, or beef, as recommended by Sir William Roberts, of Manchester, should obtain a good trial. If there be great exhaustion accompanied by gastric irritability, champagne may be mixed with brandy and ice, and thus administered. In some cases the brandy and water may be made to effervesce by adding a little bicarbonate of soda and tartaric acid.

Towards the end of the disease, the various preparations of iodine should be used. The skin over the swelling should be painted every third night with equal parts of the liniment of iodine and glycerine, or of the pure liniment. If this irritates the patient too much, the tincture may be tried. Iodide of potash may be at the same time administered. Some recommend the use of small blisters. They should not be applied until all febrile action and the more acute symptoms have left. If a blister is left for too long a time, great depression may follow. Brunton says that when we want *absorption* to take place, the blister should be applied directly over the part; but if it be required to *reduce inflammation* or congestion, it should be applied at a little distance from the seat of the disease. Of late, massage has been recommended. It can be used by the bi-manual method. No doubt it may help to remove the cicatricial bands

which frequently follow an attack. The constant up and down movement of the uterus in respiration must help. Freund (M.A.) refers to cicatricial bands, which cause stenosis of the veins, and other disorders of the circulation, which may cause atrophy of the entire genital canal. The other after-results are so serious, that every care should be taken so as to eradicate the disease. The patient should be kept in her bed for weeks; be clothed in flannel, and sleep in a large, well-ventilated room. The husband should be instructed not on any account to have sexual intercourse with his wife so long as she is ill.

There is a general opinion that the too early opening of the abscess is not to be recommended. If it is about to come to the surface, the skin over it becomes first red, then bluish, and fluctuation is detected beneath. If about to burst into the bladder, the dysuria increases, and perhaps there will be retention of urine. Further, if pus is about to come to the surface, the skin and abdominal wall become one, and cannot be moved on each other as in health. If the tip of the finger can detect in the vaginal roof a point which before was hard and brawny, but is now soft, and permits the finger to sink into it, but immediately bulges out again when the finger is removed, we may soon expect the abscess to burst. It should be remembered that the abscess may burst into the peritoneal cavity. The aspirator should be used before this can take place. Sometimes the abscess may be opened at the point of fluctuation, when a drainage tube should be inserted, and antiseptic cotton wool used. When the discharge is offensive, the cavity should be washed out with warm carbolic solution, and if it do not heal up, a weak solution of tincture of iodine and water should be injected. Well regulated pads and bandaging, accompanied by a position of the patient which will secure drainage, will greatly help in the closing of the sac. When opening an abscess in the vagina, it is necessary to remember the relationship of the ureters, for, according to Emmet, these have been cut across in one or two cases, with the result that urine is discharged *per vaginam*. Lawson Tait has in some cases reached the abscess by opening the abdomen. If the abscess should burst

into the peritoneal cavity, this should be opened, and well cleaned out either by syphoning or sponging, and the sides of the cyst stitched to the abdominal wall.

PELVIC PERITONITIS, OR PERIMETRITIS.—Three varieties of this complaint are described, the adhesive, serous, and purulent. Its course is divided into three stages:—First, where there is simple engorgement, with redness and dryness of the peritoneum, and where it loses its glistening appearance and becomes cloudy; second, where there is effusion of plastic lymph on the surface of the peritoneum, or of serous, purulent, or sero-purulent fluid; third, this exudation may be either absorbed, or break down and form pus. It may also, in some cases, become organised, and finally contract. This latter may go on, so that the uterus, ovaries, tubes, and intestines may be included in one mass, thus giving all the physical signs of a tumour.

The collection of serum or pus, as the case may be, forms a tumour which may occupy the pelvic region, displacing the uterus, so that it may be difficult to pass the finger in the vagina up between the pubes and the swelling, to the os. Sometimes the swelling is more abdominal, and extends up to the umbilicus. The serous or purulent fluid may gravitate into Douglas's pouch. In some cases purulent matter may be found in the ovary, or Fallopian tube. When infection is septic, the exudation is often purulent, and here the adhesions soon break down. When recovery takes place, the lymph is absorbed, but the uterus and tubes are frequently drawn out of place.

Causation.—It rarely occurs as a primary affection, but more frequently follows injury to the uterus, septic infection, or injection of irritating fluids. It frequently accompanies metritis and cellulitis. The two affections, cellulitis and perimetritis, are entirely distinct diseases, although they frequently complicate each other. They may be compared to serous and parenchymatous inflammation of the lungs—pleurisy and pneumonia. Noeggerath has attributed it to latent gonorrhœa, or gleet.

Symptoms.—A rigor generally announces the beginning of the disease. The patient lies on her back with the legs drawn up.

There is some swelling and tenderness over the lower part of the abdomen, and the pain is increased by pressure. The bed-clothes are even too heavy to be borne by the patient. The pulse is 120, or more, and the temperature varies from 101° to 105° F. If the case has a high temperature at the beginning, it is likely to run a violent and dangerous course. It should be remembered that the temperature may be sub-normal, as Wunderlich and others have remarked, this sign being of grave import. Nausea, vomiting, constipation, or diarrhœa may be present. There may be frequent attempts at micturition, and an inability to pass water. Duncan says he has seen some cases where there was so little pain, that it was not noticed by the patient, the chief symptom pointing to irritability of the bladder. The mind may be disturbed, and delirium set in. On palpating the abdomen, a sense of fluctuation may be made out.

An examination *per vaginam* will, if made during the first stage, show nothing but great sensitiveness. There is none of the doughy, puffy, or œdematous feeling which is met with in cellulitis. There may be a sense of resistance in the vaginal roof. In the second stage an ill-defined tumour may be felt on either side of the uterus, or behind. The tumour is found to be an agglutination of pelvic and abdominal viscera. It is sensitive and tender to the touch. It may eventually become organised and contract, then drawing the uterus to one side, or it may break down, forming an abscess. The tumour may be so large that it extends upwards as high as the umbilicus. If the disease has extended from the uterus, the symptoms will be more severe. In rare cases the inflammation may involve the general peritoneum, while other serous cavities may become affected.

Treatment.—When the infection is autogenetic, the uterus and vagina should be carefully irrigated, and the physician must be careful to do this himself. The patient should be made as comfortable as possible in bed. Absolute rest should be enjoined, while, to relieve the pain, morphia or opium may be given. Leeches are sometimes used, especially if the patient be plethoric. An ice-bag applied to the abdomen, if it can be borne, is advised

by some German authorities. Hot fomentations or light poultices are soothing. If the poultice be covered over with a layer of cotton wool and light gutta-percha sheeting, it will retain its heat much longer. It should be always recollected that one poultice should be made ready for application before the other has been removed. Cold poultices do harm. The rubber tubing coil, sometimes known as that of Leiter's, is much better and more comfortable for the patient. The diet should be carefully attended to, and the catheter used when required. Ice to the head may remove the restlessness and delirium. In more chronic cases, counter-irritation and potash iodide should be faithfully tried. When the health suffers from a collection of pus, the abscess should be aspirated. If necessary, a tube may be introduced, and the cavity washed out. Pads and bandages well applied will encourage it to close. Massage has been recommended after the feverish symptoms have left. Great care is required in deciding if the abscess should be opened. If it burst into the peritoneal cavity, this should be washed out, while the abscess walls should either be stitched to the abdominal wound, or removed. In two cases where an abscess had ruptured into the bladder, Schröder opened this viscus by the high operation, healed the abscess, and subsequently closed the vesical fistula.

ACUTE METRITIS AND ENDOMETRITIS.—Rarely is this affection confined to the tissues of the uterus when it is due to septic infection. More frequently the disease spreads to the peritoneum and cellular tissue of the broad ligaments (metro-peritonitis). A *post mortem* examination shows that there is infiltration and softening of the uterine tissue and swelling of the endometrium. The mucous membrane is of a purplish red colour. Sometimes there are flakes of false membrane on the placental disc, and this may extend over the entire inner surface of the uterus. The sinuses are often filled with pus or purulent fibrinous coagula. When the fluid obtained from the inner surface of the womb is examined microscopically, lymph cells containing diplococci or round microbes in chains may be found. Small collections of pus may be found in the muscular and cellular tissues. The

tubes, ovaries, and peritoneum may be similarly affected. It may be the result of either autogenetic or heterogenetic poisoning.

Symptoms.—If the after pains are more violent than usual, if there be febrile symptoms and local tenderness, then the threatening or beginning of metritis must be suspected. The disease is generally ushered in by a rigor, with an accompanying high pulse rate and temperature. There is pain in the pelvis, back, and over the womb, which often shoots down the thighs. Tenesmus of the bladder and bowel may be present. The breath may have the peculiar heavy sweetish odour found in those suffering from septicæmia. The lochial discharge is arrested. If there be endometritis, the discharge may be muco-purulent and offensive. Sometimes the pain is paroxysmal. A digital examination shows the vagina to be hot, and the uterus swollen, bulky, and tender. The cervix is swollen and the os gaping. Adenitis and lymphangitis may occur at the same time, and enlarged glands can sometimes be detected by the examining finger on the posterior surface of the uterus. Johnstone holds that the internal surface of the uterus is one large lymph sinus. These lymph spaces originate around the utricular glands and blood vessels, while the lymph vessels may attain the size of a goose quill. Hence the great power of these to absorb and convey the products of putrefaction, and to set up lymphangitis.

When a large quantity of poison has been introduced into the system, there will be profuse perspirations and an eruption of sudamina. Miliary or pustular forms may appear on the skin or on the labiæ. When the puerperal metritis occurs some days after delivery, the symptoms are not so acute (post-puerperal metritis), as the uterus has had time to partly contract, and so prepare itself against the entrance of poisonous material into the system. Probably because portions of decidua or membranes are left in the uterus after abortions and miscarriages, endometritis is so likely to take place.

Suppurative metritis may occur. Barnes describes a gangrenous metritis, where there is great prostration, low delirium, swollen abdomen, large uterus, and terribly offensive discharge.

Pyæmia and multiple abscesses may form in various parts of the body. The symptoms may, from the very first, be of an adynamic type. Dr Grigg reports two cases, one where the uterus sloughed, and where there was no offensive discharge after the first few days. In the other the organ sloughed away, and the bowels protruded.

Treatment.—The uterus should be irrigated with a warm solution of carbolic acid (1 in 50), and if any portions of placenta or decidua remain, these must be removed. Opium may be given to relieve the pain, while quinine and ergot should be given so as to help in keeping the uterus contracted. Digitalis and ammonia may be given if the heart is weak. The temperature may be reduced by cold sponging, ice, Thornton's ice cap, or by placing the patient on a water bed. The effects of the cold should be carefully watched. Poultices and fomentations will relieve the pain. Tympanitis may be eased by giving oil of turpentine, either in mucilage by the mouth, or by an enema, combined with asafoetida. Ice, champagne, or other alcohol, and nourishing extracts, such as Brand's, Carnrick's beef peptonoids, and pre-digested foods should be given. It is needless to add that, in all cases, there should be a night and day nurse, who should attend carefully to the perfect cleanliness of the patient, her clothing, and to the ventilation of the room.

PHYSOMETRA. TYMPANITES UTERI.—This is a rare accompaniment of abortion, more especially so in the early months, where the uterus is small. In this disease air is generated and collects in the uterine cavity. Barnes says "air may be sucked into the uterus when flaccid, and the abdominal walls are relaxed, so that the uterus, bagging down, creates a vacuum." Air may also enter when the hand is carried into the uterus. It may happen with fat women who have a large—almost pendulous—abdomen, especially if they lie much on their side, or get on their hands and knees. This is more likely to happen when the binder is not thoroughly applied. Many cases are met with where the patient is really so fat that she spreads her abdomen almost half way over the bed when lying down. Matthews Duncan has

called attention to the "adspiratory action" of the abdomen. It is produced by the negative pressure within the abdomen. That it is a strong power has been proved by the fact that women have been impregnated without penetration, and that mucus has been seen to pass *from* the vagina to the womb.

Piering and Eisenlohr have called attention to the condition known as emphysematous vaginitis (*Beitrage zur Pathol. Anat.*, vol. 3, p. 1), and state that certain gas-producing bacteria have been discovered. These bodies may perhaps have a prominent part in producing air in the uterus.

It is to be remembered that when the perineal body has been lacerated, the sufferer may be afflicted with *garrulitas vulvæ* or flatus vaginalis (Thomas). This is one very important reason why the perineum should be immediately stitched. As Thomas says—"When a woman with a normal perineum is placed on her back and the finger of the examiner is passed into the vagina, as it passes over the perineal body it will be firmly pressed against the upper vaginal wall, and when the finger is withdrawn the separated walls will come in contact by the rising of the posterior one. In rupture of the perineal body no such pressure is found." This statement should be closely considered. The very diagrammatic figure in the text books, with the vaginal walls circular and about half an inch apart, with a wide open entrance, is most misleading. Practically the perineum is a flap valve. If the surgeon, ignorant of his anatomy, stitch only the cutaneous edge of the rupture, he will leave the anterior surface of the perineal body and the vaginal wall lying open and gaping, into which the anterior vaginal wall and bladder will fall.

By physometra, however, is understood an accumulation of air caused by decomposing clots, &c., in the uterus. Here the uterus will be enlarged and tympanitic, while symptoms of septicæmia may follow. If pressure on the womb—or even uterine tension—make gas escape, a very bad odour is detected. The abdomen is enlarged and tender, so much so that the breathing may be interfered with. Retention of urine may occur. If the finger is introduced into the cervix, a piece of placenta or clot may be

felt presenting. If this is removed, or if the uterus is irrigated, the discharge will have a fearfully offensive smell. At the same time gas may be expelled so that the room is filled with the odour. When the womb is irrigated, the temperature may fall two or three degrees, and the pulse come down to near the normal. Stande has collected 64 cases; of these 32 died, 18 had some puerperal complications, and 14 recovered without any special disorder. The treatment will consist in removing the cause, in irrigating the uterus, in giving ergot and quinine, in supporting the patient's strength, and in applying a well-fitting binder.

SALPINGITIS.—In this disorder the Fallopian tube is swollen, and its external surface has a red or violet colour. The fimbriated end is red, swollen, and covered with pus. The internal lining of the tube is very vascular, red, and swollen. It is bathed in a liquid, which may be mucus-like, sanguinolent, or composed of pus. In rarer cases it is lined with a false membrane, more especially when the inner surface of the uterus is in a purulent condition. Should the tube have its openings obliterated at both ends, the contained liquid accumulates, and an abscess may be formed; or if the effusion is sero-mucus, a hydrosalpinx may occur. The corresponding ovary may or may not be implicated, and if the former is the case it will perhaps contain pus. If pus escape from the tube into the uterine cavity, peritonitis will probably follow. Martin, Howitz, Forster, and others have described this condition. R. Barnes relates a case when it followed an induced abortion. It may be the chief affection, or it may be a complication. The danger that the tube may overflow or burst into the peritoneal cavity should be kept in mind. Sänger, of Leipzig, says that after an abortion the results of a recent or old gonorrhœa are seen in a sudden attack of salpingitis. If the gonococcus of Neisser could be detected in the discharges, it would help in forming an opinion.

Dr Grigg, of Queen Charlotte Hospital, has lately published the notes of four patients who died there with symptoms of puerperal fever. A *post-mortem* examination showed that in each case there was a pyo-salpinx. Had there been no *post-*

mortem made, it would have been thought that death was due to septicæmia. If the suggestion made some time ago was carried out, viz., that every woman who has been delivered, should be examined about six or eight weeks after her confinement, so as to find out if the womb and surrounding organs had or had not returned to their natural state, there would be less danger of future pregnancies being complicated with disease of the ovaries and tubes.

Tait says, "In its acute stages inflammation of the tubes is a most formidable disease, and so rapidly ends in general peritonitis, that we can hardly recognise the necessity for interfering, before it is too late to do anything. I have seen several fatal cases of peritonitis which undoubtedly had their origin from inflammation of the Fallopian tubes, and which ought to have been treated by abdominal section. I am fully persuaded that we might save many such cases by boldly opening the abdomen, and cleansing its cavity." In the "Medico-Chirurgical Transactions," vol. 63, he has a paper "On the treatment of pelvic suppuration by abdominal section and drainage." Six cases are recorded, and these were suppurating pelvic hæmatoceles. In all, the cyst was carefully cleansed out, and its walls stitched to the abdominal wounds. A Koeberlé's glass drainage tube was inserted, and this was displaced after six or ten days by a Chassagny wire tube, or a soft rubber one. He adds, that he would always advise an exploratory incision, where he was satisfied that there was an abscess, and where it could not be satisfactorily emptied from below.

In those cases of pyo-salpinx where the adhesions are so strong or numerous as to prevent the removal of the tube, the above plan of operating will be of great service.

OVARITIS.—Acute ovaritis is a rare affection after abortion. Tait records a case of the wife of a medical man. Both ovaries were affected, and one went on to abscess. This was tapped *per vaginam* by the aspirator. The chief symptoms were pain, high temperature, sweats, flexed limb, infra-mammary pain shooting down the leg and thigh. The treatment consisted of stupes, opium, quinine, and blisters.

PERITONITIS.—This affection may follow an injury inflicted in criminal abortion. It may occur as an affection primary or secondary to metritis, oopharitis, or salpingitis. It may also be caused by too early rising, or exposure to cold. It is somewhat difficult to believe in a simple or idiopathic case of puerperal peritonitis. The complaint generally begins with a chill or rigor. The pulse varies from 100 to 120, and the temperature from 97° to 103° F. The pain in the abdomen is sharp and cutting. The patient lies on her back, and with the legs drawn up. The abdomen is swollen and tense, and the breathing frequent and shallow, owing to the pressure on the thoracic organs. There is headache, delirium, and vomiting. There may be an accompanying inflammation of the other serous membranes. The tongue may be at first white, and finally dry and brown. The features are pinched. Emmet has drawn attention to the fact that in some cases of blood poisoning, the voice remains clear and strong, although the patient may be collapsed. In puerperal fevers, Dolores has found ptomaines in the blood of a young woman who died of puerperal eclampsia, and also that rabbits, when inoculated with it, soon died.

Treatment.—Rest, opium, leeches, half a grain of calomel, with one grain of opium, are recommended. Turpentine stupes for the tympanites. Alcohol. The womb should be irrigated if it is thought to contain any injurious substance. Some recommend the use of aperients. Tait, and a few American authorities recommend the avoidance of opiates, the restriction of both solids and liquids, the administration of enemata of turpentine, so as to prevent the occurrence of tympanites, and the prescribing of a brisk aperient. Should the abdomen be opened and washed out when it contains purulent matter, and treated as an abscess? All practical-minded men must surely agree to such a procedure.

PHLEGMASIA DOLENS: THROMBOSIS: OR, THROMBOTIC PUERPERAL FEVER.—This disease may follow abortion. It is generally auto-genetic. The clotting of the blood is thought to be due to the precipitating power of the poison introduced. To an extent this

clotting is curative, for it tends to localise the disease. But when the system is weak, or when it receives a large quantity of the poison, then the coagulation is not well marked, and symptoms of general infection follow. Previous ideas that this disease was due to inflammation of the veins are now no longer held, as the experiments of Lee, and others, proved how difficult it is to produce inflammation of the lining membrane of these vessels.

There are two forms of this complaint: the simple and the toxæmic, or the simple and infectious.

In the *simple* form, the skin of the affected limb is thickened, and its connective tissue infiltrated with serum and lymph. The vein is occupied by a clot, but generally it is not inflamed. When the affection is further advanced, the walls of the vein are thickened, and they may adhere externally to the connective tissue. Finally, the clot softens into a pultaceous mass, which is not pus, this change being due to fatty disintegration. The uterine, vaginal, iliac, femoral, and other veins further distant, may be affected. Generally the lymphatic vessels and glands are enlarged. The clot usually extends to the junction of some important collateral branch of the vein. It may, however, be prolonged beyond this point. Thus it may originate in an uterine, and extend to the femoral vein. The end of the clot is usually conical. The disease is one of the many forms of septicæmia. It usually runs its course from six to ten days after labour, and has frequently its starting-point in some uterine or pelvic septic inflammation.

In the *severe*, or *infectious* form, the septic symptoms predominate. The clots are more disintegrated. Pus may be found in the veins, and in the surrounding connective tissue.

The uterus, broad ligaments, tubes, and ovaries may be inflamed at the same time, and effusion take place into the pelvic cavity. The liver, lungs, kidney, and heart may be involved. This variety differs from the other chiefly in its consequences. Septic products enter the circulation, and are carried to various parts, owing to the softening and breaking down of the clots. The clot, which is soft and blackish, may not entirely fill

the vein, when cavities, holding puriform liquid, will be found. It is thought that the disorganisation of the clots is due to the entrance of microbes, and that the secondary affections result from the transference of the micrococci into the different organs.

Symptoms.—A few days after labour a chill or rigor occurs. The temperature may be from 100° to 104° F., and the pulse 100 to 120. The respirations may be 25 to 30 per minute. Perspirations may take place. The local signs are, acute pain in the limb, groin, or iliac region. The leg is generally stiff, with impaired mobility. Afterwards the leg becomes swollen, and this extends from *above* downwards, and not from below, as in dropsies. There is tenderness of the part on pressure, and the swelling is tense, glistening, shiny, and white, hence the word *alba*. The sense given by feeling the part is not the same as in œdema, and it does not, in the early stages of the disease, pit on pressure. If the affected part is punctured, serum does not run off as in œdema, but a drop of fluid collects, which quickly coagulates. The lymphatics in Scarpa's space are swollen and enlarged, and the femoral vessels feel like hard cords, while the surrounding connective tissue, owing to the effusion of coagulated lymph, feels matted. A vaginal examination generally shows an accompanying perimetritis, or effusion into the broad ligaments. The leg is quite powerless, owing partly to the pressure on the nerves, and the accumulations in the pelvis. The leg is generally flexed and abducted. When fresh additions of noxious material enter the blood, there will be a recurrence of rigors, high temperature, sweating, pain, and vomiting.

In eight to ten days the febrile symptoms subside. The leg remains swollen, but may now pit on pressure. The weakness of the limb remains for two or three weeks. The swelling gradually decreases as the effused lymph and serum are absorbed. Sometimes as one leg recovers the other one is attacked. The simple form usually runs its course in forty to fifty days. In some rare cases the arm is affected. Bastian described a case where the leg, both arms, sides of the neck, and anterior surface of the

chest and face were affected. The jugular vein could be felt as hard as a cord.

In the majority of cases the recovery is gradual, and takes place by the disintegration of the thrombi in the veins and lymphatics. The clots undergo fatty conversion, forming a kind of emulsion—"the physiological milk" of Virchow. Generally the veins are left weak and dilated, so that they are very plainly seen on the leg. There may afterwards be varicose veins or varicose ulcers. These may burst, and so give rise to severe hæmorrhage.

Treatment.—The limb should be placed on a pillow, and perfect rest enjoined. The foot should be raised so that gravitation is brought to bear on the swollen leg. The entire limb should be enveloped in cotton wool, and then surrounded with macintosh sheeting or oil silk. Sometimes, when the patient is strong, eight or ten leeches may be applied in Scarpa's space. The leg should not be rubbed. Accupuncture does not appear to give good results. The local application of a solution of the sulphate of iron (30 grs. to 1 ounce) applied as a hot fomentation, has been highly recommended. If the heart's action is excessive, quinine and digitalis, or the latter with ammonia, may be given. If the pain is severe, opium is useful. Alcohol is often of service. The nurse should be cautioned to keep a careful watch for attacks of syncope, or signs of embolism or cardiac thrombosis. In such events brandy or a hypodermic injection of ether should be given. A cradle should be used, so as to protect the leg from injury or the weight of the bed-clothes. When the pain is severe, some recommend the local application of a liniment composed of six ounces of compound soap liniment, one and a half ounces of laudanum, half an ounce of extract of belladonna, and half an ounce of tinct. of aconite. When the limb is beginning to recover, it should always be bandaged with a flannel roller, and perfect support given, so that the veins may regain their proper tone. In the severe form the strength must be sustained, and symptoms combated as they arise.

PULMONARY THROMBOSIS.—When this condition occurs there

is generally an antecedent history of clots in the uterine or other veins, and perhaps inflammation of the uterus. Generally the symptoms of thrombosis of the peripheral veins have set in some three to four days after labour. Then the pulmonic symptoms begin in four to twenty days after. Death is more or less sudden. Coagula are found not only in the larger branches of the pulmonary artery, but also in the smaller branches. Clots may be found in the right side of the heart. When death is gradual symptoms of pneumonia come on.

In such cases minute clots have been carried into the finer divisions of the pulmonary arteries, thus setting up lobular pneumonia. Playfair thinks that *primary* or *spontaneous* thrombosis may occur, and that when this takes place the setting in of the symptoms correspond in point of time with that which would happen when peripheral thrombosis takes place—death occurring on the second to the third day. Barnes and others believe that in all cases, whether the thrombosis is in the periphery or in the pulmonary artery, the cause is the same, *i.e.*, the invasion of the venous blood with noxious matter.

Symptoms.—These generally develop suddenly. The patient is perhaps sitting up, when suddenly she becomes extremely breathless. She is conscious but frightened, and therefore the attack cannot be mistaken for an attack of fainting—where there is insensibility.

Treatment.—Here prevention is best. Consequently perfect rest should be enjoined in all cases, more especially where there is thrombosis. Brandy or ether should be given at once, and the patient placed in the position of greatest comfort. If she survive, then the lung symptoms should be treated.

ARTERIAL THROMBOSIS.—This is fortunately a rare affection. Generally the woman is seized with faintness and intense pain in the leg, with accompanying numbness, loss of feeling, arrest of pulsation, and loss of power in it. Then follows gangrene and perhaps death. The most frequent cause is detachment of an embolus from the aortic valves, as when the labour has been complicated with a valvular affection left after an attack

of rheumatism. In rare cases the thrombus is probably due to a clot of blood in the left ventricle. When recovery takes place, it is owing to the establishment of a collateral circulation.

Treatment.—The patient should be kept quite quiet, and the leg enveloped in layers of cotton wool. Bottles containing hot water should be placed on each side. A coil of rubber tubes (Leiter's) may be placed around or over the leg. Barnes recommends the application of leeches over the precordia, or a small bleeding from the arm. A mixture containing sp. of ammonia, sp. of chloroform, and ether may be prescribed. If the patient is kept alive for some time, recovery may take place. Death may be due to sudden movement of the body. Baker relates a case where recovery took place without gangrene. Amputation has been advised and practised.

TETANUS.—Sir James Simpson has described this affection. Garrigues also speaks fully on the subject. Of fifty-seven cases collected by him, twenty-five followed abortion. It is a rare affection. It is thought that a hot climate, advanced age, and the negro blood, predispose towards it. Lately the infective power of tetanus has been discussed. It has long been known that it is endemic in certain regions and epidemic in others. Some hold that it can be communicated by inoculation. Flugge thinks that the bacilli are to be found in ordinary soil. It is known that the soil contains the miasm of ague, and that when this is conveyed to different localities, it may give rise to an attack of this fever. So it may be proved to be the same with the germs which cause tetanus, and if this statement be correct it may help to explain the sudden outbreaks of tetanus which Lary, Thierry, and others described as having occurred during the Napoleonic wars, and which more especially occurred when the wounded were allowed to lie on the battlefield during the night.

Aretæus, in ancient times, thought it more common among women than men. Simpson recorded a case which occurred after he had dilated the os with a sponge tent and removed a soft polypus. He says one special complication was present in

the cases he refers to, viz., hæmorrhage and plugging of the vagina. Aubinais, of Nantes, reports three cases which followed exposure to cold. One crossed a wet floor on her bare feet four days after abortion; another exposed herself to cold four days after; while a third drank a large quantity of cold water on the fifth day.

Denham reports three cases following abortion and hæmorrhage. Waring says, that in three years, ending December 1853, 232 women are recorded as having perished from puerperal tetanus in Bombay. During the same time, 912 persons—other than the above—died of tetanus.

Garrigues says advanced age is a predisposing cause. More than one-half of the women who suffer were over the thirty-fifth year. Puerperal tetanus is thought by some to be a zymotic disease, and to be an autogenetic poison.

The disease generally sets in oftenest on the eleventh day after labour, but this may vary from the second to the thirtieth. The symptoms are almost similar to those of ordinary tetanus. These may at first resemble those of a "sore throat," as weakness, difficulty in swallowing, stiffness, and pain. Trismus may extend to convulsions of the entire muscular system. The disease may last three to four days. It may be fatal in a few hours, and those who are attacked often die before the eighth day. Fournier-Pescay saw tetanus occurring in a woman who, six days after confinement, went to a privy, constructed over a river, and exposed to all the winds. In all cases, the uterus, vagina, and vulva should be fully examined for wounds or cicatrices. Chloroform, chloral, nitrate of amyl, turpentine, curara, or bromide of potash, may be tried. Of twenty-six cases collected by Simpson, and referred to in his *Essays*, twenty-one died, and five recovered.

SUDDEN DEATH.—This heartrending termination of life is fortunately of rare occurrence. A full description is given by Churchill. At one place, when speaking of the sudden entrance of air as a cause, he says, "The veins of the gravid uterus present four remarkable characteristics: first, the total absence of valves;

second, their freedom from inosculation; third, their very large size, readily admitting a goose quill, and sometimes a little finger; and fourth, their opening on the internal surface of the uterus—at the placenta site—by large, open orifices.” These very valuable remarks show how important it is that the physician should be careful to bring about and maintain good contraction of the womb, so that these orifices may be closed, and air and septic matter prevented from passing. Sudden deaths may be due to the formation of clots in the heart. It may also be due to anæmia, and to the excess of fibrin in the blood, or to excessive action of the heart during labour. It has been stated that it may be due to the entrance of a large quantity of puerperal poison entering the blood. Acute pulmonary œdema, and great nervous shock, also act as causes.

RUPTURE OF THE UTERUS.—Dr J. G. Swayne describes a case. It occurred when an effort was made to expel a five-months' putrid foetus. It may also occur in cases of criminal abortion.

SECONDARY HÆMORRHAGE.—This may be due to various causes. Drs Johnston and Sinclair describe such as being due to a uterine thrombosis, this having burst on the fourth day after delivery. M'Clintock says that among the out-patients at the Rotunda Hospital, it was sometimes caused by sexual intercourse, which was permitted eight or ten days after labour. Charpentier also refers to cases, where the simple return of the husband to the wife's bed brought on flooding, this being probably due to sexual excitement, or perhaps orgasm. The treatment will be that already described.

PROLAPSE OF THE OVARY.—This body is known to be enlarged and heavier in the pregnant condition. Hemming says it is nearly twice as large. Consequently, it may drop into the retro-uterine pouch, and be associated with retroversion, or flexion. The left ovary is the one most frequently prolapsed, this being partly due to the fact that the left ovary is much more bulky than the right; also because there is no valve on the left spermatic or ovarian vein. It is well known that in abortion the entire process of involution is generally more or less imperfect.

INVERSION OF UTERUS.—Emmet calls attention to a case of Dr E. Skae's, where he reduced an inverted uterus, which followed an abortion at the fourth month. Scott also records a case.

ARREST, OR PREMATURE SENILITY OF THE OVARIES.—Lawson Tait says that the period of functional activity is shortened, and that this is not unusual after first confinements, and more particularly after miscarriages. Many such have been under his care, who never again became pregnant.

INSANITY.—Puerperal insanity is a very rare occurrence. The frequent recurrence of abortions may act as a cause. Speaking on insanity, Grey says, "I have for many years received and treated patients, whose insanity was distinctly traceable to this crime (abortion), through its moral and physical effects. I need not here discuss at length the disorders consequent upon this crime, in any and all its shades, but I deem it no less my duty to declare that it is, directly and indirectly, one of the causes of insanity."

PUERPERAL CONVULSIONS have been referred to under "Maternal Causes of Abortion."

DEAFNESS.—This complication has been observed to set in after abortion. It has been noted as a complication after labour at term, and also during a menstrual period. In some there is only dulness of hearing.

CHAPTER XI.

THE TREATMENT OF ABORTION.

PROPHYLAXIS; TREATMENT OF THREATENED ABORTION; OF COMPLETE;
OF INCOMPLETE; OF HABITUAL; AND OF MISSED ABORTION.

THE PREVENTION OF ABORTION.—This resolves itself into doing everything in one's power to preserve the due relationship which should exist between a healthy body and mind, and to induce the pregnant woman to avoid all the various morbid states which may bring about the premature expulsion of the ovum. Marriages should be carefully considered and selected. Both should be of a suitable age, as when either are too young, or too old, or when there is a disproportion in the ages, the ovum is likely to suffer. Aristotle seems to have grasped the importance of this, when he fixed the ages for marriage at thirty-seven for men and eighteen for women. Men also were to cease from procreating at the age of forty-five, because the offspring would be imperfect in body and mind. His logic on this question is very defective in other respects. Health should be sought after. Certainly the Darwinian process of Natural Selection is fairly well crushed out in the present day. Two great forces—religion and society—take it on themselves to decide “who is to marry who.” A church, acting under the very comprehensive name of religion, forbids its daughters to marry those who belong to a different order, while society, careful to protect itself from a state it has once passed through, excommunicates the man who dares to take a wife from outside its own narrow circle. Thus future generations suffer, for a man does not always ask, “Will she be a good wife and a perfect mother to my children?” but more probably, “Will

this union help forward my worldly prospects?" If more careful selection were made, not only the physical but the intellectual wellbeing of the race would benefit. Various illnesses would not be bred "in and in," and so not only should the chances of abortion be lessened, but the eye would not be shocked by meeting those who are crippled with hereditary ailments. This progress of retrograde development may well be sarcastically referred to as "the survival of the unfittest." Our children, in the words of Shakespeare, need neither be deformed or unfinished, nor "sent before their time into this breathing world scarce half made up." Nature, when not severely interfered with, is kind.

The sexual relations between husband and wife should be kept under control as completely as possible. Woman stands at a disadvantage with the so-called lower animal, in that she has to yield to the too frequent wishes of her husband. It is well known that the majority of idiots are the product of first conceptions. And just as the first marital act may cause a shock to the mother, so may the too frequent repetition of sexual intercourse act injuriously. Sexual intercourse should not be engaged in at the times corresponding to the menstrual periods. Kleinwächter says, that it should be restricted during the first four and a half months, and absolutely forbidden in the second half of pregnancy. There is no doubt but that rape, such in every sense save its technical acknowledgment by the law, is frequently committed in the marriage bed by the husband upon the sick or unwilling wife, and that this is done year after year, until death brings release (Storer). Dr B. W. Richardson says, that the pregnant woman should occupy her own bed exclusively. Dr Richard says, that if the human race were guided by the example of animals, coition during pregnancy would be entirely abandoned. Indeed, there seems to be a strong indifference and aversion to sexual intercourse during pregnancy. Röderer said that the *viri fastidium* is a sign of pregnancy, while Stoltz points to the *horreur du mari*. Swift, in his Gulliver's travels, refers to the she Yahoo, that admits the male

while she is pregnant, and the action is spoken of "as such a degree of infamous brutality as no other sensitive creature arrives at." In Old Calabar, I have been told, that the natives send their wives up into the plantations, when they become pregnant. Truly, there is no good in ploughing the soil, when the seed is sown, and when, at the very time, the germ is developing. Any desire for sexual relationship should be only secondary to the wish to perpetuate the race. Intercourse is not carried on during menstruation amongst the Jews, nor for some days after. In Ploss's work, "Das Weib," it is said, that in most heathen nations, sexual continence is observed during pregnancy, some thinking that a woman at this time is unclean. The ancient Irans gave a man 2000 lashes, and compelled him to carry 1000 loads of heavy, and 1000 loads of light wood, if he were found cohabiting with a pregnant woman. The old Hebrews, and the Rabbi, taught that sexual intercourse during the first three months was injurious. This idea of abstinence seems to be hinted at by the anonymous writer of the well known Latin work, called "Fleta," written about A.D. 1290, when he says, "Moreover, whoever shall have overlain a pregnant woman, or who shall have given her drugs and blows, in such sort as to procure abortion is by law a homicide." Whitehead states, that abortion is very frequent among young prostitutes, and in those who are of the prostitute class. As far as one can judge, it would seem that too frequent sexual intercourse weakens the male elements, and so prevents a perfect development of the embryo. R. Barnes says, he has known pelvic cellulitis caused by connection having taken place a few days before labour. I have strong evidence for stating, that, in one case, the membranes were burst two days before labour, this having been caused by sexual connection. It has been suggested, that repeated sexual intercourse during the early months of pregnancy may be a cause of adherent placenta, but all those conditions which produce congestion of the pelvic viscera may lead to this unfortunate occurrence.

If the pregnant woman is anæmic and weak, and is troubled

with dyspepsia, or leucorrhoea, she should take nourishing food, healthful exercise, and some bitter tonic to improve the digestion. Reduced iron with pepsine in powder may be found useful. When a woman is weak, her tissues are generally relaxed. Here the uterus may descend, giving rise to pains and dragging sensations in the loins. Tepid sea water and hip-baths may do good, but vaginal injections, when used in those predisposed to abort, must be prescribed with great deliberation. Diet should be carefully attended to. While over-eating is to be avoided, sufficient nourishment should be taken, for it should be remembered that there are two beings to be provided for. Alcohol should, as a rule, not be prescribed, and the same statement applies to late hours, emotional influences, and dancing. Should a mother be nursing her infant, and at this time become pregnant, she should then cease nursing, as her system cannot support three beings, herself, her baby, and the infant in the womb. If she do, some part will give way, and generally the ovarian influence is stronger than that of the breast.

Constipation should be avoided. Those who have seen what large accumulations of *fæces* may take place in the intestine, can well understand that this may act as an irritant to the womb. The usual aperient medicines, and fresh fruits, with outdoor exercise, should be tried. The German compound liquorice powder, in teaspoonful doses when required, may be found useful.

Reference shall be made to the sad results which follow when a man with acute syphilitic disease marries. Do members of the medical profession act truly, and conscientiously with their patients? I fear we all do not. Many who come, look for the physician's half-sympathetic laugh, or jocose remark. Married men have—when lamenting a wife's and child's condition—stated that in former years a doctor advised them "to have a woman." Perhaps there are a few of our profession who are idiotic enough to give such advice, but their number must be very limited. There is an anecdote told of a medical man in a university town, who always, when giving advice, suggested sexual intercourse. A young fellow to whom he gave it said, "Yes, I agree with you.

I have just called to see if your daughter is disengaged." From that time onward no further such advice was volunteered! Society has elevated the medical practitioner, or perhaps lowered him, into the position of the "venereal doctor," and looks to him for his sympathy. If each physician would only impress this fact upon his patient, that he is not cured until six or eight months have elapsed since the last appearance of any symptoms, however late, and that he must on no account marry until all remote symptoms have disappeared, then one would not so frequently meet with those numerous cases of abortion which result from the poison of syphilis. It is now held by many that the period of transmission of this disease has passed whenever a man develops tertiary symptoms. But who, having respect for his own statement, will say *when* secondary symptoms end, and tertiary begin. Who would sacrifice a daughter to the case which rests on a supposition? One does not speak as if one thought all cases of abortion were due to syphilis.

In cases of fever, when we know that the life of the fœtus is in danger, as when the temperature is high, general measures should be taken so as to lower it. Priestley suggests that a local effort should also be made to lower the fœtal temperature by applying ice bags, or coils of tubing, over the mother's abdomen. Treatment, however, must not degenerate into a mock sentimentality, for one could not see the utility of trying to preserve a fœtal life when there is a maternal temperature of 105° due to syphilis, for instance. Happily such treatment would be futile.

Such care should be taken so as to avoid any intra-uterine meddling. There is no doubt but that sounds have been introduced into the pregnant uterus unwittingly. I have done so myself in a case of retroflexion, when the woman assured me she was not *enceinte*. And although she wore a Hodge's pessary for five weeks, no uterine action was set up, she being delivered at term in my presence. Other similar misadventures have been recorded, one in which an intra-uterine pessary was introduced and worn without doing any harm.

Little need be said of those who take drugs with the intention

of bringing on abortion. There is no doubt, if one may judge by the large quantities of "abortion" medicine sold, and by the numerous stilettes used, but that there is a constant effort made by a large number to prevent themselves from becoming mothers.

Finally, all those conditions of the womb, such as retroversion and endometritis, should be carefully attended to. Furthermore, it must not be taken for granted that on every occasion when nature throws off the ovum, she is going in a wrong direction. Abortion may be in reality a conservative process. When no cause can be detected in the woman, then our attention should be directed to the seminal fluid of the husband, to the fœtus and its envelopes, and to the uterus.

TREATMENT OF THREATENED ABORTION.—This will depend on the cause. In all cases the patient should be put to bed, and instructed to stay there until all traces of the threatened illness have passed away; that is, supposing the fœtus is not dead, and that the occurrence of complete abortion is not salutary. The bedroom should be well aired, and the air cool, while the bed-clothes should be light, and a hair mattress used. All sources of excitement should be excluded, and a well-trained nurse provided. Many cases of threatened abortion develop into the inevitable form, simply because there is either an active or passive wish on the part of the patient to abort. One is frequently met with the expression, "Oh, it is only a mishap," and from this one may form an idea of the care which the patient and her relatives will give to the treatment. Indeed, in some cases, better results will be secured if the physician himself give the medicine to the patient.

As to diet, neither too hot nor too cold substances should be given. Both the quantity and quality of solids, and especially of liquids, should be reduced. A little milk, or milk and soda, beef tea, or chicken soup, may be allowed. When there is vomiting, or irritability of the stomach, this should be at once stopped. Half teaspoonfuls of Brand's beef essence, or a quarter of a teaspoonful of Carnrick's beef peptonoids in milk, often agree well. Repeated vaginal examinations should not be made,

as these have a strong tendency not only to disturb the patient but to irritate the uterus and vagina. The interfering old nurse should be made to understand that she must not make any such examinations. There is a close sympathy between the various mucous membranes, and, indeed, the entire tissue of the genital tract. This is markedly shown when attacks of inflammation or septicæmia follow some trivial operation of the female genital tract. Great care should be taken to prevent the patient from rising out of bed. A well-aired slipper bed pan, into which a little hot water and some Condy's fluid have been placed, should be used. If the bladder cannot expel its contents, then a catheter may be used. It will save any disturbance of the patient, if a few feet of india-rubber tubing is fixed to the catheter, so that the urine may pass off into a chamber placed at the side of the bed. A small pot of vaseline, to which a little carbolic acid or iodoform has been added, should always be carried to such cases. This may be used to anoint the fingers, or to apply to instruments. One is frequently amused by the variety of substances presented to the doctor, when called upon to anoint his finger. It may, for all one knows, be the rendering of diseased bacon or fat, or the ordinary tallow candle melted down! Thus, they ask us to put substances into the womb which they would not on any account have placed on their lips or tongue. Before making a digital examination, the hands should be thoroughly washed with a nail brush, and a solution of carbolic acid, or in one of perchloride of mercury—1 in 1,000. It has been said that the death warrant of a woman may be carried under the finger nail, and a case has been related when a patient refused to allow a medical man to examine her because she noticed that his hands were dirty. If there be any purulent or offensive discharge from the vagina, it should be carefully washed away with a warm solution of carbolic acid—1 in 50. Care should, however, be taken not to irritate the uterus. Here one may pause and say, that if the vagina were frequently washed out, in all cases where there is the slightest trace of an irritating discharge, we should hear and see much less than we now do, of the occurrence of ophthalmia in infants.

As regards the drugs used in order to prevent abortion taking place, most of these act by calming the nervous system, and by reducing the irritability of the uterus. Battley's liquor opii sedativus, in doses of from ten to fifteen drops, and given every third hour, is highly spoken of. If opium be given in the form of tincture, it will frequently be rejected by the stomach. A much better plan is to give it as a clyster, with a little starch. Playfair speaks of chlorodyne, given in fifteen-drop doses, every third hour. Bromide of potash is sometimes prescribed. Of late, the liquid extract, or extract of viburnum prunifolium, prepared from the bark of the black haw, has been much praised. Phares recommended it in the *Atlanta Medical and Surgical Journal* of 1886, and Dr Jenks read a paper on its uses, which paper has been published in Vol. I., 1876, of the *American Gynecological Society Transactions*. The liquid extract is a very disagreeable preparation. It may be given in doses of thirty to sixty drops. The extract is generally given in the form of pills, and in doses of three to five grains every third hour, for three to four times. It may be made up with paraffin. I may say that, in those cases of threatened abortion, even when the os was sufficiently dilated to admit the finger, the extract, combined with rest, acted most beneficially. Some American physicians give ergot in small doses, supposing it may act in such cases as a uterine sedative, or as an arrester of hæmorrhage. We do not as yet fully understand how ergot acts on the uterus. Duncan holds that it does not cause contraction, but retraction of the muscular fibres, while others maintain that it produces both. Atthill speaks of the power which ergot possesses to arrest hæmorrhage in cases of threatened abortion, while he strongly advises the use of the American Liquid Extract—known as Squibbs' Ergot. If by its action a thickening of the uterine wall is produced and this condition kept up, then good results may follow, especially as it is the general opinion of practical men, that the power of ergot to bring about abortion is almost *nil*. Chloral hydrate has also been recommended. Generally, the above treatment will, when combined with rest, allay the contractions of the uterus.

When hæmorrhage is a prominent symptom, some give the acetate of lead. The application of cold to the hypogastric region is of doubtful utility. Still, if the hæmorrhage is profuse, it may be tried, with, however, little hope of doing good, as, where the bleeding is severe, although uterine contraction be feeble, the placenta and fœtus are likely to suffer. It should, however, be remembered that bleeding may continue for some days, and still the pregnancy go on to term.

If the threatened abortion be due to a plethoric state of the woman's system, and in one who has had profuse menstrual periods, all excitement should be avoided, the diet should be restricted, little liquid be given, while alcohol should be entirely given up. The liver should be encouraged to act freely, and should not be stimulated by rich food or spices. Tight-lacing should be forbidden. The bowels should be made to act freely. Some recommend a slight bleeding from the arm, while others advise that this plan be carried out at each menstrual period. Leeches have been applied to the anus. Perhaps venesection, and the use of leeches, have been too absolutely forbidden. If so, it is to be hoped that the swing of the pendulum will soon bring us back to our proper state of scientific equilibrium. Dry cups have also been used. Tarnier speaks of the "decidedly beneficial effects" of dry cupping, especially in cases of plethora. R. Barnes has shown that, when bleeding begins at a given point, there is an increased flow of blood to that part. It is practical to suppose that if the blood stream is diverted from this point, the strain will be taken off, and the tendency to a continuation of the hæmorrhage, or congestion, lessened. Counter-irritation, applied to the region of the chest, so as to divert the excess of blood from the uterus, has been advised.

In a case of repeated abortion from hæmorrhage, Dr G. O. Hemming states that Marshall Hall and Gregory applied a lusty child to the breast of the patient, and with the result that she bore children. All sexual intercourse should be prohibited for some days, both before and after the time which would otherwise have been a menstrual period. Those who are plethoric,

and who have profuse periods, should rest in bed for five to ten days at the time corresponding to the period.

If the threatened abortion is due to *placentitis*, or *placental hæmorrhage*, resulting from congestion of the uterus, or to some affection of the heart, lungs, or zymotic disease, little can be done to arrest the bleeding. Hæmorrhagic endometritis is frequently fatal to the foetus. As has elsewhere been stated, that there are some diseased conditions where a woman's recovery is more certain if she abort, so the physician must be careful not to thwart Nature when she is trying to free herself of some unbearable burden. On the other hand, as stated, the woman's chance of recovery may be lessened by the occurrence of abortion, or her strength so reduced, that her system will be unable to stand the shock of delivery. In this latter case, all should be done to prevent abortion. When due to *fatty degeneration of the placenta*, Sir J. Simpson spoke highly of the use of chlorate of potash. It may be given a fair trial, although there are few now who believe in the good effects of this drug to such an extent as Sir James did. This drug is given with the idea that it increases the oxygen in the mother's blood, and, through her, in that of the foetus also. If this is so, one would suppose that oxygen gas, stored in iron cylinders, and administered by inhalation, might prove beneficial.

When some *displacement of the uterus* is the cause, this should be rectified, but if the uterus be bound down by adhesions, this will be impossible. Before trying to replace, the bladder should be emptied, and the bowel cleared out. The woman may lie on her side, and the finger should press up the fundus. Dr Barnes draws attention to the plan of pushing the uterus towards one sacro-iliac sychondrosis, so as to avoid the prominence of the sacrum, and if the colon or rectum is full of fæces, one would endeavour to push the womb up by the right side of the pelvic cavity. If these means do not answer, then the knee elbow position may be tried. Pressure on the fundus by the finger introduced into the rectum, or by introducing one of Barnes' bags, may be tried when other methods fail. If, when the womb is replaced,

it fall back again, then a well-fitting Hodge's pessary may be used. If the womb be anteverted, the woman should rest on her back, and when taking exercise should use an abdominal belt. When the threat is due to a loaded state of the large bowel, enemata of warm water and oil should be used. Soap and turpentine are too stimulating. The endometritis, which so frequently leads to abortion, will require, in the future, a prolonged course of local applications, combined with tonics, and sea-bathing. Finally, the great secret of success in treating all cases of threatened abortion, will depend on the complete knowledge of its etiology; without this, one must work in the dark. One may be called to a case, and only inquire if there is much hæmorrhage, or pain. The patient is then advised to go to bed, and future events are carelessly waited for. This is a wrong plan of procedure, and to it must be laid a great share of the blame by which many women look on the act of aborting with so much carelessness of feeling. A well balanced train of reasoning will, in every individual case, be required, for no one would think of arresting a threatened abortion when due, say, to well marked parental syphilis, or to the albuminuria of Bright's disease.

If any of the above plans of treatment stop the pains and hæmorrhage, the threatened abortion has for the time been arrested, and if no difficulty occur the patient will go on to term. If, however, pain and hæmorrhage continue, and more especially if portions of the ovum be discharged, then the abortion becomes *inevitable*. This will result in either a *complete* or *incomplete* abortion, according as the entire embryo and membranes are expelled, or if the embryo is expelled and the membranes retained.

TREATMENT OF COMPLETE ABORTION.—Generally complete abortion gives little or no trouble or cause for anxiety. The physician may be called in, and the nurse draws his attention to some substance which has been expelled. On examination the entire ovum and membranes will be seen. If placed in water, the villi of the chorion will float out. They may have been detached in some parts, while clotted blood and decidua may be found adhering. The membranes may have been ruptured and the liquor

amniæ dispersed; or the ovum, with the contained embryo, may be found entire. At other times the physician is called in because the patient and her friends are alarmed at the hæmorrhage and pain. If an examination is now made, the os may be found dilated. If the ovum is found to occupy the cervix, the hæmorrhage will be trivial. This should not therefore be interfered with, as it will help to control the hæmorrhage and dilate the os. The vagina should be kept pure, by irrigating it every fourth or sixth hour, according as symptoms prompt, with warm carbolic solution. If there is pain and the hæmorrhage trivial, the case must be watched, and if necessary nature be assisted—thus we superintend the course of events. If progress is slow, a dose of the liquid extract of ergot may be given. The fresh drug should be used, as it does not keep. Thirty drops repeated every half hour for one or two hours will be sufficient. Many, however, prefer giving a dose of opium. Then if the os do not dilate, one or more tupelo tents should be introduced into the cervix, and kept in place with pledgets of cotton wool to each of which a piece of string has been attached. This is one of the best plans for arresting hæmorrhage, and at the same time bringing about the dilatation of the cervix. A small size may first be used. It should be well smeared with vaseline and carbolic acid before being introduced. Barnes' instrument for placing a sponge tent in position will be found to answer well. Some, however, use Marion Sims's duck-bill speculum and a tenaculum to steady and bring down the uterus. A string should be left attached to the tent, so that it may not pass into the uterus, and that it may be more easily withdrawn. A tent should not be allowed to remain in longer than six to eight hours. An objection to the laminaria is, that it expands unequally throughout its length, especially when it is nipped by the internal os, when it may be difficult to remove. If, during the stay of the tent in the cervix, the temperature of the patient run up, the plug should be removed and the vagina irrigated with warm carbolic solution.

When the tent is in place the bleeding may in rare cases still continue. Some hold that in early pregnancy the uterus will

not dilate sufficiently to allow any concealed hæmorrhage to take place into its cavity. However, it is always right to closely watch the pulse, temperature, and appearance of the patient. If the lips become pale, if she complain of feeling faint and is short of breath, and if the pulse rise in frequency and become diminished in strength, then the suspicions of the physician should

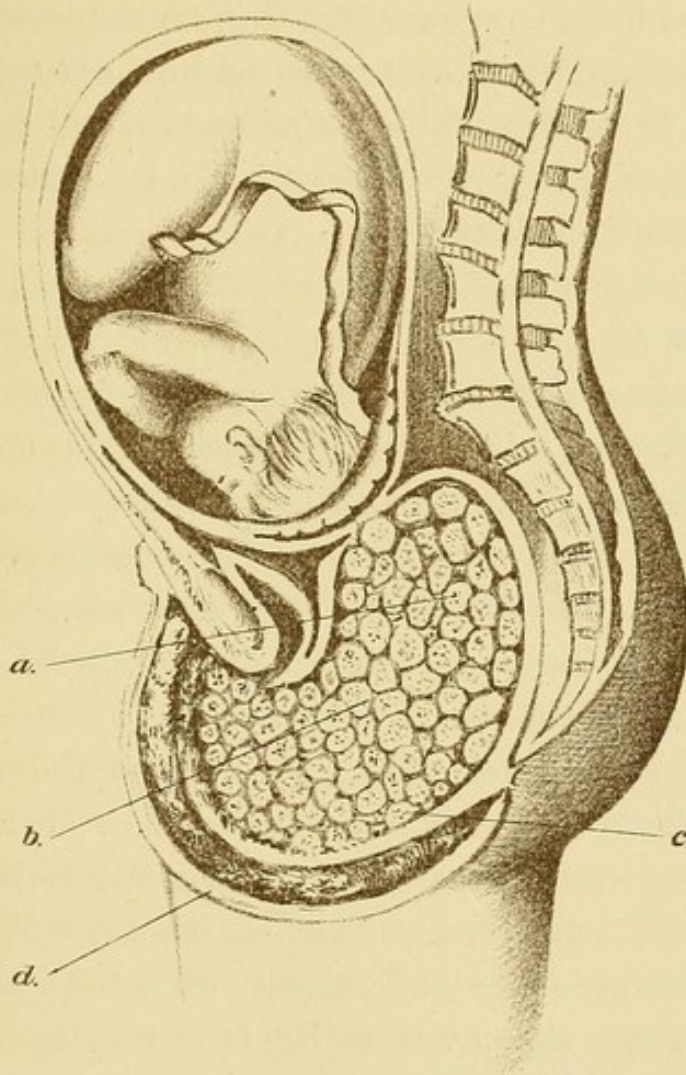


FIG. 29.—*a*, Deeply placed fossils, to each of which a cord is attached. *b*, Superficial fossils, without cord. *c*, Pad of cotton. *d*, T bandage. (Parvin's "Midwifery.")

be aroused. Along with this the womb should be carefully examined now and then, and if it be found to increase in size, the tent should be withdrawn, and the cervix dilated with one of the smaller bags of Barnes', or Greenhalgh's modification.

Instead of using the sponge many prefer to use the tupelo tent—made from the wood of the tupelo or nyssa, a tree growing in

the Southern States of America. It does not expand so much as the sponge, but it maintains its full expansion size, and this the sponge tent is said to fail to do. Tents made of the slippery elm bark are sometimes used. When kept in stock they may be coated with gelatine, and placed in a corked bottle.

Physicians may prefer to *plug the vagina* instead of using the tent when the hæmorrhage is severe and the os undilated. The treatment by the tampon shows that it often succeeds well in stopping the bleeding, for when it is withdrawn only that part at the fundus of the vagina will be found to be stained. A dose of ergot is usually given when it is used. It is needless to add any astringent medicines to the plugs. In grave cases of hæmorrhage the entire vagina and vulva should be plugged, and this kept in its place by a T-shaped binder. (See Fig. 29.) Before plugging the vagina, the bladder and bowel should be both emptied, and strips of lint, or balls of absorbent cotton wool, with pieces of string attached, should be prepared. The vagina should be irrigated with a warm solution of carbolic acid. The patient should lie on her side, and be well drawn out to the side of the bed. Marion Sims's duck-bill speculum should be introduced, and confided to the care of an assistant. Then each piece of lint is carried to the fundus of the vagina, and the physician begins by building up, first, all round the cervical portion of the womb; next, over the os; and lastly, filling the entire vagina until the vestibule is reached. The first introduced plug may be saturated with glycerine and carbolic acid. An advantage will be gained by applying a well-fitting binder to the abdomen.

The tampon may be left in for eight or twelve hours. It is a suitable plan to adopt when the physician has to leave the patient for some time, or when he resides in the country. Generally, if it is found that the plugging does not act sufficiently inside twenty-four hours, it may be discarded, as there is the danger of the retained clots becoming decomposed and putrid. Often, however, when the tampon is removed, the ovum will be found expelled and resting on it. Care should be taken to irrigate the vagina after using the tampon. Should success not

follow its use, then a laminaria or tupelo tent may be introduced. If time is an important element in the case, Barnes' small bag may be used. When a sponge tent or laminaria is used, the pain is sometimes severe while dilatation is going on. This may be soothed by giving twenty drops of laudanum, or if this be counter-indicated, a mixture of bromide of potash and chloral.

Some hold that the plugging of the vagina, and more especially the filling up of the space around the cervix and os, keeps the latter from dilating. Therefore when plugging it will be well not to press the uterus too forcibly against the sacrum. Not only will dilatation not be retarded, but the sacral nerves will escape injury, and neuralgia be prevented. When introducing the different pledgets, it has been suggested that each string should have a different number of knots put on, so that one may know how many tampons have been introduced, and also the order in which they should be withdrawn. Thus pledget 1, 2, 3, 4, and 5 should have a corresponding number of knots on their separate strings.

Emmet has recommended the use of damp cotton for plugging. Pieces are soaked in water, and next squeezed nearly dry. They are then moistened with a saturated solution of alum, and again squeezed. Before beginning, the bowel and bladder should be emptied. The vagina must be cleared of all clots, and its walls well smeared with vaseline. By this means the vagina can be more closely packed, the mucous membrane is in less danger of being bruised, while the escape of blood between the plugs and the vaginal walls is retarded. If necessary a piece of cotton may be placed in the cervix. If a sedative enema or suppository is required, it should be passed up into the rectum before plugging. If the pledgets press severely on the neck of the bladder, one or two should be removed. Others have recommended the use of a roller bandage for plugging. A cylindrical speculum is first introduced, then the bandage is pushed up as far as the os. Pressure is made from below on the central part of the roller while the speculum is withdrawn. This, as well as the "kite tail" tampon, will be found to be much inferior to the recognised plan.

When a tupelo tent is not at hand, some have used pieces of sponge soaked in a warm solution of tincture of iodine or carbolic acid; others have employed a long strip of lamp wick or handkerchief. Plugging the vagina is now objected to by many, except when we wish to gain time, or where there are no sponge tents or laminaria at hand. If, when the cervix has been dilated by one or a combination of the above means, the foetus is not expelled, and if a dose of ergot do not excite uterine contractions, then after sufficient waiting the finger may be introduced, and the ovum and membranes extracted. The best plan to follow is to put the patient under ether, and then to slowly introduce the finger into the womb. At the same time the uterus should be steadily depressed by the other hand above the pubes, or better still if an assistant will do this. The finger then sweeps the entire cavity of the uterus, and so detaches the ovum. Great care should be used, for patience and gentleness will have their reward. It is much better to push the uterus well down into the vagina, instead of introducing the fingers or hand.

The remarks made by Graily Hewitt are well worth attending to. He points out that abortions are frequent in cases of flexion, and that there is much danger in the ovum being retained when this condition is present. "With reference to the importance of this relation between retention of the ovum in early miscarriages with flexions, I do not hesitate to say, that in not one single instance during the last three or four years, since my attention has been directed to the mechanism of these occurrences, have I seen a case in which the relation described has not been most obvious."

In abortion at the fifth or sixth month, the foetus may present transversely, and in this way delay labour. The presentation, therefore, should be made out, and podalic version performed. In bringing away the foetus in such cases, time should be given when the head is passing through the cervix, as this may not be sufficiently dilated. It may also facilitate matters if it be remembered that there may sometimes be two children in the womb. Therefore, if the uterus appears to be unduly large, or more

especially if another foetus can be made out by abdominal or vaginal examination, or if the heart sounds are heard, great gentleness should be used, as cases are known where, when the dead foetus has been expelled, the woman has carried her other baby to full time. In those cases of abortion where twin pregnancy is suspected, it is advisable that the cord of the expelled foetus be tied, so that the other foetus may not suffer through a loss of blood. And, here it should be mentioned that, if the foetus is born alive, or if it breathe, then an effort should be made to keep it alive. It is to be feared that a considerable number of infants are lost yearly, and simply on the mere suggestion that it is a "premature birth." If the motto for the

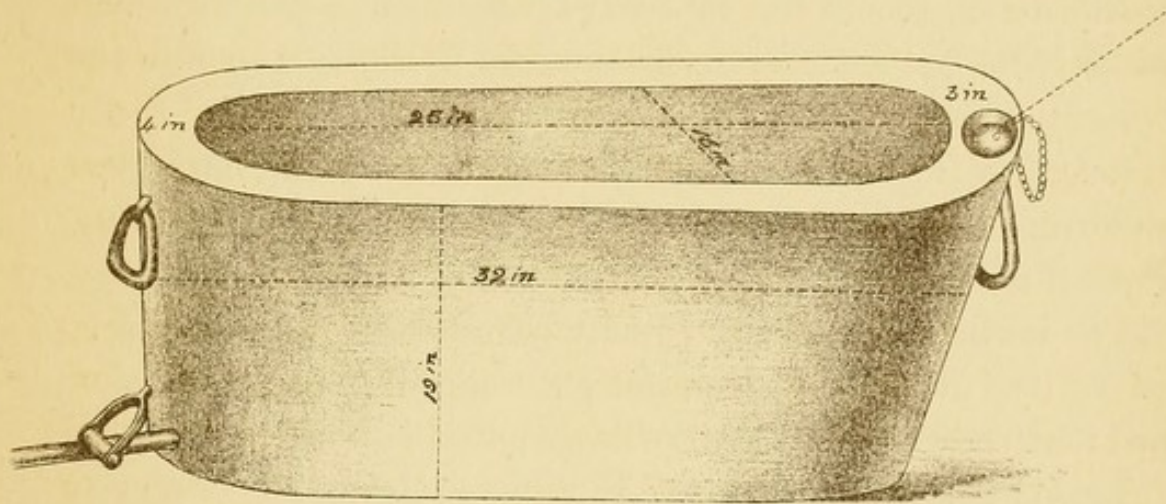


FIG. 30.—A Credé's Incubator.

guidance of the practitioner be, **KEEP EVERYTHING ALIVE**, then more vigorous efforts must be made. It is a matter of difficulty for a woman to say at what day she conceived, and it is as difficult for the physician to decide the age of an infant. It should therefore get the benefit of the doubt. It should be wrapped up in layers of cotton wool, and surrounded by well-warmed blankets, and hot-water bottles. Credé's incubator is a simple contrivance, shaped like a bath. (See Fig. 30.) It has double walls, is made of copper, and has the space between the walls filled with water. This water is renewed every fourth hour, and has a temperature of 122° F., thus sustaining the temperature of the bath at about 99° to 107° F. The tub is half-full of cotton

wool. On this the child is laid, and when so placed is thoroughly covered over with more wool. Instead of being bathed, it is rubbed over daily with warm oil. In the Maternity Hospital, Philadelphia, such infants are fed every hour, by passing a soft gum catheter into the stomach, and then injecting a little over one drachm of fresh human milk. Should one infant be born dead, and another—but of a more mature age—be expelled, the above plan will be worthy of a faithful trial.

In treating an abortion due to valvular disease of the heart, and especially to the grave form of mitral stenosis, it has been prominently stated that ergot should not be given, that the hæmorrhage should not be checked unless severe, and that the heart's action should be supported by digitalis, or strophanthus; while, if the patient is cyanotic, she may be dry cupped over the heart, or bled.

Let it be understood that, although the various operations above described may be called for, still Nature frequently conducts this confinement to a successful termination, even though she is taken unprepared. It may be necessary to remind ourselves that there is such a thing as "meddlesome midwifery," and that "masterly inactivity" is sometimes useful.

TREATMENT OF INCOMPLETE ABORTION. RETAINED PLACENTA OR MEMBRANES. ADHERENT PLACENTA.—In this case the fœtus is expelled, but the placenta and membranes remain in the uterus. Consequently serious results may follow. The three chief dangers ever present to the mind are,—the dread of the occurrence of hæmorrhage, and its accompanying exhaustion with slow convalescence; inflammation of the pelvic organs; and blood poisoning. It is a practised rule for guidance, that so long as hæmorrhage continue, there is something in the uterus. Denman, years ago, pointed out the fact, that when a part of the placenta was retained, the cervix did not contract, but remained patulous.

How a case of incomplete abortion should be treated is a question to which, even to-day, two separate and distinct answers are given. One side says, "Remove the placenta as soon

as possible;" and the other, "Leave it to Nature." Both produce arguments and facts to show that their opinions are the right ones. Unfortunately, in cases of abortion, the majority of patients do not send for us until some hours have elapsed since the birth of the foetus, and with this result, that when a vaginal examination is made, the cervix is found to be contracted. When one is conducting a case of abortion, it is the earnest hope of the accoucheur that the membranes will not be too long delayed in the uterus; in other words, that the danger of hæmorrhage and septicæmia shall be excluded. Consequently many recommend that, when the cervix is found to be sufficiently dilated to allow the foetus to pass, and for the finger to be introduced, the secundines should be removed at once, before the cervix has closed, and while it is soft and patulous. The doctrine of non-interference is a baneful one to teach, if we may judge of its effects on patients and on midwives. Metrorrhagia, due to retained products of conception, is not an uncommon complaint, while the history of the case, and an examination for the cause, will confirm the opinion, that an abortion took place some weeks or months ago, and that now a portion of placenta is retained. Again, the *laissez-faire* doctrine leads many a midwife into trouble. Consequently cases are reported in the daily papers where a coroner has had to severely censure a midwife who has left a woman with her placenta retained for days, until septicæmia sets in. And even when the physician is called in, it is more the dread of fever than the condition of the womb which frightens her. Still, figures have been advanced to uphold this teaching. Budin analyses 210 cases of "miscarriage." In forty-six there was retention of the membranes, with only one death. He does not advocate immediate removal, but irrigates the vagina twice daily with an antiseptic solution, and if the discharge becomes offensive, he washes out the uterus. Such treatment will not be put into force when symptoms of hæmorrhage and blood poisoning are present. Perhaps the teaching of Denman has encouraged the idea of non-interference. Thus he says, "It has been imagined that the safety of the patient very much depended

upon the complete expulsion of the placenta, and when it was retained, very active deobstruent medicines, as they were called, were supposed to be necessary, and strenuously given for the purpose of expelling it, lest it should become putrid, and some of the putrified particles be absorbed into the constitution. I believe the whole of this supposition is groundless, having many instances of its being expelled in a very putrid state at different periods of pregnancy, when the patient was in perfect health; and if she had any disease, the putridity of the placenta clearly showed the consequence, not the cause of the disease. At all events, much less mischief may be expected from retention of a putrid placenta at this period of pregnancy, than from attempts to force it away by the medicines usually given for that purpose, or by manual assistance. . . . In abortion, dreadful and alarming as they sometimes are, it is a great comfort to know that they are almost universally void of danger, either from the hæmorrhage, or on any other account."

Again, cases are recorded where the placenta has been retained for a long time, without any very serious results. Two such are reported in the *American Journal of Obstetrics*; in one, the placenta was retained for 115 days after the expulsion of the foetus, and in the other, for 66 days. Eventually, however, the health suffered, and some hæmorrhage occurred; the cervix had to be dilated with tents, and adherent placentæ removed by aid of curette and forceps. Therefore, one may ask—Why this prolongation of suffering, to be followed at last by operative interference?

Paul Mundé and others strongly recommend the *immediate removal* of the secundines.. Mundé gives a table of fifty-seven cases of abortion. Thirty of these were seen in consultation, and the other twenty-seven at varying times after the birth of the foetus. Only one case had a fatal termination, death being due to septicæmia. He recommends, that if the cervix is dilated, the finger should be used, and the membranes removed, while, if the finger will not bring it away, he uses his curette. If, again, the cervix is undilated, he inserts tupelo tents, and finally extracts.

After this, the interior of the uterus is irrigated, and finally swabbed out with tincture of iodine. In fifty-seven cases, the removal of the secundines was manual in twenty-two, and instrumental—curette and forceps—in thirty-one. He also advises that, as a measure of prevention, an ice bag should be placed over the region of the womb for twenty-four hours after removal of the placenta by finger or instruments, so that cellulitis may be prevented. Duhrssen has reported 150 cases of abortion, where the secundines were removed at once. Out of this number, only two died, and their death was not attributable to the treatment.

The above statements show that it will be much to the benefit of the patient, if the placenta be removed. The mere fact that they are retained is often looked upon as a disaster. How much more then will a continuance of this condition add to the giving of a guarded prognosis. Barker says that more women die from hæmorrhage occurring after abortion, than from that cause at term. Still, it must always be remembered that, while expectancy has its limits, the *accouchement force* must be avoided. Experience will eventually give us the proper key-note for action. Animated discussions as to the treatment of retention of the placenta at term, have frequently taken place. Some allow that it should remain for five, ten, or thirty minutes, while others hold that no interference should be permitted—the lower animals being taken as an example. However, even at term, the question of interference will entirely depend on circumstances, as, for instance, atony of the uterus, hæmorrhage, exhaustion, adhesion, and hour-glass contraction. Perhaps the same rules which guide us in treating cases of retention *at term*, will be appropriate also when treating similar conditions occurring prematurely. But it is to be remembered that, if the expectant treatment is carried out, and operative measures have afterwards to be adopted, the uterus will be soft and swollen, and readily injured when its internal surface requires curetting, or handling. Having made these remarks on the differences of opinion held, a closer notice will be taken of the treatment to be adopted in individual cases.

A careful study of the condition of the patient will always be necessary, for, on being called in, hæmorrhage may be the leading feature, or the patient may be in a state of collapse, or suffering from blood poisoning. The previous history may be one of endometritis, or adherent placenta. Or, again, the patient may be troubled with a very slight loss of blood, and here urgency is excluded. Besides this, more than one fœtus may be present, and cases are known where, in a twin pregnancy, one fœtus has been expelled and its placenta retained, along with the other child, until term. Späth found, in 185 cases, the placentæ separate, with two chorions and two amnions, forty-nine times; placentæ united, one chorion and two amnions, twenty-eight times; and placentæ united, with one chorion and one amnion, in two cases. The proportion of twin pregnancies to ordinary is about one in eighty, while the habit runs in certain families, and in different nationalities.

When the bleeding is so trivial as to give rise to no anxiety, and when pulse and temperature are normal, it is well to wait for a short time, and see what Nature proposes doing. No doubt, watching such a case will give rise to great anxiety, for no one can feel comfortable with a patient who has a retained placenta. In this stage, some recommend the use of ergot, while others consider it more prudent not to administer it. If, however, one wishes to keep the uterus closely contracted, small quantities may be given, and, if the temperature rise, quinine should be added. At the same time, the vagina should be kept pure, by using an antiseptic solution.

When the placenta partly engages the cervix, due caution should be exercised before trying to remove it, for here it serves as a plug, helping on dilatation, and tending to check hæmorrhage. Acting also as a foreign body, it keeps up uterine contraction.

If bleeding now set in, the placenta should be removed. If the cervix is soft, and fairly dilated, pressure over the fundus should be made, and the plan known as that of Credé employed. The uterus is gently grasped on each side with the right and left hands, and gradual pressure made in the direction of the

cavity of the pelvis. It has been suggested that our efforts may be more successful, if Hœning's method be tried. In order to carry it out, two fingers—the index and middle finger—should be passed into the vagina. The index is then passed into the anterior vaginal cul-de-sac, and the middle finger into the posterior. Both fingers are kept close to the cervix, and are made to exert a steady upward pressure, while, at the same time, the other hand, placed on the abdomen, makes pressure downward. If pressure do not succeed then—the cervix being fairly dilated—the index finger should be slowly and gently insinuated into the uterus. When the cervix is soft, and comparatively dilated, this is not difficult to do, and, with gradual pressure, two fingers can, in ten to thirty minutes, be introduced. The giving of an anæsthetic will greatly facilitate progress, and relieve the patient of a great deal of acute suffering. Sometimes the cord will act as a guide to the finger when the latter is made to rupture the foetal surface and coverings of the placenta and hooked over the umbilical arteries, just as they begin to branch out. Slow traction is then made, when the secundines will soon come away. Undue haste will only lead to the breaking up of the placenta, and the leaving of portions behind. If the placenta is retained because the membranes are adherent to some part of the uterine wall, then a slow and gradual rotation of the placenta should be made; but if this movement do not detach them, then the finger should be introduced, and separation effected. Afterwards, the amnion should be examined, so as to note that no rents or loss of its tissue have taken place. Some have recommended the injection of ice-cold water into the umbilical artery, so as to induce the uterus to contract; this, however, may be a more appropriate plan to put into force when the placenta is partially adherent. Irrigation of the uterus has also been recommended. Dolores has proposed that, in cases of simple retained placenta, the uterine cavity should be brushed out with a mop, having a shape something like that used in cleansing a cannon. Such an instrument, however, or even the curette or forceps, is seldom, if ever, required in the above condition of affairs.

Supposing the cervix is, on examination, found to be contracted, how are we to act? If time is of no importance, and if the hæmorrhage is of small quantity, and no other urgent symptoms present, then a slow method of bringing about dilatation may be selected. The two more common means are, plugging the vagina, or introducing one or more laminaria, sponge, or tupelo tents. Before beginning, the bowel and bladder should be emptied, and the vagina irrigated with a warm antiseptic lotion. Then the patient should be placed on her side, and a Sims's speculum introduced. The uterus should be pressed down from above, and a tenaculum hooked into the anterior lip of the os, so as to steady the womb. Then, holding the tent in a speculum forceps, the former is pushed into the cervix. The tents should be kept in position by placing a few pledgets of wool saturated with some glycerine and carbolic acid, or carbolised vaseline, in the vaginal roof and over the os. The tents should also be smeared, or dusted with iodoform. When introducing them the curved state of the cervix should be remembered, and, if necessary, a corresponding curve given. If a vulsellum is used, it is well to remember that too great traction will do harm. Generally the os can be drawn down to near the vaginal entrance. This cervico-vaginal tampon, as it has been termed, may be left in for six or eight hours, the condition of the patient always being noted. Some practitioners do not care to use a sponge tent, because of the dread of septic poisoning. (Driner, of Budapesth, has recently called attention to the more perfect disinfection of uterine tents. Surgeons, not to mention workmen and instrument makers, go into a surgical instrument maker's, and handle, examine, and leave these tents lying on the counter, with the result that they are often the opposite of pure when sold. He thinks the mere soaking of a tent in an antiseptic solution is insufficient. Fritsch's method of coating them with wax, he does not consider perfect. He recommends that they be immersed in a one per cent. solution of corrosive sublimate in absolute alcohol. When required for use, the tent is taken straight from the bottle and inserted into the cervix. The ex-

pansion powers, he says, are not lessened by the use of absolute alcohol, and no bad results follow their use. Some place the laminaria in an aqueous solution of iodine for a time, and dry it previous to insertion.) If, on the removal of the cervico-vaginal tampon, it is found that the cervix is dilated, the placenta will be extracted, either by the finger or forceps—preferably the former. If it be not sufficiently dilated, then the tents may be again introduced, or Barnes' smallest bag used. After extraction, the uterus and vagina should be irrigated. Speaking of irrigating, it is well to avoid using the term, "washing out the uterus." This operation, if it may be so called, requires that all gentleness and care be taken, lest the tissues be lacerated, or other injury done. With the use of Higginson's syringe, and a large "uterine tube," great harm may follow, as the force used by such a syringe is very great. The size of the uterus at this time should be remembered. Various uterine tubes, such as Atthill's and Neugebauer's double-channelled glass tube, have been used, but both are too large. Metal tubes should be avoided, as chemical changes may be set up by the substance used in the solution. One with one opening at the end is not so useful as that with pepper-box openings. Bozeman's tube is recommended by American writers. It is made in three sizes, and the smallest numbered will generally be found to be sufficiently large in cases of abortion where the uterus is small. If there be any difficulty in introducing the tube into the uterus when about to irrigate, it is much better to secure a full view of the parts, so as to render it certain that the cavity is thoroughly cleansed. Sims's duck-bill speculum will be found useful. The gum elastic catheter, with either a single or double channel, may be found useful—a No. 12 is sufficiently large. It is better to be too small than too large, as the reflux of liquid will not be hindered. Again, if a piece of tape be tied round it, about three inches from its end, this will give us a fair idea as to how far it should be passed into the uterus; consequently the danger of making it enter a Fallopian tube, or injecting fluid into one of these, will be prevented. A piece of quarter-inch tubing, five to six feet in length, should be attached at one end to the

catheter, and at the other end to a can containing the fluid. Having allowed the liquid to run so as to drive all the air out, the catheter, smeared with carbolised vaseline, is introduced into the uterus. The finger should be kept close to the os, so as to note if the fluid is returning, while it will allow us to feel that the catheter is not in the vagina only. The force of the stream may be varied by the elevation or lowering of the can by the nurse, or by turning the tap on the tube. The antiseptic generally added to the warm water is carbolic acid, in the proportion of 1 in 50. It has been suggested that when the patient is weak, a saturated solution of boric acid should be used, as it has not the depressing action of the carbolic. The injurious effects of carbolic acid in those suffering from Bright's disease has been pointed out, and for this reason its use in such cases should be avoided. A weak solution of permanganate of potash is used by some, but its disadvantages are that it is not sufficiently accurate in its action to be trusted in all cases, and that by discolouring the water one does not see what is being washed away, unless the irrigating is continued until the returning fluid is no longer discoloured. Of late, corrosive sublimate in solution has been used in the proportion of 1 to 3000 of water. Koch has shown that a solution of 1 part in 15,000 is sufficient to kill micro-organisms, while 1 in 1000 is sufficiently strong to kill the resting spores in a few minutes. Cases of mercurial poisoning having been recorded, prompts us to use weak solutions. If there are any lacerations of the cervix, vagina, or perineum, it had better not be used at all, or if given, only with the greatest caution. Killer has recognised mercury in the urine after the solution has been used, and cases of mercurialism have likewise been recorded. Traces have been also found in the stools when a solution of 1 in 5000 has been used. Tablets composed of two grains of corrosive sublimate with two grains of the chloride of ammonium, are made by chemists. One such added to a pint of water will give a solution of the strength of 1 in 5000. In connection with this part of the subject, it is well to remember Lesser of Berlin has stated, that in thirty cases

of criminal abortion, the vagina was injured in ten; the cervix and adjoining parts of the uterus and the upper parts in ten. (See *Atlas der Gerichtlichen Medicin.*) Some recommend the corrosive solution being used for the first two occasions, and then in

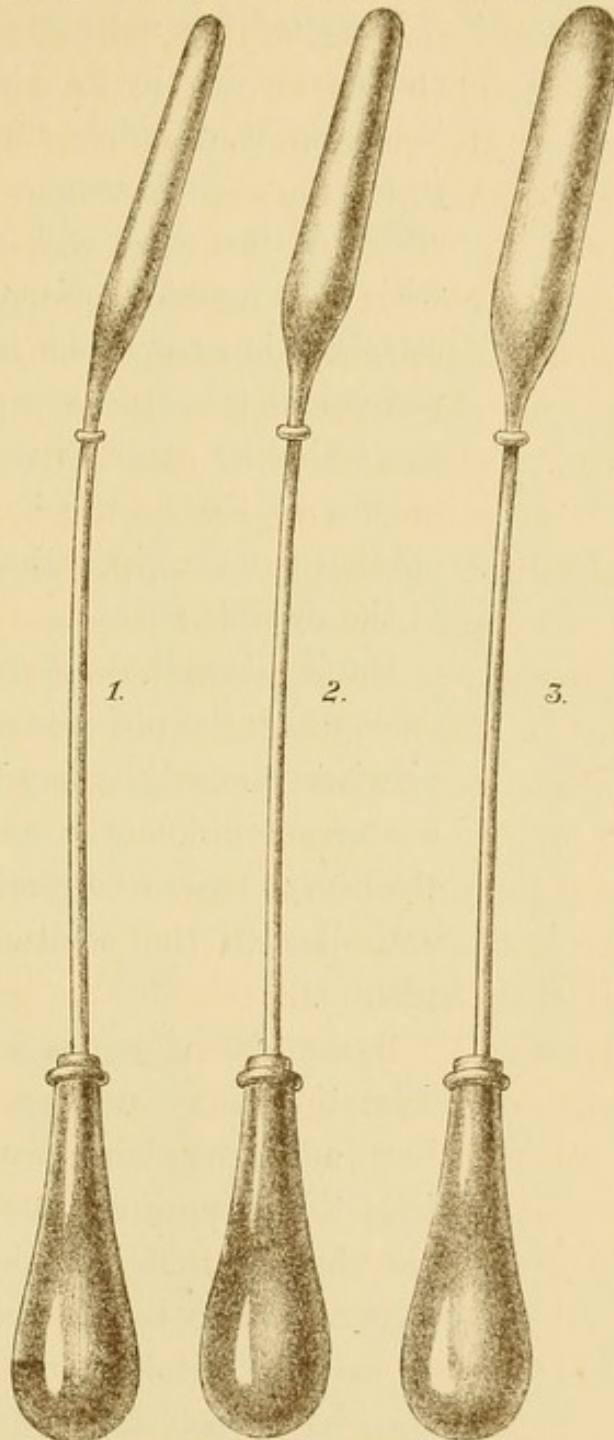


FIG. 31.—Fritch's Dilators.

the succeeding irrigations carbolic acid being employed; a return to the former only to be permitted if the feverish symptoms do not abate, or recur. Dr Boxall has called attention to the chemical incompatibility of antiseptic agents. Irrigation having

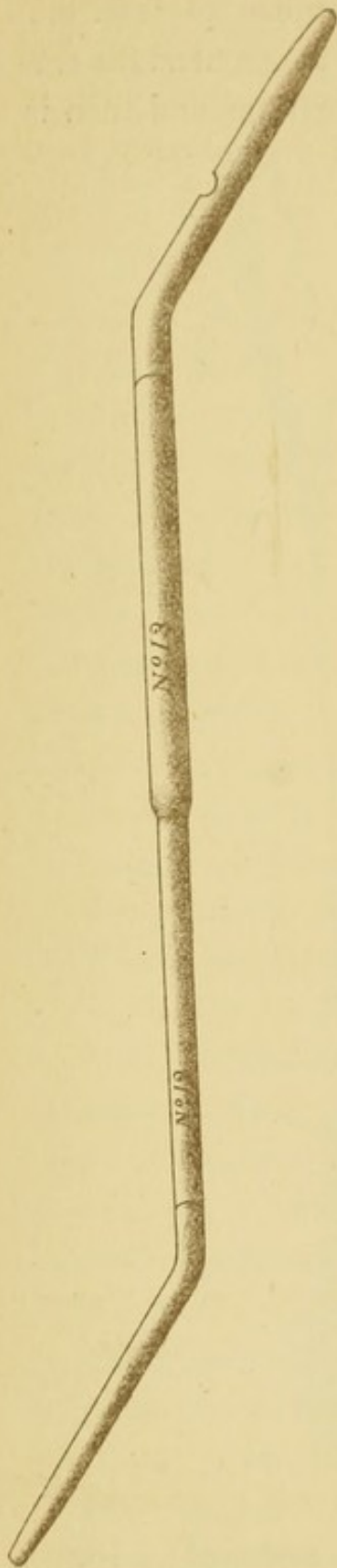


FIG. 32.—Sloan's Dilator.

been properly accomplished, a very marked fall in the patient's temperature may be noticed. In that form of blood poisoning known as sapræmia, the specific material, it is argued, has not the power of growing and developing in the patient's blood, in this respect differing from that causing pyæmia or septicæmia. Therefore the effects of the former will be commensurate with the amount of poison introduced. It certainly is marvellous what a rapid improvement takes place in these cases when the offending cause is removed from the uterus, so that a much more favourable opinion can be given than when a case is of the pyæmic nature.

Having described the treatment of those cases where the placenta may be expressed, or where the cervix may be *slowly* dilated, a reference will now be made to those where the cervix has to be more rapidly dilated, and also to the treatment of adherent placenta.

Symptoms which would render rapid dilatation necessary are, severe hæmorrhage, adherent placenta, and septic poisoning; these requiring immediate removal of the placenta. Besides the use of the index finger, various instruments, such as those of Fritsch, Tait, Hegar, and Sloan (see Fig. 32), have been recommended. Fritsch's dilators (see Fig. 31) consist of a series of graduated stems, dilatation being begun by the smaller size, and gradually increased until the requisite expansion is effected. Schwartz, of Halle, who has

written fully on the subject of abortion, has recommended their use. The disadvantages of Hegar's hard cervical dilators, or the various modifications, are their shortness, and the fact that it is difficult to obtain a firm working grip of them. The use of the finger as a dilator has already been

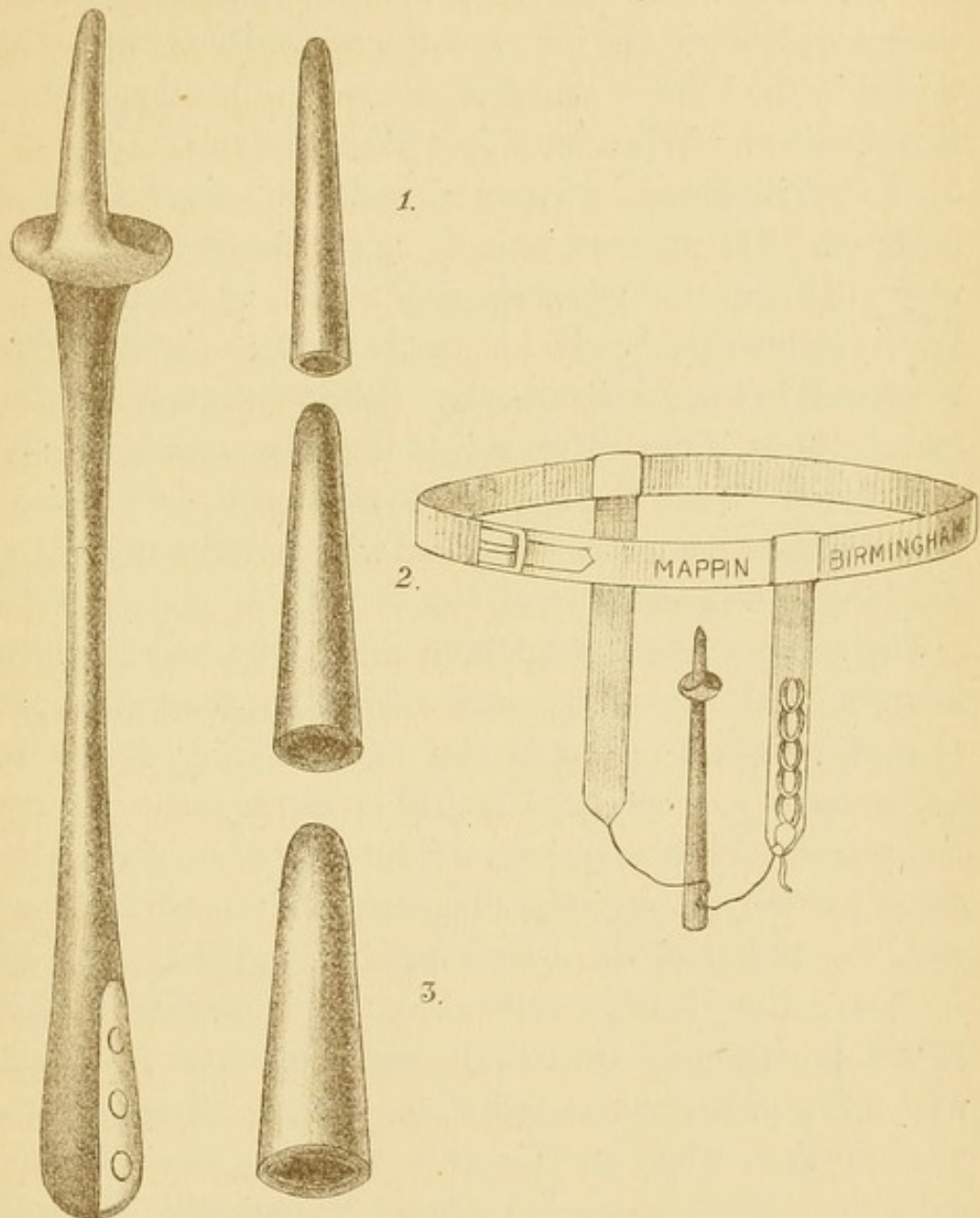


FIG. 33.—Lawson Tait's Dilators.

referred to, but its utility is more prominently brought out where the placenta has to be extracted, or peeled off. Lawson Tait's dilators (see Fig. 33) consist of a stem and four vulcanite cones of different sizes, which can be screwed on the stem. At the base of the stem are three holes, through which the elastic

thread is passed when the dilator is inserted. When using the dilator, the belt is placed round the waist, having one of the hooked straps in front, and the other behind. The elastic thread is passed through all the three holes in the stem, No. 1 dilator is now screwed on to the stem, and is passed up the vagina and into the cervix. Two loops are made on the elastic thread, and these are placed in the hooks on the belt. By manipulating this thread in the holes of the stem, the proper direction of the latter is maintained. When No. 1 has passed into the uterus as far as the collar, it should be removed, and No. 2 screwed on and introduced. The pressure kept up by the elastic thread should be very slight, except when urgency exists, when, if the pain is severe, opium may be given. In the latter case dilatation may be effected in three or four hours. Otherwise it may take twenty-four to thirty hours. Two points are to be attended to:—First, always begin with No. 1 dilator; and second, do not use more pressure than the patient can bear without pain, unless the case can be seen frequently.

The cervix thus having been dilated by one of the above methods, and the uterus and vagina irrigated, the placenta is next removed. How is this to be done? Either by the finger, forceps, or curette. It may be an easy matter to remove the placenta, or it may be very difficult, especially when it is either partially, or entirely, adherent. To remove such an one is a tedious task, and the utmost patience and skill are requisite, an hour's time being often taken up. The great majority of British practitioners trust to the use of the finger. It has been well termed the "gynecological eye." It is always well to remember that, when the placenta has been retained for some days, the uterine tissue is generally chronically inflamed, and therefore may be readily ruptured. If not inflamed, the tissues are soft and swollen, and are easily wounded by rough manipulation, or by using a curette. Thus, perforation may be caused, or further bleeding produced, and fresh surfaces made for the absorption of the products of decomposition. It is also to be remembered that, in a few cases, the placenta may be so closely

adherent to the uterine wall, as to forbid our using strong measures in trying to remove it. Further, that the connection between placenta and uterus is more complete at the fourth and fifth months, than during the first and last months.

When about to remove an adherent placenta, the patient should be given an anæsthetic. She should wear flannel drawers, and stockings, and be well wrapped up in blankets. The bed or couch on which she lies should be dry and comfortable, and the room should be warm (70° F.). It is to be feared that some patients succumb, or contract cellulitis, more because of our carelessness in not attending to the so-called details. If the patient is weak, she may have some hot punch. Ether, on account of its non-depressing action on the heart, is likely to be selected. The uterus is then irrigated. Having been placed on her left side, an assistant makes pressure from above, and presses the uterus down. Then the index finger, oiled with carbolised vaseline, is passed through the cervix, and examines carefully, and in succession, the fundus, and other parts of the interior of the womb. Sometimes there will be no difficulty in detecting the placenta, especially if the cord is present to act as a guide. Its position may also be sometimes made out by the detection of an elevation of one part of the uterus, or by comparing the thickness of the uterine wall by bi-manual touch—one finger being in the uterus. If the edge of the placenta can be found, the process of peeling it off should be begun from this point.

Braxton Hicks gives some valuable advice for the treating of such cases. If the physician, on careful examination, comes to the conclusion that the placenta is adherent, he may have to be content to remove it bit by bit. It may be difficult to find the edge of the placenta when we wish to peel it off. If so, the finger should be made to pierce it at its centre, and to work outwards, until the wall of the womb is reached. From this point the operator will work towards the circumference. He further adds that, when trying to remove an adherent placenta, one should be careful not to remove the hard nodules—the products of effusion between the uterus and serotina—which are occasion-

ally met with. It is better to detach the healthier part, and then to bruise down with the finger all the soft parts between the nodules. If the latter are left behind, they slowly disintegrate, and may be carried away with the discharge. The dangers are great if the nodules are removed, for part of the uterine tissue may be torn, and hæmorrhage follow. In some cases, either the situation of the placental insertion, or a peculiar condition of the lining of the uterus, may be mistaken for a retained placenta. In the first, the tissue *at the placental site* is of a limited extent, and projects into the interior of the uterus. It has also a different feeling to that of the placenta. This outstanding, or projecting placental wound, is, according to Robin, formed by the utero-placental mucous membrane remaining adherent after delivery. In the second above-referred-to condition, Hicks describes a condition of the inner lining of the uterus where this tissue, after the fœtus and membranes have been expelled, is thrown into folds, imitating, in some degree, growths which have a loose attachment to the interior of the uterus. If *the lining* of the uterus became contracted to the same extent as the muscular tissue beneath, then the former would lie smoothly, and even, with the general surface. But it does not normally do so. The membrane may rest so loosely on the muscular layer, that if it be pressed upon by the finger, it is felt to glide on the tissue beneath, so much so, in fact, that it may be mistaken for a placenta, portion of placenta, or thickened membrane. Churchill, in his "Midwifery," p. 232, calls attention to the same condition. "When examined a day or two after delivery, the lining membrane appears loose, and corrugated, and somewhat softened. The part to which the placenta has been attached is raised above the level of the surrounding parts." This loose and puckered condition of the lining membrane may also occur, even when the placenta is retained. When the membranes (amnion) are spread over the inner surface of the uterus, they will present to the finger a sensation somewhat similar to that given by the fœtal surface of the placenta; and, as inflammatory deposits may take place in the amnion, these may give

rise to mistakes in diagnosis, if confounded with other retained products of conception.

The fact that the patient has suffered from a fixed pain in her side, and in the region of the womb, may help one to locate the region of placental adhesion. This pain is not to be confounded with that often felt by mothers in the last half of pregnancy, and fixed higher up, and usually in the right side. It is due to the stretching of the oblique, and transverse abdominal muscles, and is generally relieved by wearing a well-fitting support.

Various forceps have been made for the purpose of extracting the placenta, such as those of Mundé, Tait, Sims, and Thomas. The curette forceps of Emmet are used by some. Fig. 34 gives some idea of their shape. The instrument is about eleven inches long, and is gently curved, to suit the curve of the pelvis and cervix. Each blade is fenestrated and is somewhat sharp. Their advantage, when compared with the curette, is, that when the blades are closed, no more tissue can be grasped than what projects along the

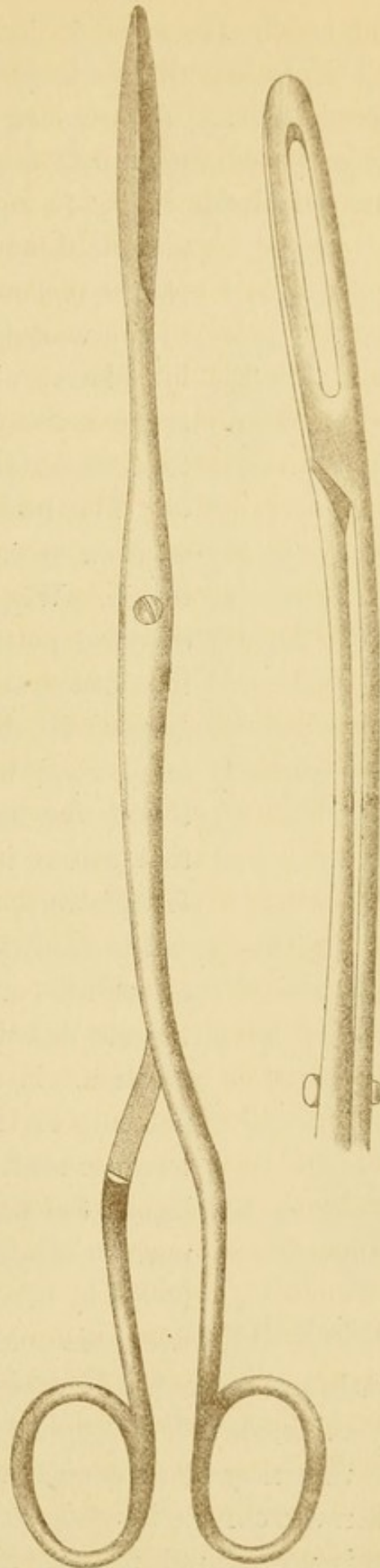


FIG. 34.—Emmet's Curette Forceps.

general level. He says, that when about to use them, the patient is rolled up in blankets, placed on her side, and an anæsthetic given. A speculum should be introduced. If the cervix is dilated, the curette forceps are passed into the uterus. If not, the blades of the forceps, while resting in the cervix,



FIG. 35.—Simon's Spoon.

may be slowly separated so as to bring about sufficient dilatation. If they will not do this, then a well disinfected sponge tent should be introduced. Next, the cervix is drawn down to near the vaginal outlet, by the aid of a tenaculum, hooked into the anterior lip of the os. The forceps are now dipped in a warm solution of carbolic, and then passed up the cervix. When the spot is reached where the elevated portion of the placenta is located, the blades are slowly separated, and, having grasped it, they are now closed. When the forceps are withdrawn, with any contained tissue, they are immersed in the warm solution, and re-introduced as often as requisite. In this way, the portions of tissue removed can be easily identified. After all, or as much as possible, of the placenta has been removed, the uterus is irrigated with a warm antiseptic solution. Next, a free application of iodine is made to the interior of the uterus, so as to cause contraction and cessation of hæmorrhage. Some use the tincture of iodine, either pure or diluted. Churchill's tincture is preferred by others. It is made up of seventy-five grains of iodine, ninety grains of iodide

of potash, and one ounce of alcohol. A piece of cotton, saturated in glycerine, should be applied to the os, so as to collect any iodine that may be expressed or flow from the womb.

When the curette is used, great care must be taken that the uterus is not injured, for not only unhealthy but healthy tissue

may be removed. It is a very dangerous instrument in unskilful hands. A sharp instrument should not be employed. Tarnier has recommended that a loop of silver wire be used, and by this means remove pieces of projecting placenta. The curette of Thomas or Sims is sometimes used. Simon's spoon is recommended where the cervix is dilated only to a small degree. A curette may be made of copper or iron wire by twisting the two ends together and forming a loop above. If the loop portion be flattened out, it will act better. Spiegelberg—in his "Midwifery"—says that after curetting the interior of the uterus, he swabs it out with pure carbolic acid. He further speaks highly of this procedure.

Supposing it is impossible to remove all the placenta, either by the finger, forceps, or curette, or if the patient is too exhausted, operative interference must not be carried too far, else more harm than good will follow. Here stimulants, quinine, and uterine irrigation—three or more times each twenty-four hours, if called for—are necessary, in the hope that as the retained portions disintegrate they will be removed. Dr Wylie has suggested that when the cervix is closed, and where there is not sufficient drainage, a tube may be placed in the uterus. To this as much rubber tubing as will reach to the vulva is attached, and through it irrigation may be carried on. The discharge is to be collected on an antiseptic pad placed over the parts. Some might, however, object to leaving a tube in the uterus, as it may be the means of conveying air, or might be expelled by uterine contraction. In desperate cases, however, any means likely to save life will be gladly welcomed, and practically the treatment of a fetid condition in the uterus must be that of any like condition in other parts of the body.

Supposing hæmorrhage continue after the entire placenta has been removed, what is to be done? Sometimes it is due to retroflexion or version of the uterus, and if so this organ should be replaced, and if necessary kept in its position by pledgets of cotton wool, or by a Hodge's pessary. If it be due to a placenta succenturiata, or to a second foetus, the former should be removed,

and, if necessary, the latter also. It is to be remembered that hæmorrhage may not only be due to a portion of placenta, but to retention of a piece of membrane. When due to malarial fever, as it sometimes is in those who have resided in swampy districts, quinine in large doses should be tried. If due to the presence of a polypus, to partial or complete inversion of the uterus, or to inflammatory ulceration of the cervix, each of these must receive the appropriate treatment. If due to rupture of a thrombus in the cervix, vagina, or vulva, it will be best to enlarge the opening and to plug the cavity with lint, saturated in turpentine or iron. This will be a better plan than plugging the vagina, as the latter method would interfere with the free flow of the lochia, and hinder the cleansing of the vagina. If the perineum is ruptured, all bleeding should be stopped by bringing the parts together with silver wire.

Schröder says that the rare lacerations of the mucous membrane between the clitoris and urethra, especially the vascular cavernous tissue, may give rise to severe hæmorrhage. If the bleeding be due to the presence of clots in the uterus, these should be removed. In some cases the hæmorrhage is not so great in quantity, but persists and goes on trickling until the patient is thoroughly exhausted. If due to a want of muscular contraction, the uterus should be irrigated with water at a temperature of 110° to 118° F. This heat will not inconvenience the patient, except perhaps as it flows back over the vulva. Thirty drops of the liquid extract of ergot, or three to six minims of the hypodermic injection of ergot in B. P., may be given. It is generally thought that this drug should not be used when the nerve power is much depressed and the heart's action feeble. Ergot is but a poor hæmostatic, and not to be much depended upon for controlling bleeding. As has been well said, "the citadel must be carried by some more active means, but when so, it may be held by ergot." In treating hæmorrhage, one must choose between those medicines which act by inducing contraction of the uterus and those used to produce thrombosis of the uterine sinuses. The giving of turpentine in two to four drachm

doses, suspended in mucilage or white of egg, or the placing of pieces of ice in the uterus or vagina, may prove useful. The shock of cold seems to be more beneficial than the continued application of it. A binder with a pad below it should be applied, and the patient's head kept low. If the patient is very weak from loss of blood, half a drachm to a drachm of ether should be given hypodermically, and this may be repeated in thirty minutes if necessary.

If the above means do not arrest the hæmorrhage, the patient should be placed in a good position, so as to allow a minute survey of the parts, and a bivalve speculum introduced. Sometimes a small artery will be found spouting, or perhaps a vein torn. Emmet says that when a loss of blood continues after a miscarriage or birth at term, and the uterus has sufficiently contracted to prevent *post partum* hæmorrhage proper, the flow may be considered as due to a portion of retained placenta, or to a lacerated cervix. With the first condition, the external hæmorrhage is not continuous, but becomes more marked when the uterus contracts and expels a clot. When the bleeding from the vagina is continuous, and if there has not been any laceration externally, the probabilities are greater that the cervix has been deeply lacerated so as to involve the circular artery. In the latter case he recommends that the patient should be well wrapped in blankets and placed on a table, and that the laceration should be closed by introducing several interrupted sutures, so as to bring the two surfaces well together. This will not only arrest the bleeding and liability to absorption by the wounded surface, but may prevent future ill health. (In connection with wounds of these parts, it is well to remember the figures of Lesser, already quoted.)

Supposing the above method of treatment is not appropriate, and if the hæmorrhage continue, then the interior of the uterus should be swabbed out—while the patient is on the table—either with a solution of tincture of iodine (1 in 5), or with Churchill's tincture. A Sims's speculum is passed, and a tenaculum draws down and steadies the uterus. A Playfair's probe,

armed with cotton wool, and dipped in the iodine, is passed into the uterus, and this repeated as often as necessary. A solution of the perchloride of iron, 1 in 10, is sometimes used, and may be applied on a sponge, or slowly injected. But it is much better to use the former, as iron is not so safe an injection as iodine. Not more than a few drops of iron solution should at first be used, and its effects closely watched, as there is always the danger that the clotting of blood in the uterine sinuses may extend into the neighbouring veins. By employing Guyon's instrument, as used for applying solutions to the prostatic portion of the urethra, the amount injected, and the location of the fluid in the uterus, might be accurately known. When the hæmorrhage is severe, and the patient cannot afford to lose any more blood, it has been recommended that not only the cervix but the interior of the uterus itself should be tamponed with iodoform wool (Vulliet). Betz advises the local application of chloroform on a sponge to the interior of the uterus. Chéron says it acts more powerfully on the uterine walls, and more energetically than vinegar. Vinegar applied to the interior of the uterus has also been strongly recommended. Leroux used this remedy in 1776. Ingleby says Cruikshank used a sponge dipped in lemon juice or vinegar; Dr Grigg gave a wine-glassful by mistake to a patient, and the bleeding soon ceased. Plugging the vagina or uterus with bags was advised by Rouget in 1810. Tarnier and Bailly have suggested the use of water baths at a temperature of 30° C. for twenty to thirty minutes for secondary hæmorrhage. No doubt a hot-water bath will greatly help to deflect the blood stream from the uterus.

The use of electricity has been put into force, not only for the purpose of controlling uterine hæmorrhage, but also for causing the absorption and disappearance of retained portions of placenta. The constant or galvanic current is preferred. One pole is placed over the lumbar spine, while the other one—properly insulated—is passed up the cervical canal, and to that part of the uterus where the placental remains are supposed to be situated. The strength of the current used may vary from fifty to eighty mil-

liampères, and a sitting last for five to ten minutes. Generally speaking, it is found that it is the smallest dose compatible with utility which acts most beneficially. The application generally stops any hæmorrhage, and may, by causing the uterus to contract, bring about expulsion. But, by introducing the anode into the uterus, coagulation is produced, which may be followed by absorption. Fry (U.S.A.) thinks that the positive pole is anti-septic, as this pole liberates oxygen. It is known that if we expose a piece of animal tissue to the action of the galvanic current, the water in it is decomposed, oxygen being set free at the anode, and hydrogen at the kathode. The contained salts split into acids at the anode, and into alkalies at the kathode. The acids, along with the nascent oxygen, oxidise the tissues, while the alkalies exert a caustic action. If a strong current is used, eschars will be formed (De Watteville).

Autotransfusion, by means of elastic bandages applied to the legs and arms, so as to drive the blood to the heart, and localize its distribution, as well as faradisation of the uterus, have been tried; while compression of the abdominal aorta, either through the abdominal wall or by the rectum, have been recommended. Lately, Von Ziemssen has advised the hypodermic injection of defibrinated blood. He injects 25 cc., about seven drachms, into the cellular tissue of each thigh, and the swelling caused is slowly rubbed so as to disperse the blood. The intra-peritoneal injection of the same material has also been recommended. Should the patient be very exhausted, half a drachm of ether may be administered hypodermically, and finally transfusion, either of blood, saline solution, or fresh milk should be tried. Perhaps in the near future the insufflation of powders into the uterine cavity, such as tannin or alum, may be tried for the treatment of hæmorrhage. The introduction of bags into the uterus, and their inflation with either air or ice-cold water, has been recommended.

AFTER TREATMENT OF ABORTION.—Having, in either complete or incomplete abortion, emptied the uterus of its contents, the patient should be placed in a comfortable bed, and with a hot-

water bottle at her feet. If the thermometer, or discharge indicate, the uterus and vagina should be irrigated daily. The addition of glycerine, one ounce to the pint of carbolised water, renders the injection less irritating. A solution made of one ounce of carbolic acid with seven ounces of glycerine may be used for purposes of irrigating the vagina and vulva, half-an-ounce of the above being added to a pint of warm water. The vulva should be gently sponged morning and evening with it, while the diaper may be well sprinkled before being applied. Some introduce one of Ehrendorfer's iodoform bougies into the uterus daily, after using the douche. If iodoform is used in solution, it may be washed out, and if introduced by insufflation, air may enter. He therefore gives a suppository. Each contains ninety grains of pure iodoform, and he has never seen any bad results from its use, although as much as 150 grains have been given. The formula is—Iodoform pulv. 20·0; gummi arabic, glycerine, amyli. pulv. ā ā 20; Ft. Suppos. No. 3 longit. 5·6. Of late some derogatory remarks regarding iodoform have been made. Bouma, of Leyden, is of opinion that poisonous effects are due to impurities. It should always be kept free from air, and from light. (H. Agema's test for pure iodoform is, shake up the iodoform with distilled water, filter, add an alcoholic solution of nitrate of silver to the filtrate, and allow it to stand for twenty-four hours. A slight grey deposit is usually found at the bottom of the test tube, but if the precipitate is black, reduced silver, it is not pure.)

Prolonged rest in bed must be insisted on, no matter whether the patient or her friends wish it. It is a very difficult matter to get those who do not wish it to be known that they have aborted, to take the requisite rest. The patient should remain in bed for at least fourteen days. Indeed, it might be well if she remained quiet until the next menstrual period. If it be remembered that an abortion is generally the result of some diseased organ wanting rest, it will be difficult to err on the side of prudence. Involution is more rapid in those delivered at term than in those who have brought forth prematurely. Fritsch

has pointed out, that after early abortions, the uterine mucosa or the decidua may remain in the uterus, as it does during menstruation, and may consequently lead to faulty involution and hypertrophy of the mucous membrane. The natural stimulus of nursing being absent, involution is not encouraged. Tilt says, involution is so often defective after abortion because women get about too soon, and too soon resume marital intercourse. The want of some definite understanding respecting the rules to be adopted after abortion, renders it a fertile source of disease. Much of this would be prevented if we could persuade the public that a month's treatment is not too much for an ordinary abortion, at the third or fourth month, and that a bad miscarriage is worse than a confinement. It is a well-known fact that after early abortions, and more especially if the foetus is expelled in a dead state, the lochial discharge lasts for a few days only, and is small in quantity. At term it is generally about three-quarters of a pound in weight, and the various tinges of lochia rubra, l. serosa and l. alba, as described by Gassner, are observed. This is not so after abortion. Some nurses do not give much care to the napkins, unless their sense of smell is offended. The physician had better see these each day, when they can be inspected in the bath room. Generally the discharge lasts from a few days to two weeks, gradually becoming thinner, less blood-stained and more mucus like. If the patient is excited or undergo any exertion, the discharge may at once become bright red again. The womb will tolerate disturbances as badly as will a half-healed wound; both will begin to bleed if they receive unnecessary handling before they have completely recovered.

If there is retention of urine—and this is likely to occur if there has been instrumental delivery—the catheter should be used. In passing it, care should be taken that no lochial discharge be carried into the bladder, and for this reason the nurse should be told to wash the vulva previous to our drawing off the urine. The catheter—a No. 8 gum elastic will do—should be smeared in carbolised vaseline, or carbolic oil, 1 in 10. If, when in the bladder, the urine does not flow, gentle pressure should be

made over the pubes. To the end of the catheter a piece of indiarubber tubing, about four feet long, with a stop-cock, is attached. To introduce it, the patient should lie on her back, near the edge of the bed, and the lower pins of the binder removed. Then, standing at the right side of the patient, she is requested to draw up her right leg. The index finger of the right hand, previously oiled, is passed over the thigh, and introduced into the lower part of the vagina. If the finger feel along the anterior and lower part of the vaginal wall, the somewhat hard and cord-like urethra will be detected. Next, the left hand, carrying the catheter, is passed *over* the thigh and down towards the other finger. In doing so, if the catheter slip past the urethral orifice, it will impinge on the finger in the vagina, when it may be partly withdrawn and another effort made. When in place, the tubing is brought out under the leg, the tap turned, and the urine allowed to escape into a receptacle on the floor. Such a mode of procedure does not disturb the patient, and is superior to the indelicate plan of uncovering her, and with the aid of a candle, making a search for the urethral orifice, then passing in the short female catheter. Instances are recorded when the lining of the bladder is sucked in through the eye of the catheter, and where it has either given great pain, or is difficult to remove. A little water injected along the catheter will drive the membrane back. An instrument with the pepper-box holes would be better. Practice on a cadaver will teach most how to pass a catheter—a little operation over which there is sometimes much bungling.

After pains, if present, may be relieved by making gentle pressure over the womb, so as to expel any clots. They are sometimes neuralgic in their nature, and, for such, Fordyce Barker strongly recommends a few doses of quinine—five grains morning and evening—and also the local application over the uterus of a piece of lint, saturated in chloroform liniment. For the ordinary pains, fifteen drops of the liquor opii sedativus may be given, or a few doses of bromide of potash, with camphor water. It is always well to inquire into the condition of the

bladder and bowel. Enemata, containing thirty to sixty drops of turpentine, are very useful in relieving tympanitis. The bowels should be relieved by the second day, a dose of castor oil, either in capsules, or mixed with beef tea, being given. Lately, I have tried the effects of Richardson's solidified glycerine suppositories. One is introduced into the rectum when we wish the bowel to act. Their use is generally followed by satisfactory results. They do away with the exposure of a patient by a nurse, when giving an enema, and so prevent chills.

The breasts, as a rule, do not give any trouble. If they, however, secrete milk, they should be kept quiet, either by the patient wearing a close-fitting singlet, or jersey, or by suspending them in silk handkerchiefs. But, in all these cases, the breasts should be well protected, so that chills may be avoided. If it were remembered that, practically, these glands are as active as those of the skin, we should hear and see less of abscess of the breasts. Who would expose a man with a perspiring skin to the effects of a cold atmosphere? This perspiring condition—if the expression be allowed—of the secreting breasts should be noted and acted upon. If this rest do not allow the breasts to cease their activity, then they should be painted over with equal parts of extract of belladonna and glycerine. The smell of the belladonna is disagreeable, and may be hidden by rose, or lavender. A thick fold of flannel should be worn, so as to protect the patient's clothes. When the breasts are full, and very tender, some recommend that they be gently rubbed, two or three times a day, with a saturated solution of camphor in glycerine. The direction of the rubbing should be from the circumference of the gland towards the nipple, and, if milk do not flow in five minutes, it may be taken for granted that the quantity present is not excessive. As little liquid should be drunk as possible, and a mixture of iodide of potash, and tincture of belladonna, with syrup of orange and water, be given. A dose of Epsom salts, in a tumblerful of lemonade, will afford a liquid motion. It may be here mentioned that the oleate of atropine has been recommended where there is a flow of watery milk, and that, when

this state exists, it is well to see that the uterus and ovaries are not in a morbid condition, and so be the cause of galactorrhœa.

If symptoms of septicæmia set in, a minute examination must be made for the cause (see Complications). The uterus must be irrigated with an antiseptic solution, and this repeated. If it do not reduce the temperature, it should not, after having a fair trial, be persevered with, as the cause may be outside the uterus. Quinine, in 15 grain doses, should be given, and, if it fail, the salicylate of soda should be tried—10-15 grain doses every two hours—its effects being watched. Digitalis, with ammonia, is a most useful mixture when the system requires sustaining treatment. A retroflexion may cause retention of the lochia. Septicæmia, it should be observed, may set in before any offensive smell in the discharge has been noticed; indeed, the poison must be slowly finding its way into the general circulation for some time before the rigor, or high temperature, announces the fact. As Dr Brown, in his work on "Animal Alkaloids," says, "the generation of fetid effluvia, it ought to be remembered, is but a secondary factor in the process of bacterial putrefaction. If its presence is characteristic of putridity, putridity may still be active in its absence, bacterides and poisonous alkaloids included." In other cases, the dose of sepsine is so great as to completely swamp the patient, she being in a comatose condition from the first. Malarial fever must not be confounded with septicæmia, though the two, it is thought, may exist together. Husband and wife should be strictly enjoined not to have sexual intercourse for some six to eight weeks. Churchill and others have noted that this was a cause of secondary hæmorrhage. Indeed, if the Mosaic Law, which, by all practical men, is considered to be the best, were carried out, no ill results would follow. There it is strictly laid down that the woman who bears a child is unclean for at least forty days; the term "unclean" being generally meant to express the fact that the woman may not touch her husband, but that she may look after her infant, and carry out her usual domestic duties.

TREATMENT OF HABITUAL, OR RECURRING ABORTION.—The discussion of this part might, perhaps, be taken with that of prevention, or prophylaxis. But it should be remembered that, in habitual abortion, *the habit* did not begin the series. The treatment will depend upon the cause. It is frequently due to syphilis, disease of the kidneys, heart, liver, or lungs, to endometritis, congestion, and other diseases of the placenta, or to displacement of the uterus. Each abortion taking place makes the succeeding conception more likely to follow in the footsteps of its predecessor; in other words, there is a growing tendency, if not checked, on the part of the system to rid itself of the contents of the uterus, and, therefore, all our efforts should be made to break this habit. A good plan is to send either the husband or wife for a holiday of six or eight months' duration. This should allow sexual rest, while, at the same time, general and local treatment can be carried on. The patient should be made to understand that it will take some considerable time to bring her case to a successful issue. Young relates the history of one who aborted thirteen times in succession, and, on the fourteenth occasion, bore a child at full term. It will, I suppose, be granted that a woman may abort thirteen times each year, or at each menstrual period.

Tait speaks of the chloride of potash as "an absolute specific against habitual miscarriage, in a very large number of cases." Simpson also highly recommended it, especially when the placenta is diseased, and because it contains so much oxygen. Does this drug increase the quantity of oxygen in the maternal blood, as has been suggested, and does it prevent the formation of coagula and fibrinous deposits in the placenta? Mundé refers to two cases of habitual abortion, in which he continued to give chloride of potash and tincture of iron for nine months. It should be given four times each day after food, and in doses of from ten to twenty grains. This, accompanied by rest in bed, was followed by the birth of healthy children at term. A pill, composed of sulphate of iron, carbonate of potash, and glycerine of tragacanth—a sufficiency—is very useful in anæmia. The

tincture of iron, kept for two years or so, as suggested by Emmet, is very valuable. If combined with equal parts of spirit of nitrous ether, it will generally agree with the most delicate stomach. Certainly, some ethereal preparation is the best. A mixture, containing the sulphate of iron, quinine, and magnesia, with hydrobromic acid, is found to be serviceable, or a few drops of tincture of iron, with syrup of lemon, taken in half-a-tumblerful of simple aerated water, is a pleasant mode of administering.

The viburnum prunifolium, either in the form of a pill containing 4 grs. of the extract, or 1 drachm of the liquid extract, is highly spoken of. On one of the American plantations it is a popular belief that a woman cannot abort if she is under the influence of this black haw, although she may at the time be taking other drugs with a criminal intent. Dr E. J. Jenks, U.S.A., recommends that it be given for two days before, during, and two days after the time corresponding to the menstrual period. Large doses of asafœtida have been recommended in this condition.

When specific treatment is required, both the husband and wife should take a prolonged course of mercurial treatment; the husband should be entreated to forego sexual intercourse for some months. The treatment of the wife has already been described when speaking of the maternal causes of abortion.

If abortion happen to those who are plethoric, the diet should be light and non-stimulating. The bowels should be made to act regularly. Late hours and the other modes of spending a fashionable life should be avoided; while exercise should be methodical, and not carried to the point of fatigue. Rest in bed, or if not, on the sofa in the bedroom, should be strictly enjoined for three to four days before, during, and after the times corresponding to the menstrual period. Prolonged rest on the sofa for the first four to six months has been recommended. Slight bleeding from the arm has been advised. Burns, in his work on "Abortion," refers to the case of a woman who, in the space of nineteen years, was bled no less than 1020 times "without material injury!" Leeches, dry cups, and counter irritants

have also been tried. A course of baths at Aix-les-Bains or Kissingen may do good. Horseback exercise has been recommended by Boerhaave and others. Priestley records the case of

lady who aborted several times though she had taken prolonged rest. Disgusted with the results, she took to horse exercise, and was soon afterwards delivered of a healthy child.

When no maternal cause can be found, then attention should be given to the husband, albumen and sugar being looked for, and his seminal fluid closely examined.

It will be well to remember that there are some women to whom the physician should not explain the cause of their aborting; for just as some prefer to carry their uterine trouble so as to prevent conception, there are others who will refuse to have the cause removed which to them procures their aborting.

Reference has already been made to the administration of chlorate of potash, owing to its supposed power of supplying an increased quantity of oxygen. If this theory is correct, and if good results follow its use, then it may readily be supposed that the prescribing of oxygen would be very useful in those cases where a previous experience has shown that the lung of the fœtus—the placenta—has its working space encroached upon, as in hæmorrhage, fatty degeneration, and syphilis of that organ. Oxygen may be given either by inhalation or by drinking water charged with it. The gas is stored in steel cylinders, with the inhalation apparatus attached. It is supplied by the Brin Oxygen Company, London, S.W.

TREATMENT OF MISSED ABORTION.—Generally these cases do not call for any interference; if, however, the health of the patient suffer, a labour should be induced by the means immediately to be described. If the fœtus mummifies little or no harm will result, and therefore it may be left alone. If it putrefies it must be removed, for in such an occurrence the health will suffer. Shiverings, rise of evening temperature, loss of blood, foul discharge from the vagina, or other symptoms of blood-poisoning may show themselves. Generally the introduc-

tion of a gum elastic bougie into the uterus will stimulate contraction. If it do not, then tents may be used, and the fœtus and membranes removed, every effort being made to keep the parts as antiseptic as possible.

THE INDUCTION OF ABORTION—ARTIFICIAL OR JUSTIFIABLE ABORTION.—By this is meant the induction of labour at a time when the fœtus, if delivered, is not able to carry on an independent existence of the mother, and its one object is to save the life of the mother. This last remark, therefore, is the definition of justifiable abortion—the fact that the mother's life is in urgent danger, and that this operation may save her life. It must, however, always be remembered that the operation is not free from danger, and this is particularly true when it is recollected that the person operated upon is an invalid with diseased organs. The law relating to criminal abortion has been referred to under that heading, and also the excellent advice given by Tidy, that before one performs the operation a second medical opinion should be had, and also that the consent of both husband and wife should be obtained, if possible, in writing.

The induction of abortion is an operation justified by scientific observation. One section of the Christian Church still opposes it, as also the operation of craniotomy, holding that if any one is to suffer it is the mother. This dogma is in reality more conservative than the operation itself, for it recognises the fact that disease is preventible, and that it is better to go back to the origin. It will further act as a stimulus to the thoughtful practitioner, so that he will endeavour by some means to do away with those conditions, which, for their treatment, may require either the induction of premature labour, of abortion, or of craniotomy. Perhaps the clergy of the Roman Catholic Church would not object so strongly, if we could prove to their satisfaction, that the baptism of the child in the uterus is a possibility. An American physician has, I believe, invented a syringe with a long nozzle, so that the water of baptism may be conveyed to the womb. If the membranes be considered a part of the child, then these need not be ruptured so as to permit access to it.

But if not, then the induction of abortion must be begun before baptism. *The induction of abortion* is just now a justifiable operation, although it has had to pass through a long period of discussion. This perhaps may have been due to the fact that it has been, and is, greatly abused, and also because the early Christian writers so severely condemned it. The operation is done with the aim of saving the life of one, and if it be not performed then both will lose their lives. Radford considers the evil effects of abortion so great that he thought an enactment necessary "entirely prohibiting obstetric abortion before the period of vitality, as the door for evil purposes is already too open, and would be still more so if it were legally decided that where performed on supposed obstetric grounds no inquiry should be made." As events are at present, it would be a magnificent tribute to the honesty of purpose of the medical profession if a number of our senior and well known men met together and drew up an *obstetric code*, so that even the youngest of us should have the power of knowing how to act. It would then be understood that we not only believe in the highest calling of our professional being—the *saving of human life*—but were determined to strengthen the moral feeling of our nation, so that a being "should not be put to death under the very hands and in the shop of nature." In the near future perhaps the Cæsarean Section will allow physicians to stay other modes of procedure, so that the child may be retained *in utero* until it is viable, *i. e.*, to the seventh month, more especially in cases of pelvic deformity and tumours. The operation known as "amputation of the pregnant uterus," and described by Tait in the *British Medical Journal* of Nov. 1888, may in the near future take the place of the induction of abortion in some cases, as for instance where there is great pelvic deformity, uterine tumours, or fixed growths in the pelvis. Such an operation would not only allow us to bring forth a living child, but the mother would for ever after be unable to conceive. This operation would take the place of Cæsarean section, or its modification by Säger. "Sacrificial midwifery," as seen in embryotomy, and the induction of abor-

tion, would be moreover lessened to the farthest limit; while one more step would be taken to reach the great wish of Tyler Smith, when he hoped the time would come when craniotomy would be an affair of the past.

Abortion having been brought about in one whose health will certainly suffer to a severe or fatal extent if she again become pregnant, the question may be asked, Are medical men right in explaining to husbands and wives that there are some supposed means of checking conception, which, at the same time, will allow them to gratify their sexual desires? This is at first sight apparently a difficult question to answer. But now that the very heart and core of society threatens to be poisoned by unscrupulous persons, who fill their purses by the degradation of humanity, it should be answered. Sir J. Simpson said, "If a woman with a deformed pelvis would go on putting herself in the way of becoming pregnant, she ought to be made to take the risks of the Cæsarean operation rather than be encouraged in her course by sacrificing the life of her child." Churchill also lays it down—"My own opinion is that such a course (the repetition of abortion) ought not to be adopted, but that pregnancy should be allowed to proceed without interruption to the full period, and when labour declares itself that the infant should invariably be extracted by the Cæsarean section." On the other hand, Naegele and others held that it was right to destroy the fœtus when the mother refused to undergo the Cæsarean operation. The question, Who should marry? requires much more careful study and more public discussion than it now receives. No doubt parents should see that before marriage their daughters are thoroughly fit to carry out one of the chief aims for which they are made—the bearing and nurturing of healthy children. We know well enough by this time that if a woman suffering from mitral stenosis, fatty or dilated heart, Bright's disease, aneurism, contracted pelvis, fibroids, diabetes, or lead poisoning, marry and become pregnant, not only is she likely to abort, but she may also lose her own life. We all exclaim, "No one with syphilis should marry," but why stop short here? Why should, in fact,

any of the above cases marry unless cured? There is a common opinion that if a man, given to constant drinking of alcohol, fecundate his wife, the product of this union is likely to be an epileptic. And why—if these rules of health be brought to bear upon womankind—should they not be equally applicable to men? If his wife and child suffer, these are the cases which, in our mock heroics, are hypocritically termed the “cruel laws and workings of nature.” As if Nature had anything to do with the condition! But if this question is taken a step further and it is asked, Suppose a woman during her married life suffer from such a disease as acute parenchymatous nephritis of pregnancy, and does not recover, how are we to advise her? All will agree in saying that the best thing for her is that she bear no more children for some years. The sufferer will—as far as she herself is concerned—have little or no desire for sexual intercourse, and if left to her own line of action would trouble neither the physician nor her friends with inquiries as to how conception should be prevented. She will only submit because of her love for her husband, or from motives of duty.

We must then, if our morality is based on the teachings of the Sacred Writings, come to the conclusion that unnatural means for preventing conception are radically wrong, and that the law which states that the evils of the parent must be visited on our innocent and guiltless children—a course of events which many object to, but which few try to hinder—is right. In Genesis (Chap. xxxviii. 8) the practising of an artificial check is distinctly referred to—“And Judah said unto Onan, Go in unto thy brother’s wife, and perform the duty of a husband’s brother to her, and raise up seed to thy brother. And Onan knew that the seed should not be his; and it came to pass when he went in unto his brother’s wife, that he spilled it on the ground lest that he should give seed to his brother. *And the thing which he did displeased the Lord: wherefore he slew him also.*” The question therefore is not only one of sentiment, but one of religion and morality. If we advocate certain check measures for these complaints, shall it not also be used in cases of insanity and epilepsy,

or even where there is only a history of insanity? In the latter case, it is necessary that a knowledge of the action must be had before marriage. Who then will preach the doctrine referred to, and to what a point will such teaching lead the non-medical public! There are no means whatever of *artificially* preventing pregnancy, whether by impure intercourse or otherwise, that are not positively injurious to one or both of the parties concerned, either physically or morally considered.

The same sound advice being given the wife, it follows that it applies also to the husband when he is suffering from disease such as diabetes or syphilis. It is now well known that if he suffer from diabetes he may beget one or two children, more especially if his complaint is yet in an early stage, and if his wife is sufficiently strong to nourish a poorly fecundated ovule, but eventually abortions will follow. To such men we have no hesitation in advising them not to marry until the result of treatment is noted, just in the same way as similar advice would be given one who suffers from severe heart disease or aneurism. To advise a woman not to use unnatural means, but to do the reverse with men, is as unlogical as untenable. It may be that the parties chiefly interested will settle the question for themselves, and will only refer to the physician if they wish to test his moral tone—much in the same way as they offer alcohol in order to see if one mixes up work and drink!

The induction of abortion has been proposed—

1. In cases of marked contraction of the bony pelvis—when the narrowing is under two inches.
2. In obstinate vomiting when all other treatment has failed, when the patient is emaciated and shows signs of irritative fever.
3. In some cases of hæmorrhage, as that due to placenta prævia.
4. In some cases of heart disease, when the circulation and respiration are prominently affected.
5. In some cases of hydramnios and cystic chorion.
6. In cases of complete retroflexion of the uterus—other treatment having failed.

7. In some cases of "missed abortion," when septic symptoms have set in.
8. In a few cases of Bright's disease, where there is extensive anasarca; when the urine, on the addition of nitric acid and boiling, is almost solid; and when the symptoms, being of a grave character, do not yield to hot baths, diuretics, and purgatives, and when the condition of the patient, if not relieved, must end in death. Pajot and a few others hold that abortion should never be brought on in such cases.
9. In some zymotic fevers, and in some inflammatory maternal disorders.
10. In some cases of acute chorea, and in goitre, where asphyxia is threatened.

Operation.—This may be done slowly or quickly according to circumstances. Before proceeding, the bowel and bladder should be emptied and the vagina irrigated. The patient is placed in bed and on her left side. A thoroughly disinfected No. 10 gum elastic bougie is then passed through the cervix, and allowed to slowly find its way up to the fundus of the uterus. It should pass between the membranes and the uterine wall, and care should be taken not to rupture the membranes. If it meet with the edge of the placenta, it will most probably glide by this and not detach it. About three to four inches of bougie are passed into the uterus, the remainder being coiled up in the fundus of the vagina, and the whole left in until delivery is completed. This little operation should be done at bed-time, the bougie being left in during the night. By next morning some uterine action will be kindled, and the cervix will have softened and dilated a little. When the cervix is fairly dilated the membranes should be ruptured, a binder applied, and the case conducted to a finish.

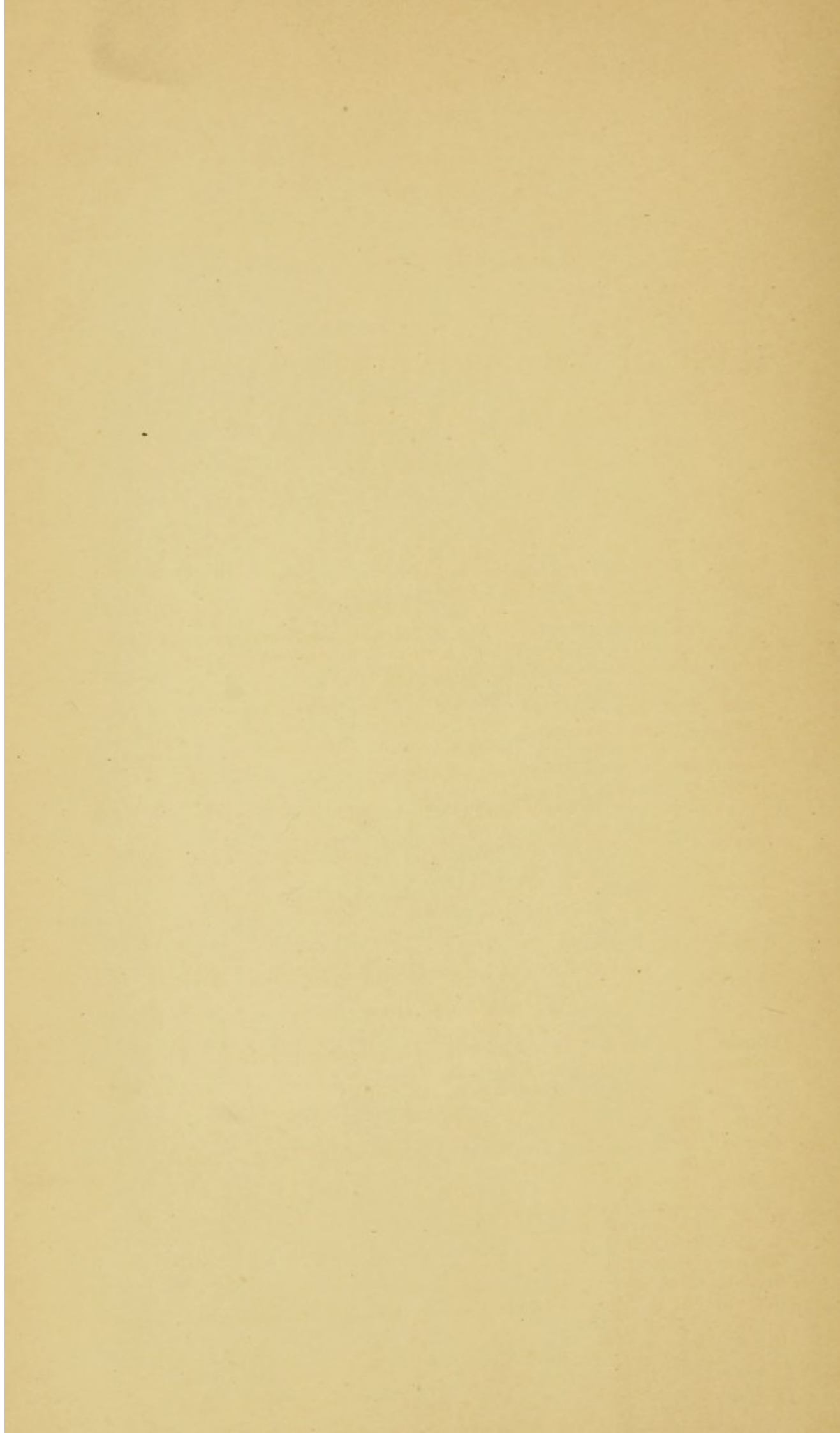
If time is of importance, either tents may be introduced, or Fritsch's or Tait's dilators used. This can be followed up by the use of the finger, or by one of Barnes' bags. Generally an anæsthetic is required, as the pain of rapid dilatation is severe.

Other means are, puncturing the membranes either opposite the os, or by introducing the sound high up towards the fundus, passing it between the membranes and uterine wall, and then rupturing the former. The latter plan is considered to be the best, though the former is the quicker of the two. The time which elapses from the introduction of abortion to its termination varies. Orfila says that in thirty-four cases the minimum was thirteen and a half hours and the maximum six days. In thirty-six cases reported by Tardieu, the minimum was five hours and the maximum eleven days before expulsion of the foetus took place.

Lately, Walker, in the *American Journal of Obstetrics*, vol. 12, described two cases where he induced abortion. In one the patient was suffering from chronic albuminuria. The faradic current was used; one olive-pointed electrode was passed into the os externum, while the other was placed over the fundus externally. The full force of the coil, with four Leclanché cells, was used every third day for half an hour at each sitting. Six sittings were required before the signs of pregnancy ceased, and one week elapsed after this when an easy and safe abortion followed. In the second case, the electrodes were placed as in the first case, but a constant current of fifty milliamperes was used. This was administered on two occasions, when signs of pregnancy ceased. Abortion followed four days later. The current was given in slow, interrupted shocks, and the negative pole placed in the cervix.

Storer has called attention to the ebb and flow in the uterus. If a sound is passed during the ebb no uterine action may follow. But if action is taken at a time corresponding to the flow, more satisfactory results will be obtained.

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INDEX OF AUTHORS.

	PAGE		PAGE
Ætius,	9	Bourgeois	45
Agema,	242	Boxall,	229
Ahlfeld,	84	Bozeman,	227
Albrecht,	46	Braun,	28, 58, 128, 160
Andral,	68	Breslau,	54
Aretæus,	1, 199	Brown,	246
Aristotle,	8, 147, 159, 203	Brown-Séguard	54, 55, 65
Atthill,	210, 227	Brunton	184
Aubanis,	45, 200	Bryer,	81
Aveling,	75	Budin,	172, 220
Avicenna,	9	Burdach,	72
Baillly,	240	Burns,	66, 72, 151, 159, 248
Baker,	55, 56, 199	Busch,	2, 5
Barbour,	171, 181	Bustamente,	100
Bardinet,	60	Callender,	140
Bärensprung,	126	Casper,	56
Barker,	223, 244	Cazeaux,	6, 132
Barnes, 19, 29, 37, 38, 39, 42, 55, 58, 59, 62, 63, 66, 68, 69, 74, 75, 85, 88, 90, 91, 92, 93, 95, 99, 125, 129, 130, 145, 154, 180, 189, 190, 192, 198, 199, 205, 211, 212, 227, 255.		Cazin,	64
Barratte,	42	Celsus,	9
Bastian,	196	Cettani,	81
Baudelocque,	70, 114	Chadwick,	129
Baumeister,	146	Chamberland,	80
Beatty,	5	Champneys,	91
Beclard,	108	Charpentier,	43, 59, 100, 201
Behm,	80	Chatelain,	67
Bemiss,	46	Chéron,	240
Benicke,	82	Churchill, 5, 60, 156, 200, 234, 236, 246, 252.	
Bennet,	30	Cohnstein,	73, 74, 154
Bergeon,	55	Colles,	46
Berks,	179	Collins,	5
Bernutz,	41, 179	Cooke,	36
Betz,	240	Coste	98
Birch-Hirschfeld,	122	Credé,	224
Bland,	5	Croft,	65
Bode,	115	Cruveilhier	87, 100
Boerhaave,	5	De Watteville,	241
Boivin,	108	Dareste,	114
Bollinger,	80	Darwin,	124, 145
Bomher,	29	Delamotte,	121
Bonfils,	45	Delore,	114
Botal,	152	Delwart,	146
Bouchut,	44, 87	Deneux,	121
Bouley,	147	Denham,	200
Bouma,	242	Denman,	32, 221
		Depaul,	71, 115
		Desmoreux,	5
		Deubel,	5
		Devergie,	135

	PAGE		PAGE
Devilliers,	44, 131	Goodell,	40, 142
Deweese,	63	Goodsir,	98
Dieu,	133	Gordon,	118
Dohrn,	26, 120	Granville,	5, 78, 105
Doléris,	79	Greene,	24
Dolores,	225	Grey,	202
D'Outrepont,	120	Griesinger,	43
Driner,	226	Grigg,	181, 190, 192, 240
Druitt	93	Grissolle,	68
Dubois,	29	Gross,	131, 132, 133
Duguyot,	42, 176	Gueniot,	62, 177
Duhrssen,	223	Guillemont,	2, 120
Duncan, J. Matthews, 1, 21, 24, 25, 33, 34, 60, 61, 63, 131, 156, 170, 171, 175, 177, 182, 187, 190, 210		Gusserow,	65, 82, 84
Duplay,	133	Guyon,	210
Eigenbrodt,	24	Hardy,	56
Eisenlohr,	191	Hart	171
Emmet, 31, 32, 34, 37, 73, 136, 179, 184, 185, 194, 202, 235, 239		Hassall,	93
Engelmann,	14, 33, 140, 167	Heckel	117
Ercolani,	20, 100, 103, 113	Hecker	107, 169
Farr,	14	Hegar, 2, 5, 24, 26, 27, 87, 88, 164, 165, 230, 231	
Fedore,	132	Heman,	89
Fehling,	57, 82, 83	Hemingway,	142
Ferrius,	46	Hemming,	201, 211
Fiedler,	42	Henoch,	48
Flandrin,	71	Henze,	148
Fleming,	145, 146, 147, 148	Herbert,	144
Flint,	63	Hering,	86
Flugge,	199	Hervieux,	53, 109
Foster,	192	Hewitt, 31, 57, 62, 71, 102, 105, 170, 173, 175, 218	
Foulis,	68	Hicks, 38, 116, 154, 162, 163, 164, 165, 233, 234	
Fournier,	49, 53	Highuron,	130
Fournier-Pescay,	200	Hill, Berkeley,	49
Fränkel,	109, 112	Hippocrates,	9, 10
Franck,	148, 149	Hodge,	83
Frank,	132	Hoffman,	45
Frerichs,	61	Hohl,	78
Freund,	185	Howitz,	192
Friedländer,	21, 67	Hunter,	25, 41
Fritsch,	226, 230, 242, 255	Hutchinson,	47
Fry,	241	Huvellier,	147
Galabin,	92	Hyrthl,	122
Gallard,	179	Ingelby,	114, 240
Garimond,	53	Jacquemier,	45, 96, 99, 117
Garrigues,	200	Jago,	159
Gassner,	90, 154, 243	Jenkins,	123
Gast,	80	Jenks,	210, 248
Gayton,	43	Johnston,	201
Gelle,	147	Johnstone,	189
Gendrin,	34, 39, 99	Jowett,	8
Gervis,	38, 115	Jungbluth,	115, 116
Geyl,	128	Jürgensen,	67
Gierse,	92	Juvenal,	7
Göth,	45	Kaltenbach,	81
		Kaminski,	43

	PAGE		PAGE
Kassowitz,	47	Montgomery,	114, 171
Kehrer,	65	Morgagni,	23
Kidd,	114	Morgangé,	5
Kilian,	93	Moster,	2, 5
Killer,	228	Müller,	103, 144, 145
Kleinwächter,	9, 120, 204	Mundé,	31, 222, 235, 247
Kluge,	154	Murchison,	43, 45, 46, 61
Koch,	81	Murray,	32
Kölliker,	19, 98		
Kormann,	71, 83	Naegele,	29, 159, 252
Koubassoff,	80	Negri,	154
Kreiger,	107	Nieberding,	115
Kussmaul,	26	Neisser,	192
		Neugebauer,	227
Lachapelle, Malame,	5, 6	Neumann,	89
Lænnec,	172	Neville,	123
Laister,	128	Niemeyer,	42
Lancereaux,	68	Noeggerath,	31, 40
Lary,	199	Nonat,	181
Lawrence,	70	Norcard,	148
Leale,	127		
Lebedeff,	80	Odling,	115
Lecky,	12	Odmansson,	122
Lee,	113, 195	Olivier,	33
Leopold,	21	Orfila,	135, 256
Leroux,	240	Ovid,	7
Lesser,	228, 239		
Leveret,	121	Paget, Sir James,	17
Lewin,	53	Pajot,	154
Liebermeister,	43	Paré,	9, 105
Litzmann,	58, 172	Parker,	36
Lizé,	56	Parrot,	126
Lizzoni,	81	Partridge,	142
Löhlein,	79	Parvin,	37, 57, 58, 64, 70, 73, 121
Lomer,	127	Pasteur,	81
Löwy,	53	Paul,	55
Lusk,	24	Pereira,	142
		Piering,	191
M'Clintock, 1, 107, 115, 116, 125, 154, 160, 165, 183, 201		Phares,	210
Macdonald,	66	Phillips,	64
M'Dougall,	59	Plato,	8
Maclaren,	57	Playfair,	116, 198, 210
Macnamara,	130	Ploss,	205
Madden,	107	Pollak,	83
Magendie,	77, 78	Preyer,	79
Maier,	86, 87	Priestley, 3, 4, 5, 25, 27, 30, 49, 72, 80, 101, 103, 132, 154, 207 249.	
Mann,	74		
Martin,	36, 82, 157, 192	Puech,	37
Maslieurat-Lagemart,	65	Quain,	98
Massot,	74	Queirel,	69
Mauriceau,	120		
Mayor,	172	Ramsbotham,	129
Meckel,	92	Rindfleisch,	34
Mégrat,	54, 68	Ricau,	68
Meigs,	34	Richard,	204
Mercier,	113	Richardson,	204
Mewis,	110	Richerand,	129
Meyer,	89, 117	Richet,	30
Miguel,	71		
Millot,	44, 46		

	PAGE		PAGE
Ricord,	47	Tait, 35, 37, 41, 53, 67, 69, 71, 74, 91,	
Ritz,	82	114, 127, 131, 167, 174,	
Roberts,	63, 184	185, 193, 194, 202, 230,	
Robin,	101	231, 235, 247, 251, 255.	
Röderer,	204	Tardieu,	15, 71, 73, 135, 177, 256
Rokitansky,	42	Tarnier, 29, 30, 44, 45, 60, 75, 114,	
Rouget,	240	117, 121, 149, 152, 157,	
Rueff,	146	175, 177, 211, 237, 240.	
Ruge,	82, 125, 126	Taylor,	129, 142, 143
Runge,	79, 83	Tertullian,	11
Russel,	45, 46	Thierry,	199
Ruysch,	20, 105, 152	Thomas, 91, 107, 135, 142, 179, 191,	
St Ange,	122	235, 237.	
St Cyr,	146, 147	Thompson,	39, 127, 168
St Donat,	130	Tidy,	71, 132, 137, 250
St Vel,	60	Tillaux,	116
Saffin,	127	Tilt,	51, 243
Sallinger,	115	Toggia,	146
Salomon,	56	Toldt,	169
Sancorette,	75	Torelli,	46
Sänger,	192	Tourcoing,	45
Sangregorio,	43	Traube,	60, 146
Sansom,	177	Troja,	59
Sappey,	125	Trousseau,	73
Savidan,	43	Truzzi,	116
Savory,	77	Velpeau,	75, 130
Sawyer,	128	Virchow, 27, 95, 96, 101, 103, 105,	
Scanzoni,	43, 54, 115, 169	109, 112, 113, 115, 126,	
Schneider,	117	197.	
Schröder, 27, 35, 54, 69, 88, 107, 113		Volkman,	106
115, 238.		Vulliet,	240
Schwartz,	31, 230, 157	Wagner,	113, 126
Scott,	202	Waldeyer,	168
Scroggie,	67	Walker,	256
Sein,	120	Waring,	200
Serres,	43, 72	Weber,	46, 101
Shansen,	44	Wegner,	126
Simon,	44, 59, 237	Weil,	48
Simpson, Sir J. Y., 86, 90, 91, 92, 199,		Wells,	31, 172
200, 247, 252.		Werth,	115
Sims,	227, 235, 237	West,	36, 41, 179
Sinclair,	201	Whitehead, 2, 3, 4, 5, 30, 31, 34, 41,	
Skæe,	202	47, 49, 65, 71, 72, 205.	
Sloan,	230	Wilde,	89
Smellie,	43, 70, 108, 152	Williams,	108
Smith, Tyler,	5, 32, 59, 63, 173	Winckel,	32, 80, 167, 176
Späth,	119, 160, 224	Winter,	57
Spiegelberg, 27, 114, 116, 120, 169,		Wunderlich,	187
175, 237.		Wylie,	237
Spitzka,	71	Young,	129, 247
Sprengel,	144	Zacchias,	132
Stande,	192	Ziemssen, Von,	56, 241
Stokes,	45	Zilles,	109, 111, 112
Stoltz,	64, 204	Zülzer,	43
Storer,	14, 136, 204, 256	Zundel,	148
Strachan,	68	Zweifel,	82
Strauss,	80		
Swayne,	201		
Swift,	204		

GENERAL INDEX.

	PAGE		PAGE
Abdominal Palpation,	164	Age of expelled Fœtus,	167
Abortion, Adolescent,	72	Albumen in Liquor Amnii,	84
" Artificial,	2, 137	Albuminuria, a Cause of Abortion,	57
" Causes of, foetal,	77	" in Male,	132
" " maternal,	19	Alcohol, a Cause of Abortion,	57
" " paternal,	131	Amnion, Extreme Weakness of the,	117
" Complete,	1	Amniotus,	113
" Complications of,	179	Anæmia, a Cause of Abortion,	64
" Criminal,	2, 134	Animals, Abortion in,	144
" Death rates in,	177	" " Epizootic,	148
" Definition of,	1	" " External Causes	
" Diagnosis of,	164	of,	146
" Embryonic,	2	" " Internal Causes	
" Fœtal,	2, 77	of,	147
" Frequency of,	2	Arrest, or Premature Senility of	
" Historical Notice of,	7	Ovaries,	202
" Incomplete,	1, 158	Arterial Thrombosis,	198
" " Symptoms of,	160	Atrophy of the Placenta,	90
" Induction of,	250	Azoospermism,	132
" Justifiable,	250		
" Law on,	134	Ballottement	166
" Maternal causes of,	19	Bathing, a Cause of Abortion,	70
" " risks of,	176	Bladder, Distension of the,	172
" Medico-legal examination		" Exfoliation of Lining of,	172
of a case of,	138	Blood Clots,	169, 170
" Methods of inducing		" Effusion of, into the Placenta,	96
criminal,	141	Breasts, Treatment of, after Abor-	
" Missed,	1, 155	tion,	246
" Ovular,	2	Bright's Disease,	57
" Paternal causes of,	131		
" Pluriparæ in,	5	Calcareous Degeneration of the Pla-	
" Prevention of,	203	centa,	91
" Primiparæ in,	5	Calcification of Fœtus,	125
" Prognosis of,	175	Cancer of the Uterus,	36
" Prophylaxis,	203	Carbonic Acid a Cause of Abortion,	65
" Proportion of, to births,	6	Catarrhal Decidual Endometritis,	28
" Risks of, maternal,	176	Cellulitis, Pelvic,	179
" Sequelæ of,	179	" " Treatment of,	183
" Symptoms of,	150	Cervical Pregnancy, Primary,	38
" Treatment of,	203	" " Secondary,	38
" " after,	241	Cervix, Congestion and Inflamma-	
" " of habitual,	247	tion of the,	30
" " of missed,	249	" Fissure of the,	31
" Vaginal examination in,	157	" Uteri, Malignant Disease	
Adherent Placenta,	162	of the,	171
Adolescent Abortion,	72	Change of Life, Flooding at the,	173

	PAGE		PAGE
Chlorate of Potash,	212, 247	Ehrendorfer's Iodoform Bougies,	242
Chlorosis, a Cause of Abortion,	64	Electricity,	240
Cholera,	44, 176	Endometritis,	35, 188
Chorea, a Cause of Abortion,	69	" Acute Decidual,	27
Chorion, Adhesion of, to Uterine		" Catarrhal,	28
Walls,	106	" Chronic Diffuse De-	
" Anomalies of,	102	cidual,	27
" Cystic Degeneration of,	102	" Placentaris Villosa,	110
" " Causes of,	107	" Polypoid Decidual,	28
" " Symptoms of,	109	" Symptoms	189
" " Treatment of,	109	" Treatment,	190
" Detection of, in the Ut-		" Tuberous,	28
erus of Multipara,	171	Epidemic Abortion,	75
" Fatty Degeneration of,	92	Epilepsy, a Cause of Abortion,	69
" Myxoma of,	95	Ergot,	56
" Syphilitic Affections of,	110	Erysipelas	46
Churchill's Tincture,	236	Extra Uterine Fœtation,	37
Climacteric Abortion,	72	" " Gestation,	174
Cold, Intense, a Cause of Abortion,	71		
Colles' Law,	77	Fatty Degeneration of the Placenta,	92
Complications of Abortion,	179	Female Fœtuses, Abortion of,	5
Congestion of the Placenta,	85	Fevers, Abortion in,	42, 163, 176
Consanguinity and Abortion,	70	Fibrinous Moulds,	169
Constipation a Cause of Abortion,	65	Flooding at the Change of Life,	173
Convulsions in the Fœtus,	128	Fœtal Causes of Abortion,	77
Cows, Causes of Abortion in,	146	Fœticide,	134
Credé's Incubator,	219	Fœtus, Abnormal Rotations of,	119
Criminal Abortion,	134	" Action of Drugs on,	78, 82
Cystic Degeneration of the Placenta,	102	" Adhesion of Amnion to,	114
" " " Cord,	123	" " Placenta to,	113
Cystitis, Exfoliative,	172	" Ascites of,	92
		" Attitude of, <i>in utero</i> ,	172
Deafness after Abortion,	202	" Ballottement of,	166
Death of the Mother,	75	" Calcification of,	125
" Rates in Abortion,	177	" Changes in Dead,	124
" Sudden	200	" Coiling of Cord round,	118
Decidua, Affections of the,	19	" Convulsions of,	128
" Atrophy of,	25	" Death of,	154
" Cavity of,	20	" " due to Syphilis,	125
" Congestion of,	26	" Decomposition of,	125
" Detachment of,	26	" Delivery of,	218
" Discharge of, in Extra-		" Diagnosis of Dead,	154, 155
uterine Fœtation,	174	" " Living,	172
" Hæmorrhage into,	26	" Diseases of,	77
" Hypertrophy of,	21	" Extra-uterine,	37
" Inflammation of,	27	" in Fœtu,	129
" Normal Structure of,	19	" Habitual Death of,	177
" Reflexa,	20	" Heart Disease in,	127
" Retention of, after Abor-		" " Beat of,	172
tion,	158	" Injuries of,	128
" Serotina,	21	" Length of,	140, 168
" Vera,	20	" Maceration of,	124
Definition of Abortion,	1	" Malformations of,	129
Diabetes, a Cause of Abortion,	61	" Measles in,	127
Diagnosis of Abortion,	138, 164	" Mummification of,	124
" Pregnancy,	164	" Papyraceus,	160
" Twin Conceptions,	172	" Peritonitis of,	127
Diarrhœa, a Symptom of Abortion,	65	" Pneumonia of,	128
Diphtheria, a Cause	46	" Putrefaction of,	125
Dropsy of the Placenta,	92	" Scarlet Fever in,	127
Drugs, Effect on the Fœtus,	81		

	PAGE		PAGE
Fœtus, Shrivelling of,	161	Liquor Amnii, Albumen in the,	84
„ Smallpox in,	43	Lithiasis, a Cause of Abortion,	59
„ Syphilis of,	49, 125	Lithopædion,	156
„ Temperature of,	79	Liver Diseases, a Cause of Abortion,	69
„ „ after Death,	155	„ Weight of, in Fœtus,	127
„ Weight of,	139	Lung Diseases, a Cause of Abortion,	67
Frequency of Abortion,	2		
Gangrene of the Placenta,	91	Maceration of Fœtus,	124
Goitre, a Cause of Abortion,	71	Malformations,	129
Gonorrhœa, „	40	Malignant Disease of the Cervix	
„ Treatment of, in Preg-		Uteri,	171
nancy,	41	Masturbation a Cause of Abortion,	56
Habitual Abortion,	177	Maternal Causes of Abortion—	
Hæmophilia, a Cause of Abortion,	64	Adolescence,	72
Hæmorrhage,	39, 98	Albuminuria,	57
„ Causes of,	100	Alcoholism,	57
„ Secondary,	201	Anæmia,	64
„ Symptoms of,	101, 151	Bathing,	70
„ Treatment of,	102	Carbonic Acid,	65
Hands, Disinfection of Physicians',	209	Cervix, Fissure of,	31
Heart Disease, a Cause of Abor-		„ Inflammation of,	30
tion,	66, 177	Chlorosis,	64
„ „ in the Fœtus,	127	Cholera,	44
Hippocrates, the Oath of,	10	Chorea,	69
Historical Notice of Abortion,	7	Climacteric,	72
Hydatids of the Uterus	105	Cold,	71
„ True,	173	Constipation,	65
Hydatiform Degeneration,	173	Death,	75
Hydræmia a Cause of Abortion,	64	Decidua, Affections of,	19
Hydramnios,	113	„ Atrophy,	25
Hydrometra,	173	„ Congestion,	26
Hydrops Amnii,	113	„ Endometritis,	27
Hydrorrhœa,	28	„ Hæmorrhage,	26
Hypertrophy of the Placenta,	89	„ Hypertrophy,	21
		„ Inflammation,	27
Icterus Gravis,	60	Diabetes,	61
Impetigo Herpetiformis, a Cause of		Diarrhœa,	65
Abortion,	65	Diphtheria,	46
Incubator, Credé's,	219	Endometritis,	27, 35
Induction of Abortion,	250	Epidemic,	75
Infection of Mother by Fœtus,	77	Epilepsy,	69
Inflammation of the Cord,	123	Erysipelas,	46
„ „ Placenta,	86	Extra-uterine Fœtation,	37
Influenza,	46	Fevers,	42
Injuries to the Fœtus,	128	„ Intermittent,	45
Insanity, Abortion a Cause of,	202	„ Relapsing,	45
Intermittent Fever, a Cause of		„ Scarlet,	44
Abortion,	45	„ Typhoid,	42
Intestines, Malformations of Fœtal,	129	„ Typhus,	46
Intra-Uterine Coagula,	169	„ Yellow,	46
Inversion of the Uterus,	202	Goitre,	71
Iodoform Bougies,	242	Gonorrhœa,	40
		Hæmophilia,	64
Jaundice, a Cause of Abortion,	59, 61	Hæmorrhage,	39
		Heart Disease,	66
Law, the, on Abortion,	134	Hydræmia,	64
Lead, a Cause of Abortion,	55	Impetigo Herpetiformis,	65
Leucorrhœa,	65	Jaundice,	59
Liquefaction of Fœtus,	124	Leucorrhœa,	65
		Lithiasis,	59
		Liver Diseases,	69

	PAGE		PAGE
Maternal Causes of Abortion— <i>contd.</i>		Ovaries, Premature Senility of the,	202
Lung Diseases,	67	Ovaritis after Abortion,	193
Masturbation,	71	Ovary, Prolapse of the,	201
Measles,	45	Over-feeding,	65
Metallic Impregnations,	55	Ovum in Ovo,	129
Noxious Gases,	54	Parametritis,	179
Over-feeding,	65	,, Diagnosis of,	183
,, suckling,	63	,, Pathology of,	180
Perineum Laceration,	32	,, Physical Signs of,	181
Placenta Prævia,	39	,, Symptoms of,	180
Plethora,	66	,, Treatment of,	183
Purpura Hæmorrhagica,	64	Paternal Causes of Abortion—	
Septicæmia,	53	Albuminuria,	132
Sexual Intercourse,	71	Incomplete Sterility,	131
Shock,	69	Lead,	55
Skin, Severe Itching of the,	65	Syphilis,	46, 126
Smallpox,	43, 54	Pelvic Cellulitis,	179
Surgical Operations,	73	,, Treatment of,	183
Sympathetic,	75	,, Peritonitis,	53
Syphilis,	46	Perimetritis,	186
Tobacco,	57	,, Causation,	186
Trichinosis,	65	,, Symptoms,	186
Tumours,	37	,, Treatment,	187
Uterus, Adhesions of,	33	Perineum, Complete Laceration	
,, Atrophy of,	34	of the,	32
,, Cancer of,	36	Peritonitis,	194
,, Contractions of,	34	,, a Cause of Abortion,	68
,, Displacements of,	31	,, in the Fœtus,	127
,, Hernia of,	32	,, Pelvic,	186
,, Inflammation of,	30	Pernicious Anæmia,	64
,, Prolapse of,	32	Phlegmasia Dolens,	194
,, Rigidity of Walls of,	33	Phthisis,	68, 176
,, Rupture of,	32	,, Placental,	90
,, Subinvolution of,	33	Physometra,	190
,, Syphilis of,	36	Placenta, Diseases of the,	85
,, Tubercle of,	36	,, Adherent,	62
Vegetable Substances,	56	,, Treatment of, 220, 232	
Violence,	72	,, Atrophy,	90
Vomiting,	62	,, Blood Effusion into,	96
Measles a Cause of Abortion,	45	,, Calcareous Degeneration of,	91
,, in the Fœtus,	127	,, Circulation in,	96
Medico-legal Examination of a		,, Congestion of,	85
Case of Abortion,	138	,, Cystic Degeneration of,	102
Menses, Retention of,	171	,, Dropsy of,	92
Menstrual Clots,	169	,, Endometritis Villosa,	110
,, Periods, Profuse,	175	,, Examination of the,	159
Mercury, a Cause of Abortion,	56	,, Fatty Degeneration of,	92
Methods, Direct,	73	,, Gangrene of,	91
,, Indirect,	73	,, Hydramnios,	113
Metritis, Acute,	188	,, Hydrops Amnii,	113
Microbes, Passage of, through		,, Hypertrophy of,	89
the Placenta,	80	,, Inflammation of the,	86
Missed Abortion,	1, 155	,, Myxoma Fibrosum,	95
Months of Gestation at which		,, Passage of Germs	
Abortion occurs,	5	through the,	80
Mummification of Fœtus,	124	,, Phthisis of the,	90
Myxoma Fibrosum of the Placenta,	95	,, Prævia,	39
Nervous System, Diseases of,		,, Retained,	159
causing Abortion,	69	,, Treatment of,	220
Noxious Gases,	54	,, Sclerosis of,	89

	PAGE		PAGE
Placenta, Syphilis of,	109	Statistics, Uterus, Measurements	
,, Tumours of,	92	and Weight of,	140
,, Weight of,	90	Sterility, Incomplete, in Male,	131
Plants, Abortion in,	144	Suckling,	63
Plethora, a Cause of Abortion,	66	Surgical Operations and Abortion,	73
Pleurisy,	68	Sympathetic Abortion,	75
Pluripara,	5	Syphilis of the Fœtus	125
Pneumonia in the Fœtus,	128	,, Placenta,	109
,, a Cause of Abortion, 67,	176	,, Umbilical Vessels,	122
Polypi, fibrinous,	171	,, Uterus,	36
Pregnancy, Diagnosis of,	164	,, Treatment of, in Preg-	
Premature Labour, Considerations		nancy,	50, 53
before the Induction of,	137	Temperature, Fœtal,	79
Prevention of Abortion,	203	,, Maternal,	79, 176
Primiparæ, Abortion in,	5	Tetanus,	199
Prognosis of Abortion,	175	Thrombosis,	194
Prolapse of the Ovary,	201	,, Arterial,	198
Prophylaxis of Abortion,	203	,, Pulmonary,	197
Proportion of Abortion to Birth		,, Symptoms,	196
Rate,	6	,, Treatment,	197
Puerperal Septicæmia,	53	Tobacco, a Cause of Abortion,	57
Pulmonary Thrombosis,	197	Trichinosis,	65
Purpura Hæmorrhagica, a Cause		Tubercle of the Uterus,	36
of Abortion,	64	Tuberous Decidual Endometritis,	28
Putrefaction of Fœtus,	125	Tumours of the Placenta,	92
Relapsing or Spirillum Fever, a		,, Uterus,	37
Cause of Abortion,	45, 176	Typhoid Fever, a Cause of Abor-	
Retention of Menses,	171	tion,	42, 176
Rupture of the Uterus,	201	Typhus, a Cause of Abortion,	46
Salpingitis,	192	Twin Conceptions, Diagnosis of,	172
Scarlet Fever, a Cause of Abor-		Tympanites Uteri,	190
tion,	44, 176	Umbilical Cord, Cystic Degeneration	
,, in the Fœtus	127	of the,	123
Sclerosis of the Placenta,	89	,, Diseases of the,	
Senility of Ovaries, Premature,	202	Causing Abortion,	123
Septicæmia, Treatment of,	246	,, Inflammation,	123
Sequæ of Abortion,	179	,, Knots in the,	117
Sewer Gas,	55	,, Normal Length,	117
Sex of Fœtus in Abortion,	5	,, Strength,	123
Sexual Intercourse, Excessive,	71	,, Syphilis,	122
Shock,	69	,, Torsion,	119
Skin, Severe Itching of the,	65	Urine, Retention of,	243
Smallpox,	43	Uterine Walls, Rigidity of the,	33
Spleen, Weight of, in the Fœtus,	127	Uterus, Adhesions of the,	33
Statistics,	3, 4	,, Air in the,	190
,, Cholera and Abortion,	44	,, Atrophy of the,	34
,, Fevers	42	,, Cancer of the,	36
,, Gonorrhœa	40	,, Congestion and Inflam-	
,, Lacerations of the Cervix,		mation of the,	30
and Abortion,	31	,, Contractions of the,	34
,, Length and Weight of		,, Displacements of the,	41
Fœtus at different		,, Inversion,	202
Ages,	139, 140, 168	,, Hernia of the Pregnant,	32
,, Measles	45	,, Hydatids of the,	105
,, Smallpox,	43	,, Irrigation,	228
,, Spermatozoa in Seminal		,, Length,	140
Fluid,	133	,, Prolapse,	32
,, Surgical Operations,	74	,, Rupture,	32, 201
,, Syphilis,	49	,, Subinvolution,	33
		,, Syphilis,	36

GENERAL INDEX.

271

	PAGE		PAGE
Uterus, Tubercle,	36	Viburnum Prunifolium,	210
,, Tumours,	37	Violence a Cause of Abortion,	72
,, Weight,	140	Vomiting, Obstinate,	72
Vagina, Plugging the,	216	Weight and Length of	
Vaginal Examination in Threatened		Fœtus,	139, 140, 168
or Inevitable Abortion,	157	,, ,, of Uterus,	140
Vegetable Substances Causing,	56		

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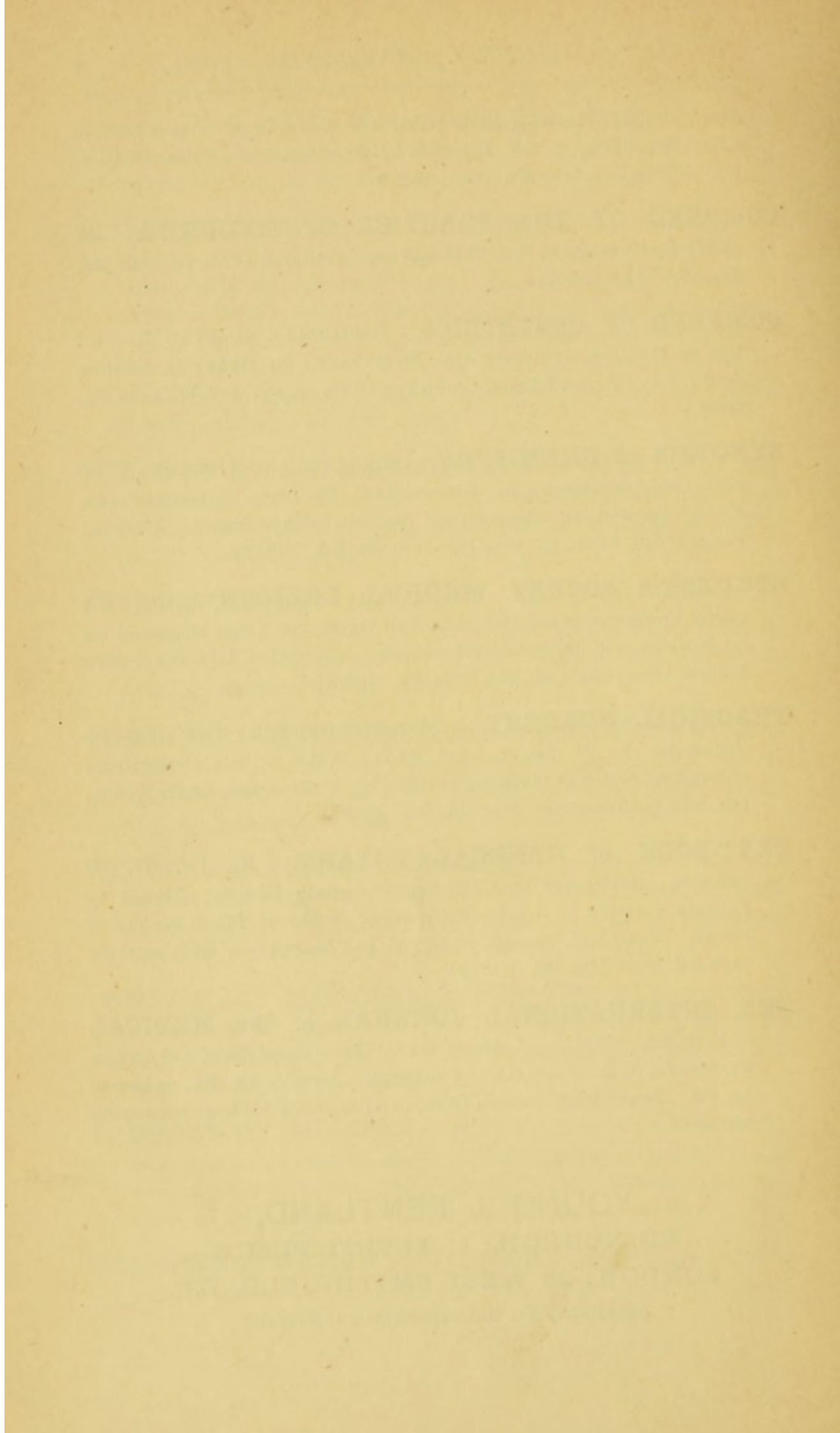
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