Lectures on the principles and practice of midwifery / by Edward William Murphy.

Contributors

Murphy, Edward W. 1802-1877.

Publication/Creation

London : Walton and Maberly, 1862 (London : Wertheimer.)

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LECTURES

ON THE

PRINCIPLES AND PRACTICE OF MIDWIFERY.

Πολλης ἐστι πειρας τελευταιον ἐπιγεννημα.

LONGINUS.

. . . . . Si quid novisti rectius istis
Candidus imperti; si non, his utere mecum.

HORACE.

LECTURES

ON THE

PRINCIPLES AND PRACTICE

OF

MIDWIFERY.

BY

EDWARD WILLIAM MURPHY, A.M., M.D.

PROFESSOR OF MIDWIFERY, UNIVERSITY COLLEGE, LONDON;
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Second Edition, Enlarged and Revised.

ILLUSTRATED BY LITHOGRAPHIC PLATES AND WOODCUTS.

LONDON:
WALTON AND MABERLY,
UPPER GOWER STREET, AND IVY LANE, PATERNOSTER ROW.

1862.

(6137023

LONDON:
PRINTED BY J. WERTHEIMER AND CO.,
CIRCUS PLACE, FINSBURY.

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PREFACE.

THE first edition of this Work having been for some time out of print, the Author, in consequence of the demand for it, has undertaken a second edition. In order to render the subject complete, he has introduced his Lectures on Gestation, and in doing so has endeavoured to bring the whole into a size and form most convenient to the student. The lectures have been so arranged as to afford every facility for reference.

The Author, like all teachers, is frequently asked by his pupils to recommend a work to read with his lectures, and has often been embarrassed to give a satisfactory answer to such a question; not because of any deficiency in obstetric literature, but because it unfortunately happens that at the present moment the most opposite opinions on important points of practice are maintained. Warm controversies have in consequence sprung up, and where it was of the greatest practical importance to have the principle intelligible, and the rule fixed, both one and the other have been so obscured as to render it difficult to determine the course to adopt. Thus for example, questions in relation to the application of instruments, to the treatment of unavoidable hæmorrhage, to the induction of anæsthesia in the practice of midwifery, to puerperal fever —each and all have elicited the most opposite opinions, and produced an uncertainty quite sufficient to confuse the student, and to render it no easy matter how to advise him in the selection of a work to guide him in his studies.

To meet this difficulty the Author has published the present volume. It is his wish to convey to the reader a comprehensive view of the Principles and Practice of Midwifery; and where controversial questions interfere, to give them the fullest and most impartial examination, so that a just conclusion may be readily formed respecting them.

He trusts also that those gentlemen who have attended the obstetric classes at University College, may find these lectures useful in recalling to their minds many points of practice which it was his wish to impress upon their attention; and that in their leisure moments it may not be uninteresting to review more carefully the subjects already brought before them.

In preparing this edition for the press, the Author feels deeply indebted to Dr. Routh for his assistance in drawing up valuable statistical tables, and also to Dr. Alexander Henry for aiding him in arranging the work. To both he returns his warmest thanks.

59, Upper Berkeley Street,
Portman Square,
July 1*st*, 1862.

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LECTURE I.

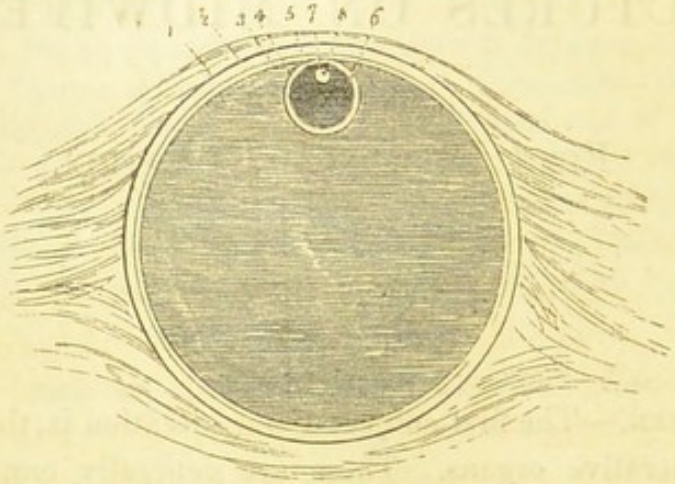
MENSTRUATION.

Gentlemen,—The first subject of our attention is, the functions of the generative organs. These are generally enumerated as menstruation, conception, and parturition. Properly speaking, there is but one function—the periodic escape of ova from the ovary, and either their expulsion from, or retention and development in, the uterus. If not impregnated, they are either washed away by the menstruous discharge, or dissolved in the uterus; if impregnated, they are retained in the cavity to undergo further changes of development. We shall first consider this function in the unimpregnated uterus; and then observe the effects produced by conception. A brief outine of the changes which occur periodically in the ovary will be sufficient for our purpose.

Periodical Changes in the Ovary.—The *Graafian Vesicle* or follicle is the seat of the ovum; this gradually enlarges during a monthly period, and approaches the surface of the ovary. The effect of this change is to bring the "*cumulus proligerus*"—the bed on which the ovum rests—close to the surface of the vesicle. At the point of contact of the vesicle and outer membrane of the ovary, the latter—"*the tunica albuginea*"—becomes so thin that the vesicle projects beyond it. The fimbriæ of the Fallopian tube closely surround this portion of the ovary; and, when the vesicle bursts, the ovum enters the pavilion of the tube and passes through the duct to the uterus.

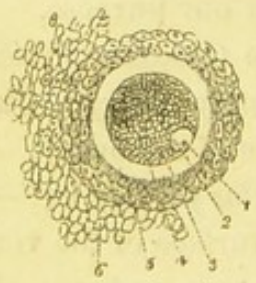
While in the ovary, the human ovum is composed, like all ova, of a yelk contained in a vitelline membrane, so transparent that it is called "*zona pellucida*." In its substance, is observed

Fig. 1.*



a fine transparent membrane containing a watery fluid—the "*germinal vesicle*;" and at that part of its surface nearest to the vitelline membrane, is seen a finely granulated membrane of a yellowish colour, so small as to be a point—a "*macula*." This is called "*the germinal spot*," and bears the same relation to the germinal vesicle that nuclei do to the formative cells.

Fig. 2.†



While the above-mentioned changes are going forward in the ovary, a determination of blood to the uterus takes place; causing in the lower animals "the heat" or "rut"; in the human female—

MENSTRUATION.—This discharge takes place from the cavity of the uterus, at the time when the ovum is about to pass

* Fig. 1. Diagram of a Graafian vesicle containing an ovum. 1. Stroma or tissue of ovary. 2. External, and 3. Internal, coats of the Graafian vesicle. 4. Cavity of the vesicle. 5. Thick tunic of the ovum or yelk-sac. 6. Yelk. 7. Germinal vesicle. 8. Germinal spot.

† Ovum of sow (after Barry). 1. Germinal spot. 2. Germinal vesicle.

into it, and is peculiar to the human female. A similar discharge has been observed by Geoffroy St. Hilaire and F. Cuvier in some of the monkey-tribe; but they maintain that these appearances were coincident with the monthly heat. Müller observes: "During the periodical sexual heat in other animals also—as the horse and the dog—there is sometimes a discharge of blood; but menstruation in the human female is a phenomenon of a totally different nature, and has no connection with sexual excitement." (*Elements of Physiology.* By Baly, p. 1482.)

CHARACTERS OF THE MENSTRUAL DISCHARGE.—Menstruation may be defined as *a red discharge, flowing from the cavity of the uterus, returning periodically within the reproductive period of female life*, and *dependent on the ovary:* it marks the period of *puberty.* Before this time, the reproductive organs exert no influence; they are, as it were, in a dormant state; but this discharge is evidence that they are roused into activity. This change exerts a remarkable influence upon all the other functions of the body, as is proved by the disturbance caused in them when this function is impaired. So also the striking effect upon the general appearance, the feelings, and the energies of the female, is equally remarkable. Hitherto, sexual differences have been imperfectly defined; now they begin to manifest themselves: the girl becomes more full and round; the voice softer and more harmonious; the neck fuller and the breast enlarged: her gait becomes altered, and her feelings changed. The innocent playfulness, and often awkward carriage, of the girl are exchanged for the modest reserve and graceful dignity of the woman. A new era in her life commences, in which all her mental, as well as personal, attractions exert an influence that

Emollit mores, nec sinit esse feros.

The uterus, in the language of Harvey, "reddens, swells, glows, and becomes, as it were, a living centre, which radiates its influence over the whole economy."

A Red Discharge.—The nature of the discharge has been the

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3. Yelk. 4. Zona pellucida. 5. Discus proligerus. 6. Adherent granules or cells.

subject of anxious inquiry and some controversy—some stating it to be sanguineous, which others have as positively denied. In cases of imperforate hymen, the menses are retained and accumulate, but no coagulation takes place. The menstrual fluid is described as "a thick viscous reddish brown syrup like treacle, devoid of smell, and not much influenced by exposure to the atmosphere." In addition to this, Gmelin asserted that it contained no globules. Professor Brande, many years ago, confirmed this view, from his examination of the menstruous discharge collected from a prolapsed uterus, "*and consequently free from the admixture of all other secretions.*"* Neither could he discover blood-corpuscles; and, although a slight degree of putrefaction had commenced, yet he thinks that the globules of the blood would not have been destroyed by so trifling a change. J. Hunter considered it sanguineous, but blood under a particular condition —"a species of blood changed, separated or thrown off from the common mass by the action of the vessels of the uterus, similar to that of secretion; by which action the blood loses the principle of coagulation, and, I suppose, of life." Later observers, MM.

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* "Whilst engaged in observing the colouring matter of the blood, I (Mr. Brande) received from Mr. W. Money, house-surgeon of the General Hospital at Northampton, some menstruous discharge collected from a woman with prolapsus uteri, and consequently free from the admixture of all other secretions. It had the property of a very concentrated solution of the colouring matter of the blood in a very dilute serum, and afforded an excellent opportunity of corroborating facts respecting this principle, which have been detailed in the preceding pages. Although I could detect no traces of iron by the usual mode of analysis, minute portions of that metal may and probably do exist in it, as in other animal fluids I may have examined; but the abundance of the colouring matter in the secretion should have afforded a proportionate quantity of iron if any connection had existed between them. It has been observed, that artificial solutions of the colouring matter of the blood invariably exhibit a green tint when viewed by transmitted light: this peculiarity is remarkably distinct in the menstruous discharge. I *could discover no globules in this fluid*; and although a very slight degree of putrefaction had commenced in it, yet the globules observed in the blood would not have been destroyed by so trifling a change." (*Phil. Trans.* vol. cii. p. 113.)

Donné, Pouchet, &c., with the aid of the microscope, have discovered blood-corpuscles; and Denis and Franz Simon have shewn that the discharge consists of all the elements of blood. Drs. Hassall and Letheby also confirm this view of its nature. The slight putrefaction which took place in that examined by Professor Brande might have acted on the blood-corpuscles; just as the acid secretion from the vagina is now known to destroy them. The results of the most careful inquiries of the present day prove that the red discharge is essentially sanguineous.

Flowing from the Cavity of the Uterus.—Cases of inversion of the uterus have been observed by Ruysch, Sir C. Clarke, Blundell, and others, at the menstrual period; and they found the fluid passing from the cavity of the uterus. Sir C. Clarke could see distinctly the fluid "oozing from the pores of the membrane lining the uterus." Dr. Wallace Johnston relates a dissection made by J. Hunter of a woman who died during menstruation. He found the whole inner surface of the uterus covered with a layer of blood; "but neither in the cavity of the vagina nor upon its inner surface was there the least mark of blood." A similar examination has been more lately made by Dr. Janzer, on a girl who was murdered four days after menstruation. He found the uterine mucous membrane "much swollen between the body and neck. In the uterus itself, it formed a velvety membrane, glossy and brilliant, easily detached with the handle of the scalpel, and presenting a fine net-work of vessels. This mucous membrane was evidently thickened; it was composed of the uterine glands, ranged perpendicularly alongside each other, and fitted with cylindrical epithelium, not ciliated. The structure between the uterine glands was composed of a network of delicate fibres, of some nucleated cellular fibres, and of amorphous tissue. The surface of the uterus was covered with a thin layer of mucus, and lined with the cylindrical epithelium, without cilia. The orifices of the Fallopian tubes were open. The vaginal mucous membrane was pale, but was only covered with a thin layer of mucus containing epithelial cells . . . It results from this observation, that the mucous membrane of the uterus presents, during menstruation, characters analogous to those which exist during

gestation; such as the hypertrophy of the uterine follicles and the disappearance of vibratile cilia." (*London Journal of Medicine*, April, 1850.) Hence, then, the inference which Pouchet asserts, that this hypertrophied mucous membrane is deciduous every monthly period, just as it is at the termination of gestation.

Returning periodically within the Reproductive Period of Female Life.—The reproductive function in the female constitution must be considered as superadded to the functions of life. The uterus may be absent without interfering with these; but, when present, its influence is paramount. Its leading duty is the development of a new being. The blood is not merely called upon to supply materials to an organ growing most rapidly, and to support in their integrity the different tissues of which the uterus is composed, but also to afford nutriment for the new structures which form the fœtus. Hence it is only when the development of the female is perfectly completed, the body fully formed, the structures matured, and the blood called upon to maintain them in that state, that the constitution is prepared to meet the demands of the uterus. The period of puberty implies that the constitution is approaching to this maturity; and the menses commence precisely at that time.

So, also, when the different tissues begin to give evidence that they are yielding to the influences constantly acting upon them—when they become harder, more contracted, less vascular, and manifest a decay which the constitution can no longer arrest—it is then that the uterine function ceases, and with it the menstrual discharge. These limits embrace a period of about thirty years, during which time the woman is capable of conception. In these climates, the age at which the discharge first appears is generally fifteen; it ceases at about forty-five; but this is liable to great variation.

Causes influencing First Appearance or Cessation of Menstruation.—*Climate.*—The influence of temperature in hastening or retarding the menses has been long maintained. In the tropics, it is said, puberty is earlier and old age approaches sooner than in these temperate climates; while in the frigid zone the menses appear much later. The distinguished Haller and

Denman were led to believe this, which in fact became the popular opinion. Prideaux, in his *Life of Mahomet*, states that his marriage with Ayesha was consummated when she was nine years of age; and this supposed precocious puberty has been the foundation for a theory of the brilliant Montesquieu to explain polygamy in the East. "Women," says he, "in hot climates are marriageable at eight, nine, and ten years of age. Thus in these countries infancy and marriage go together. They are old at twenty. Their reason, therefore, never accompanies their beauty. When beauty demands the empire, want of reason forbids the claim. When reason is obtained, beauty is absent. Women ought therefore be in a state of dependance; for reason cannot procure in old age that empire which youth and beauty could not give. It is therefore natural, that in these places a man, where no law forbids, should leave one wife and take another; and that polygamy should be introduced." (*Esprit des Lois*, liv. xvi.)

Linnæus is quoted as an authority to prove the effect of cold climates. He is stated to have said in his *Flora Lapponica*: "There were many women whom I have seen here exempt from this law for the whole period of their lives; but these, when married, remained sterile. I have even known young girls who observed these critical periods in *summer only and not in winter;* and others who had them only once in the year; these, as often as I have seen them, had œdematous feet."* Linnæus might have made the same observations if he had been studying British Flora in place of those of Lapland, because these irregularities were obviously the result of disease.

Statistics of First Appearance of Menses.—The determination of a question of this kind is attended with great difficulty, because there are many secret causes of derangement depending on consti-

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* Fuere et fœminæ plures hic quas vidi, per totam suæ vitæ periodum ab hac lege exceptæ, licet hæ maritatæ steriles persistant. Novi et juvenculas quæ *non hyeme sed solâ modo æstate* has observant crises; imo et alias quæ semel in anno purgabantur, et hæ, quotquot vidi, pedes œdematosos habebant."—*Flora Lapponica.*

tutional peculiarities; and it is one upon which it is very hard to obtain any satisfactory evidence. Mr. Roberton of Manchester has, however, given the subject his closest attention; and to him we are indebted for having first directed the attention of the profession to these popular errors. He has exposed them by proving that, in this temperate country, there is a great variation in the time when the menses first appear; and also, from a review of the statements made by travellers, who are considered to be generally faithful in their accounts, he has shewn that climate does not produce the effect which is attributed to it. He has given a table showing the results of his enquiries in 450 cases. Dr. Whitehead of Manchester has followed the same course in 4000 cases; Dr. R. Lee in 1160 cases; and ourselves in 560 cases. In each report, the age is given when the menses first appeared, showing a variation from nine years to twenty-six years.

First Appearance of Menses.

Age.	Mr. Roberton.	Dr. Whitehead.	Dr. Lee.	Dr. Murphy.	Total.
9	...	...	11	3	14
10	...	9	55	...	64
11	10	26	52	15	103
12	19	136	86	37	278
13	53	332	153	57	595
14	85	638	204	107	1034
15	97	761	201	119	1178
16	76	967	154	110	1307
17	57	499	101	57	714
18	26	393	78	34	531
19	23	148	33	9	213
20	4	71	23	6	104
21	...	9	6	3	18
22	...	6	2	2	10
23	...	2	1	1	4
24	..	1	...	...	1
25	...	1	...	...	1
26	...	1	...	...	1
	450	4000	1160	560	6170

These tables prove that, in these countries, puberty may commence at nine, ten, or eleven years. Had any of the 181 instances quoted lived in the fervid East, they might have been marriageable; at least the slaves of the harems of these polygamic countries. The latest period seems to be twenty-three years; although Dr. Whitehead mentions instances in which the menses did not commence until twenty-four, twenty-five, and twenty-six years. The largest number quoted were at the ages of fourteen, fifteen, and sixteen; the last having the highest number. These facts are sufficient to prove a great variation in the times of the first appearance of menstruation.

Mr. Roberton has quoted several authorities to shew that, in different countries, the difference in the ages at which this discharge first appears is not so great as is stated. Tooke, in his *History of the Russians*, states that, among the races bordering on the Arctic Circle, puberty commences at twelve and thirteen years of age. Mr. Crawford and Sir Stamford Raffles give evidence that the same is the case in Java and the islands of the Indian Archipelago. Dr. Nicholson of St. John's, Antigua, asserts that there and in Grenada the age of puberty is the same as in this country. These facts go far to overturn the assumed precocity of women in hot countries; but still the nature of the evidence is sufficient to prove the difficulty of accuracy. This change is not, like the growth of the beard, a matter for public observation.

There are many causes besides climate which contribute to hasten this discharge. The enervating influence of extreme civilisation, where there is a luxurious indolence coupled with an over-excited imagination; much sedentary occupation with little active exertion; the continued excitement of public amusements, not much calculated to moderate precocious desires; the refined but demoralised manners which too often prevail in the great centres of civilisation — all these causes conspire to excite the uterus prematurely to activity, and hasten the catamenia in temperate climates. In those oriental countries, where sensuality is but part of the religion, where there is a total disregard of all moral restraint, and sensual indulgence is carried on to an

unlimited extent; it is not surprising to read of early marriages, as they are called, and of the child becoming a woman at nine, ten, or eleven years of age.

The *Periodic Interval* is generally twenty-eight days, although there are many exceptions. In some instances, the discharge returns every fortnight; in many every three weeks; and there are cases where it is delayed for five and even for six weeks.

The *Cessation of the Menses* generally takes place about the forty-fifth year; but the time of cessation of the function varies just as much as that of its commencement, if not more so. When the function of the womb ceases, and the organ becomes superannuated, it is liable to morbid changes of structure, which are often preceded by a sanguineous discharge; as the catamenia decline, these commence, and for a long time observe the same law of periodicity. Thus, in many instances, the menses seem to be prolonged long after they have ceased. It is difficult, therefore, to determine the time of cessation with accuracy. Mr. Roberton makes the limit between thirty-six and seventy years. In the largest number, the menses ceased at fifty years of age.

Dependence of Menstruation on the Ovary.—When the ovary has been congenitally absent, atrophied, or removed, the menses have been absent or ceased to flow. When the ovaries are present and the uterus is atrophied or deficient, a distinct periodic molimen has been observed (see Dr. Oldham's case. *Proceedings of the Royal Society*, vol. viii. p. 377.) The intimate relation between the periodic growth and bursting of the Graafian vesicle and the menses, is now established, and proves that this discharge is only part of the function which the ovary fulfils—*the periodic discharge of ova*. In 1797, Cruikshank examined the ovaries of a girl who died during the menstrual discharge, and found traces of a ruptured vesicle; his observation then stood alone and unconfirmed. It was not until within the last few years that a multiplied evidence has given it the fullest confirmation. The researches of Drs. Girdwood, Lee, Dalton, of Pouchet, Négrier, Gendrin, of Raciborski and Bischoff—all establish the fact first observed by Cruikshank. The flow of the menses is the crisis

which denotes the bursting of a Graafian vesicle and the escape of an ovum.

Bischoff lays down the law of reproduction very clearly. "The ova" (he says) "which form in the ovaries of individual females, are submitted to a periodic maturation, even with mammiferæ and man. Their maturity is quite independent of the action of the semen It is at the period called in animals '*rut*' and in women '*menstruation*,' that these ripe ova detach themselves from the ovary and are expelled. There is manifested in animals, as in women at this period more than at any other, sexual desire. When intercourse takes place, the ovum is fructified by the action of the sperm. When this does not occur, the ovum does not the less detach itself from the ovary and descend into the oviduct, even to the uterus, where it is destroyed." (*Annales des Sciences Médicales*, Août 1844, p. 108.)

The Graafian Vesicle.—We have already alluded briefly to the changes going forward in the ovary—the development and bursting of the Graafian vesicle; but, in order to understand some practical questions, it is necessary to be more exact. We have to consider what the Graafian vesicle is, and what are the changes it undergoes from the period of its bursting to expel the ovum until it disappears. The language of Dr. A. Farre is clear and expressive.

"The ovisac" (he says,) "is always at first seen lying perfectly loose in a little cavity, excavated as it were in the substance of the surrounding tunics. Subsequently a covering or tunic, consisting of rather dense connective tissue, susceptible of becoming highly vascular and closely connected with the ovarian stroma, is gradually formed upon the outer surface of the ovisac, with which this outer covering becomes closely united. This is the structure termed by Barry the tunic of the ovisac; and *it is by the union of these two that, according to his observations, the Graafian vesicle is formed.* At this stage of its development, there exist all the elements of the completely developed follicle; viz., the outer vascular or fibrous coat, the inner softer layer or proper tunic of the ovisac, and the still more internal epithelial layer of granules representing the membrana granulosa, together

with the elements, at least, of the ovum, and the fluid contents of the sac." (*Cyclopædia of Anat. and Phys.: Uterus and Appendages*, p. 555.)

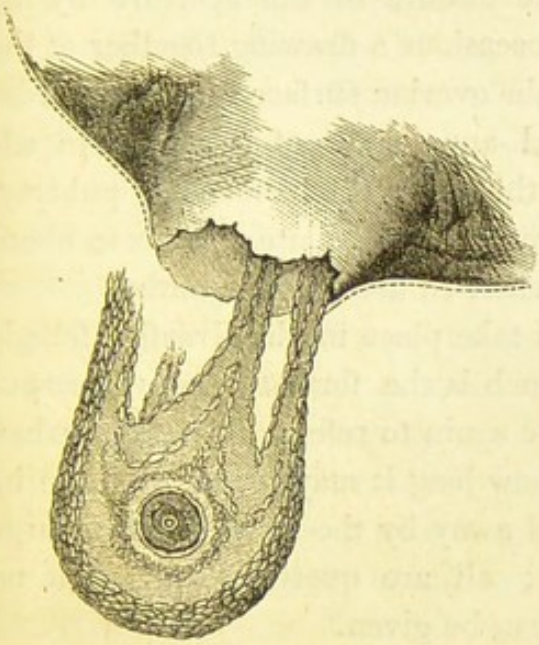
This follicle increases in its size as it approaches the surface, in consequence of the increase of its fluid contents, supplied by minute capillaries, which form a rich net-work on the inner surface of the ovisac, giving it a bright red colour. The true ovisac becomes thickened; and blood is exuded in the interior, filling up the space between the granular disk with the ovum and the thickened wall of the vesicle. This blood coagulates into a dark red clot.

Rupture of the Graafian Follicle.—While these changes are going forward within the follicle, preparation is being made externally for its rupture. The base continues imbedded in the substance of the ovary; but the upper portion projects above it. At the most salient portion, increased vascularity is observed; the peritoneum and the underlying tissues becoming exceedingly red. The tunics of the Graafian follicle become extremely thin at the point of rupture, and are so intimately united with the tunica albuginea and peritoneum, that it is impossible to separate them. Upon the surface of the most salient portion of the projecting follicle, the peritoneum may be wanting; the tunica albuginea has become greatly attenuated; whilst internally the coat of the follicle is thinnest at this point. A very slight force is sufficient to cause the rupture of the follicle, which is attributed to the accumulation of its fluid contents. "It is believed by Coste that, when the ovisacs have reached this point, which is the full term of their growth, they may remain stationary until a state of excitement arises, produced partly by the maturity of the ovum, partly by the approach of the sexes; and that it is under the influence of such excitement that the rupture of the follicle most commonly takes place." (*Cyclopædia of Anat. and Phys., loc. cit.* p. 559.). This is important, as proving that conception may take place not only at the menstrual periods, but in the intervals.

The increase of the fluids in the ovisac, whether of albumen or blood (Pouchet thinks the latter), becomes so great that the

walls are distended to their utmost; but, as they are not equally elastic, the effect is not the same. The outer tunic will not yield; and consequently the inner or true ovisac, having yielded, is thrown first into a waving line, and ultimately into folds. The combined pressure bursts the follicle; and the ovum escapes, carrying with it the retinacula and a portion of the granular membrane.

Fig. 3.*



The Corpus Luteum.—If a section be made through the centre of the projecting follicle, an ovoid cavity is observed, containing usually a deep red clot, having no adhesion to the walls of the cavity, and easily washed away. After washing out the contents of the follicle, the inner surface of the ovisac is exposed. Dr. A. Farre has occasionally seen this to be of an intensely red colour, from the surface being covered by a rich net-work of capillaries filled with blood. "But most commonly the colour of the ovisac throughout, as far as the outer tissue of the follicle, is at this time a clear, pale, chrome yellow, this coat being now very soft in texture." (*Cyclopædia of Anat. and Phys., loc. cit.* p. 557.) Thus the ovisac becomes the "*corpus luteum.*" The yellow colour is caused, like that of the yelk of the bird's egg, by the penetration of oil-globules within the tissues of the ovisac.

When the ovum has escaped, the outer tunic will by its elasticity contract; but the inner coat—the true ovisac—now the corpus luteum, having already increased in a greater degree than the outer, cannot retract; the waving line is consequently thrown into folds. As the contraction of the outer coat continues, the folds first, like convolutions, become more compressed, and form

* Ovum of rabbit escaping from ovary.

angles which, meeting in a common centre, give a stellate appearance to the cicatrix. This gradually disappears as new vesicles advance to maturity; and the closure of the aperture by the cohesion of the opposite sides occasions a drawing together of the surrounding parts, and causes the ovarian surface to sink inwards; hence the indented or fissured appearance of the ovary in advanced life, as compared with the ovary of commencing puberty. The cavity of the follicle contracts to the stellate cicatrix in about a month, and disappears altogether in about two months.

Such are the changes which take place in the Graafian follicle after the ovum has escaped; such is the formation of the *corpus luteum*, to which we shall have again to refer. The time when the ovum enters the uterus; how long it may remain there in its integrity; whether it is washed away by the menstrual discharge or is dissolved in the uterus; all are questions to which no answer has been or, perhaps, can be given.

Probable Objects of Menstruation.—It is not necessary to dwell on the causes of menstruation as assigned by the older authors—the moon, fermentation, plethora, etc.; but a few words may not be out of place as to its final cause—as to the object of the discharge in the human female.

At the time of conception, the uterus is much more injected, and its vessels are in much greater activity, than at any other period. There is a constant demand for new materials for the growing fœtus and the enlarging uterus. This demand may be made at any time; and the vascular system must be prepared to meet it, without causing functional disturbance. The periodic menstrual molimen which takes place, seems to answer this purpose. The uterine circulation is not taken by surprise when called upon for an additional supply. This condition of the uterus may be best understood, if compared with those cases where, in other situations, the blood is suddenly called upon to supply new materials; for example in wounds or fractures. The distension of the capillaries is accompanied by all the attendants of high functional disturbance which constitutes inflammation. The phenomena of gestation have been characterised as a natural inflammation; but, if so, it is an inflammation without any great

vascular disturbance, because the vessels have been accustomed to periodic congestion—the menstrual molimen.

This being the probable object of the menstrual molimen, the purpose of the discharge in the human female may be inferred, if we consider the difference of her condition from that of the lower animals. She alone is subject to the restraint of a moral law, a wise and necessary law for her happiness and the perfection of our race, but still a check upon the influence—the passions—which must result when the generative organs are in a high state of increased vascular activity. In the lower animals, if sexual desire be not gratified, the heat, as it is called, is of the most distressing character: in women the same vascular activity is at once relieved by this discharge; no inconvenience is felt from the series of active operations going on in the ovary, nor is any impulse given to infringe a moral law. If this view be correct, we have an illustration of the adaptation of natural to moral law, each perfect in itself and founded on a basis as different as mind and matter, but still harmonising with each other, and proving the unity of design in the works of an all-wise Being.

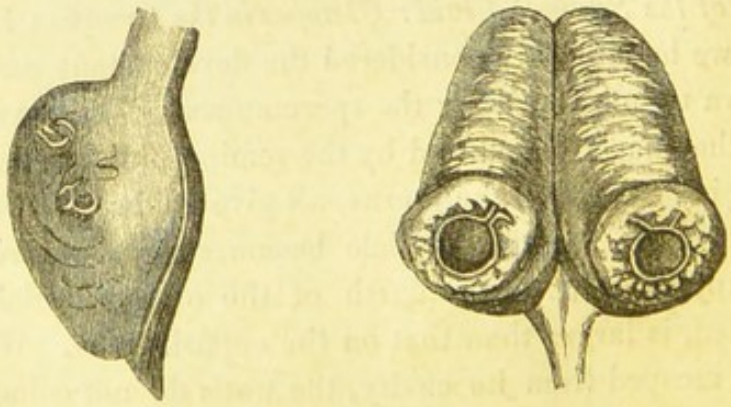
LECTURE II.

CONCEPTION AND GESTATION: THE OVUM OR EMBRYO.

Effects of the Seminal Fluid: Changes in the Graafian Vesicle.—Hitherto we have briefly considered the development and expulsion of ova uninfluenced by the spermatozoa. We have now to examine the changes produced by the seminal fluid. The ovary, the Fallopian tube, and the uterus, all give evidence of its effect. In the ovary, the Graafian follicle becomes greatly increased in size, occupying nearly one-fourth of the ovary; which, when impregnated, is larger than that on the opposite side. When the ovum has escaped from its cavity, the walls do not collapse and form a cicatrix in the same limited time; on the contrary, the cavity remains to the fourth and even to the sixth month of gestation, and traces of it can be observed, as Dr. Montgomery has

shown, at the time of delivery. The characters of the follicle are, as it were, magnified. The outer vascular tunic is more distinct; the true ovisac or "*corpus luteum*" is so large as to become a leading feature; and within this a lining membrane is formed, which is white, having the milk colour, and in some degree the consistence, of cartilage. This membrane is of low vitality, and is probably formed from the blood-clot contained in the follicle. It is evidently a new formation, and will explain perhaps the cause of the differences of opinion as to the situation of the corpus luteum. The Graafian follicle at this time presents three coats; the outer vascular red tunic; the middle yellow corpus luteum; and the inner newly formed milk-white lining membrane. Hence Dr. Montgomery, having examined the Graafian follicle of conception only, was led to believe that the corpus luteum was a new growth between the coats of the vesicle. It is now, however, proved that the inner lining membrane is superadded after conception; and that the corpus luteum is the true ovisac. This is greatly increased in size, and its plicated condition is much more obvious; vessels run numerously in straight lines from without inwards, and probably lie within the sulci which are formed by the folding of the sac. Dr. Montgomery injected these vessels so as to render the yellow mass perfectly crimson.

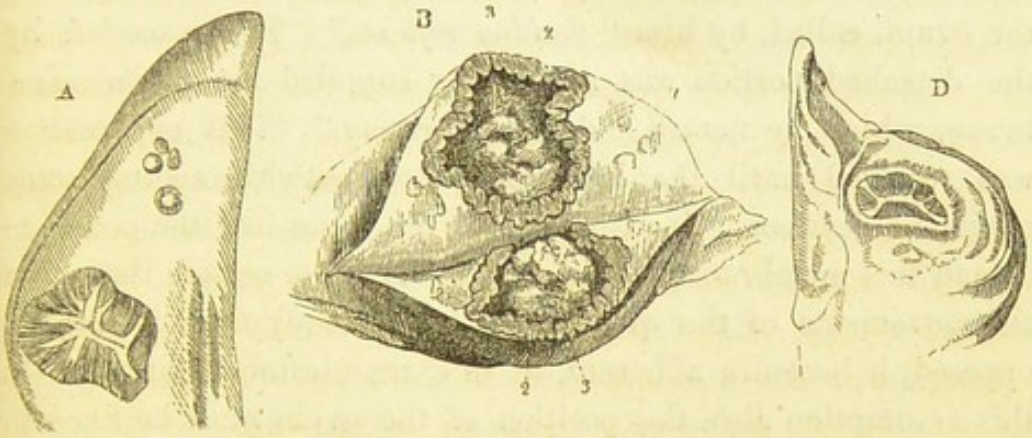
Fig. 4.*



* The ovaries of a woman, who died when three months pregnant.

The presence of the corpus luteum in the ovary has been considered an evidence of conception; recent researches have shewn that the virgin ovary may also present a corpus luteum, but it

Fig. 5.*



cannot exhibit the magnified characters of the gravid Graafian follicle. When the pregnant ovary is divided, the space which the follicle occupies, its enlarged cavity surrounded by a magnified corpus luteum—all prove impregnation. These characters have been observed by Dr. Montgomery three months after conception. He has described the progressive shrinking of the sac at the sixth week after impregnation—at two days after delivery—and even in the twelfth week, when a distinct stellate cicatrix remains, very different from that in the virgin ovary.

Conception may occur while the ovum is in the ovary, or in its transit through the Fallopian tube, or when it is in the uterus. Whenever it happens, increased vascular activity with corresponding change of structure takes place, both in the ovary and in the uterus. Those which take place in the ovary have been described; we have now to consider the changes which occur in the uterus.

* Fig. 5. Corpora lutea at different periods. A. Two days after delivery. D. The twelfth day after delivery. After Dr. Montgomery. B. About sixth weeks after impregnation, showing the plicated form. 1, Substance of the ovary. 2, Substance of corpus luteum. 3, Greyish coagulum in the cavity. After Dr. Paterson.

The Decidua is a membrane which, as its name implies, is detached from the uterus at the birth of the child: its formation is the result of impregnation. Dr. William Hunter described it as a new membrane lining the cavity of the uterus. He supposed that the ovum, on its entrance, detached a portion from the uterine surface, and formed a membrane surrounding the ovum, called by him "*decidua reflexa.*" The space left by the detached portion was afterwards supplied by a new membrane, which he named "*decidua serotina.*" This explanation was received until the last few years, notwithstanding some obvious objections. It assumed that the ovum had the power to detach this membrane; while nothing is more certain than that the movements of the ovum must be perfectly free: if they be opposed, it becomes adherent, as in extra-uterine fœtation. On this assumption also, the position of the ovum must be fixed in the neighbourhood of the opening of the oviduct—the Fallopian tube; but the ovum is often attached low down to the body and even to the neck of the uterus, and the decidua reflexa is found reflected from below upwards in place of from above downwards.

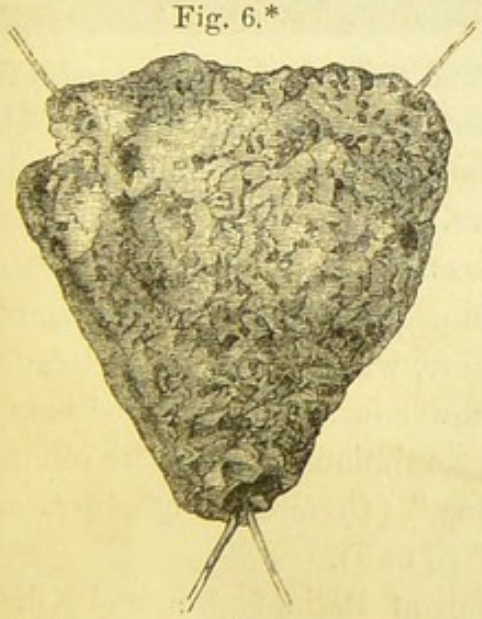
The researches of later inquirers have proved that the decidua is not a new membrane. Dr. Sharpey has shown that it has all the characters of the mucous membrane lining the cavity. The openings of the utricular glands—the foramina—are larger and more distinct; the simple glands themselves become compound; and there is every proof of hypertrophy of the membrane. It is also a soft mass, and, before the cavity of the uterus becomes enlarged, completely fills it, so that the ovum, on entering the cavity, may glide through the softened structure or rest at any given point. The ovum is embedded in this tissue, which gradually encloses it and forms the *decidua reflexa.*

Within the first month of gestation, the ovum lies loosely in the chamber so formed, but afterwards attaches itself to the uterus. As soon as this takes place, the development of the fœtus increases more rapidly: the ovum enlarges, and with it the *decidua reflexa;* so that ultimately it becomes closely applied to the *decidua uteri*, and seems to form with it a single membrane. As

the ovum commences to grow, the base of the chamber formed by the decidua reflexa expands, and a rapid formation of decidua takes place between the ovum and uterus—the *decidua serotina*. At this point the ovum unites itself to the uterus; the villi of the chorion attach themselves to the little depressions on the decidua; while offsets of this membrane dip down between the villi even to the surface of the chorion, so that these villi are surrounded on every side by dissepiments of the decidua.

The *Decidua Uteri*, at the earliest period of pregnancy, is a soft spongy mass. Its internal surface is not perfectly smooth, but rather elevated into numerous projections, having little tubes or furrows running between them. The whole of this surface is covered with minute perforations, which give it a cribriform appearance. In some cases of early abortion, this membrane has been thrown off entire, retaining the shape of the uterus. W. Hunter has given an example (fig. 6). The outer surface is rugged, not unlike a retained coagulum, but differs from this in possessing an organized structure. Many years ago, Dr. Montgomery first pointed out this peculiarity. "Repeated examinations," he says, "have shown me that there are, on the external surface of the decidua vera, a great number of small cup-like elevations, having the appearance of little bags, the bottoms of which are attached to, or embedded in its substance; they then expand, or belly out a little, and again grow smaller towards their outer or uterine end, which in by far the greater number of them, is an open mouth when separated from the uterus. Some of them, which I have found more deeply embedded in the decidua, were completely closed sacs. Their form is circular or

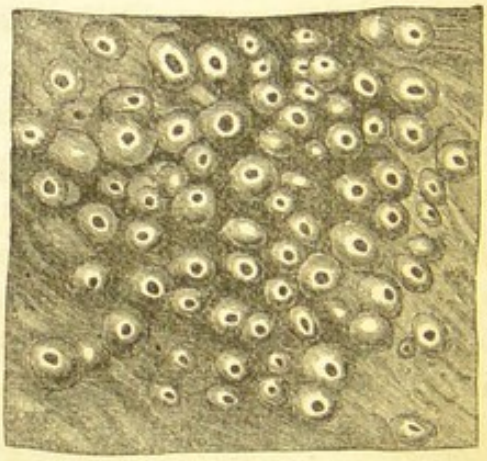
Fig. 6.*



* Fig. 6.—Decidua vera. After W. Hunter.

very nearly so; they vary in diameter from the twelfth to a sixth of an inch, and project about the twelfth of an inch from the surface of the decidua." (fig. 7.) (*Signs of Pregnancy.* Ed. 1837, p. 133.) This appearance has now been proved to arise from the enlarged utricular glands; which, when the decidua is separated from the uterus in abortion, are either torn across, leaving cup-shaped cavities, or are separated entire, forming "the completely closed sacs," described by Montgomery. As pregnancy advances, these characters disappear; the membrane becomes thinner, except where the placenta is being formed, but it still retains its spongy character.

Fig. 7.*



The *Decidua Reflexa* encloses and protects the ovum; with the growth of which its development therefore corresponds. This little sac is generally found near the opening of the Fallopian tube; but it may be met with elsewhere. It has been observed from the size of a pea to that of a hazel-nut. "As the development proceeds, the fœtal protrudes gradually into the uterine chamber, in the form of an incomplete sphere, whose upper pole rises free into the uterine cavity, but the lower forms an attached base of greater or less breadth, which is continuous in its entire circumference with the parietal decidua." (*Cyclopædia of Anat. and Phys.* "*Uterus and Appendages,*" p. 655).

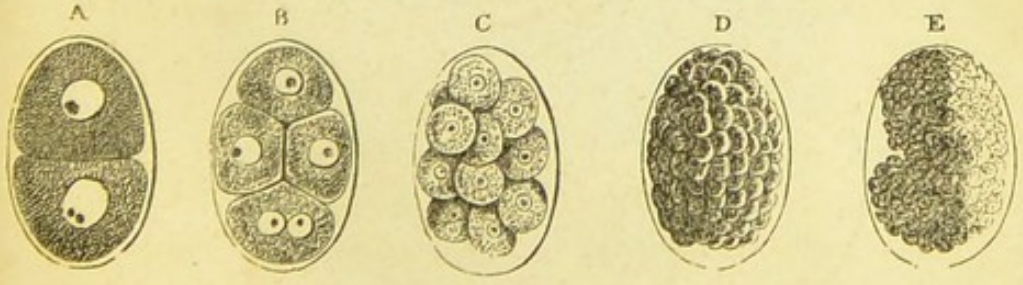
"According to the observations of Rolin, Robin, and Kilian, from the fourth and fifth month onwards, the decidua begins to lose the character of energetic life, which, up to that period, it had exhibited, and becomes atrophied and less firmly adherent to the uterine walls; while between it and the muscular parieties *there appears a new formation of decidua,* at first soft and delicate, but which gradually acquires the peculiar characteristics of that

* Fig. 7.—Decidual cups. After Montgomery.

membrane. This layer is not thrown off at birth nor dispersed in the lochia, but remains attached to the inner uterine surface and forms the foundation of a new mucous membrane" (*Op. cit.* p. 658).

THE IMPREGNATED OVUM.—We have already described (p. 2.) the characters of the unimpregnated ovum, when about to leave the Graafian follicle—the vitelline membrane or *zona pellucida*, containing the yelk, within which are the germinal vesicle and germinal spot. Conception produces remarkable changes in the ovum while passing through the Fallopian tube. The yelk-sac becomes opaque, is covered by an albuminous fluid, and is thus ultimately converted into the *Villous Chorion:* the yelk shrinks so as to leave a space between it and the yelk-sac; the germinal vesicle and germinal spot disappear: and the yelk itself undergoes a change, by which a new membrane is ultimately formed. Bischoff has noticed in the rabbit an energetic rotatory movement in the whole yelk within the sac, attributed by him to the vibratile cilia. The yelk divides into two, four, eight spherical bodies, which multiply by subdivisions in a geometric progression (*i. e.* by dichotomous segmentation) until they form a distinct granular coating surrounding a transparent fluid, the remains of the yelk (fig. 8). This is the *Germinal Membrane*, from which the embryo is formed. It is resolved into two coats or layers;

Fig. 8.*



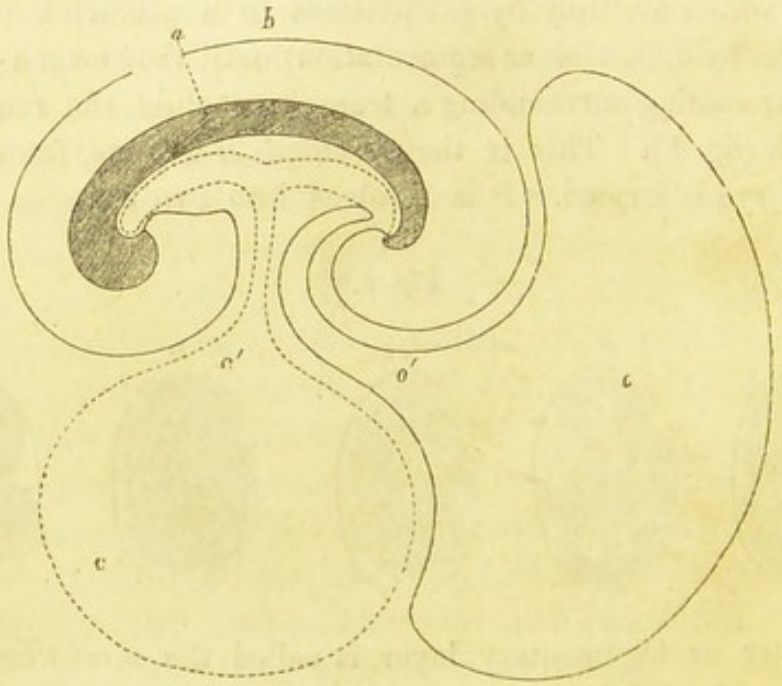
the outer or tegumentary layer is called the serous coat; the inner or visceral layer is called the mucous coat. The former completely envelopes the embryo and its organs, is reflected on

* Fig. 8. Cleavage of the yelk. From Kirkes' Physiology.

itself, and forms a sac named the *amnion*. When the abdomen (previously an open cavity) is closed, the amnion encloses the umbilical cord, and passes from it over the inner surface of the chorion. Thus the ovum presents two membranes; the villous chorion, the bond of union with the uterus; and the amnion which contains a fluid especially for its protection—the fœtal sac. The former grows with the increasing uterus: the latter enlarges with the development of the fœtus. In early ova, therefore, the amnion is very much smaller than the chorion; and a distinct space is left between them. This space is occupied with a reticulate structure (Velpeau), in which rest the *umbilical vesicle* and the *allantois*.

The *Umbilical Vesicle* is formed from the inner or mucous coat, and is connected by a duct directly with the intestines. It contains the yelk, which can pass for some time freely into the intestines: vessels pass from the fœtus along the duct, and ramify

Fig. 9.*

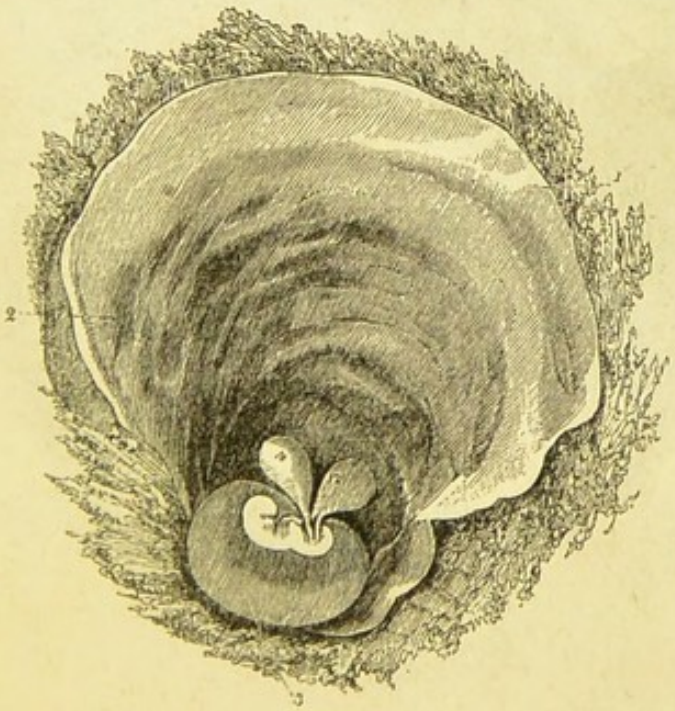


* Fig. 9. Diagram of umbilical vesicle and allantois. *a*, Dorsal structures of embryo. *b*, Amnion. *c*, Yelk-sac or umbilical vesicle. *c'*, Vitelline duct or pedicle of umbilical vesicle. *o*, Allantois. *o'*, Urachus.

over the vesicle—*the omphalo-mesenteric vessels.* When the vascular connection between the fœtus and uterus is established, the duct is closed; the sac shrinks; and, lastly, the omphalo-mesenteric vessels disappear.

The *Allantois* is a vesicle which grows from the caudal extremity of the fœtus; it is highly vascular, and is supplied by the umbilical vessels. It increases rapidly, meets the chorion, and forms the element of the placenta. The arrangement of the minute capillaries, which are crowded over the surface of this vesicle, has been compared to that of the vessels of the lung; and hence it is inferred that its office is similar. But whatever its duties, they are of short continuance; because, as soon as the umbilical vessels are conducted by it to the chorion, the allantois shrinks, and nothing remains but the urachus in connection with the bladder. It is very difficult to detect this vesicle in early ova; but a diagram from Müller will give an idea of the relative position of the umbilical vesicle and allantois (fig. 9).

Fig. 10.*



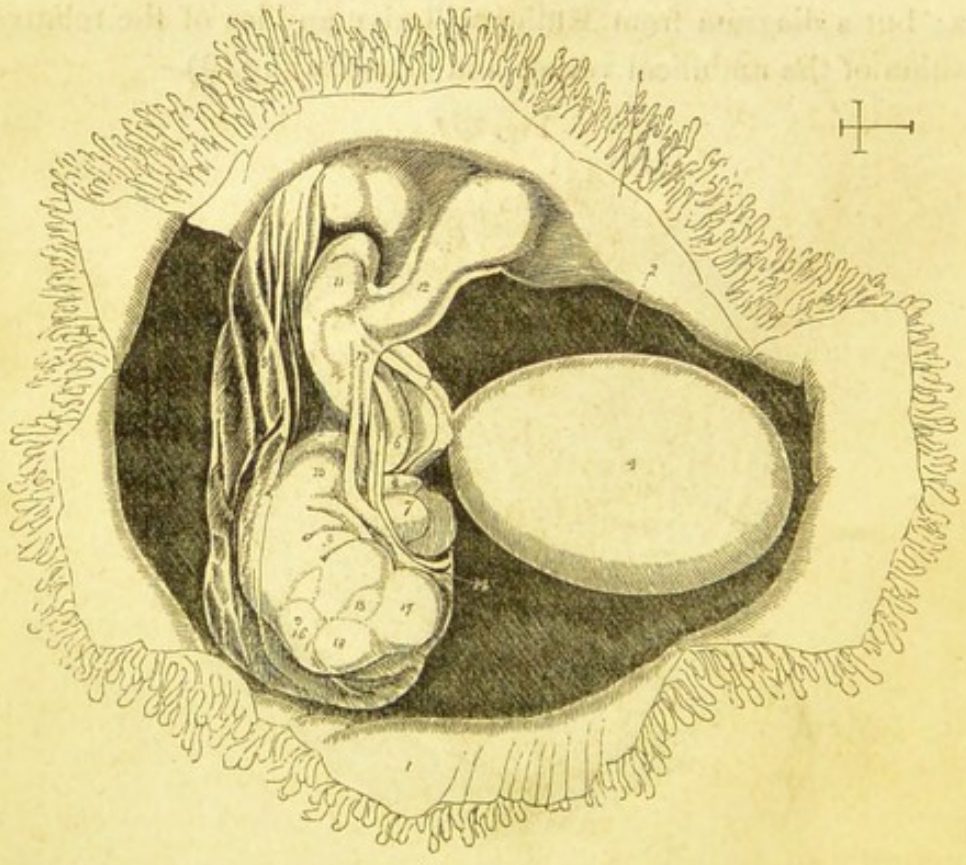
* Fig. 10. Ovum between nineteenth and twentieth days, described by Coste, magnified four diameters. 1, Decidua. 2, Chorion. 3, Amnion. 4, Umbilical vesicle. 12, Allantois.

Descriptions of Ova at early period of Gestation.—Mr. Wharton Jones, (*Phil. Trans.* 1837, p. 339.) and Dr. Allen Thomson, (*Edin. Med. and Sur. Journal,* No. 140,) have described ova as early as the twentieth day, before the allantois joined the chorion; and Coste has figured one between the sixteenth and twentieth days, magnified to the extent of four diameters (fig. 10).

In this figure, the decidua and chorion have been removed; the embryo is enveloped in the amnion; the umbilical vesicle projects from the middle of the body; and the allantois, situated nearer to the posterior extremity of the embryo, is beginning to apply itself to the chorion.

Wagner has also described and figured an ovum about the twenty-first day from conception (fig. 11).

Fig. 11.*



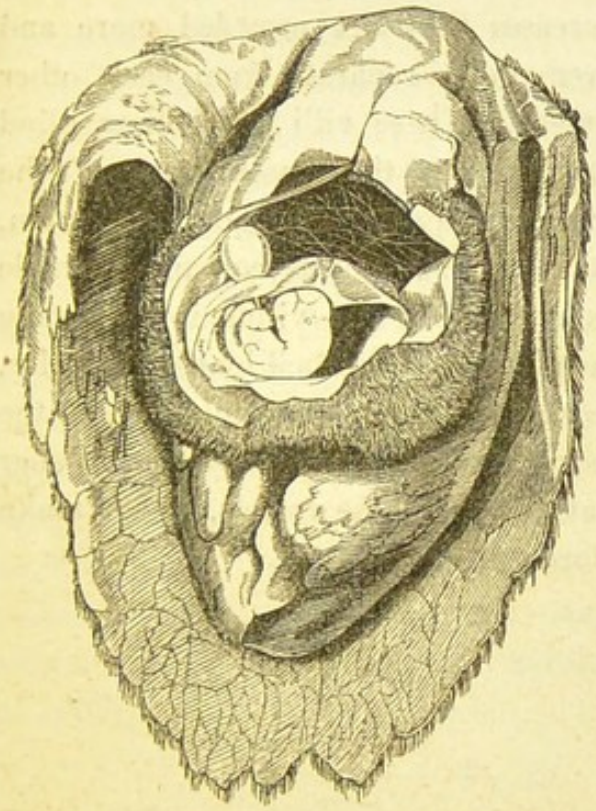
* Fig. 11. Ovum and embryo, described by Wagner. (The natural size is shewn at the side). 1, Chorion opened. 2, Space between chorion and amnion. 3, Amnion. 4, Umbilical vesicle. 5, Intestine. 6, Corpus Wolffi-



DRAWN BY J. HASLOCH. ENGRAVED BY CHARLES WASS.

These are examples of the earliest ova detected by the educated eye of distinguished physiologists. As the stages of development are advanced, the several parts are more easily seen. Wagner has given a very perfect example of an ovum at the fifth week, shewing the decidua, decidua reflexa, chorion, amnion, and umbilical vesicle, but not the allantois (fig. 12).

Fig. 12.*



At a rather later period, Dr. Sharpey has prepared an ovum, in which the omphalo-mesenteric vessels are beautifully shewn, although the vesicle itself is greatly reduced; proving that these vessels are the last to disappear (plate I.).

Thus far, the life of the embryo seems independent of the uterus. It derives its support from the yelk of the umbilical vesicle, where a very active circulation is going on; and this process is probably aided by the changes in the blood, caused by its circulation through the lung-like capillaries of the allantois. As soon, however, as the umbilical vessels reach the chorion, the allantois spreads over it, forming an inner layer of that membrane—the *endochorion;* and the capillaries of the umbilical vessels at once pass into the villi of the chorion.

The Placenta is thus formed. The chorion has been de-

anum. 7, Heart. 8, Liver. 9, Inferior maxilla. 10, Anterior extremity. 11, Posterior extremity. 12, Allantois. 13, 14, Points where amnion is reflected over the cephalic and caudal extremities. 15, Rudiments of eye. 16, Ear. 17, Cerebral hemispheres. 18, Corpora quadrigemina.

* Fig. 12. Aborted ovum and embryo of five weeks, described by Wagner.

scribed as being formed from the yelk-sac and the albuminous coating it receives on the passage of the ovum through the Fallopian tube. When in the uterus, it is covered with villi; those in contact with the *decidua serotina* dip into it and become attached; as the ovum increases they are crowded more and more together, while the remainder separate from each other until ultimately they disappear. These villi are hollow blind tubes, surrounded on every side by the dissepiments of the decidua. When the capillaries of the allantois reach the chorion, they pass into these villi, so that each villus contains a single artery and vein. Their course within the villus is extremely tortuous, like twisted threads forming terminal loops: these Dr. John Reid supposed to be the mode of communication of the artery and vein, their junction forming a single coil. Weber and Goodsir describe capillaries from these vessels, which make several convoluted loops before uniting.

Fig. 13.*

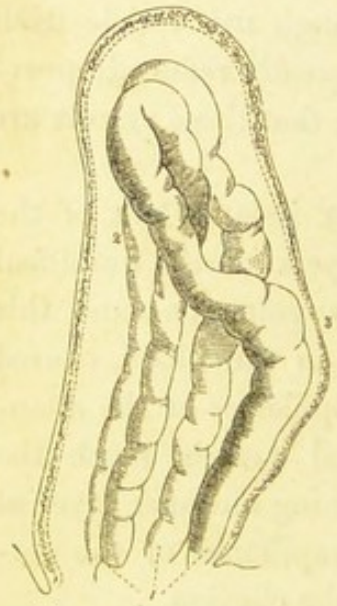
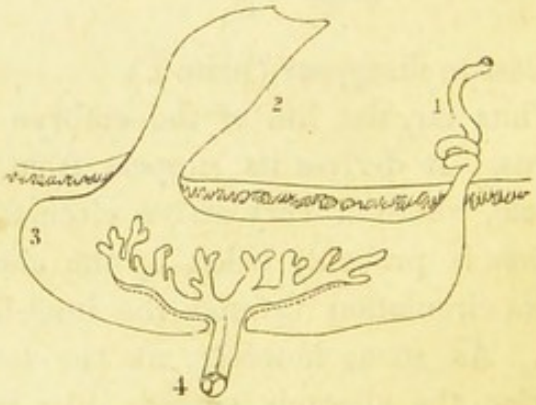


Fig. 14.



The accompanying illustrations will render the minute structure of the placenta more intelligible.

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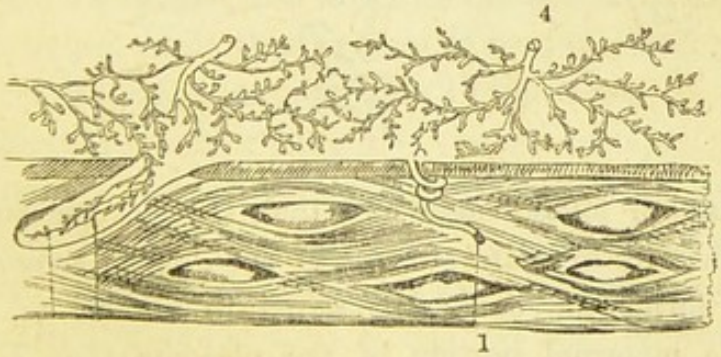
* Fig. 13. The extremity of a villus, taken from a recent placenta, in which the vessels were still filled with blood, magnified 200 diameters, after Weber. 1, Loop filled. 2, Loop empty. 3, Margin of pellucid villus.

If a single tuft of the placenta be so unfolded as to expose its several thread-like branches, and one of these be placed under a microscope, two trunks—arterial and venous—will be observed, surrounded by other smaller tufts, which are the ultimate terminations of these vessels.

Single arterial branches arise from the minute trunk, and, without subdividing, twist into several coils like tangled threads, and then each directly enters into the vein, being, as it were, a continuation of the same vessel.

"The vascular villi of the fœtus dip into wide blood-vessels which arise from the uterine system, and which permeate the whole uterine portion of the placenta: the *looped capillaries* of the fœtus being thus surrounded and bathed, as it were, in the maternal blood. The ends of the villi are formed by the inosculating loops of minute arteries and veins of the fœtus, which, however, have the distinguishing character that the same vessel makes several turns from one loop into another before it enters the nearest venous trunk." (Müller's *Physiology*, p. 1605.)

Fig. 15.

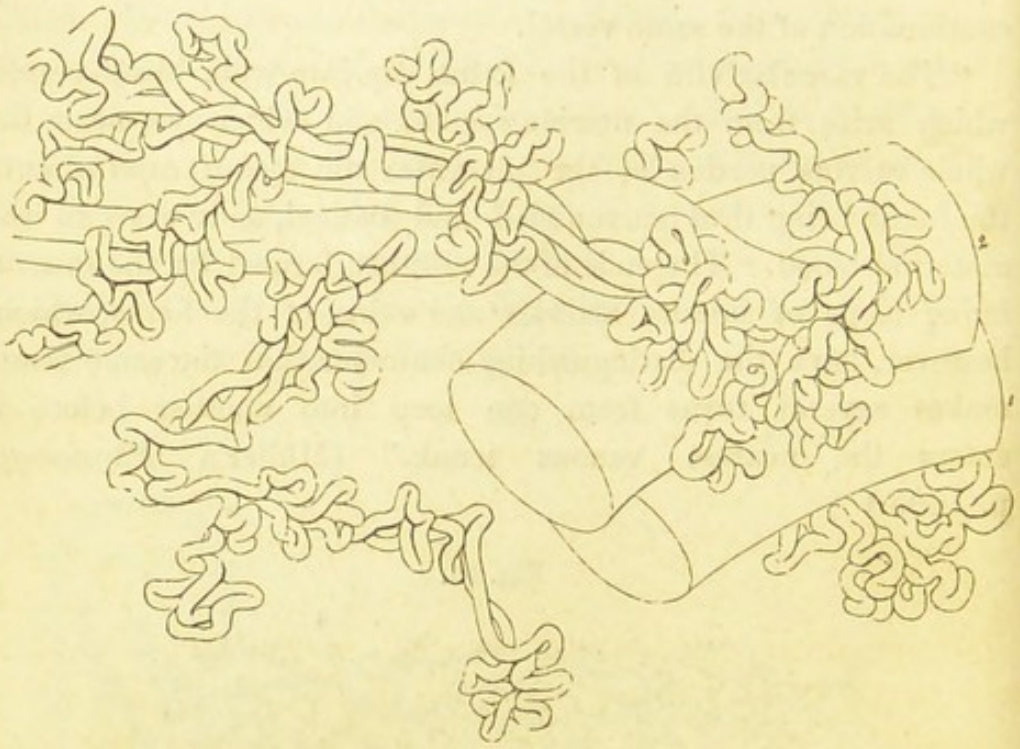


"According to Dr. Reid, the blood sent from the mother to the placenta is poured by the curling uterine arteries (1, Figs. 14, 15) into a large sac (3) formed by the inner coat of the vascular system of the mother, which is intersected in many thousand different directions by the placental tufts (4) projecting into it like fringes, and pushing its thin wall ('margin of the lucid villus') before them in the form of sheaths, which closely envelope both the trunk and each individual branch composing these trunks. From this sac the maternal blood is returned by

the utero-placental veins (2) without having been extravasated, or without having left her own system of vessels." (*Ibid.* p. 1606.)

These villi and their contained vessels collectively form lobes or cotyledons: the cotyledons united form the placenta. The convoluted character of these capillaries is retained throughout, and in the mature placenta may still be observed (fig. 16).

Fig. 16.*



These tufts of fœtal vessels and their sheaths are surrounded on every side by the dissepiments of the *decidua serotina*, which ultimately forms the cavernous structure alluded to, and constitutes the maternal portion of the placenta (fig. 14). The uterine arteries pour the blood into this structure, whence it is returned to the uterine veins; thus the fœtal vessels are, as it were, bathed in the maternal blood; but there is no direct contact—the villous sheath on the fœtal side, the membrane of the spongy portion on the maternal, are interposed. Whatever change in the blood takes place, is effected through the medium

* Fig 16. Villi of the fœtal portion of a mature human placenta magnified 100 diameters. After E. H. Weber. 1, The artery. 2, The vein.

of these membranes (fig. 15). Professor Goodsir has shewn more accurately the manner in which this is accomplished. The extremity of a placental villus being highly magnified, he has discovered two sets of nucleated cells, having a distinct space between them: one set, the internal, belong to the chorion; the other to the lining membrane of the vascular system of the mother. Hence the inference, that the materials secreted by the maternal range of cells are poured into this space, from which they are absorbed by the fœtal nucleated cells (fig. 17).

Fig. 17.*



It is an interesting question, whether any effect similar to endosmose and exosmose is the result; which, if true, would explain a difficulty with regard to the fœtal circulation. How is this carried on? The power of the fœtal heart, weak and immature, is scarcely sufficient to propel the blood, not only through the vessels of the fœtus, but along the cord to the thousand vessels of the fœtal villi. A power of attraction is necessary to draw the fœtal blood towards the placenta; and whether this power exists, while this process of secretion and absorption is going forward, seems a question full of interest.

The *Circulation in the Placenta* is carried on equally throughout the organ by the maternal and fœtal vessels; the maternal blood passing through the cavernous or spongy structure as far as the fœtal surface of the placenta, while the fœtal vessels accumulate on the uterine parietes; so that, at the full term of pregnancy, the placenta may be equally injected from the fœtal and the uterine side. Some years ago, we had the opportunity of proving this. The uterus of a woman who died in child-birth, before the placenta was detached, had been sent to us; and through the kindness of Dr. Sharpey, a very careful injection

* Fig. 17. Extremity of a placental villus, after Goodsir. *a*. Lining membrane. *c*. Vascular system of mother. *b, c*. External cells of villus. *d*. Space between maternal and fœtal portions of villus. *e*. Internal membrane of villus. *f*. Internal cells. *g*. Loop of umbilical vessels.

was made. The maternal side was injected by colourless size; the fœtal with vermilion. The colourless spaces of the spongy structure extended to the fœtal surface, and were distinctly observed between the vermilion which seemed to fill the whole placenta. (Plate II).

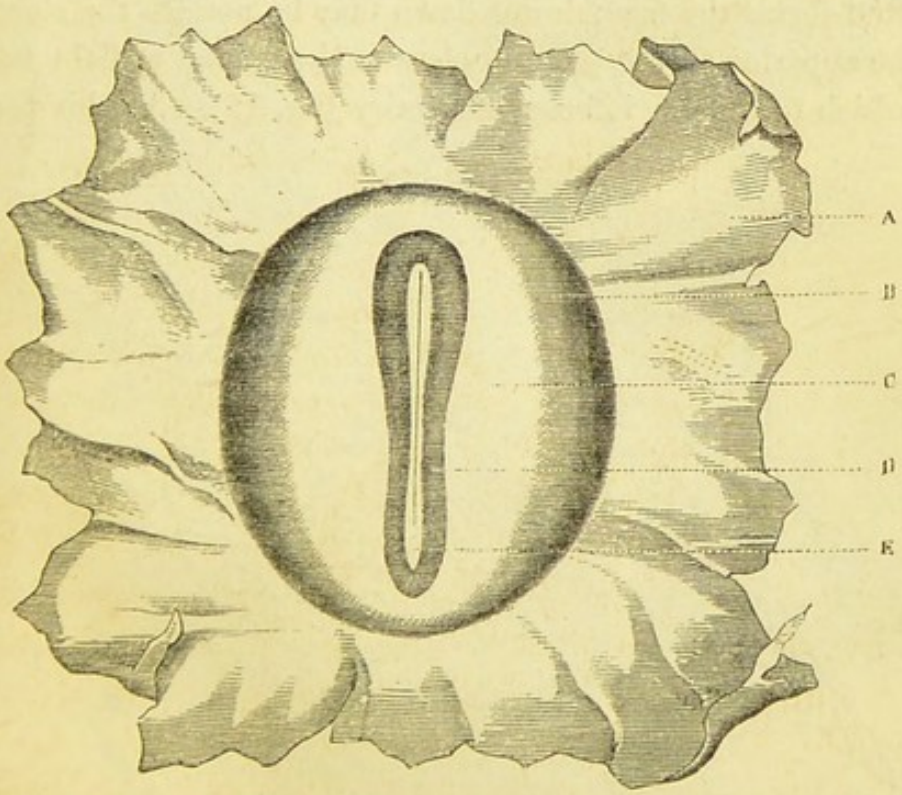
The allantois reaches the chorion about the fourth week. An outline of the placenta, marked by the clustering villi, may be observed at the second month, In the third month, the placenta is more distinct, and thus continues until birth; previously to which, however, the elements of a new mucous membrane are being formed. Rolin, Robin, and Kilian, date the commencement of this membrane so early as the fourth month; and if so, it should be sufficiently advanced by the seventh month to shield the uterine parietes when the placenta is separated, and to render its artificial separation attended with less risk. Previously, however, to this time, the attempt to remove the after-birth manually is not only very difficult, but dangerous; both because of the hemorrhage which must follow, and of the inflammation that may be excited.

The *Situation of the Placenta* varies. It has been generally supposed, since the time of Dr. Hunter, to have its seat near the Fallopian tube: and when it was found near or at the mouth of the womb, the cases were considered rare and rather puzzling exceptions to a general rule; but later researches at the time of birth have proved that this supposed position is by no means constant. Some years ago, Mr. Hugh Carmichael of Dublin, having made several *post mortem* examinations of women dying in their confinements, found the placenta invariably low down at the posterior wall of the uterus. In all cases of delivery at the Lying-in Hospital to which he was attached, great care was taken not to rupture the membrane further than necessary for the expulsion of the child; the placenta and membranes were afterwards replaced as nearly as possible in the position occupied while in the womb, and the placenta was always found at the lower part of the sac, which seemed to confirm his observation (*Dub. Journal*, vol. xiv., p. 445.) This view also receives support from auscultation: the placental murmur is heard much

more distinctly and more constantly in the lower than in the upper segment of the gravid uterus. The most usual seat of the placenta, according to Mr. Carmichael, is low down on the posterior wall of the uterus: sometimes it is applied to the anterior wall, and the sound is distinctly heard under the stethoscope; and, as is well known, it may be found close to or directly over the mouth of the womb.

The Embryo is developed from the germinal membrane (p. 21). A round opaque spot is observed at one part of the surface the aggregation of nuclei, which soon form themselves into a ring (*area vasculosa*) surrounding a clear space (*area pellucida*), in the centre of which the first trace of the embryo is observed.

Fig. 18.*



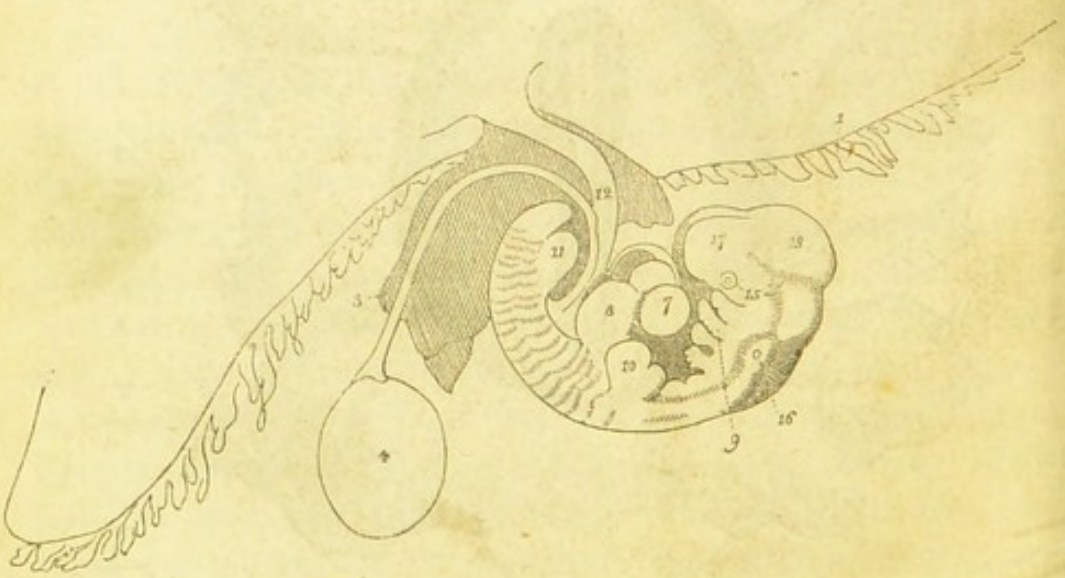
The origin of the nervous centre—the spinal cord—is first found between the serous and mucous layers; and, as it is deve-

* Fig. 18. Germinal membrane of bitch's ovum, after Bischoff. A. Germinal membrane and rudiments of embryo. B. Area vasculosa. C. Area pellucida. D. Laminæ dorsales. E. Primitive groove.

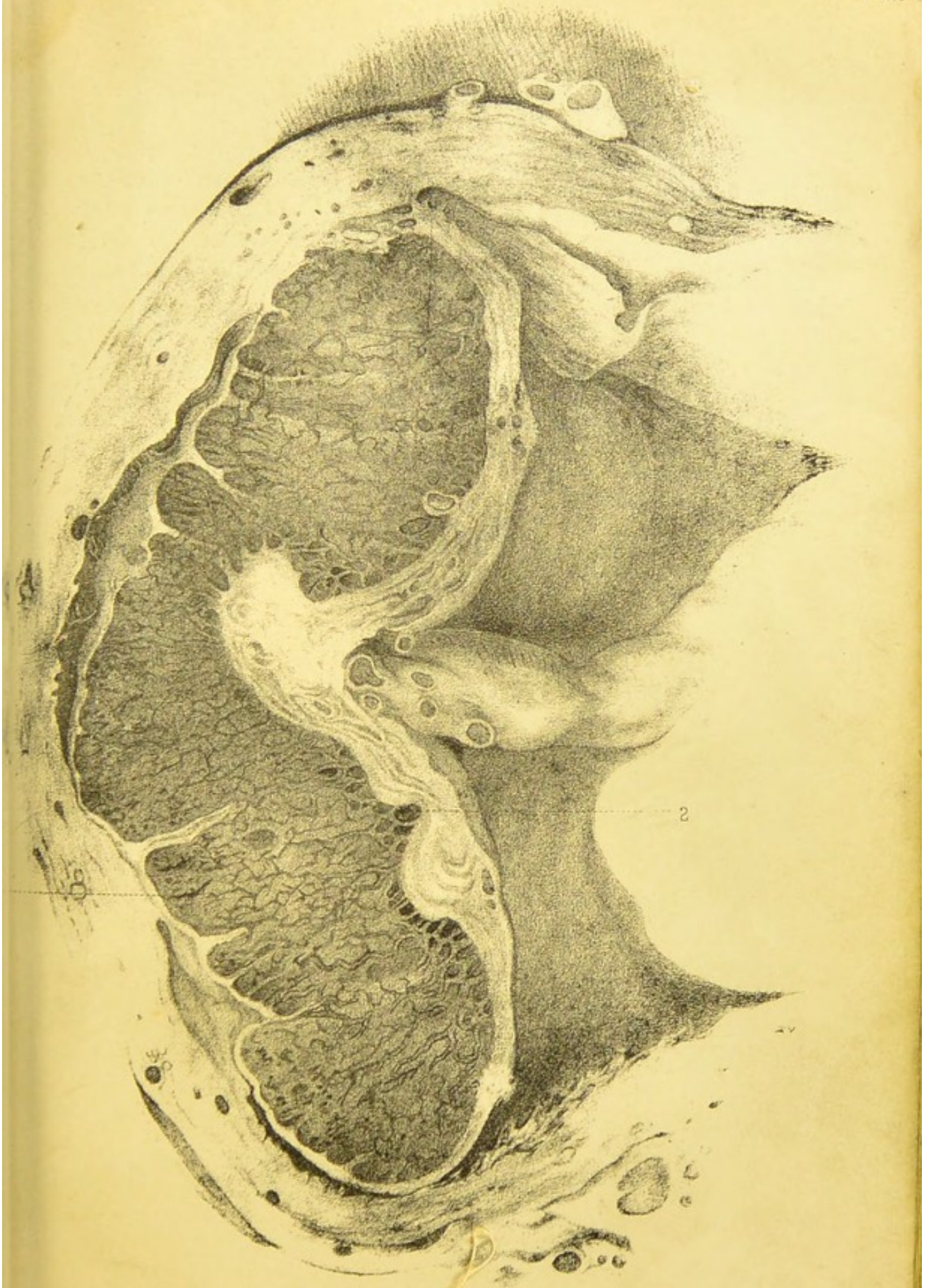
loped, bends at both extremities, drawing down the serous layer with it. The vascular system has its origin from the area vasculosa; an intermediate vascular layer being formed between the serous and mucous laminæ. The serous layer is the basis for the formation of integuments, muscle, bone, &c. The mucous layer forms the visceral organs; the nervous and vascular systems lying between the layers.

At the end of the *first month* the embryo is sufficiently developed to observe its several parts. The spinal column is strongly curved, the large head bending in towards the centre; the caudal extremity is prolonged and doubled on itself. The centre is a boat-shaped cavity, in which the elements of the visceral organs are exposed; the heart and liver lying in the same cavity. This cavity is bounded superiorly by three visceral arches, of which the first forms the face; lower down may be noticed the elements of the superior extremity, and close to the caudal end the tubercle which forms the inferior extremity (fig. 19). At this period,

Fig. 19.*



* Fig. 19. Human embryo of fourth week (Kirkes). 2, Chorion. 3, Amnion. 4, Umbilical vesicle. 7, Heart. 8, Liver. 9, Visceral arch destined to form lower jaw. 10, Rudiment of upper limb. 11, Rudiment of lower limb. 12, Umbilical cord. 15, Eye. 16, Ear. 17, Cerebral hemispheres. 18, Corpora quadrigemina.



and. lith.

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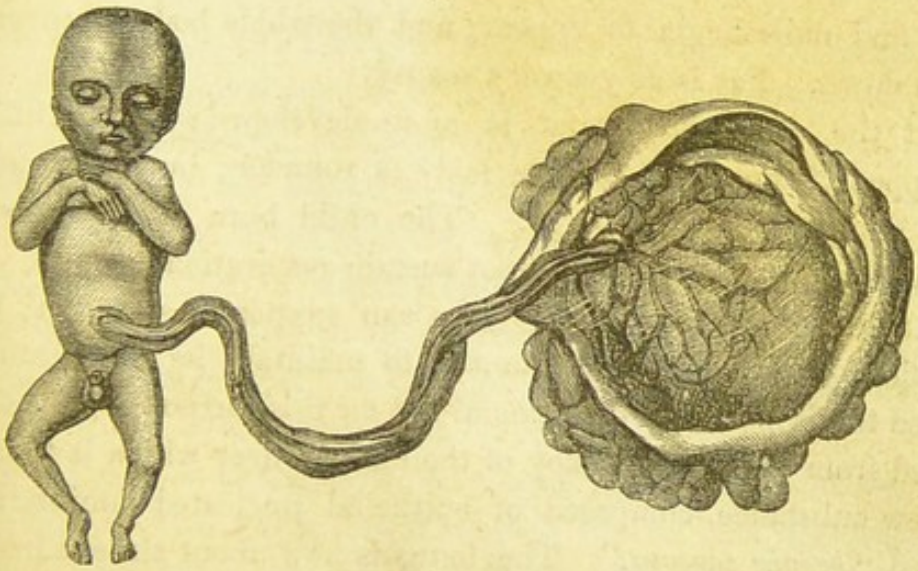
1. *Fœtal Vessels*
2. *Reticulate structure.*

NATURAL VIEW OF PLACENTAL VESSELS.

the corpora quadrigemina forms the chief portion of the cerebral mass, the cerebrum not being developed. The face is unformed; the eyes are quite lateral; and in place of nose and mouth, a triangular space exists.

At the *second month*, the head and face are more formed; the central cavity closes in, remaining open at the inferior part only, then called umbilicus; the extremities are more developed; and the caudal extremity is less prolonged. (See Dr. Sharpey's plate, p. 25.)

Fig. 20.*



At the *third month*, the outline of the embryo is perfected. The head and face are complete; the abdomen is closed; the extremities are formed; and internally the thorax is divided from the abdomen. The umbilicus becomes a circular opening, whence the cord passes to the placenta; the vessels in the cord still run parallel, not having as yet assumed their spiral course. The situation of this opening is a little above the pubes: as the embryo increases, it gradually rises, until, at the full term of gestation, it is a central point, equidistant from the head and lower extremities. At this period, the anmion is more closely

* Fig. 20.—Fœtus of three months. Vessels of cord parallel. After Moreau.

applied to the chorion, so that the ovum is resolved into the placenta, membranes, and fœtus. The latter is about two and a half inches in length, the head is globular and large—more than one fourth of the whole.

The growth of the embryo is now more rapid. At the *fourth month* it is above four inches in length.

At the *fifth month* the fœtus is about twelve inches long. Bones and muscles are more rapidly developed; the latter begin to give evidence of their power, causing the first sensations of motion in the abdomen like the trickling of water. The skin is advancing towards completion; the epidermis is formed; the hair and nails begin to appear; and the whole body is covered with down. Fat is as yet very scanty.

At the *sixth month*, fat is more developed; the wrinkles disappear from the face; the body is rounder; but the head is still disproportionately large. The child born prematurely is capable of breathing, but cannot sustain respiration.

At the *seventh month*, the fœtus can support respiration; but the fat is not in sufficient quantity to maintain its temperature; hence the importance of artificial aid for this purpose. The skin is red from the transparency of the cuticle, over which is formed a new substance, composed of epithelial nucleated laminæ, and called "*vernix caseosa*." The fœtus is now about sixteen inches in length, and weighs about two pounds.

At the *eighth month*, the membrana pupillaris, or membrane which has hitherto closed the pupil, disappears, and the epidermic sealing of the eyelids begin to loosen.

At the *ninth month*, intra-uterine life is completed. Fat is abundantly formed; the hair is increased; the nails are complete; the down has disappeared. The umbilicus is now exactly at the centre of the body. The child is about twenty inches in length, and weighs about seven pounds; but this is often exceeded.

LECTURE III.

THE GRAVID UTERUS.

Changes in Size.—The gravid uterus gradually increases in size with the development of the fœtus. The body is first enlarged, the anterior wall becoming equally round with the posterior, giving the uterus a more perfectly pyriform shape. The fundus forms no part of the cavity until about the sixth or seventh week, when it slightly rises above the openings of the Fallopian tubes. Wagner has given a section of the gravid uterus about this time, which represents accurately the ovum and its relation to the uterus (fig. 21, p. 36.)

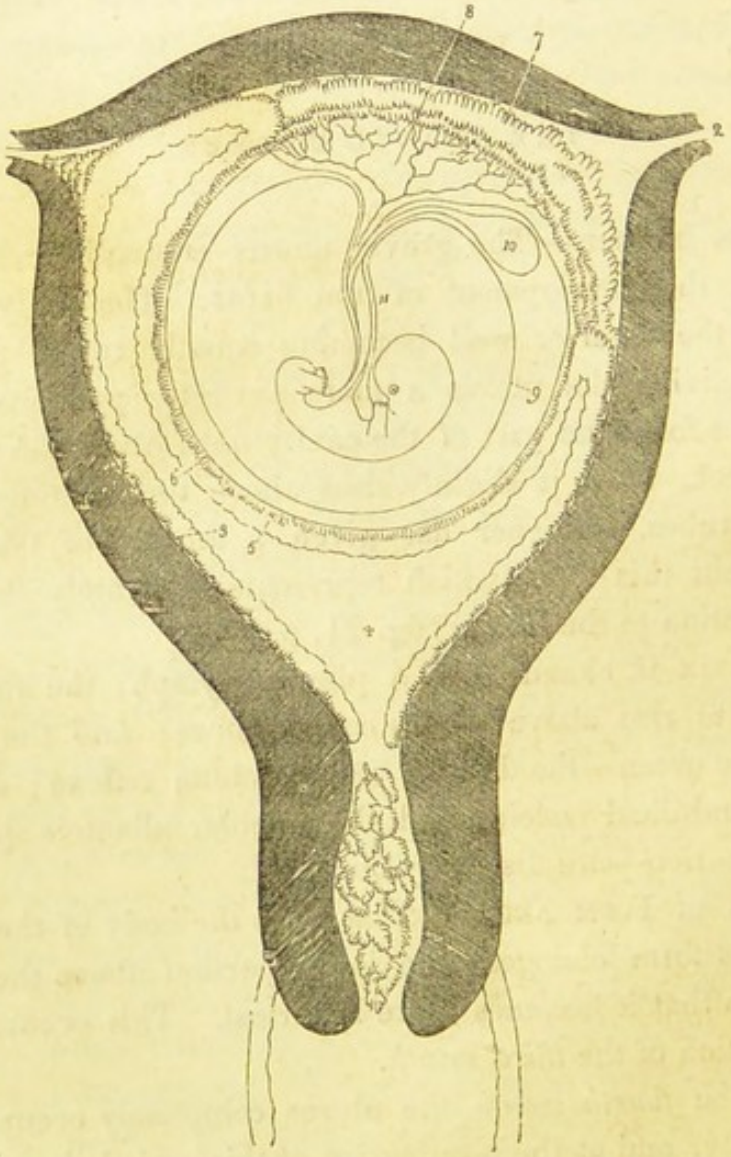
The cervix is closed with a plug of lymph; the fundus is beginning to rise above the Fallopian tubes; and the several parts of the ovum—the decidua vera; decidua reflexa; chorion; amnion; umbilical vesicle; and the vascular allantois spreading over the chorion—are distinctly observed.

Changes in Form and Position.—As the body of the womb enlarges, its form changes; the lower portion above the cervix expands, so that it becomes more spherical. This occurs about the completion of the *third month*.

During the *fourth month*, the uterus completely occupies the pelvic cavity, and at the termination of this period rises slightly above it, entering the abdomen; this may occur without any remarkable change taking place, but sometimes the uterus emerges suddenly from the brim of the pelvis, and, the pressure being quickly taken off the great venous trunks, syncope follows. Hence this symptom has been seized upon as a sign to date the duration of pregnancy. So also, if the uterus be retroverted, its

increased size, filling the pelvis, presses on the bladder and rectum so much, as to produce those distressing symptoms from retention of urine and constipation, which first attracted attention to this displacement.

Fig. 21.*



* Fig. 21.—Perpendicular section of uterus with fully formed ovum. 1, Plug of lymph in cervix uteri. 2, Opening of the Fallopian tube. 3, Decidua vera. 4, Cavity of uterus, nearly filled by ovum. 5, Decidua reflexa. 6, Chorion. 7, Decidua serotina. 8, Allantois and situation of future placenta. 9, Amnion. 10, Umbilical vesicle. 11, Umbilical cord.

At the *fifth month*, the womb, still retaining its globular form, rises midway between the pubes and umbilicus. Its length, however, is rather increased by the expansion of the fundus.

At the *sixth month*, it ascends to the level of the umbilicus; and, pressing upon it, causes it to project. The shape is becoming more an ellipse; the fundus forming the larger curve.

At the *seventh month*, it is midway between the umbilicus and ensiform cartilage, which it nearly reaches at *the eighth month*.

At *eight months and a half*, the uterus has attained its highest distance, and presses forwards against the abdominal parietes, which are expanded to their fullest extent. The intestines lie posteriorly, and in such a confined space are pressed strongly against the diaphragm; hence the distressin respiration at this time. Changes, however, now take place preparatory to parturition. The womb is gradually drawn down again towards the pelvis; the distress of respiration is relieved; the abdomen is less prominent; hence the old expression "flattening of the belly," used as an indication that labour is approaching. The womb now forms a more perfect ellipse; the lower and smaller curve being formed either by the expanded cervix, or by that portion of the uterus immediately above it (fig. 22.)

Fig. 22.*



* Fig. 22.—Gravid uterus at the ninth month.

The *Cervix Uteri* may or may not form part of the gravid uterine cavity. The changes which take place in it are of a different character from those which occur in the other parts of the organ. In the first month of gestation, it becomes more vascular, softer, and thicker than the virgin cervix; the orifice is rounder and somewhat enlarged—the little finger might be passed within it. The canal is enlarged; and the penniform rugæ are more developed. A large quantity of tough gelatinous mucus is poured out, which completely fills up and closes the cavity of the cervix. During pregnancy, the os and cervix both gradually increase in size; the cervix becomes shorter, and sometimes even apparently disappears towards the conclusion of gestation. This seeming disappearance, however, is caused by its increasing breadth; the neck, as it were, being spread out transversely and losing its former character; its cavity, however, remains in its integrity, and forms no part of the uterine cavity. Dr. A. Farre has well shewn this in a vertical section of the gravid cervix uteri of a woman, who died of phthisis in the eighth month of pregnancy.

There are some exceptional cases, however, where the cervix is completely expanded before delivery, so that the head of the child may be felt resting upon it, just as when, in the progress of labour, the cervix is gradually unfolded. Thus, in the commencement of labour, the cervix may be felt very much shortened and stretched out; the finger may pass into its cavity, but no part of the child can be felt: at a later period the cervix is unfolded; and then the cavity becomes only part of the general uterine cavity, and the presenting part and membranes are easily detected.

Positions of the Gravid Uterus.—In its ascent, the uterus is generally inclined to the right side of the abdomen; sometimes, however, to the left. Its inclination forwards depends very much upon the strength of the parietes of the abdomen and on the axis of the brim of the pelvis. When the muscular walls are strong, as in first pregnancies, the uterus is not allowed to project much; this is remarkably the case with women in a state of nature, as among some of the Indian tribes and other aborigines.

So also, with strong girls, the form may be so little altered, that pregnancy is concealed to the time of delivery. On the other hand, when the abdominal parietes are weakened by many pregnancies, the womb projects very much; and if, in addition to this, the brim of the pelvis look forwards, and the uterus be compressed by the corset, it may be driven directly downwards over the pubes.

The Special Coats and Tissues of the uterus undergo a remarkable development during its rapid increase of size; an increase in nine months of from two inches to more than twelve in its longitudinal axis.

The *Peritoneum* was supposed by Dr. Wm. Hunter to be only unfolded; the broad ligaments being separated, and applied to the increasing uterus: but this opinion has since been proved incorrect, because the broad ligaments are found in the gravid uterus at the full term very nearly of the same size as in the unimpregnated womb, the only alteration being that of position, the alæ being more closely applied in the former than the latter case. The growth of the peritoneum keeps pace with that of the uterus by the addition of new matter, so that it is rather increased than otherwise in thickness. It is united to the uterus by a strong fibrous tissue, which gives the womb a powerful support during its expansion, and when uterine action commences. This seems proved by some forms of rupture of the uterus, when the peritoneum and these fibres give way, causing transverse fissures, as if it were cut with a knife.

The *Middle or Proper Coat of the Uterus*, in the virgin, requires the microscope and the scientific eye to detect embryonic muscular fibres; now, however, the stimulus of conception causes such a rapid growth that muscular fibres are perfectly obvious. The elementary fibres increase from seven to eleven times their length, and are nearly five times as wide. In addition to these, a new formation of muscular fibres takes place, chiefly within the first half of the period of gestation; and from this time forwards, the muscular coat is strongly marked, the fibre-cells being of great magnitude; they are thrown into numerous folds, and seem striated, with the nuclei prolonged. The fibres are formed into layers

united by fibrous tissue more densely and firmly on the inner and outer surfaces. Towards the centre, they are more separable; the fibrous tissue being looser and everywhere traversed by blood-vessels. "These laminæ are superimposed the one upon the other, in layers parallel with the two surfaces of the uterine walls; but neither the laminæ themselves nor the fibres composing them can be said to take any definite course." "This," Dr. Farre observes, "is especially the case in the middle or vascular layer." (*Cyclopædia of Anat. and Phys.* "*Uterus*," p. 651). On the external and internal surfaces, the course of the fibres is more easily traced; those described by Sir Charles Bell as converging towards the round ligaments, and those surrounding the Fallopian tubes. "But nothing like a continuous arrangement of muscular fibres in *the form of circular or longitudinal bands surrounding or investing the organ can anywhere be demonstrated* by the aid of the microscope" (Dr. Farre, *loc. cit.*). In connection with the management of the first stage of labour, these external and internal muscles will be described, and circular fibres will be alluded to; but they must not be considered as being equally defined. The extremely irregular course which the laminæ of fibres take everywhere, perforated by blood-vessels, give a section of the uterine parietes the appearance of a sponge.

The *Blood-vessels* of the uterus are greatly increased in length and breadth; the arteries pursuing a spiral course, the veins appearing like flattened channels between the muscular parietes. They will be more particularly described in connection with hæmorrhage.

The *Nerves of the Uterus* have been the subject of a very heated controversy, which has much contributed to obscure our knowledge of the subject. It will be necessary, therefore, to examine the questions raised, and to separate, if possible, fact from assertion. The chief supply of nerves is derived from the hypogastric and inferior aortic plexuses; some arise in the spermatic plexus, and go principally to the ovaries; a few fibres spring from the sacral plexus. The ganglionic nerves, consisting of gelatinous fibre, greatly predominate; the tubular fibres of the cerebro-spinal system are also found, but in small quantity.

Dr.Snow Beck has made a beautiful dissection of these nerves, which deservedly obtained the approval of the Royal Society.

Are the nerves enlarged like the arteries and veins, in the gravid uterus? This is not a new question. Dr. Wm. Hunter thought that they must be enlarged; but he could not prove it or satisfy his brother John, who denied that they were so. Tiedemann, in his plates of the nervous system, gives those of the gravid uterus; but they are not enlarged, on the contrary, are rather scanty. These authorities governed the opinion of the profession until 1842, when Dr. Lee presented to the Royal Society an "Appendix to a paper on the Nervous Ganglia of the Uterus, with a Further Account of the Nervous Structures of that Organ," in which he describes enlarged nerves forming sub-peritoneal plexuses and ganglia on the anterior and posterior surfaces; in fact, shewing a similar increase in the nerves to that which is observed in the arteries and veins. The consistency of such a discovery with probability, led to the adoption of Dr. Lee's dissections by the profession; and many of the most eminent saw and admired them. Dr. Snow Beck was at the same time engaged in making the beautiful preparation of the nerves of the unimpregnated uterus to which we have alluded; and Dr. Lee's discovery induced him to make another preparation of the nerves of the gravid uterus, to shew by contrast their enlargement and the new plexuses spoken of. In proceeding with his task, difficulties began to surround him; he could find no sub-peritoneal plexuses; his eye, well accustomed to nervous tissue, sought for nothing else; the neurilemma therefore, and every portion of fibrous structure surrounding the nerves lying between the peritoneum and the uterus were removed. The result was that the nerves, thus exposed, were found not enlarged, but just as John Hunter first stated. Dr. Snow Beck's enquiries on this question were sent to the Royal Society, together with his account of the nerves of the non-gravid uterus.

A storm of controversy increasing almost to a hurricane, sprang up, which displaced the President from his seat, and greatly disturbed the whole profession. A mass of evidence was collected in favour of Dr. Lee's views; and great indignation was

expressed that any doubt should be cast upon them. The facts, however, remained unaltered. Hirschfeld, Robin, and Jobert de Lamballe, state that there is no actual increase of nerve-substance. Franz Kilian and Kölliker, advance only a very few paces in favour of Dr. Lee. Kölliker from the analogy of the lower animals, considers that the nerve-fibres are like the muscular fibres, embryonic in the unimpregnated uterus; that during pregnancy they are increased *in length;* but that any increase of *thickness* is due to the growth of the fibrous investing sheath—*the neurilemma*. All admit that the fibrous sheath is increased in thickness; none, except Dr. Lee, assert that the nerves are enlarged. The sheath of the nerve is not the nerve itself; consisting of fibrous tissue, it gives the nerve that support and protection which are especially necessary in the enlarging uterus; but it does not convey nerve-force—it is not nerve, strictly so called; and hence, while Dr. Snow Beck's dissections receive this support, the source of error in Dr. Lee's dissections is easily understood. If the neurilemma be considered as nerve, it is certainly enlarged; and it is quite possible to dissect ganglia very like the neurilemma from the fibrous structure beneath the peritoneum, as Dr. Beck asserts has been done with regard to the anterior and posterior subperitoneal ganglia. But if this be not granted, then it is clear no change takes place; and the very small supply of nerve to an organ so rapidly increasing becomes in itself a question of difficulty.

It is to be regretted, that a question so full of interest should resolve itself into a kind of personal dispute, to be determined by a majority. It cannot be so decided. It is only by the repeated and careful dissections of such men as the Hunters, Tiedemann, Hirschfeld, Beck, and Dr. Robert Lee himself, that the truth can be ascertained; and, if one dissection fail, a second may succeed. This would be of far more value than a host of evidence collected from mere lookers-on. Thus far the enlargement of these nerves has not been proved, but the future enquirer may yet succeed in establishing it.

The Action of the Uterus at the time of labour has been much discussed. Where the nervous supply is so scanty, is

the action of the uterus, as John Hunter said, "in itself," in a certain degree independent of the nerves? Or is it completely under their control? And, if so, what portion or portions of the nervous system govern it? To give a satisfactory reply to these queries is extremely difficult; because, in most instances, we can only draw, from experiments on the lower animals, conclusions which are consequently liable to error.

This action may be considered in two points of view; the peristaltic action, dependent upon the ganglionic nerves; the reflex action, arising from the spinal centre. The former may exist without the latter, as is evidenced in cases of *post mortem* parturition, and in complete paralysis of the lower half of the body. Dr. A. Farre relates a most interesting case to illustrate this. "A woman was attacked with paraplegia in the eighth month of pregnancy. She had neither sensation nor motion in any part below the umbilicus. *No reflex movement whatever could be produced* by tickling the soles of the feet; the fæces passed involuntarily; and the urine was drawn off daily. About the ninth month, her medical attendant, when about to pass the catheter, found a full grown fœtus in the bed, dead. *The uterus was contracted, and the placenta in the vagina.*" (*Cyclop. of Anat. and Physiol.* "*Uterus*," p. 676.) The reflex spinal system, however, exercises a marked influence over uterine contractions. Irritation of the mamma, of the vagina, of the os uteri, of the cavity of the uterus, will excite uterine action. Distention of the bladder or of the rectum; emotions, as shocks, the fear of pains, the presence of the obstetric attendant, will suspend its contractions. Both systems are intimately bound up together; yet it is necessary to separate them so as not to confound the influence of one with the other. *Peristaltic action* depends upon the structure of the organ in which it is excited. In the non-striated involuntary muscular fibre of the uterus, it commences at a given point, spreads outwardly, excites other centres to action, and thus moves slowly from point to point; until the whole uterus is engaged in contraction. There is thus a gradual slow contraction, followed by a relaxation of a similar character. This power exists in the muscular structure itself, and does not depend

upon the supply of nerve. "It need not excite surprise," observes Dr. Farre, "if these centres of excitement are few, and the nerves of the gravid uterus consequently not numerous; for a more abundant supply of nerve-force and more rapidly recurring contractions would be prejudicial to labour, by bringing the uterine walls more constantly and violently into contact with the fœtus, and by driving out the blood passing through them so rapidly as to cause dangerous regurgitation, or so frequently as to cause fœtal asphyxia, through too constant interruption of the placental circulation." (*Op. cit.* p. 674.) It is necessary that these vermicular contractions should not occur irregularly, or depend merely on casual irritation, A certain controlling power is required to regulate the order of contraction, and to bring it into harmony with the system generally. Such seems to be the office of the reflex nerves: they may excite or control the peristaltic action, regulate the rhythm of its return, and render, by the aid of the respiratory muscles, the contractions more frequent, strong, and powerful; or they may suspend the action altogether.

The description given by Wigand of these contractions, as commencing from the os tincæ, proceeding upwards towards the fundus uteri, and again returning towards the mouth of the uterus, will be found questioned when describing the first stage of labour. *Practically*, the order of contraction is from above downwards. In order to procure an efficient contraction of the uterus, it must commence at the fundus; contractions from below upwards retard labour, retain the placenta, and lead to those contractions called "*hour-glass.*" But, in considering the order of contraction as a physiological question, it may be quite true that the os uteri is influenced before the fundus. The child may act against the mouth of the womb, just in the same way as food against the pylorus, by first exciting in the os uteri the reflex action which is instantly conveyed to the fundus; but, for all practical purposes, it must be considered that contraction takes place from above downwards, and that irregular contractions take place when this order is reversed. A slow peristaltic action from below upwards cannot cause the liquor amnii to press down upon the os uteri, which is the first effect of a contraction. It is far

more probable, that the effect on the os uteri is a reflex action, the irritation of the os tincæ communicated to the fundus more rapidly than through peristaltic action; and that the centre of action so excited is at the fundus, and not at the os uteri.

LECTURE IV.

SYMPTOMS AND SIGNS OF PREGNANCY.

The symptoms and signs of pregnancy have generally been treated as a medico-legal question; and, in the most valuable essays on the subject, the signs have been divided, according to their importance, in determining the *existence of pregnancy*. This division is useful in assisting the practitioner to decide a doubtful and perhaps important question; but it has led authors to dwell too exclusively on the *forensic signs of pregnancy*, and to give comparatively little attention to the symptoms of gestation where there is no doubt of its existence. The consideration of those signs and symptoms, as evidence of the phenomena which take place in the uterus during the development of the fœtus, is equally interesting and important to the accoucheur; and the manner in which the constitution is influenced by the new function, if attentively studied, will enable him to understand and to obviate many deranged actions that are now loosely classed as the diseases of pregnancy.

Periods of Pregnancy.—*The symptoms and signs of pregnancy* may be considered in detail, as they successively arise in the progress of gestation: the *symptoms* chiefly indicating the effects produced on the vital functions; the *signs*, those local changes caused by the increasing weight and size of the uterus, and by the development of the fœtus. For the purpose of examination, the whole term of gestation may be divided into three periods.

The *first period* is from conception to the termination of the fourth month. At this time, the embryo is in its rudimentary state, gradually advancing to the completion of its organisation and outward form; the chorion is resolving itself into placenta

and membranes; and the uterus increases until it occupies the whole pelvic cavity and emerges into the abdomen.

The *second period* is the interval between the fourth and the middle of the ninth month. The uterus, as an abdominal organ, enlarges to its greatest size; the fœtus increases rapidly in its development, the placenta is fully formed; and the membranes have lost their distinct character, forming, as it were, a single laminated membrane.

The *third period* is that preliminary to parturition. The uterus is descending towards the pelvis; the matured child is abundantly supplied with fat, and is prepared at any time to leave its temporary resting-place. The symptoms which present themselves are those which mark the approach of parturition, and are called "the premonitory signs of labour."

The symptoms and signs may be classified as constitutional and local; the former are evidences of the disturbance caused in several functions; the latter, of the changes going forward in the uterus.

First Period.—The symptoms and signs of this period are the following:—

	Constitutional Symptoms.	*Local Signs.*
Circulation.	Rigor. Syncope.	Fulness and softness of os uteri.
	Slight lividity of the countenance.	Colour of vagina.
	Slight febrile paroxysm.	Vaginal pulse.
	Blood altered.	Menses suppressed.

Nervous system.	Reflex nerves.	Nausea—Altered appetite.
		Irritability of bladder.
		„ of rectum.
		Altered temper.
	Sentient nerves.	Headache (Beccaria's.)
		Shooting pains of mamma.
		Neuralgic pains in face.
		„ „ in ear.
		„ „ in teeth.

Secretions { Salivation. Urine. The skin.

In the first period, the *Symptoms of Constitutional Disturbance* are strongly marked.

The *Circulation* gives instant evidence that conception has taken place ; the blood is directed towards the uterus from the surface to the centre; hence a *sign* sometimes occurs—the *rigor coitus* of the older authors. *Syncope* may follow conception, and become its earliest symptom. A remarkable alteration in the countenance is frequently observed ; the features are drawn, and a *slight lividity* is noticed about the eyes and the angles of the mouth ; the cheek is paler than usual. The face presents an *expression of languor*, and has very slightly the appearance observed in the commencement of a febrile paroxysm. The *pulse* sometimes is more frequent ; and the *blood* is altered in its appearance and properties.

The *Blood* of pregnant women usually *presents a buffy coat;* but this is not constant, nor does its appearance indicate any essential change in the elements of the blood. Simon analysed the blood of a pregnant woman presenting a buffy coat. He states "that it differs in no respect from normal blood." It was composed of—

Water	806·898
Solid constituents . .	193·102
Fibrine	2·102
Fat	3·040
Albumen	72·200
Hæmatoglobulin . . .	96·900
Extractive matter and salts .	7·980

The amount of solid constituents is somewhat below the standard of normal blood, and the quantity of fat is increased. The proportion of hæmatoglobulin to albumen is normal. Becquerel and Rodier analysed the blood of nine pregnant women, one at

the fourth month, five at the fifth month, one at five and a half months, one at the sixth month, and one at seven months. A most careful analysis was made; and the maxima, minima, and mean results are given in the following table :—

Analysis of the Blood of nine Pregnant Women.

Elements of the Blood.	Mean.	Maxima.	Minima.
Density of defibrinated blood	1051·5	1055·1	1046·2
Density of serum	1025·5	1026·8	1023·6
Water	801·6		
Fibrin	3·5	4·0	2·5
Albumen	66·1	68·8	62·4
Blood-corpuscles	111·8	127·1	87·7
Extractive matter and salts	6·6	8·7	4·7
Fat	1·922	2·519	1·158
Consisting of serolin.	variable	0·108	0·018
Phosphorised fat	0·646	0·863	0 381
Cholesterin	0·061	0·225	0·030
Saponified fat	1·195	1·323	0·737

The salts in 1000 parts of blood consisted of—

Chloride of sodium	3·2	3·9	2·3
Other soluble salts	2·4	2·8	1·8
Phosphates	0·425	0·690	0·282
Iron	0·449	0·490	0·370

From these analyses they conclude that pregnancy *exercises a marked influence on the blood*; the density of the defibrinated blood and of the serum being diminished; the water, the fibrine, and the phosphorised fat increased; while the corpuscles are diminished. (Simon's *Animal Chemistry*, pp. 336, 7.)

The *Local Signs of Pregnancy* at this period are derived chiefly from the very active circulation going forward in the uterus. *The cervix uteri* becomes *fuller and softer*; the temperature is also

increased; and the lips of the os uteri are more rounded and equal. The most remarkable effect is an alteration in *the colour of the vagina,* which assumes somewhat a lavender hue. Jacquemier first noticed this appearance, in the course of his examinations with the speculum, in order to detect disease among the degraded classes in Paris. At first its cause was a mystery; but it being frequently observed, and taken in connexion with the history of the patient, pregnancy, in all these cases, was found to exist. Parent Du Chatelet confirmed these observations; and they considered this peculiar colour a diagnostic sign of conception.

Osiander has pointed out another sign, which he considers to be equally diagnostic—*the vaginal pulse.* The arteries in the vagina are increased in size; the circulation is more active; and the pulsations are more distinct. It is questionable, however, whether this is so certain a sign. Similar effects are sometimes the result of disease.

The *Cessation of the Menses* is a sign which has been most constantly observed, and is, by general consent, considered to be a strong evidence of pregnancy. It is not, however, so certain a proof as is supposed, although one which must always suggest the probable existence of gestation. The popular belief, that the cessation of the menses is a proof of pregnancy, is a sufficient evidence of the constancy with which this effect follows conception. The fact, also, that the cavity of the uterus, from which this discharge flows, undergoes a complete alteration on its surface, and that the cervix uteri is closed by conception, strongly confirms the popular opinion. The cessation of the menses may therefore be considered *a highly presumptive proof of pregnancy;* but it is only when it is put forward as a positive sign, that there is reason to doubt whether the proof be unequivocal. Diseases of the uterus, and still more of the ovaries, may interrupt the catamenia. This discharge is often suspended for months, in cases where pregnancy is not the cause. Such cases are rendered still more embarrassing, if accompanied by those symptoms of constitutional irritation that so often attend pregnancy. Morning sickness, enlargement of the abdomen, shooting pains in the mammæ, and even the secretion of milk,

have been observed to follow the cessation of the menses, where pregnancy did not exist, but where ovarian irritation was the cause. To hazard too confident an opinion as to the certainty of pregnancy on so many apparent proofs, might be most unfortunate. The cessation of the menses cannot then be considered an unequivocal sign of pregnancy, because it may be the result of other causes.

Another question, not less difficult to answer, is, whether pregnancy may exist and the menses continue? This has been denied by Denman, Dr. J. Hamilton, and Dr. R. Lee, who "believes, from the anatomy of the gravid uterus, and other circumstances, that regular menstruation never takes place during pregnancy."—(Lee's *Lectures*, p. 152). Cases illustrative of the continuance of menstruation during gestation, however, have been quoted by Mauriceau, Puzos, Johnstone, Dewees, Montgomery, E. Rigby, Churchill, and others: too strong a testimony to doubt its occurrence. A few patients have come under my own observation, with whom a periodical discharge, resembling the catamenia, took place during pregnancy; in one case to the time of quickening, when it ceased; in another to the eighth month; in a third throughout the whole period of pregnancy. Dewees and E. Rigby both allude to the cessation of menstruation in the middle of pregnancy. According to their observations, it ceases about the fourth month.

Conception may occur without any previous menstrual discharge. A remarkable instance came under our notice, in which the only appearance of the kind was observed during pregnancy. A woman, delicate-looking but healthy, aged 23, was pregnant of her second child, in November, 1843. She then, for the first time, perceived a discharge resembling the menses. Her first child was born in 1841. "She had never been poorly" previously to or during that pregnancy, nor had ever observed any such appearance, until her second pregnancy, in Nov., 1843. Cases in which the catamenia occur only during pregnancy are related by Deventer, Dewees, Baudelocque, and Kennedy. Other instances have been mentioned by Johnstone, Blundell, and Montgomery, in which the menses have been very copious immediately after

conception, and have then ceased. We cannot therefore place much dependence on the cessation of the menses *as a positive sign* of pregnancy; although the constancy of their absence, when conception has taken place, renders it an evidence of much weight, when taken in connection with the other signs.

The *Nervous System* gives equal evidence of disturbance with the circulation. The sympathies of the stomach, the brain, the bladder, and the rectum, show the influence of pregnancy on the reflex nerves; while the different forms of neuralgic pains, as headache, toothache, face-ache, &c., prove the irritation of the sentient nerves.

Morning Sickness, the conventional term for the nausea which follows conception, is a constant symptom of pregnancy, and is equally popular with the cessation of the menses. As its name implies, it occurs in the morning when the patient first rises; it may be slight, and only spoil her breakfast; and may amount to actual vomiting. It generally passes away in about half-an-hour; but in some constitutions it returns during the day, and even at night. It may follow immediately on conception, but more usually occurs about the fourth or sixth week, and generally disappears about the fourth month. The cause of this sickness returning every morning as soon as the patient rises, has been supposed to be the sudden change in the position of the uterus: there is no doubt that this may sometimes excite the stomach, but the sickness often takes place before the patient rises; and we know that the recumbent position, quite independent of pregnancy, will allay irritation of the stomach. In sea-sickness, where the stomach sympathises with the brain disturbed by an unaccustomed motion, vomiting often does not take place until the person makes an effort to rise. When the stomach is irritated, position will produce the same effect in the one case as in the other. There is an obvious reason why this sickness should occur more frequently in the morning than at any other time. The nerves are, as it were, then first roused from their slumber, and are alive to impressions which produce no effect during sleep; hence the irritation of the stomach, like the irritation of the bladder, is felt as soon as the patient wakes from sleep.

The *Appetite* is often altered. It is sometimes increased; the woman eats and drinks heartily, even of food which previously she could not taste. In other cases the appetite is capricious; and the woman rejects food which formerly she desired, and craves for what before may have excited disgust. These varieties are more frequent when the irritation is excessive, and becomes one of the diseases of pregnancy.

Irritation of the Bladder is frequently an early and very troublesome sign of pregnancy. Micturition becomes occasionally very annoying; the cause of this may not be at first understood, but other symptoms follow, which prove it an early evidence of pregnancy. In certain cases, this irritability of the bladder is found to depend upon the symphysis pubis, which becomes extremely painful in certain positions, showing a tendency to loosening of the articulation.

Diarrhœa is also in some cases an early evidence of conception.

The opposite condition, however, both of bladder and of rectum sometimes occurs. Pregnancy may cause *constipation* and *retention of urine.*

The *Temper* of pregnant women is sometimes altered: the mildest disposition may become peevish and irritable. With some, a most unaccountable anxiety and dread afford them a very certain proof of their condition. Dr. Montgomery mentions an instance in which the temper was improved. He says, in his excellent work on the *Signs of Pregnancy:* "A gentleman lately informed me, that, being afflicted with a step-mother naturally more disposed to the *fortiter in re* than the *suaviter in modo,* he and all the household learned, from experience, to hail with joyful anticipations the lady's pregnancy, as a period when clouds and storm were exchanged for sunshine and quietness."

Rest is frequently disturbed. The woman gets but little sleep, and that little uneasy and troubled by unpleasant dreams. Nevertheless she seems nothing the worse; neither in her appearance nor manner is there anything to indicate a sleepless night. This symptom disappears as gestation advances. All these evidences of constitutional disturbance affecting the nervous

system are most obvious when the attention is first directed to the uterus just roused into activity.

Headache proves the influence of conception on the sentient nerves. It is frequently an early symptom of pregnancy; so much so, as to lead Dr. A. Hamilton to assign the cessation of the menses as its cause. It is generally referred to the temples or across the forehead; but some years ago Beccaria mentioned a peculiar headache, which he considered diagnostic of pregnancy. He describes it as an acute pulsating pain in the occipital region: this pain is accompanied with giddiness on the least motion of the head, and with difficulty in supporting the light; it comes on suddenly, and is succeeded by a disposition to sleep. After sleeping some minutes, the patient is said to awake free from pain, and with a strong desire for food. (*Archives Générales de Médecine,* Tome xxiv., p. 443.)

Neuralgic pains are often distressing. *Shooting pains in the mammæ* are frequent; and in women who are hysterical, the characteristic pains under the left breast are renewed by pregnancy. *Pains in the ear and face* sometimes cause distress; but the most frequent source of misery is—

Toothache. Some caution is necessary when such a symptom presents itself, especially if there be a decayed tooth. The patient may fly for relief to the usual remedy—extraction; this, however, does not afford the customary benefit. The pain may be removed for a short time, but it soon attacks another tooth, and thus renders extraction useless. Besides this, there is some risk in removing a tooth from a pregnant woman, if she should be under much apprehension of a painful operation. The excitement caused by fear might end in serious consequences, if it induced abortion. As a general rule, therefore, extraction is not advisable in such cases.

The *Secretions* are sometimes preternaturally excited.

One of the most remarkable of the effects of pregnancy is *Salivation.* Some pregnant women have been as completely salivated as if they had been under the influence of mercury; and hence the danger, lest the whole of this irritation should be attributed to the medical attendant, if he should have given his

patient mercury in any form. Medical men have been blamed where no such medicine has been administered. How much more difficult the defence, if blue pill had been prescribed as an aperient! It is necessary to know, therefore, that pregnancy alone may excite salivation; and also to distinguish between it and mercurial ptyalism.

The sympathetic salivation of pregnancy is not accompanied by any unusual redness or sponginess of the gums, by any peculiar fœtor or metallic taste in the mouth, or by any great viscidity of the saliva. The saliva is simply increased; the excessive flow continues for a certain time, and then disappears without leaving any trace of previous irritation. In a few cases, salivation has continued to the end of pregnancy; but generally it ceases at the fourth or fifth month.

The *Urine* is influenced by gestation; and the changes produced in it have been for a long time the subject of observation. In 1486, Savonarola gave a minute description of its appearance. "Up to about the sixth month, the urine is clear and of a pale citron color, with a cloud on its surface; and about the middle of the fluid a deposit like carded wool; but, as pregnancy advances towards its close, the urine becomes redder and turbid when stirred." M. Nauche has revived these observations. He says: "By allowing the urine of pregnant women or *of nurses* to stand for some time, in thirty or forty hours a deposit takes place of white flaky pulverulent grumous matter, being *the caseum or peculiar principle of milk found in the breasts during gestation.*" He describes also a white mass that separates after the urine has stood for some time; partly rising to the surface, where it forms a somewhat tough pilous membrane interspersed with glistening crystals, and partly sinking to the bottom, forming a cream-like precipitate. Nauche considered this as a positive sign of pregnancy, which Dr. Montgomery in some degree confirmed; "I have myself" (he observes) "tried it" (this test) "in several instances; and the result of my trials has been this. In some instances, no opinion could be formed as to whether the peculiar deposit existed or not, on account of the deep colour and turbid condition of the urine; but in cases in which the fluid was clear

and pregnancy existing, the peculiar deposit was observed in every instance. Its appearance would be best described by saying that it looks as if a little milk had been thrown into the urine, and, having sunk through, partly reached the bottom, while a part remained suspended in the form of a white semi-transparent filmy cloud." (*Signs and Symptoms of Pregnancy*, 1st edit., p. 158.)

Eguisier has also published his observations on the subject. He remarks that the urine of a pregnant woman examined in the morning is generally of a pale yellow colour and slightly milky; it first reddens and then turns blue turnsol paper, as in ordinary urine. Exposed to the contact of air, a cloudiness is observed from the first day, resembling fine wool; from the first also a white matter is deposited. These phenomena are not, however, constant. From the second to the sixth day small opaque bodies are seen rising from the bottom to the surface of the fluid, and then collecting together until they form a layer covering the whole surface: this is *Kyesteine*. It is sufficiently consistent to be raised from off the fluid. It is whitish, opaline, slightly granular, and resembles much a layer of fat which swims on the surface of fat broth when cool. Examined by the microscope, it appears a gelatinous mass of indeterminate form. When it is old, cubic crystals are sometimes detected. (*Lancette Française*, Feb. 1839, p. 36.)

Dr. Golding Bird made experiments on the urine of twenty-seven pregnant women, and arrived at the following conclusions: "1. That certain organic matters, closely resembling if not identical with caseous matter mixed with abundance of earthy phosphates in a crystallized state, are eliminated from the blood during pregnancy, and, if not otherwise removed or taken up, are finally thrown out by the kidneys. 2. That certain accidental circumstances, especially connected with those morbid actions in which the kidney is called upon to perform a compensating function for the skin, as indicated by the abundance of azotised matter in the form of amorphous lithate of ammonia in the urine, interfere temporarily with the development of caseous matter, as they do in checking the cutaneous and other secretions.

3. That, taken in connection with other symptoms, as the formation of a dark areola round the nipple, the cessation of menstruation, and abdominal enlargement, the formation of a caseous pellicle in the urine affords a very valuable corroborative indication of the existence of pregnancy." (*Guy's Hospital Reports*, No. X.)

The most extensive series of observations were made by the late Dr. Kane of Philadelphia. He concludes that *kyesteine* does not appear sooner than thirty hours or later that eight days; that on its first appearance it forms a scarcely perceptible membrane, which gradually becomes firmer and thicker, and after a time breaks up, the fragments sinking to the bottom; that a kyesteine-like membrane may also appear in the urine of persons with phthisis, arthritis, metastatic abscess, vesical catarrh, &c., but that it differs from true kyesteine both in the manner of its formation and of its destruction. It appears later than true kyesteine; and, having once appeared, develops itself more rapidly and possesses less tenacity. The urine is neutral or ammoniacal on the appearance of kyesteine, which under the microscope appears as an amorphous matter consisting of minute opaque corpuscles, intermingled with crystals of ammoniaco-magnesian phosphate.

Dr. Kane likewise ascertained that kyesteine occurs not only during pregnancy, but also during lactation; especially when the secretion of milk is at all checked.

Simon examined the urine during the second, third, fourth, and fifth months of pregnancy, but did not invariably detect kyesteine. In those cases where it was found, he thus describes the appearances. "The urine on emission was clear yellow, faintly acid, and not affected either by nitric or acetic acid, or by heat. Usually, in about twenty-four hours, the whole urine became slightly turbid, the acid reaction disappeared, a white viscid sediment was deposited, and soon afterwards the surface of the fluid became covered with a pellicle, at first extremely delicate, but after from twelve to twenty-four hours becoming tough, thick, opaque, and with a glistening aspect, in consequence of the light reflected from numerous minute crystals of ammoniaco-magnesian phosphate with which it was studded. On examining

this pellicle in its early state under the microscope, it appeared (when magnified 300 times) to consist of an amorphous matter composed of minute opaque points, such as are presented by sediments of phosphate of lime or urate of ammonia; except that, in the latter, the individual particles are usually darker, more clearly defined, and larger than in kyesteine. The whole field of vision was likewise bestrewed with numerous vibriones in active motion, and crystals of ammoniaco-magnesian phosphate. When the pellicle became thicker, precisely similar phenomena were observed, but the vibriones were supplanted by a considerable number of monads; on the addition of acetic acid the crystals disappeared, while the amorphous matter remained unaffected" (*Animal Chemistry,* vol. ii. p. 330).

Dr. Elliot of New York describes the appearances in 153 cases of pregnancy, to which we would especially refer you. (*New York Journal of Medicine*, Sept. 1856).

Having given a sufficient body of evidence on the appearances which the urine of pregnant women presents, we shall conclude with the observations of Dr. Parkes on the nature of kyesteine. "It was supposed that this substance was in part composed of casein derived from the mammary gland; but this does not appear to be the case. The so-called kyesteine is not of constant or determined composition, but consists of triple phosphates, derived from decomposition of the urea, bladder-mucus, fat, infusoria, and fungus-growths, mixed with the organic matter of the vaginal discharges. Very similar appearances are found less frequently in the urine of anæmic non-pregnant women, and sometimes in the urine of men." (*Composition of the Urine,* p. 106).

Kyesteine as an evidence of pregnancy may be considered as a presumptive, but by no means an unequivocal proof. It may be absent when pregnancy exists, and present, as in the urine of anæmic women, when there is no conception. It must, however, be looked upon with suspicion; and, if supported by other signs, be taken as a tolerably certain proof of pregnancy.

The *Skin* undergoes some remarkable alterations; but they are confined to special cases, and may be considered as indica-

tions of a disordered action. The features are more drawn than usual; the angles of the mouth and lower eyelids are darker; but sometimes distinct blotches are observed upon the face, and that character which is known as scorbutic occasionally occurs. Slight jaundice is met with in some cases; and the face often loses that fine delicacy of complexion that was so attractive.

In this, the first period of pregnancy, there are no unequivocal signs; but those which approach to certainty and may be considered as diagnostic are, the cessation of the menses; the colour of the vagina; and the peculiar character of the urine. In the second period, the principal signs are collected. The constitutional symptoms subside; and those depending upon the increasing size of the uterus and the development of the fœtus are more manifest.

LECTURE V.

SYMPTOMS AND SIGNS OF PREGNANCY (*continued*).

SECOND PERIOD.—The symptoms and signs of this period, or that from the fourth to the middle of the tenth month, are:—

Constitutional.	*Local.*
Mammary sympathies.	Changes in the cervix uteri.
Syncope.	Shape of the abdomen.
	Cracks and marks in the abdomen.
	Active motions of the child.
	Passive motions.
	Signs by auscultation.

Mammary Sympathies is the term by which Dr. Montgomery expresses the changes produced by pregnancy on the mammary gland. These commence in the first period, and gradually

increase until in this, the second, they become more defined. Previously to the fourth month the breasts swell up, until a feeling of tension is observed by the woman; but this increase of size should not be confounded with a temporary fulness depending upon other causes. Any excitant which produces irritation of the womb may cause the breasts to enlarge. Thus marriage may lead to this effect without resulting in conception: a rapid increase of fat might take place about the gland, and deceive the practitioner. The enlargement from pregnancy is different; the mammæ increase gradually; and, as the gland enlarges, its characters become more obvious. It is firm; tender on pressure; granular on its surface; and somewhat conical in shape. The integument is tense, mottled, and traversed by numerous large veins. In some cases, the tension is so great that the skin yields and is fissured, and *silvery lines*, the result of these cracks, traverse the surface. Dr. Montgomery relates a remarkable case, in which these marks afforded him decisive evidence of a pregnancy which had been strongly denied (*Signs of Pregnancy*, 1st Edit. p. 50).

The *Areola* undergoes alterations, which Dr. Montgomery has considered to be very indicative of pregnancy. The change in its colour—the dark circle—has long been looked upon as a certain sign; although doubted, and with justice, by some authorities. The areola presents other characters that are worthy of attention. The disk seems swollen, as if œdematous; it is slightly bedewed with moisture collected about the base of the nipple, which is larger and more prominent. A number of enlarged papillæ are observed on the surface; to these Dr. Montgomery paid particular attention, because he considered them diagnostic of pregnancy. During the progress of the third and fourth months, he states "that the changes in the areola are in general perfected, or nearly so; and then it presents the following characters:—A circle around the nipple, whose colour varies in intensity according to the particular complexion of the individual, being usually much darker in persons with black hair, dark eyes, and sallow skin, than in those of fair hair, light-coloured eyes, and delicate complexion. The extent of this circle varies in

diameter from an inch to an inch and half, and increases in most persons as pregnancy advances, as does also the depth of colour. I" (Dr. Montgomery) "have seen the areola at the time of labour almost black, and upwards of three inches in diameter, in a young woman of very dark hair and complexion; while in another instance, lately seen by the writer, its breadth around the base of the nipple did not at any time of gestation amount to a quarter of an inch, and at first was not more than an eighth: this circle, however, narrow as it was, was studded at nearly regular intervals with the glandular tubercles, which were not unlike a string of beads..... ..In the centre of the coloured circle the nipple is observed, partaking of the altered colour of the part, and appearing turgid and prominent; while the surface of the areola, especially that part of it which lies more immediately around the base of the nipple, is studded over and rendered unequal by the prominence of the glandular follicles, which, varying in number from twelve to twenty, project from the sixteenth to the eighth of an inch. Lastly, the integument covering the part appears turgescent, softer, and more moist than that which surrounds it; while on both there are to be observed at this period, especially in women of dark hair and eyes, numerous round spots or small mottled patches of a whitish colour scattered over the outer part of the areola, and for an inch or more all around, presenting an appearance as if the colour had been discharged by a shower of drops falling on the parts." (*Op. cit.* pp. 61, 2.)

The areola as a sign of pregnancy, when presenting all these appearances, may be looked upon with confidence; but still exceptions occasionally arise, which prevents its adoption as an unequivocal test. The *change of colour* is uncertain; frequently no change, at least none that would excite attention, takes place. When the colour is altered, it remains for a certain time after pregnancy, especially in women who are nursing; and sometimes it is permanent: therefore, in any case of pseudo-pregnancy, this sign might be observed, although the result of a former gestation.

The *enlargement of the glandular follicles* has been observed in

cases of functional derangement of the uterus and ovaries. We have noticed the increase of size in a woman with amenorrhœa and tympanitis, whose state excited suspicion, but who proved not to be pregnant. Since then, similar cases have presented themselves, having these follicles enlarged; in one of which a lactescent fluid could be squeezed from the nipple. *The moisture on the surface of the areola* and its œdematous appearance we have never seen, except in cases of pregnancy; but a medical friend informed us "that he had a patient with whom the menses were irregular, and, while so, the areola is bedewed with moisture; but when pregnant, it is not so." In 1848, Professor Simpson "showed to the Edinburgh Obstetrical Society a woman seven months gone with child, whose breasts gave no indication whatever of her pregnant state." This case he contrasted with another: the lady had never been pregnant, but was suffering from great uterine irritation; "the areola was turgid, and of a dark brown colour; the papillæ were numerous and much enlarged; and the superficial veins very large and prominent. (*Edinburgh Monthly Journal*, March, 1848, p. 639.) These exceptions are sufficient to prevent the appearances of the areola from being taken as a certain test; nevertheless, when taken in connection with other evidences, the condition of this part gives strong confirmation.

The presence of *Milk in the Breasts* is not an infallible sign of pregnancy. Cases have been quoted by Baudelocque, Belloc, and Foderè, in which mere irritation of the mammary gland excited the lacteal secretion independently of pregnancy. One of the most singular is related by Mr. George Semple. "Mrs. Breward, of Simpson Green, near Idle, aged forty-nine, was mother of nine children, the youngest of whom is twelve years old. She lost a daughter-in-law about a year ago, who died in a fortnight after giving birth to her first child. On her death, Mrs. B. took charge of the infant, a little puny sickly baby. She was so fretful and uneasy that Mrs. B., after several sleepless nights, was induced to permit the child to take the nipple into its mouth. In the course of from thirty to sixty hours she felt very unwell; her breast became extremely painful, considerably increased in

size; and soon after, to her utter astonishment, milk was secreted and poured forth in the same abundance as on former occasions on the birth of her own children. The child is now a year old, is a fine thriving healthy girl, and only a few days ago I saw her eagerly engaged in obtaining an apparently abundant supply of healthy nourishment from the same fountain, which nearly twenty years ago poured forth its resources for the support of its father." (*North of England Medical and Surgical Journal*, vol. i., p. 230.)

Syncope has been already alluded to (p. 35), and its cause explained. In the majority of cases, it is incomplete; rather a sensation of faintness than actual fainting. The patient, previously quite well, feels suddenly faint and giddy; she soon recovers, but the fact is noted. Sometimes complete syncope takes place.

The *Local Signs of Gestation* are becoming now more prominent. The enlarging uterus causes an alteration in the form of the cervix, and also in the shape of the abdomen.

One of the earliest symptoms of gestation in the first period is caused by the descent of the uterus, and the nearer approach of the cervix uteri to the vulva. The uterus, however, soon rises again; and the cervix is drawn upwards. So, also, the irritation caused in the intestines by the function going forward excites flatus, and the abdomen is enlarged far beyond the increase of the uterus; but this also soon subsides, and the shape of the abdomen afterwards depends upon the size and form of the uterus.

The *Changes in the Neck of the Uterus* have been much dwelt upon. The dense elastic cellular structure in the early months become softer and fuller, the mouth of the uterus also rounder; but no alteration in the length of the cervix takes place until about the end of the fifth month, when it seems to diminish: this goes on progressively from month to month, until the cervix seems to disappear. We have already given proofs (p. 38) that this diminution is more apparent than real; that it arises from the cervix being very much stretched transversely, and therefore diminished in length, but not because the cavity of the cervix is unfolded to form a part of the uterine cavity. Exceptions

however occasionally are found, in which the cervix is so unfolded and thinned that the head of the child can be felt resting upon it, so that it must form a portion of the general cavity.

The *Shape of the Abdomen* begins to change at the end of the fourth month, when the uterus rises into this cavity. As it ascends towards the umbilicus, it chiefly occupies the right side, but is not prominent, and may be confounded with tumours in the abdomen. When it passes and presses forward the umbilicus, the prominence of the abdomen is more remarkable, and the peculiar oval form of the uterine tumour is obvious. These characters become still more distinct as the organ approaches the ensiforme cartilage. Deviations from them occasionally arise. The prominence of the abdomen may be greater or less, according to the strength of the abdominal parietes and the inclination of the brim of the pelvis. Its oval form may be altered by twins, and by the presence of an ovarian cyst which may complicate pregnancy.

Cracks and fissures leaving, as in the mamma, white silvery lines over the abdomen, are frequently observed in those who have been pregnant more than once. *A dark line over the linea alba* is also occasionally noticed.

The *Active Motions of the Child* are generally noticed about the completion of the fifth month. They have been confounded, under the name of "quickening," with the sensation caused by the rising of the womb into the abdomen: hence they are dated by Denman as early as the fourth month; but the peculiar feel, accompanied by faintness, which is perceived at the fourth month, is different from that produced by the motions of the child. Its muscular power is then very feeble; an abundance of the liquor amnii is interposed; and consequently its motions can hardly be felt: it is only when its size is sufficiently increased and its muscular power is more developed, that its movements are noticed, and this is seldom earlier than the fifth month. The sensation has been compared, at first, to the trickling of water, but presently becomes more plain. The passage of air in the intestines, the peristaltic action of the uterus itself, will imitate these motions. The former is a frequent

cause of error with those who are the subject of uterine irritation. If a lady of a certain age marry, and the abdomen swell in consequence, the impulse of flatus sufficiently imitates the quickening of the child to persuade her she is pregnant, and it requires some firmness on the part of the practitioner to convince her that she is not. The peristaltic action of the uterus has also been sometimes mistaken for the motions of the child, especially when excitants have been used to stimulate them. The practitioner, placing his ice-cold hand on the abdomen, may excite only this action of the uterus, and not the child. After the fifth month, the child's motions become more obvious, and cannot well be mistaken. The term "*quickening*" is strictly applicable to these motions, because originally, the child was not supposed to be alive (quick) until it could move.

The *Passive Motions of the Child* are those which may be excited in a dead child. The French suggested the possibility of making the fœtus move in the fluid medium containing it, and under the name of *ballottement* proposed a method of percussing the uterus so as to produce this effect. The patient was placed standing upright; the finger was passed up the vagina to the anterior wall of the cervix uteri, and kept firmly there; with the opposite hand the fundus was pressed down, so that the child might be forced on the cervix. As soon as it was felt, the finger at the cervix was struck against it, so that it rose and again descended on the finger. The sensation of a solid body floating freely in a fluid medium can only be caused by a child in the womb; and hence it was adopted as a sign of pregnancy. In these countries, no practitioner could place his patient in the position for examination adopted by the French. She must lie on the side, but with the body sufficiently raised to allow the child to gravitate towards the cervix. In this position, it is by no means easy to produce the intended effect; the cervix is frequently too high, and, even when felt, too dense to admit the impulse of the child to be felt. The pressure on the fundus can have no effect on the child; so that this mode of examination is both difficult and uncertain, and cannot be employed before the sixth month, when the weight of the child is sufficiently increased to press towards the cervix.

Auscultation was first applied by Mayor of Geneva to the gravid uterus. He detected the sounds of the fœtal heart in 1818. Afterwards, Kergaradec followed up his research, and described the placental murmur. Since then, E. Kennedy, F. Naegele, Hohl, and others, have given it their attention, and published the results of their inquiries. These two sounds, the placental murmur, and the sound of the fœtal heart, are described, and become valuable as evidences not only of pregnancy, but of the life of the child.

The *Placental Murmur* is a rushing sound—a hum ; it has been compared to the distant sound of the sea—to the vibrations of a metallic string—to water forced from a syringe into water at rest —and, lastly, to the sound of varicose aneurism. It has been called the placental sound (*bruit placentaire*—Kergaradec) ; the utero-placental sound (Hohl) ; the uterine sound (F. Naegele) ; according to the views of its situation held by these different observers.

The utero-placental sound is not generally heard before the fourth month of pregnancy. E. Kennedy states that he heard it as early as the tenth and eleventh weeks of gestation; but this has not been confirmed by others. It is only when the uterus becomes an abdominal organ—that is, after the fourth month—that the sound can be heard; because then only can the stethoscope be applied directly to the uterus. The *usual seat of the sound* is in either the right or the left iliac region, just above Poupart's ligament. It may be heard in the neighbourhood of the umbilicus; and sometimes, but rarely, at the fundus uteri. There are cases of pregnancy where it is absent. The sound is very variable in its intensity; at one time a clear aneurismal murmur, at another a deep distant hum. The sound is sometimes clear on both sides of the abdomen, but generally so only on one side. Its most frequent situation is the inguinal region; next the lumbar; and least, the neighbourhood of the umbilicus. The murmur may be either direct or indirect. The *direct sound* is clear, loud, whizzing, sometimes almost shrill and piping. The *indirect sound* is a deep sonorous murmur, or faint rushing sound. The former is heard at the anterior wall of the uterus, and is rarely

met with. The latter is the more usual sound heard in one or or both inguinal regions.

The source and cause of the sound were attributed by Monad, Kergaradec, De Leus, and the earliest observers, to the placenta; hence it was called "*bruit placentaire.*" This was soon, however, controverted, especially by Velpeau, who considered the placenta to be composed solely of fœtal vessels: he denied an utero-placental circulation, and consequently the possibility of the seat of this sound being the placenta. Velpeau inclines to the opinion of Haus, that it arises from the pressure of the uterus on the iliac vessels: 1. Because it is not heard till the uterus rises from the pelvis, and may be supposed to press on the iliac arteries. 2. It is heard in the inguinal regions, and often equally at opposite sides. 3. It is heard after delivery. 4. A perfectly similar sound is heard in cases of tumors in the abdomen pressing on the iliac vessels. Velpeau's reasons only go to prove that the uterus may by its size compress the iliac vessels, and produce a "*bruit,*" in the same way as a fibrous tumour. Such probably occurred in the case quoted by Kennedy, where a *soufflet* was heard forty-four hours after delivery; but instances of this kind are not sufficient to prove that this is the true cause of the sound. Velpeau hesitates on this point, and admits "that very often this sound appears to approach the ear so closely, to occupy a space so different from that which the pelvic arteries would seem to indicate, that one cannot hesitate to reject in spite of oneself (so to speak) the theory of Haus." (*Traité des Accouchemens*, Vol. i. p. 202.)

F. Naegele asserts that the sound exists in the walls of the uterus; because it is only heard after the fourth month, when the uterus is in the abdomen, and, as the uterus rises, the sound accompanies it. (F. Naegele, on *Auscultation.* West, p. 18.) He considers that the vascular system of the uterus is the seat of this sound; and that the changes which the uterine vessels undergo are its cause. He denies "that it exists in every portion of the placenta, and hence adopts the term '*Uterine Sound*;'" because. 1. It may be usually detected in both inguinal regions, from one of which it will be heard extending forwards and upwards with increased intensity. 2. It is almost always heard through a space

considerably larger than the portion of the uterus to which the placenta is attached. (*Op. cit.* p. 20). The sound being heard most frequently in the course of Poupart's ligament, leads F. Naegele to suppose that it is produced by the dilated uterine arteries, just as they leave the broad ligaments to enter the womb; and he accounts for the different degrees of intensity at opposite sides by the supposition that the placenta is attached to the side of increased intensity, the vessels being larger and more numerous than on the opposite side. (*Op. cit.* p. 25.)

Without entering too minutely into this discussion, some opinion may be formed from admitted facts. 1. The sound is not confined to Poupart's ligament, but has been heard at the upper part of the uterus. We have heard it distinctly at the anterior surface of the uterus. This could not occur if the sound depended either upon the iliac vessels, or on the arteries just entering the womb. 2. The sound is not only admitted to vary in its position, but is sometimes absent. 3. It is heard on opposite sides with unequal intensity, and is often detected on one side only. These facts can only be explained by assuming that the placenta, or the portion of the uterus in contact with it, is the seat of the sound. If so: is it in the walls of the uterus alone, in the placenta alone, or in both combined? It seems to us that this may be determined by a fair examination of the sound itself. It has been well compared to the bruit of a varicose aneurism, which it closely resembles. In varicose aneurism, a number of arteries pour their blood into dilated veins, containing blood having a much slower motion; the sound seems to arise from the impulse of the more rapid arterial current against the sides of the dilated vessels. If this be a correct explanation of the cause of the sound in varicose aneurism, it will serve to explain the same sound in the gravid uterus; because there is a perfect analogy between the utero-placental circulation and that in a varicose aneurism. Innumerable tortuous arteries pour their contents into a structure (the maternal placenta) composed of large cells penetrating every portion of the placenta. This structure has been compared to a *rete* of colossal capillaries; it contains a large quantity of blood moving, with a much slower motion, into the large uterine veins. There is, therefore, the impulse of the arterial

current against the slower moving blood and the sides of the cellular structure, sufficient to cause a vibration in the whole placenta. This vibration may be communicated to the stethoscope *directly*, if it be applied over the anterior wall of the uterus, and the placenta be attached there. In this case the sound is clear, and sometimes even whistling. Or it may be heard *indirectly*, through the medium of the liquor amnii; and, according to the position of the placenta, sometimes plainer on the left side than on the right, or the reverse; and if the placenta be placed low down near the os uteri, the sound may not be heard at all. When heard indirectly, it is soft, diffused, indistinct, and often lost, when any thing (the child for instance) interrupts the vibration. If this assumption be admitted, it is sufficient to explain the phenomena. The sound varies with the position of the placenta; and is most frequently heard in the inguinal regions, because the placenta is most usually attached low down to the posterior wall of the uterus, sometimes to the left, sometimes to the right side. Hence, also, the sound may be heard on one side only; the fœtus interrupting the vibration on the opposite side, where the fœtal heart is generally perceived. The sound extends over a wider surface than the placenta, because it is diffused by the liquor amnii. Hohl's view, therefore, that the sound is caused by the utero-placental circulation, appears correct.

One objection, and a strong one, requires consideration; that in fibrous tumours, moles, etc., an uterine murmur is often heard, exactly the same as in pregnancy. It is not exactly the same, but is much louder; and it is either limited to a very circumscribed space, showing its seat to be in some single compressed artery, or is heard generally over the uterus, when its vessels are irregularly pressed upon by the new growth. The practised ear will at once distinguish between these sounds. A very remarkable case came under our notice, which will illustrate this. In 1852, a case of doubtful pregnancy was sent up from the country for our opinion. The woman had hitherto maintained a most respectable character; but the abdomen began to enlarge, the menses had ceased, and, as she held a public appointment, it was thought right to have a medical opinion. The gentleman

applied to could not give a decided answer; and she was sent to town. A large and distinct tumour, like the gravid uterus, occupied the left side and partly the right of the abdomen; *a loud uterine murmur* was heard in the left inguinal region; and, on examining *per vaginam*, the cervix uteri was quite thin, and expanded over what seemed very like the fœtal head. The loudness of the uterine murmur raised a doubt. A closer examination was made; and these appearances were found to be caused by a firm, partly osseous, fibrous tumour.

The *Fœtal Heart* is generally heard about the same time as the utero-placental sound, when the uterus is in the abdomen. The sound is very feeble at first, but becomes more and more distinct as pregnancy advances. The pulsations have been aptly compared to the ticking of a watch heard through a pillow; their number varies from eighty to a hundred and sixty; the average rate is about a hundred and forty. The sound is most commonly heard in the iliac or inguinal region, opposite to the placental murmur. It is sometimes audible in the lumbar regions, at the fundus uteri, and in the neighbourhood of the umbilicus. There is reason to suspect malposition of the child when the sound is central. In three cases in which the shoulder presented, we heard the fœtal heart close to the umbilicus. If the sound be equally audible and distinct at opposite sides of the uterus, it may indicate twins. The rate of pulsation at each side should be counted, and compared with the maternal pulse. The fœtal hearts of twins are never synchronous; if therefore, a difference be observed, and neither pulsation corresponds with the mother's pulse, it is a proof of twins.

The fœtal pulsations may not be heard, although the child is living. In the most favourable cases, it is by no means easy of detection; and the remark of Laennec is perfectly true: "L'étude de ces phenomènes demande incomparablement plus d'attention que celle de tous ceux que presentent les maladies de la poitrine." The child may be small; the heart weak; or the liquor amnii abundant. If the child lie at the back of the uterus, the sound is lost; the vibrations being diffused and reflected by the liquor amnii. If the child lie anteriorly, these pulsations

will be heard; thus the position of the woman lying on her back may prevent the sound from being heard, and it may be at once detected by a change of position. The sound is heard most plainly in cases of labour when the waters have escaped, and the head of the child is fixed in the pelvis. The most inexperienced may learn the double beat in such cases; and this knowledge can be applied afterwards to those which are more doubtful.

As a sign of pregnancy, the sound of the fœtal heart is the only unequivocal evidence we have; and therefore is the most important. It is valuable, also, in being consistent with the strictest delicacy, and rendering unnecessary any search after other signs which are not so completely within those limits.

In order to determine pregnancy by auscultation, the bowels should be previously relieved, and the urine drawn off. The accumulation of air in the intestines, and the distention of the bladder, sometimes obscure the sound. The woman should be placed in a recumbent position, so as to relax as much as possible the abdominal muscles; a sheet should be thrown over the person, and nothing interposed between it and the abdomen. A perfect silence in the room should be preserved; and the examination should be commenced in the inguinal region, proceeding from below upwards, until the situation of the sound is discovered.

At this, the middle period of pregnancy, the leading signs are, then, the *changes in the areola;* the *active motions of the child* (quickening); the *changes in the cervix uteri;* and, with the *utero-placental murmur*, the *pulsations of the fœtal heart.*

When it is required to give an opinion in doubtful cases of pregnancy, much caution is necessary. It would be well to observe the following rules.

1. Never depend upon a single sign, except the sound of the fœtal heart; but rather seek for several as a confirmation of that first observed.

2. If there be no evidence for the affirmative, do not hastily conclude negatively; rather let a second examination be made after a certain interval.

3. Set no value on the evidence of the party in question. In doubtful cases, there are many inducements to deceive the prac-

titioner in order to disguise an existing pregnancy, as well as to convince him of a conception which has no existence except in the imagination of one anxious to be a mother.

4. In all cases where the opinion is of importance, the examination should be made in the presence of a third party.

THIRD PERIOD.—The symptoms and signs of this period, or the last month of gestation, are—

Constitutional.	*Local.*
Renewed febrile irritation.	Falling of the abdomen.
Renewed irritability of bladder and rectum.	Great sense of weight.
Constipation or diarrhœa.	Difficulty in walking.
Restlessness.	Sciatic pains.
Irregular pains in the abdomen.	Varicose veins.
Sudden cessation of anxiety.	Increased vaginal discharge — the "Show."

The third period of pregnancy is characterised by symptoms which are premonitory to parturition.

The *Uterus descends towards the pelvis;* the abdomen is less prominent; and the woman feels a weight about the loins which makes exercise distressing to her.

Pressure-Effects.—The *nerves* are more pressed upon, causing a tingling sensation round the hips and down the legs; this sometimes amounts to pain followed by numbness. There are cases in which the sacral plexus has been so compressed, that the sciatic nerve has been paralysed, and lameness has been caused.

The *veins* suffer equal pressure. The feet and ancles are swollen; the veins of the legs are distended, and often, from repeated pregnancy, *become varicose.* In the neighbourhood of the rectum, the inconvenience is greatest; because the foundation of hæmorrhoids is too frequently thus laid, and once formed they increase and become more distressing with every successive pregnancy.

The *Sympathetic Irritation* of the neighbouring organs is renewed. The *bladder* is very irritable; and micturition is frequent and troublesome. The action of the *rectum* may be excited, and cause *diarrhœa;* or it may be suspended, producing *constipation.* The latter is more usual; and, when it occurs, the woman is often

quite unconscious of any inconvenience; the rectum may be loaded for one, two, and even three weeks, without causing distress until just before labour approaches, when the irritation may be reflected on the uterus, and cause premature spasmodic contractions. These *false labour-pains* are always most distressing, and cause the patient much unnecessary agony.

The *Vaginal Discharge* is increased; and a thick glairy mucus flows abundantly for two or three weeks before parturition. This has been sometimes mistaken by primiparæ for the show. In some instances, the vagina is dry, and no discharge appears until the time of labour; and even then not until the first stage is considerably advanced.

The "*Show*" is a sanguineous discharge that finally colours the mucous secretion. It is the last sign of pregnancy; the first of parturition.

LECTURE VI.

DURATION OF PREGNANCY.

The Duration of Pregnancy is so intimately related to important forensic questions, that it has always been the subject of anxious discussion. The rights of property, the happiness of a mother, and the character of a husband, may be determined by the limits within which a legitimate child may be born. By the laws of England, the "*legitimum tempus pariendi*" is declared to be *usually* "nine calendar months, or forty weeks"; but the law is not exact to a few days. (Blackstone's *Commentaries*, vol. i. p. 456.) Nine months are either 273 or 275 days, according as February is or is not included: nine calendar months and forty weeks (280 days) do not mean the same thing; but, as the law

allows a few days' latitude, the period it seems to fix is forty weeks, or two hundred and eighty days.

There are therefore three questions for consideration, which we shall presently examine. 1. Is the period of human gestation fixed to forty weeks? 2. If not, what is the longest period, and (3) what the shortest, in which a living child can be born?

Modes of Calculation. In order to calculate the duration of pregnancy, the time of conception must be determined; and for this purpose *three modes* are adopted.

The *first* is the *Effect of Conception on the Woman.* Some women are conscious of sensations unusual to them at any other time. They not only know that they have conceived, but can predict the date of their delivery. These cases are rare; but they are valued because of the accuracy of their prophecy. Dr. Montgomery mentions instances of this kind occurring in his own practice, in which labour took place on the day named, being the 280th day. (*Signs of Pregnancy*, Ed. I. pp. 254-5.) Under this category may be included those cases, very difficult to determine, where pregnancy followed a single coitus.

The *second* method, and that most generally adopted, is to calculate from the *Last Appearance of the Catamenia* forwards nine months or forty weeks. This mode has the advantages of facility, of being general in its application, and of embracing a much larger number of cases for the purpose of determining the duration of pregnancy than the former method admits of: but it is liable to error from the uncertainty as to the exact time of conception. Conception may take place immediately after the menses; or, as Coste has shown, at any time between the periods; or just before that which is to succeed, and thus arrest its appearance. The most likely time for conception is the periodic molimen of the ovaries; but that is not the only period, as it may occur in the interval. In calculating the duration of pregnancy, there may thus be a mistake of three weeks. In order to avoid error, and to approach as nearly to accuracy as possible, the middle point of the catamenial interval is sometimes taken as the commencement of pregnancy, so that any error is diminished by one half.

OBSTETRIC CALENDAR.

JAN.			FEB.			MARCH.			APRIL.			MAY.			JUNE.		
Begin.	*Middle*	*End.*	*Begin.*	*Middle.*	*End.*	*Begin*	*Middle.*	*End.*	*Begin.*	*Middle.*	*End.*	*Begin.*	*Middle.*	*End*	*Begin.*	*Middle.*	*End.*
Jan.	May.	Oct.	Feb.	June.	Nov.	March.	July.	Dec.	April.	Aug.	Jan.	May	Sept.	Feb.	June.	Oct.	March.
1	20	8	1	20	8	1	18	6	1	18	6	1	17	5	1	18	8
2	21	9	2	21	9	2	19	7	2	19	7	2	18	6	2	19	9
3	22	10	3	22	10	3	20	8	3	20	8	3	19	7	3	20	10
4	23	11	4	23	11	4	21	9	4	21	9	4	20	8	4	21	11
5	24	12	5	24	12	5	22	10	5	22	10	5	21	9	5	22	12
6	25	13	6	25	13	6	23	11	6	23	11	6	22	10	6	23	13
7	26	14	7	26	14	7	24	12	7	24	12	7	23	11	7	24	14
8	27	15	8	27	15	8	25	13	8	25	13	8	24	12	8	25	15
9	28	16	9	28	16	9	26	14	9	26	14	9	25	13	9	26	16
10	29	17	10	29	17	10	27	15	10	27	15	10	26	14	10	27	17
11	30	18	11	30	18	11	28	16	11	28	16	11	27	15	11	28	18
12	31	19	July.			12	29	17	12	29	17	12	28	16	12	29	19
June.			12	1	19	13	30	18	13	30	18	13	29	17	13	30	20
13	1	20	13	2	20	14	31	19	14	31	19	14	30	18	14	31	21
14	2	21	14	3	21	Aug.			Sept.			Oct.			Nov.		
15	3	22	15	4	22	15	1	20	15	1	20	15	1	19	15	1	22
16	4	23	16	5	23	16	2	21	16	2	21	16	2	20	16	2	23
17	5	24	17	6	24	17	3	22	17	3	22	17	3	21	17	3	24
18	6	25	18	7	25	18	4	23	18	4	23	18	4	22	18	4	25
19	7	26	19	8	26	19	5	24	19	5	24	19	5	23	19	5	26
20	8	27	20	9	27	20	6	25	20	6	25	20	6	24	20	6	27
21	9	28	21	10	28	21	7	26	21	7	26	21	7	25	21	7	28
22	10	29	22	11	29	22	8	27	22	8	27	22	8	26	22	8	29
23	11	30	23	12	30	23	9	28	23	9	28	23	9	27	23	9	30
24	12	31			Dec.	24	10	29	24	10	29	24	10	28	24	10	31
		Nov.	24	13	1	25	11	30	25	11	30			March.			April.
25	13	1	25	14	2	26	12	31	26	12	31	25	11	1	25	11	1
26	14	2	26	15	3			Jan.			Feb.	26	12	2	26	12	2
27	15	3	27	16	4	27	13	1	27	13	1	27	13	3	27	13	3
28	16	4	28	17	5	28	14	2	28	14	2	28	14	4	28	14	4
29	17	5				29	15	3	29	15	3	29	15	5	29	15	5

July.	Nov.	April.
1	17	7
2	18	8
3	19	9
4	20	10
5	21	11
6	22	12
7	23	13
8	24	14
9	25	15
10	26	16
11	27	17
12	28	18
13	29	19
14	30	20
Dec.		
15	1	21
16	2	22
17	3	23
18	4	24
19	5	25
20	6	26
21	7	27
22	8	28
23	9	29
24	10	30
May.		
25	11	1
26	12	2
27	13	3
28	14	4
29	15	5
30	16	6
31	17	7

Aug.	Dec.	May.
1	18	8
2	19	9
3	20	10
4	21	11
5	22	12
6	23	13
7	24	14
8	25	15
9	26	16
10	27	17
11	28	18
12	29	19
13	30	20
14	31	21
Jan.		
15	1	22
16	2	23
17	3	24
18	4	25
19	5	26
20	6	27
21	7	28
22	8	29
23	9	30
24	10	31
June.		
25	11	1
26	12	2
27	13	3
28	14	4
29	15	5
30	16	6
31	17	7

Sept.	Jan.	June.
1	18	8
2	19	9
3	20	10
4	21	11
5	22	12
6	23	13
7	24	14
8	25	15
9	26	16
10	27	17
11	28	18
12	29	19
13	30	20
14	31	21
Feb.		
15	1	22
16	2	23
17	3	24
18	4	25
19	5	26
20	6	27
21	7	28
22	8	29
23	9	30
		July.
24	10	1
25	11	2
26	12	3
27	13	4
28	14	5
29	15	6
30	16	7

Oct.	Feb.	July.
1	17	8
2	18	9
3	19	10
4	20	11
5	21	12
6	22	13
7	23	14
8	24	15
9	25	16
10	26	17
11	27	18
12	28	19
March.		
13	1	20
14	2	21
15	3	22
16	4	23
17	5	24
18	6	25
19	7	26
20	8	27
21	9	28
22	10	29
23	11	30
24	12	31
		Aug.
25	13	1
26	14	2
27	15	3
28	16	4
29	17	5
30	18	6
31	19	7

Nov.	March.	Aug.
1	20	8
2	21	9
3	22	10
4	23	11
5	24	12
6	25	13
7	26	14
8	27	15
9	28	16
10	29	17
11	30	18
12	31	19
April		
13	1	20
14	2	21
15	3	22
16	4	23
17	5	24
18	6	25
19	7	26
20	8	27
21	9	28
22	10	29
23	11	30
24	12	31
		Sept.
25	13	1
26	14	2
27	15	3
28	16	4
29	17	5
30	18	6

Dec.	April.	Sept.
1	19	7
2	20	8
3	21	9
4	22	10
5	23	11
6	24	12
7	25	13
8	26	14
9	27	15
10	28	16
11	29	17
12	30	18
May.		
13	1	19
14	2	20
15	3	21
16	4	22
17	5	23
18	6	24
19	7	25
20	8	26
21	9	27
22	10	28
23	11	29
24	12	30
		Oct.
25	13	1
26	14	2
27	15	3
28	16	4
29	17	5
30	18	6
31	19	7

In reckoning by this Calendar, 280 days, or ten lunar or nine calendar months and one week, are taken as the duration of human pregnancy; but many women, it must be recollected, are delivered on the 270th or 275th day, and some on the 285th or 290th day.

The first column supposes conception to have taken place on any particular day, or the last catamenial period may be taken as the time of conception. The middle column in each month will indicate pretty nearly the time of quickening, supposing, as a general rule, that it occurs in middle of pregnancy. The last column will, within a day or two, indicate the date of delivery.

What, then, is the *Longest Period of Pregnancy?* According to the table formed by dating from the last menses, we have found the following results :—

Periods of Human Gestation, in 168 *Cases.*

Days of Gestation.	No. of Cases.	Days of Gestation.	No. of Cases.	Days of Gestation.	No. of Cases.	Days of Gestation.	No. of Cases.
254	4	267	2	280	2	292	4
255	2	269	5	281	2	293	2
256	3	270	6	282	4	294	2
257	1	271	3	283	7	295	2
258	1	272	4	284	6	296	4
259	1	273	7	285	10	297	6
261	1	274	3	286	4	298	1
262	1	275	5	287	6	299	4
263	1	276	1	288	3	300	4
264	4	277	4	289	5	301	4
265	4	278	6	290	2	314	1
266	3	279	7	291	3	324	1

In calculating these tables, twenty-eight days were deducted from the whole number; so that the period of pregnancy was probably more than that stated. For instance, the longest period of protracted gestation was 362 days; but, deducting the interval, (352 − 28) = 324 is marked as the period. The total number now given is 168; twenty being deducted, which might be considered premature labours. The late Dr. Merriman has given 114 cases, in which the dates of birth were calculated from the last appearance of the menses, but not including that day. The late Dr. Reid has also collected 500 cases, adopting the same mode of calculation. These three tables Dr. Simpson has arranged according to weeks, commencing with the thirty-seventh.

Date of Delivery calculated from the Last Day of the Menses.

Weeks.	Days.	Merriman.	Murphy.	Reid.	Total.
37	From 252 to 259	3	12	23	38
38	„ 260 to 265	13	14	48	75
39	„ 267 to 273	14	27	81	122
40	„ 274 to 280	33	28	131	192
41	„ 281 to 287	22	39	112	173
42	„ 288 to 294	15	21	63	99
43	„ 295 to 301	10	25	28	63
44 and upwards	„ 302 to 326	4	2	14	20
		114	168	500	782

Thus it is found, that not only is the fixed date, 280 days, exceeded, but that, as with the catamenia, there is an ascending and a descending series. The highest number in which the menses appear for the first time is between 14 and 16 years of age; and so between the 274th and 280th days of gestation are the largest number of deliveries—192 cases in 782, or about one-fourth of the whole number. The same law seems to apply in the one case as in the other.

In the evidence thus afforded, we met with two cases protracted to 314 and 324 days. Such an inordinate length led to the most careful inquiries respecting them, lest there might be some undetected source of error in estimating the duration of pregnancy. We could not find anything to cause a doubt.

Case I.—*Protracted Gestation* (342—28)= 314 *days.*

M. R., æt. 26, was pregnant with her third child. She was a married woman, respectable in her appearance, and intelligent in her manner. Her health had always been good; menstruation commenced at thirteen years of age, and returned regularly every four weeks. It took place in the intervals between her pregnancies, the same as at other times. The catamenia ceased September 1st, 1841, which she attributed to her being pregnant soon after that date. She was delivered August 9th, 1842, of a girl, still-born; from her description, it must have been putrid. She is perfectly conscious that she was pregnant soon after the last appearance of the menstrual discharge; that her gestation greatly exceeded its usual time, and was considerably longer than her former pregnancies, which did not exceed nine months.

Case II.—*Protracted Gestation* (352—28)=324 *days.*

M. P., æt. 33, was pregnant with her fifth child. She was a married woman, respectable in appearance, intelligent in manner, and very clear in her answers to questions. Her previous four children were all girls, and with the second she had had a protracted pregnancy. Her health was always good; menstruation commenced at 15, and returned every four weeks, sometimes sooner, but never later. It ceased the first week in March, 1843; soon after which she was seized with nausea and constant sickness of the stomach. Pregnancy not being suspected, she was placed

under treatment for a disease; but the failure of the means used to relieve her led to the belief that the irritation of the stomach was the effect of gestation; nothing further was done, and it ceased naturally. She had also occasionally a sense of weight and fulness about the loins. The movements of the child were felt in July following, and she was delivered February 16, 1844, of a boy. She stated that the child was not then above the average size; but at the time these notes were taken (August, 1844) it was unusually large and fat for a child six months old.

Professor Simpson (*Obstetric Works*, vol. i., p. 334) has given four cases of protracted gestation, dated from the last appearance of the menses, in which he has carefully avoided every source of error, deducting twenty-three days from the total as the catamenial interval.

Case 1. Number of days from last menstruation...336—23=313
Case 2. ,, ,, ,, ...332—23=309
Case 3. ,, ,, ,, ...319—23=296
Case 4. ,, ,, ,, ...324—23=301

These results receive great support from observations on the gestation of the lower animals, in which the date of intercourse and conception can always be ascertained. The late Earl Spencer gave great attention to the gestation of the cow, whose period is 285 days. He found the same variation in the duration of pregnancy in the cow, as has been just noted in the human female. The following are the periods of gestation given by him in 391 cows:—

Days of Gestation.	No. of Cows.	Days of Gestation.	No. of Cows.	Days of Gestation.	No. of Cows.	Days of Gestation.	No. of Cows.	Days of Gestation.	No. of Cows.
245	1	271	3	279	19	287	25	295	1
252	1	272	2	280	17	288	23	296	4
254	2	273	2	281	20	289	18	297	2
260	1	274	1	282	31	290	17	298	—
262	1	275	7	283	33	291	12	299	—
263	4	276	6	284	36	292	10	300	—
268	2	277	8	285	35	293	7	301	2
270	2	278	13	286	18	294	5		

Total number of Cows..... 391

The limits of the variation are 245 and 301 days; the highest number 284 days. Tessier made more extended inquiries as to the period of gestation in the lower animals, the cow, the mare, the sow, the bitch, etc., etc. In all he found a variation. He gives a table of the gestation of the cow with the following results :—

Days of Gestation.	Number of Cows.
From 260 to 270	21
270 to 280	213
280 to 297	321
298	6
299	4
300 to 321	10

This evidence is sufficient to prove the law—that *the term of gestation is variable:* that, if human gestation were fixed to a period of 280 days, it would be an exception to the general rule. The tables already quoted prove that this is not the case. As yet, however, a certain knowledge of the longest date is involved in obscurity. Professor Simpson, in his valuable paper on the duration of pregnancy, quotes two remarkable cases. One is reported by Professor Meigs, of Philadelphia, on "facts" which are considered to be "trustworthy."—(*Simpson's Obstetric Works*, vol. i. p. 340). The patient supposed herself pregnant in July, 1839; quickened on the 20th November; had spurious labour-pains on the 10th April, 1840; but her child was not born till the 13th September, 1840; pregnancy having "endured nearly fourteen months, or 420 days." Professor Atlee, of Philadelphia, has published two cases of protracted gestation occurring under his own observation. In the first of these, the patient lost her catamenia on March 22, 1832, quickened August 5th of the same year, and was delivered with forceps March 22, 1833. It was her fourth pregnancy. In Dr. Atlee's second case, the patient saw the appearance of menstruation for the last time on August 6, 1832, quickened December 25, and was not delivered till August 13, 1833. Dr. Atlee states, that "he has not the least doubt of the truthfulness of the evidence in the above cases." Professor Simpson, however, hesitates, and confesses "that some of the late

cases recorded particularly by our American brethren appear to me beyond the bounds of this possibility." Such was our own impression until the following remarkable case came under our notice. We were sent for (February 1, 1862) to see a lady whose pregnancy had been protracted. She had three children, the two first born at the usual term, the third a fortnight later. This pregnancy she dated from February 10, 1861, when the menses last appeared. The motions of the child were felt between the 10th and 20th of July, and she expected her confinement in November. In that month, she states that she felt her pains, and thought labour was coming on, but she received a letter which gave her a great shock; the pains at once disappeared and did not return until March 2, 1862, when she was delivered by Mr. Parrott, of Clapham, who kindly informed us that "she had a most easy labour"—"the child appears feeble and diminutive." The health of the lady has been perfectly good, but while carrying this child she has been subjected to causes of great anxiety. The duration of pregnancy in this case, dating from the last appearance of the menses, would be 385 days; but, deducting 23 days' interval (Simpson) it would be 362 days, or 28 days according to our own estimate, it would be 357—almost a year.

That these cases stand as remarkable exceptions to the general rule, is clear from the careful researches of the late Drs. Reid and Montgomery. Dr. Reid formed a table of thirty-nine cases, in which pregnancy, the result of a single coitus, was known. In this list the highest number is 301 days' gestation, Dr. Montgomery formed a similar table of fifty-six cases. Both tables may be compared.

	Reid.	Montgomery.	Total.
35 weeks, or 252 days	...	1	1
37 „ „ 259 „	1	2	3
38 „ „ 266 „	6	2	8
39 „ „ 273 „	7	10	17
40 „ „ 280 „	18	22	40
41 „ „ 287 „	2	9	11
42 „ „ 294 „	3	8	11
43 „ „ 301 „	2	2	4
	39	56	95

What is the Shortest Period within which a Living Child can be born? This question has also given rise to much discussion, in consequence of its forensic importance in determining the legitimacy of offspring. Capuron relates the case of Fortunio Liceti, who was born after a gestation of four and a half months, and lived to eighty years of age. (Capuron, *Cours Méd.-Légale*, p. 157.) No similar instance has since appeared; there is every reason, therefore, to doubt its authority. Dr. Rodman of Paisley mentions a case of nineteen weeks or 133 days' gestation, in which the child survived; but the particulars are too loosely expressed to insure confidence in the account. Professor Christison met with one instance in which a living child was born at the 167th day, or five and a half calendar months, and lived eight and a half hours. We met with a similar case. A child born about the same age, five and a half months, respired for some time, but could not sustain respiration more than two hours, although every care was taken to maintain its temperature. Professor Fleischmann relates a birth at the twenty-fifth week, or 175th day, in which the child, a girl, lived for a week.

The clearest case to determine this question is one recorded by Mr. Tait. A woman, married July 22nd, 1839, menstruated naturally the week before her marriage, and felt herself quite well only two days before that event; but the menses never afterwards returned. She was delivered January 18th, 1840, of a female child (171 days); but it was so feeble and so premature in its whole appearance, that the question of its viability was never once entertained. Its cry was so weak as scarcely to be heard a few yards distant; and more resembled the mew of a kitten than the natural cry of an infant. There were no nails on the fingers and toes; a thick dark down covered the head instead of hair; the skin everywhere was unusually florid and thin; the extremities were imperfectly developed; the bones of the head were soft and easily compressed, and the approximation of the sutures imperfect; the membrana pupillaris was entire. The greatest pains were taken to preserve the child; and so successfully, that after three weeks it began to suck. "Before it began to suck, it was so shrivelled and covered with down similar to that on its head at its birth, that several

professional friends who saw it, declared that it would not live, and were surprised that it survived so long. So soon, however, as it began to suck, its whole appearance began to alter; and it became an object of great interest and anxiety. Its length and weight were for the first time accurately taken forty days after birth (February 27th): weight three pounds, length thirteen inches; centre of body nearly an inch above the umbilicus. April 11: weight five pounds three ounces; length seventeen inches; centre of body at superior margin of the umbilicus; the nails were formed on the fingers and toes; the aspect was more natural than hitherto; the down had almost entirely disappeared from every part of the body. From the above period, it continued to thrive until May 27th, when it was seized with measles and died after two days' illness." (*Lancet*, vol. ii. 1841-2, p. 119.) This case was extremely interesting, because it bears internal evidence of truth, and seems to point out the limit at which it would be possible to save a premature child.

Professor D'Outrepont of Würzburg gives a case equally circumstantial. A male child was born twenty-seven weeks (189 days) after the last appearance of the catamenia. It measured thirteen inches, and weighed one pound and a half. Its skin was covered with smooth lank down, and was much wrinkled; the whole extremities were exceedingly small in proportion to the trunk, and were kept constantly bent over the body, as during the existence of the fœtus in the womb; the nails of the fingers and toes were like mere folds of the skin; the testicles were still within the belly; and the pupillary membrane was entire. The child whined, but could not cry; it slept almost constantly, and awoke only once a-day; seldom opened its eyelids, and was obviously insensible to light or sound. For some time, it was fed with a spoon on diluted milk and sugar. In four weeks the down began to drop from the skin; in fifteen weeks, it had made very little progress in any respect; the wrinkles had, however, disappeared from the skin, and the length was increased an inch and three quarters. *But from this time, which corresponded with the fortieth or forty-second week since conception*, it made rapid advances; sleeping less, eating more, crying strongly, and

becoming evidently sensible to sound and pleased with light." (Probationary Essay *On the Vitality of the Fœtus*. By A. Campbell, M.D. Edin. 1842.)

These cases are related with so much accuracy, that every confidence may be placed in them. The first (Mr. Tait's) proves the possibility, but at the same time the extreme difficulty, of preserving a child born on the 171st day—within nine days of six calendar months. This may be considered the extreme limit. The second gives an interesting account of the extra-uterine development of the fœtus, and the rapid change observed when the full term of gestation was completed.

Dr. Montgomery reports ten cases of premature births, with their results; commencing at the twenty-third week—161 days.

No.	Last Menses.	Date of Conception.	Birth.	Duration of Gestation. M.	D.	Days.	Survival of Child.
1	Oct. 9.	Oct. 9	April 3	5	10	161	Twelve hours
2	—	Aug. 24 married	March 3	5	21	174	Till March 10—a week
3	—	July 22 married	Jan. 18	5	27	180	— May 29
4	—	—	—	6		183	Seven weeks
5	April 10	April 10	Oct. 16	6	9	189	Eleven years
6	—	April 1	— 10	6	13	193	Doing well six months afterwards
7	—	Jan. 31	Aug. 14	6	16	196	Thirty years
8	—	June 12	Dec. 27	6	18	198	Two years
9	—	Oct. 24	May 10	6	19	199	Eleven days
10	—	Aug. 22	March 8	6	21	201	Thirteen years

This table shows that, previously to the 180th day, the child seldom survives: after that date there is more certainty.

Summary.—With regard to the duration of pregnancy, the evidence seems to us to prove:—

1, That it is not fixed to forty weeks or 280 days.

2. That the *longest period* is uncertain. It certainly exceeds 300 days; but the "*ultimum tempus*" cannot be defined.

3. That the *shortest period* is 171 days, where extreme care and

attention may succeed; but that a fœtus born at 180 days is more certain of survival.

The following table will, perhaps, facilitate calculations as to the duration of pregnancy being formed, according to the number of days, weeks, lunar and calendar months. The last are reckoned as being of thirty days each.

Days.	Weeks.	Months.		
		Lunar.	Calendar.	
7	1			
14	2			
21	3			Date of earliest healthy
28	4	1		aborted ovum.
30	4+2 days.		1	
35	5			
42	6			
49	7			
56	8	2		
60	8+4 days.		2	
63	9			
70	10			
77	11			
84	12	3		
90	12+6 days.		3	
91	13			
98	14			
105	15			
112	16	4		
119	17			[men.
120	17+1 day.		4	Uterus rises into the abdo-
126	18			Slight motions of child felt.
133	19			
140	20	5		
147	21			
150	21+3 days.		5	
154	22			
161	23			Child can breathe but not
168	24	6		[sustain respiration.
175	25			Child can support respira-
180	25+5 days.		6	[tion. *Vide* Tait's case.
182	26			Child will with care survive,
189	27			[*Vide* Montgomery's Tabie.
196	28	7		
203	29			
210	30		7	
217	31			
224	32	8		
231	33			

	Days.	Weeks.	Months. Lunar.	Months. Calendar.	
	238	34			
	240	34+2 days.		8	
	245	35			
	252	36	9		
	259	37			
	266	38			
	273	39		9	Including February.
	275	39+2 days.		9	Not including February.
	280	40	10	9+5 days.	
Protracted Gestation.	287	41			
	294	42			
	301	43		10	Highest number in Dr. Montgomery and Reid's tables, *vide* p. 82.
	308	44	11		
	315	45			Highest number reported by Dr. Simpson, 313, *vide* p. 80.
	322	46			Highest number in our Report, 324, *vide* p. 78.
Extreme Cases.	365	52+1 day.	13	12	Professor Atlee's case.
	372	53+1 day.	13+1 wk.	12+12days	do. do.
	385	55	13+3wks.	13 nearly	Dr. Murphy's case.
	420	60	15	14	Dr. Meigs' case.

LECTURE VII.

DISEASES OF PREGNANCY.

THE DISEASES OF PREGNANCY embrace a very large class of ailments, many of which can scarcely be considered as such. Like the symptoms of pregnancy, they may be classed as functional and local. Some of the functional derangements are but the exaggeration of the ordinary symptoms; thus nausea may become excessive vomiting; restlessness may terminate in a complete loss of rest; and so on. All constitutions are not equally able to meet the demands made upon them by gestation, and hence arise many

of the so-called diseases; these are rather proofs of the great nervous irritation caused by constitutional exhaustion, than of any absolute morbid change going forward in the system. So also the effects of weight and pressure, if frequently repeated, establish diseases, which are correctly so called, as a morbid alteration is really the result: thus hæmorrhoids and varicose veins, enlargement of the neck of the womb, and prolapsus uteri, too frequently are the consequences of gestation. Adopting the same arrangement of these diseases as has been made with regard to the symptoms and signs of pregnancy, we shall consider the constitutional and the local symptoms according as they affect the circulation, the nervous system, the digestive organs, and the secretions.

The *diseases of the ovum* will then be considered. They form an obscure and difficult subject, but one of extreme importance, as illustrating many causes of abortion as yet very imperfectly understood.

Affecting the Circulation.

Constitutional Diseases.	Local Diseases.
Palpitations.	Œdema of lower extremities.
Syncope.	Varicose veins.
Œdema (of face).	Hæmorrhoids.
Dyspnœa.	
Hæmoptysis.	
Cough.	

Affecting the Nervous System.

Insomnia.	
Headache.	
Convulsions.	
Neuralgic pains.	Hemiplegia.
Distressing motions of the child.	

Affecting the Digestive Organs.

Excessive vomiting.
Pyrosis.
Cramps of stomach and duodenum.
Diarrhœa.
Constipation.

Affecting the Secretions.

Constitutional Diseases.	Local Diseases.
Jaundice.	Incontinence of urine.
Excessive salivation.	Retention of urine.
Albuminuria.	

Displacements of the Uterus.

Retroversion.
Prolapsus.

Constitutional Disorders of the Circulation.—*Palpitations* are very frequent in pregnancy, even with women in average health; but are particularly distressing to delicate hysterical temperaments. The patient is unequal to her duties; nervous irritation is the result; and *hence the palpitations*. The attack comes on suddenly, usually at night; the patient starts out of sleep alarmed; the heart pulsates violently; and rest is completely broken. Some patients are seized with palpitations during the day; and occasionally the action of the heart is so violent that the whole body trembles.

Syncope may occur at the time of quickening, but does not return. In delicate constitutions, syncope is more frequent, and may be produced by the most trifling causes; heated apartments, offensive sights or odours, slight shocks, rapid motions—any of these will induce an attack. Burns mentions a species of syncope, "that he has oftener than once found to prove fatal." He has met with it in the early stage of pregnancy; yet he has also seen it take place so late as the sixth month. (*Midwifery*, p. 235.) He attributes it to disease of the heart.

Œdema of the Face and upper parts of the body is an evidence of albuminuria, which at any time may produce convulsions. Such an effect does not generally take place until the period of labour.

Dyspnœa is a common hysterical symptom in delicate females. With such it may occur in the first months of pregnancy; but, as the uterus rises into the abdomen and presses on the diaphragm, it becomes most distressing. The patient cannot lie down, and what little sleep she has is disturbed by nightmare

dreams. Nevertheless, in these cases, the dyspnœa often suddenly disappears on the approach of labour.

Hæmoptysis is sometimes a great cause of anxiety, lest phthisis be indicated. No tubercle may exist in the lungs; but the hæmoptysis is an evidence of the state of the blood which is very unfavourable, as it may at any time, but especially at the time of labour, cause hæmorrhage.

Cough may or may not accompany hæmoptysis. It may be dry, short, and hacking, or hoarse, prolonged, and loud. The cough is hysterical, but may become dangerous by its constancy and violence, inducing abortion. If abortion takes place, the cough ceases—a sufficient indication of its cause.

Treatment of Diseases of Circulation. All these affections are only so many indications of debility, and must be treated on the same principles—to strengthen the constitution; to improve the blood; and to regulate the bowels, which are always disordered. The aloetic purgatives, myrrh, rhubarb, the daily use of lavements, are all necessary; but active purgatives should be avoided. Small doses of any of the above-named purgatives, frequently repeated, are far preferable to full doses. With these purgatives, tonics are often combined; and that which is generally preferred is iron, because of its effect on the blood. The sulphate or phosphate may be given with great advantage.

Cases of syncope require great care, because they are sometimes dangerous. Every possible cause of excitement should be avoided; crowded rooms, public exhibitions, rapid travelling, should be dispensed with.

Constitutional Diseases of the Nervous System.—The nervous system gives evidence of disturbance in these cases, equally with the circulation. Rest is frequently interfered with, even in health; but—

Insomnia—total loss of rest—is only met with in cases of debility. The patient is generally thin, perhaps emaciated; the child to which she gives birth may be large and fat: the demand made for support is more than she can bear; and hence the result.

There is a great variety in the manner in which the patients

are affected by want of sleep. Some are not much inconvenienced by it; they do not feel the same amount of fatigue in the morning that might be expected. In some of these cases, one can scarcely believe that they have not had some sleep, although not conscious of it. We remember one patient who was not conscious of having slept for three weeks. It is difficult to believe that there was not some sleep within that time. In other instances, women are greatly distressed by loss of rest; they become feverish and irritable; their appetite is lost; and, if these symptoms be protracted, there is danger of miscarriage.

Sometimes the sleeplessness at night is compensated in the daytime: the order of nature is reversed. In general, this derangement is fortunately not of long continuance; and, like many other affections of pregnancy, it disappears suddenly.

Treatment of Insomnia. Anodynes have very little influence in these cases: opium acts rather as a stimulant, and assists in keeping them awake. Denman found a cup of cold water on going to bed to do more good. A cup of cold beef-tea would be better.

Headache may be either a very serious symptom, or one of trifling importance. If accompanied by suffusion of the eyes, drowsiness or giddiness, muscæ volitantes, or noises in the ears, headache is very dangerous; and, if not promptly relieved, may terminate in convulsions. The patients who are liable to such attacks are generally of strong plethoric habits, not very moderate in their appetites; and these attacks frequently follow after a full meal.

Treatment of Plethoric Headache. In such cases, depletion followed by active purgatives is essential to prevent one of two results, convulsions or mis-carriage. Exercise, low diet, the *avoidance of all stimulants*, should be insisted upon. Patients of a very different temperament are also liable to headache, which is only one of the many forms in which neuralgia presents itself. They are delicate and hysterical; the pain is often severe, and usually partial. It may have its seat across the temples, on one side or other of the head or at the occiput. It lasts for a short

time, again returns and is sometimes periodic, observing the dates of the catamenia.

Treatment of Neuralgic Headache. These cases, which are instances of constitutional debility, require the treatment alluded to in p. 90. Quinine in full doses sometimes gives immediate relief.

Convulsions of the true puerperal type may occur during pregnancy. Of these the headache above alluded to is the monitor; but usually they are of an hysterical character, met with in patients disposed to syncope, who are highly excitable or much exhausted. The pale and anxious countenance, the anæmic aspect, and nervous twitchings, sufficiently indicate the character of the constitution and the treatment necessary. These convulsions are seldom dangerous; but in some instances have induced miscarriage.

Neuralgic Pains vary very much in their seat. They give rise to the headache which has been just alluded to. Neuralgia of the face, like tic douloureux, is sometimes met with. Severe pains under the left mammæ, and even sciatica, occasionally occur; but by far the most troublesome of these affections, and perhaps the most frequent, is—

Toothache. The tooth may be sound or diseased. If the former be fortunately the case, the practitioner might hesitate as to the propriety of removing it; but if it be diseased, and he proceed to extract, the patient receives only temporary relief. Another tooth, perhaps a decayed one, is seized upon by the pain, and may be extracted also. While the removal of the teeth gives no real relief to the patient, the dread of the operation is not unaccompanied with danger. Abortion has been known to follow this simple operation. In all such cases, extraction should be avoided. Chloroform may be inhaled, or chloric ether administered to relieve the pain; but iron will best remove its cause.

Distressing Motions of the Child seems to be an indication of neuralgia of the uterus. These movements generally cause no inconvenience, sometimes even pleasure; but there are cases in which they cause pain. The patient is awakened by a sudden

attack of pain, which is renewed with the movements of the child. They are not so troublesome during the day, and are generally relieved by the support of a properly applied bandage.

CONSTITUTIONAL DISEASES OF THE DIGESTIVE ORGANS.—The digestive organs are frequently the seat of deranged action.

Nausea and Vomiting, when not in excess, and occurring periodically, are rather indications of health, than of disease; but there are occasional exceptions in which the irritation of the stomach is so violent and protracted as to place the patient in great danger. Miscarriage may take place; and, if she recover from the immediate loss of blood, it may save her; but she may die of inanition. The symptoms and danger will be best understood by the relation of a few cases.

Dr. Johnson reports in the *Lancet* the case of a lady aged thirty, "who soon after marriage ceased to menstruate. She became affected with morning sickness, which was naturally attributed to pregnancy. The sickness became worse, and nothing of any kind could be retained on her stomach. *Pregnancy was not detected;* but the disease was attributed to the pylorus. The sickness and emaciation were the only symptoms present." She died; and "after death no morbid appearances were observable in any part of the body. The uterus contained a fœtus about four months old. This patient was literally starved to death." (*Lancet*, March 3, 1838, p. 825.)

A very remarkable case is related by the late Professor Davis, which occurred in the practice of Dr. Haighton. She had most obstinate vomiting in two previous pregnancies. This was her fourth; and she was in about the sixth month of gestation. All that Dr. Haighton and the practitioner in attendance could do, did not correct the vomiting. She was sent to Islington, but returned without receiving any benefit. "She was then in her seventh month. Her sickness grew worse; but it underwent some changes, for sometimes it would be very violent, and then intermit. The intermission would last a short time, and then end in diarrhœa. If means were used to stop the looseness, the sickness immediately returned. . . . . During a few days in the progress of this exhaustion, I observed that her strength declined

much faster than before I (Dr. Haighton) expressed to her mother my wish to to be permitted to invite a tendency to labour." Dr. Haighton did not like to induce abortion on his own responsibility. A consultation was held; some delay took place before coming to a decision. "At this time, unluckily, she had retained about half a pound of nourishment; and the sickness had not increased. He (the consultant) thought it proper therefore to defer the operation, although I explained that this was one of those delusive intervals that terminate in diarrhœa. So indeed it proved; for the next day she was exceedingly ill," and in consequence of this hesitation died two days afterwards. (*Obstetric Medicine*, vol. ii. p. 871.)

Dr. Churchill relates an interesting case which occurred to him in consultation with Dr. Maguire of Castleknock. "The patient was a young woman pregnant with her third child, and at about four months was attacked with incessant vomiting, until her life was rendered intolerable and her strength nearly exhausted. *I never saw such agony in any case.* We tried all the usual remedies with occasional relief, but the vomiting returned, and, finding that she could obtain no nourishment whatever, that her bodily powers were worn out, that her pulse was steadily 120, I determined, at the sixth month, to induce premature labour, which I effected by penetrating the membranes and giving ergot of rye. She was delivered of a dead fœtus, recovered rapidly, and has since borne a child at the full time." (*Practice of Midwifery*, 4th Edition, p. 301.)

We have not been so fortunate. We were called, some years ago, into consultation on the case of a lady pregnant with her first child. She had frequent attacks of severe vomiting, almost from the time of conception. About the third month, it became so severe as to cause great emaciation and exhaustion. Several remedies were used to no purpose; and at the eleventh hour, the question was asked, what further could be done? She was fast sinking; the time was passed to attempt the induction of premature labour; and she died in about two days afterwards.

Thus, in four cases of excessive vomiting followed by exhaustion, three were lost through hesitation and delay; and one was saved by promptitude in inducing miscarriage.

The *Treatment*, therefore, of such cases does not need discussion. When symptoms of exhaustion present themselves in the least, no time should be lost in removing the ovum. Every hour increases the danger; because the patient will be less able to sustain the loss of blood which must attend the operation. If exhaustion be not present, the vomiting may be checked by remedies; and those generally used are directed to the stomach alone. Tonic infusions with carbonate of soda or ammonia, salicine, creasote, hydrocyanic acid, all have been tried with about equal effect. They have sometimes succeeded, but more usually have failed. The cause of this violent vomiting does not exist in the stomach; and therefore those medicines which generally control its irritation are found of no use. The cause exists in the action going on in the uterus; and the vomiting in some cases very much resembles that produced by nervous shock. If this be so, it may arise from inability of the constitution to sustain the demand made upon it, or from some morbid—perhaps poisonous—action going forward in the utero-placental circulation. The latter must of necessity lead to the death of the ovum and its separation from the uterus; this has sometimes occurred naturally, and saved the patient. The former may be relieved by treatment directed not to the stomach alone, but to the uterus also. Strong beef-tea with ice, and hydrocyanic acid, will be found serviceable. Counter-irritation over the sacrum, followed by opiate plaisters and anodyne injections into the rectum and vagina, will very much assist in allaying the irritation of the stomach: but before using these injections the bowels should be regulated, so that no scybala or other cause of irritation remain to influence the stomach. By these means, vomiting may in milder cases be checked; sometimes it ceases of its own accord, and if so, the strictest attention should be paid to the diet of the patient and to the state of the bowels. She requires every aid to promote the digestion of healthy food, so as to support the demands made upon the blood.

Pyrosis—Water-brash—Heart-burn—all express a very troublesome but not dangerous irritation of the stomach. The patient feels a burning sensation at the epigastrium extending along the throat, followed by eructations of a bitter fluid that fills the

mouth. She then experiences a temporary relief; but the attack always returns after eating, when the contents of the stomach may be rejected. In some cases, eructation precedes these distressing symptoms.

Treatment. The symptoms are best relieved by the solution of fluid magnesia and hydrocyanic acid. Great care is also necessary in respect to diet. Vegetables are generally hurtful; but it is very difficult to determine in these cases what agrees with the stomach; it must be allowed to tell its own tale.

Cramp of the Stomach and Duodenum has been described by Burns as an affection, the symptoms of which very closely resemble those attending the passage of a gall-stone. In the cases he met with, the pain had been so violent as to place the patient in danger of miscarriage.

Treatment. A full dose of tincture of opium and chloric ether will always give relief; but tonics are also necessary to prevent a return of the attack. The infusion of chamomile, with nitro-muriatic acid, will be found very serviceable.

Diarrhœa frequently accompanies pregnancy; and is sometimes an evidence of its existence. Patients who are, at other times, free from such attacks, are seized soon after conception; and hence, with these, diarrhœa is one of the most certain signs of pregnancy. Diarrhœa is sometimes a premonitor of labour, and is useful in preventing the bowels from being loaded at this important time. In neither of these cases can diarrhœa be spoken of as a disease. It is only an irritation reflected from the uterus; and will subside of its own accord. Cases, however, occasionally arise in which it becomes constant, and sometimes very exhausting. The appetite is lost; the tongue furred; and the evacuations very offensive.

Treatment. In these cases, chalk mixture with catechu or kino will check or at least moderate the diarrhœa; but alteratives are essential to remove the cause. Hydragyrum cum cretâ with rhubarb, given in very small and frequently repeated doses, will be found useful. Lime-water and milk will assist in allaying irritation. The surface must be kept warm; and strict attention given to the diet.

Constipation very commonly occurs during pregnancy. It may have existed before conception; or may take place soon after the uterus enters upon its active duties. In many of these cases, the constipation causes no inconvenience; the patient is not aware that her bowels are confined, because there may be a daily evacuation which deceives her. At length, however, disturbance begins. Shooting pains through the abdomen are followed by dull pains in the back, with a sense of bearing-down. It seems as if abortion or miscarriage were about to take place. If an examination then be made *per vaginam*, the cause is explained by the loaded rectum.

When this occurs near the time of parturition, much more distressing symptoms present themselves. Severe false labour pains are induced, which are much more intolerable than the true pains of commencing labour. They are mistaken for labour pains; and it is not until they have continued uselessly for some time, that their cause is ascertained. In these instances, the rectum is blocked up by a mass of indurated fæces, which it has lost all power to expel. The irregular accumulation of scybala ("the sow's back") presses forward into the vagina so prominently as nearly to fill the passage. This condition of the rectum reacts upon the uterus, and causes the *false pains*.

The *Treatment* of these cases does not consist in merely unloading the bowels by active purgatives. This must be done in the first instance; but the great object is to restore, if possible, the tonic power of the large intestines. There are many cases in which habitual constipation has been established before pregnancy—before marriage. The habit is acquired by much sedentary employment; and an over-sensitive delicacy leads to it. When marriage and conception take place, the activity of the nervous system is directed to the uterus; and until it amounts to an extreme, no notice is taken of the constipation. Thus the rectum loses its tone, which the irritation of drastic purgatives will not strengthen. A full dose of calomel, followed by castor oil, may be necessary for false pains; and when the bowels are thus relieved, tincture of opium and chloric æther must be given to allay them; but if an enema answer the same purpose, it is

preferable. In the earlier periods of pregnancy, when the bowels are once relieved, a lavement should be used daily; warm water or thin gruel will answer the purpose. After the evacuation takes place, an astringent injection will be found very serviceable; an ounce of decoction of oak-bark and poppyheads, or decoction of cinchona with thirty minims of tincture of opium, may be injected slowly into the rectum. This plan alone may be sufficient; but it is not always easy to carry it out, and therefore we are compelled, as it were, to act through the stomach. In such cases the combination of tonics and aperients, in small doses, will often be found much more efficient than the stronger cathartics. Half a grain of the phosphate of iron, with a grain of the compound colocynth pill, repeated every two or three hours, will do more good than double the dose at longer intervals; so with quinine and rhubarb; extract of henbane and aloes, etc. There are certain cases in which all these remedies fail, and in which it becomes actually necessary to remove the fæces artificially. When once, however, this is accomplished, the use of astringent injections will prevent any return of the difficulty.

Constitutional Diseases of the Secretions.—The secretions may be disordered by pregnancy.

Jaundice is met with in some cases. The yellowness may be slight or deep; it may be accompanied with dyspeptic symptoms or not. In general, it is only an evidence of reflex action; but sometimes it has been known to depend on disease of the liver. When this is the case, other symptoms of hepatic derangement will manifest themselves, which will require appropriate treatment and great attention, because it is a very dangerous combination. But what may be called sympathetic jaundice often passes away of its own accord, and, if not, will do so, if attention be paid to the bowels. Small doses of blue pill and henbane, followed by a neutral salt in any of the tonic infusions, will generally be found sufficient for the purpose.

Excessive Salivation sometimes, but very rarely, occurs. The salivary glands are not swollen, although tender; nor are the gums inflamed; but the saliva accumulates, and distresses the patient very much. It may subside suddenly; but if it con-

tinue or increase, it is best to act on the old principle of derivation —to set another and a different set of glands in action. Thus the saline purgatives, by exciting the secretion from the intestines, will control that from the salivary glands.

Albuminuria has been mentioned but lately in connection with pregnancy. Œdema of the face and upper part of the body during pregnancy was considered by Montgomery an indication of puerperal convulsions. Hamilton, Burns, Ingleby, and others, applied the same remark to anasarca. It remained, however, for Drs. Simpson and Lever to connect cause and effect, and to prove that this œdema and anasarca were the result of albuminuria, just as is observed in Bright's disease of the kidney; and that the cause of the convulsions was the condition of the blood produced by this disease. Albuminous urine in pregnancy is not always a proof of Bright's disease. So long as that disease exists, the albuminous urine remains; but in pregnancy it often disappears after parturition, proving that it is not caused by the organic disease described by Bright. The same effect seems to be produced by congestion of the kidney. It is observed that "albuminuria and its effects are far more common *in first* than in later labours, and these constitute a disease which in general disappears entirely after delivery."—(Simpson's *Obstetric Works*, vol. i. p. 830.) In the first pregnancy, there is much greater pressure on the leading venous trunks in the abdomen than in subsequent pregnancies; the abdominal muscles are more powerful, and press the uterus more backward. Hence arises congestion of the renal veins; which, as Dr. Cormack has shown, will produce the same effect as Bright's disease. Albumen is passed in the urine, and urea is retained in the blood. Puerperal convulsions are not the only consequence to be dreaded from this serious symptom. Dr. Simpson has observed as the result, amaurosis, loss of hearing, paraplegia, hemiplegia, and other derangements of the nervous system. Hence the importance of promptitude in meeting the attack.

The *Treatment* must be directed to relieve venous congestion; and therefore depletion is indicated. Active aperients are also necessary; diet of the least stimulating character; in fact, every-

thing that will diminish the engorgement which oppresses the kidney. In following out this treatment, caution is necessary; it must be recollected that a poison (urea) is in the blood, and that there is consequent nervous depression. While, therefore, the power of the constitution is lowered by depletion, it must be artificially supported. Tonics are necessary. Stimulants after depletion may be cautiously used. The temperature must be maintained; and rest, if necessary, procured by anodynes. For this purpose, chloroform or chloric æther will be found very useful. Diuretics may be given with great advantage: the nitrate or acetate of potash, in the infusion of juniper; scoparium; pareira brava, etc., may be employed. If the urine, which is generally scanty, pass freely, the albumen will diminish, and perhaps ultimately disappear.

Local Diseases of the Circulation.—*Œdema of the Lower Extremities.* This may be part of the disease just described—albuminuria; and in all such cases the condition of the urine should be carefully examined; but it may be the result simply of pressure—the iliac veins may be compressed while the renal veins are free. It is first perceived by the foot becoming too large for the shoes: by and by the veins begin to swell, and the œdema increases; at length it extends up the limb, and the patient is unable to walk.

Treatment. However inconvenient, these cases are not dangerous. Mild saline aperients, with moderate pressure on the limb, are generally sufficient. The œdema may subside, as in many other cases, suddenly; or it may continue until labour is concluded. In the latter case, the strictest attention is necessary to have the limb properly supported, until its size is restored and the enlarged veins disappear.

Varicose Veins are generally met with in women who have had many children; the veins have been frequently exposed to pressure, and at length their coats yield. The veins, once enlarged, seldom return to their original size; but, whenever pregnancy takes place, they enlarge, sometimes enormously. The whole leg has been black with thick venous trunks, traversing it in every direction. So long as no abrasion takes place,

the patient is safe; but a very trifling wound may cause a very serious hæmorrhage, and certainly establish a most unmanageable ulcer. This condition of the veins is generally observed about the fourth month of gestation; and it is probable that, in these cases, the space between the uterus and pelvis is so limited that the iliac veins are strongly pressed upon, just as the uterus is rising into the abdomen. But when the uterus occupies the abdomen, and that pressure is taken off, still the veins remain varicose. It is probable, therefore, that a subacute inflammation takes place in their coats; that the circulation is thus interrupted; and the varicose condition still remains. This may explain the knotted character which these veins sometimes present.

Treatment. Rest in the recumbent position, the elastic web-bandage, and aperients, are the only treatment which can be adopted during pregnancy. Afterwards friction, and the firm support of a laced stocking, should be used to strengthen the veins as far as possible.

Hæmorrhoids are also the result of pressure, and sometimes become extremely troublesome. They begin to appear about the middle of pregnancy, and gradually increase both in size and number towards its conclusion. After delivery they disappear; at least, they cease to annoy the patient. Women who have had many children suffer most from hæmorrhoids; because, the cause of irritation being frequently repeated, they become permanent.

Sometimes the anus is surrounded by a bunch of very large hæmorrhoids during pregnancy, which afterwards scarcely diminish in size. If these bleed, the patient is relieved; otherwise she suffers great distress.

Hæmorrhoids are not caused merely by the pressure of the uterus; they are sometimes produced by a sluggish state of the bowels. Hence in the

Treatment, the chief attention is directed to regulate the bowels. All stimulant and drastic purgatives, especially aloes, should be avoided. The lenitive electuary, with bitartrate of potash and sulphur, has been an old favourite. Gallic acid or powdered galls are added as astringents. The injection of warm water into the rectum often gives relief; but, in many cases, this cannot be

done. The hæmorrhoids are expelled with efforts to relieve the bowels; they may be strangulated, and cause excruciating pains. In these cases, they can generally be reduced; and when they are replaced, a small candle-end smeared with gallic acid ointment, may be inserted into the rectum, and be replaced from time to time. If the gallic acid ointment cause pain, opium or hyoscyamus may be substituted. If this should fail, leeches must be applied; but no attempt should be made to remove the hæmorrhoids at this time by operation.

Hemiplegia may be the result of albuminuria; and if so, will disappear when the cause is removed.

Paraplegia may also depend upon the same cause. Cases, however, arise occasionally in which the spine is diseased; and these cannot be cured. They are more interesting in a physiological than in a practical point of view. We have already (p. 43) alluded to a remarkable case of paraplegia, related by Dr. A. Farre; in which, although the patient was perfectly paralysed from the umbilicus downwards, and no reflex action could be excited, the uterus contracted perfectly and expelled the child. In the year 1842, we were favoured by Mr. Shaw with the report of a very similar case which was under his care in the Middlesex Hospital. The woman had paraplegia from caries of the spine. She was admitted into the hospital, April 6th, 1842, without any power of moving her limbs; she had no control over the bladder or rectum. She was about five months pregnant. She left the hospital about a month afterwards, and was delivered in Scotland, in August, of a still-born child, which presented the arm. The uterus contracted perfectly.

Incontinence of Urine is an annoying attendant on the early months of gestation; it soon, however, subsides, and may not return. In the last month, however, just before labour, the pressure of the uterus on the bladder often renews the attack. In neither case, can much be done; only so far as by mechanical contrivances, of which there are several, to save the patient from the inconvenience.

Retention of Urine is more rarely met with. It is generally produced by the displacement of the uterus known as retroversion, which we shall now consider.

Displacement of the Uterus. *Retroversion of the Uterus* was believed by Denman and the older authors to be an accidental displacement occurring at the fourth month of pregnancy, when the uterus completely occupied the pelvis, and its position might be easily disturbed. It was supposed, that it was caused by an over-distended bladder; that the urine was retained from some unknown cause, and pressed back the uterus. The first symptom which attracted attention was retention of urine; and hence it was assumed to be the cause of the displacement. The improved knowledge of uterine pathology has proved that retroversion, or rather retroflection of the uterus in its non-gravid state, is a common occurrence. If, therefore, it become gravid, its position will remain unaltered; the retroflected uterus will enlarge; but, in doing so, must press directly on the rectum and push the cervix against the urethra. Constipation and retention of urine follow; and the distended bladder and bowels, the latter filled with air from irritation, press down upon the rising uterus. If, unfortunately, the promontory of the sacrum project, the difficulty of escape is increased, and thus the uterus is impacted, as it were, in the pelvic cavity. The cervix does not remain retroflected, but is straitened and drawn upwards.

The *Symptoms* are obvious. The bowels become more and more constipated; and the patient herself feels an obstruction in the passage. She bears down with the motion, but feels something in the way. By and by the bladder becomes irritable; urine is passed, but with difficulty; at length it will not pass at all. Then commences the distress from retention of urine; and assistance, perhaps for the first time, is called for. In relieving the bladder, the practitioner at once perceives the cause. The urethra is drawn up against the pelvis; he cannot find the os uteri; and the vagina is pressed forward by a firm tumour—the retroverted uterus. These cases, when neglected or unknown in the first instance, become very difficult to manage. It is possible that, by keeping the bladder and rectum empty, Nature will overcome the difficulty, and that the increasing uterus will rise into the abdomen; but she may fail, and artificial means must be employed.

Treatment. Attempts have been made to replace the uterus by introducing bladders (Halpin) or vulcanised India-rubber pessaries (Gariel) into the vagina, and then inflating them. By this means a more equable pressure is supposed to be directed against the retroverted uterus, by which it is pushed upwards. Instruments have also been contrived for this purpose, one of which, invented by Dr. Bond of Philadelphia, is described by Dr. Meigs, and found by him successful where other means had failed.—(*Obstetrics*, p. 50.) We confess that we have very little confidence in these methods. They are ingenious, and have been successful; but using them is like groping in the dark—you do not know exactly where the pressure is applied. It is not so with the fingers, which generally can be made to answer the purpose. The patient should be placed on her hands and knees, and two fingers passed into the rectum; two of the opposite hand into the vagina; pressure may be made with the four fingers against the tumour—the fundus—between them. If it be even slightly raised, the fingers in the vagina should seek the os tincæ. They may be passed up directly behind the pubes; and if the cervix be reached, it may be drawn down while pressure is still continued against the fundus through the rectum, If the uterus be thus replaced, a circular pessary might be directed to the anterior wall of the cervix uteri, so as to prevent, if possible, a second retroversion. In extreme cases all these means may fail, and the induction of abortion is the only resource left—a very difficult operation, because, the os uteri being so much out of reach, the usual means for this purpose cannot be applied. Ergot of rye may be given with advantage; because, as the tendency of the uterus is to relieve itself and to expel the ovum, its action is more easily excited. No cases illustrate the maxim "prevention is better than cure" more perfectly than these; because these distressing and sometimes dangerous symptoms may almost always be prevented.

When the patient complains of constipation during the fourth month of her pregnancy, of irritability of the bladder, and then of difficulty in passing urine, of a sense of weight and bearing down in trying to evacuate the bowels, the practitioner should

require an examination *per vaginam* to be made. If this be submitted to (and when the reason is properly explained, it will never be refused), he will at once perceive the retroversion, or perhaps it may be the retroflexion of the uterus. Behind the os uteri, if within reach, a tumour will be felt; and if the opposite hand be placed on the abdomen, above the pubes, it may be pressed down on the pelvis without feeling anything like the uterus. The displacement having thus been ascertained, by strict attention to the bowels, the daily use of the lavement, and of the catheter if necessary, the uterus may correct itself; if not, the fingers can do so much more efficiently here than in extreme cases.

Prolapsus Uteri is not so much a disease of pregnancy as a pre-existing disease. The womb may become pregnant, although prolapsed. These are always very troublesome cases in the early months of pregnancy, because of the increasing weight of the uterus. Afterwards, however, they are less so; and, as the uterus occupies the abdomen, it rather rises from the vulva. As parturition, however, approaches, and the uterus again descends towards the pelvis, the cervix passes down the vagina, and is sometimes quite close to the vulva before labour begins.

The *Treatment* for such cases is a proper supporting bandage, which must be worn throughout pregnancy. The recumbent position should be as much as possible observed, especially when labour approaches. A sudden dilatation of the cervix may take place, and the child be expelled in a single pain.

LECTURE VIII.

DISEASES OF THE OVUM.

The diseases of the ovum are involved in obscurity. We know some of the results—the *post mortem* appearances; but the diseases which cause these morbid alterations, and their symptoms, are

unknown. Degeneration of the ovum is a term which will sufficiently express these effects, but the cause of the degeneration is the difficulty. In certain cases, where an animal poison, as syphilis, is the known cause of morbid changes, we are less at a loss; the poison may be controlled, if not removed; and abortion, the result of its destructive influence, prevented. But unfortunately, there are many more cases in which degenerate ova will be again and again expelled; and we only arrive at the safe conclusion that the womb has *the habit of aborting*—something like saying "it is the will of God."

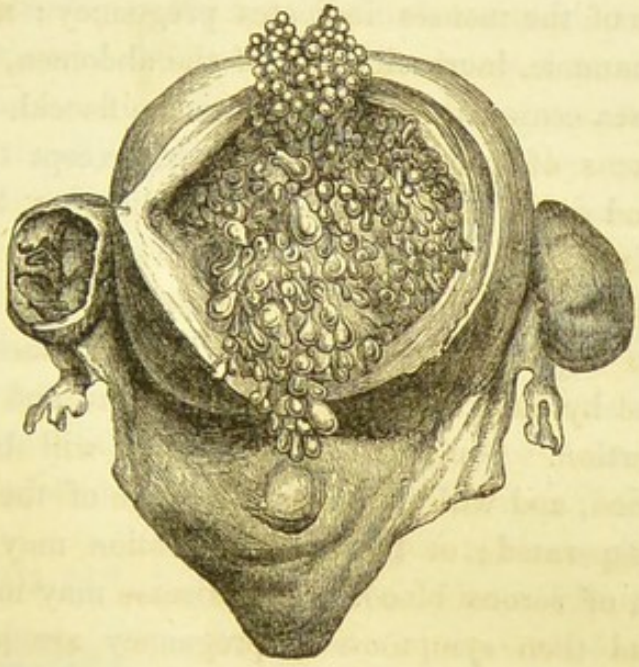
The chorion, the amnion, the placenta, all may undergo changes of structure. The fœtus may be atrophied or deformed; and new morbid growths may take its place. The chorion may be morbidly hypertrophied, or atrophied. The amniotic fluid may amount to dropsy, or be deficient. The beautiful and delicate structure through which the utero-placental circulation is carried on, may be congested, broken, inflamed, or softened. Just as in the lung, we have congestion (apoplexy), inflammation, hepatisation, and gangrene, so the same phenomena are observed in the placenta. We shall consider these changes separately.

Diseases of the Chorion. *Hypertrophy of the Chorion* (*Hydatids*) expresses the morbid change which takes place when the general development of this membrane is arrested, while the growth of certain parts of it continues, or is, perhaps, morbidly increased.

We have explained that, when the ovum arrives in the uterus, it is enveloped by a chorion covered with villi; that these villi collect at that part of the uterus where the placenta is about to be formed—the remaining villi separating, shrinking, and ultimately disappearing. These villi are closed tubuli, containing the terminations of the fœtal vessels, which insert themselves in the decidual membrane. If, however, the development of the chorion be arrested, the villi remain as they entered the uterus surrounding the ovum. As they increase in size, their tubular character is altered; a fluid collects within the tube, and gradually changes it from a tube to a sphere. The extremity of the tube first presents this character; the tube terminating in a small globule, like a currant on its twig. Then the tube disappears,

and the enlarged globule only remains. Thus the chorion is ultimately converted into a collection of cysts, constituting the disease known as "*Hydatids*" (fig. 23). Time will not permit me to enter minutely into the pathology of this disease; but this

FIG. 23.*



deficiency is well supplied by a valuable paper by Dr. Barnes in the *British and Foreign Medico-Chirurgical Review*, (1855), to which I refer you.

The necessary effect of this morbid change in the chorion is that the fœtal circulation is not established, and therefore the fœtus is blighted soon after it enters the womb. Hence the traces of the fœtus are constantly lost; and as, in the examination of the hydatid mass when expelled from the womb, nothing like a fœtus is found, the disease is assumed to have no connection with conception—an opinion which is strengthened by those cases where the symptoms and signs of pregnancy had long ceased or were forgotten. There is, however, every evidence that morbid specimens can give of these progressive changes of the chorion

* FIG. 23. Uterine Hydatids.

to be found in the pathological museums; there are several in University College; and we must infer that in those cases where the fœtus is absent, and we have no evidence of pregnancy, either the signs were forgotten, or so imperfectly marked as not to attract attention.

The *Symptoms* which characterise this disease are obscure. The cessation of the menses indicates pregnancy; nausea, fullness of the mammæ, increasing size of the abdomen, follow; but soon the nausea ceases, the mammæ become flaccid, and all the early symptoms of pregnancy disappear, except the enlarged abdomen; and even here the sensation is different, being that of a dull heavy weight.

If the morbid changes take place rapidly, the uterus may endeavour to expel the mass; and if it do so, these symptoms are succeeded by hæmorrhage, expulsive pains, and other symptoms of abortion. Sometimes broken cysts will be discharged with the blood, and will indicate the nature of the case before the mass is separated; or the whole collection may be expelled with a gush of serous blood. The disease may make a slower progress; and then symptoms of pregnancy are lost sight of. The abdomen remains larger than usual, and slight serous hæmorrhage returns from time to time, This is mistaken for irregular menstruation, until ultimately a profuse hæmorrhage places the patient in immediate danger. An examination *per vaginam* will explain the cause. Some portion of the diseased mass is generally found, which can be removed and examined; and if cysts be found, the separation of the remainder depends upon its position. If a portion have passed into the vagina, it may be possible to dilate the os uteri, so as to detach the whole; if not, the vagina must be plugged, and ergot of rye given to excite the uterus to expel its contents.

Atrophy of the Chorion is an opposite condition, in which the villi do not accumulate in the usual manner to form the placenta. They remain in a great degree scattered, but still unite themselves with the decidua, so as to carry on the circulation. The placenta thus formed presents a membranous appearance, and has been called *the membranous placenta*. The fœtal vessels,

in place of entering the substance of the placenta before dividing, seem to distribute themselves over the membranes, just as is observed among the lower animals, as in the mare. Such cases are rare, and do not seem to affect materially the development of the fœtus.

Diseases of the Amnion. *Dropsy.* The amniotic fluid may be in excess; possibly as the result of inflammation, because in some of these instances the membrane is observed to be thickened. Dropsy of the amnion does not arrest the progress of development; although at the full period, the child is generally, but not always, smaller than usual. It is only when adhesion between the amnion and fœtus takes place, that development is interfered with; and this adhesion may occur from the same cause that produces dropsy—inflammation.

Deficiency of the Amniotic Fluid. The amniotic fluid may be deficient in quantity, and hence fail in one of its most important duties—the protection of the fœtus, which may be thus too much exposed to the contractile power of the uterus during pregnancy. At the time when the fœtus acquires sufficient size to occupy the womb, it may come into direct contact with it; and, there being not sufficient liquor amnii interposed, the limbs are fixed in their position, and deformity is the result. Cruvielhier has given a remarkable example of this, which will sufficiently explain the effect (fig. 24). Adhesions also between the amnion and fœtus are also more likely to occur than when dropsy takes place; and whenever this occurs, deformity is the result.

Fig. 24.*

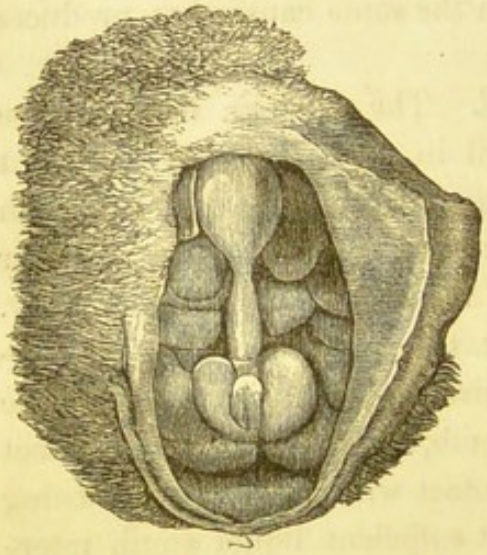


* Fig. 24. Deformed fœtus from deficient liquor amnii. After Cruveilhier.

Diseases of the Placenta. These vary with the stage of its progress.

Congestion may occur at any period in the first months, or at the time of labour. Its characters are best observed in the placenta expelled after a severe labour. The uterine surface presents a deep purple hue of different shades, giving it a mottled appearance; distinct dark patches mark out the congested cotyledons, which, if cut into, resemble coagula more than anything else. If the congestion occur before labour, further changes take place. All the elements of the blood except fibrine are gradually removed; and the dark clot becomes a firm yellow nodule, as hard almost as cartilage. These appearances are generally confined to the uterine side of the placenta. We cannot remember observing them on the fœtal surface; but in the earlier months of pregnancy, when the placenta is being formed, the amnion at the part of its attachment has been pushed forward by numerous small elevations giving the fœtal surface quite a nodulated appearance. These are the remains of coagula caused by congestion (fig. 25).

Fig. 25.*



The *Causes* of this congestion, at the time of a severe labour, when the maternal circulation is so much disturbed, are sufficiently obvious; but during pregnancy they are more obscure. Congestion is caused, no doubt, by disturbance of the circulation; but the source of that irregularity is not so clear. Sometimes we meet with plethoric women, who present symptoms of an over-excited circulation. We should naturally expect to find congestion of the placenta in such cases; and if abortion or miscarriage take place, its characters should be carefully looked for;

* Fig. 25. Placenta shewing remains of congestion.

but there are many cases in which congestion of the placenta is observed, where the cause is by no means so obvious.

The influence of congestion or apoplexy of the placenta on the fœtus is very evident in the early months. The specimens of this disease of the placenta are also examples of arrest of development in the fœtus. In the last months, the influence is not so manifest, unless miscarriage take place. A child may be born at the full term, of the average size and strength; and yet the placenta may present evidence of local congestion.

At the time of labour, when it is severe, congestion seems to me to be one of the causes of the death of the child; the accumulation of blood forced upon the finely reticulate structure of the placenta bursts through the cells, coagulates, compresses the fœtal vessels, and prevents the changes necessary in the fœtal blood from being carried out. A clot is interposed between the maternal and the fœtal vessels.

Inflammation of the Placenta was brought before the profession some years ago by Professor Simpson (1835) in a valuable paper (Simpson's *Obstetric Works*, vol. ii. p. 397). Previously it received but little attention. Morbid adhesion of the placenta to the uterus was laid down as a cause of its retention; but the cause of the adhesion was never inquired after. Inflammation and its results have now been pointed out, and it only needs a careful record of the previous history of these cases, to determine precisely its symptoms. Professor Simpson divides the anatomical characters of the inflammation into three stages:—

First. The stage of *inflammatory congestion and the effusion of serum.*

Second. The *effusion or secretion of fibrine or coagulable lymph.*

Third. The *secretion or effusion of purulent matter.*

The *First Stage—congestion*—is very difficult to discriminate from the congestion which is not inflammatory. The former may be more circumscribed than the latter; but it is only when the morbid action of inflammation—the effusion of serum, lymph, pus, softening or induration of the tissues—gives evidence, that we can be certain of the cause.

The effusion of serum alone is rarely observed. When the placenta separates, the serum escapes, and leaves it a more ragged, softened, and irregular mass than usual. We once, however, had the opportunity of observing a case of effusion which amounted to dropsy. The placenta was of twice the usual size. The whole tissue was so perfectly infiltrated, that the fœtal vessels were as distinct to their ultimate ramifications as if the placenta had been macerated. The child was of the average size, but also dropsical. The history threw no light upon the case; but it was probably the result of inflammation, running rapidly into effusion of serum. The child being fully grown, proved that the morbid change did not affect its development; and therefore it is probable that the change did not take place until it was nearly completed.

The *Second Stage—effusion of coagulable lymph*—is best observed in cases of morbid adhesion to the placenta. Lymph, the result of inflammation, being effused between the placenta and uterus, becomes organised and unites the surfaces. Usually these effusions are partial—a few cotyledons being adherent, generally towards the centre of the placenta. In some cases, the circumference and not the centre is its seat. The margin of the placenta in its healthy state is more firmly united to the uterus than the centre; and if inflammation take place, the effused lymph may so strengthen the adhesion as to render separation impossible. Thus, it seems to us, may be explained some cases of fatal hæmorrhage, in which there was no discharge of blood externally. The blood was poured into the centre of the placenta, separating it from the uterus; the margin did not give way; and, when death took place, and the placenta was examined and separated, it was found pushed forward by a quantity of coagula, which could not escape in consequence of the adhesion of the margin.

On the fœtal surface, also, white patches of coagulable lymph are sometimes observed; but this change is generally found in connection with the effusion of serum. The white patch on the fœtal surface of the placenta may engage both chorion and amnion; with the former, there is serous effusion in the placenta; with the latter, dropsy of the amnion.

The *Third Stage—effusion of pus*—is not so frequently met with; and, of the cases reported, we have only the *post mortem* appearances without any previous history. We are uncertain, therefore, whether these are strictly instances of placentitis or of pyæmia. The cases in which I have had an opportunity of observing these effusions of pus, were cases of puerperal fever; and in one instance, which cannot be strictly so called, there was extensive softening of the tissues of the uterus, with infiltration of pus extending to the placenta. Inflammation, however, may sometimes be the cause, especially where small circumscribed abscesses are found.

The *Causes* of inflammation of the placenta are very obscure, Professor Simpson has taken great pains to determine them, and quotes several cases in confirmation of Brechet's view, who enumerates as causes, "blows upon the belly; falls; violent succussions; sudden and great movements; frights; emotions; all kinds of lively and profound sensations; and diseases of the mother, particularly metritis." (*Obstetric Works*, vol. ii. p. 432.) In other words, all causes which suddenly disturb the circulation in the placenta may cause inflammation; and, just as in the lung "a cold" (congestion) is followed by bronchitis or pneumonia, so congestion of the placenta is succeeded by inflammation. But the immediate cause of the congestion and inflammation is just as difficult to determine, as how a patient "caught cold."

The *Symptoms* are obscure, unless the inflammation extend to the uterus. In such cases the patient is distressed by spasmodic pains, especially at night; the motions of the child are painful; and there is general fever. Professor Simpson describes lumbar and uterine pains as characteristic of this inflammation.

The *Treatment* is like that of inflammation of the lungs—depletion followed by antiphlogistics. Formerly depletion was adopted as a rule, whenever a pregnant woman complained of a "pain in her side," which might mean the inguinal or even the lumbar region. She was generally benefited by the treatment; and it is probable that inflammation of the placenta was checked.

Softening of the structure of the placenta may be the result of inflammation; and this may be observed, especially in cases of

severe labour where the death of the child has taken place before delivery. This change is allied to another—

Fatty Degeneration, which the able researches of Dr. Barnes have recently elucidated. This may be also the consequence of inflammation. The yellow nodule — the fibrinous deposit— becomes altered in its character; it is paler, more easily broken; and, when carefully examined, the tufts are hard, somewhat glistening, do not expand when placed under water, and under the microscope are seen filled with oil-globules. Inflammation is not the only cause of this morbid change. Dr. Druitt supposes that, to a limited extent, it always takes place; and that, in the healthy placenta at birth, some traces of it may be observed. If there be a deficient formative force in the ovum, if the maternal blood do not communicate sufficient nutrition, this change in the villi of the placenta is the result; and the rupture of the vessels, hæmorrhage, and abortion, the consequence. Hence "the habit of aborting" may simply mean the inability of the constitution to meet the demand made upon it; and the only mode of arresting the habit must be by sustaining constitutional vigour. Any effort for this purpose is counteracted by frequent conceptions. If the demand be again and again repeated, the result must be the same, and "the habit" become incurable: but, along with general tonic treatment, if the patient remain separate until there is sufficient evidence that her health is restored, then by ordinary caution this habit may be arrested.

Fatty degeneration may be a much more frequent cause of abortion than is generally supposed, and should always be sought for in unexplained cases. It is very seldom in such instances, that the placenta or chorion is submitted to the microscope, which is necessary, in order to determine this cause. Abortion may not take place; and yet the development of the ovum may be arrested. The fatty degeneration proceeds; the membranes are thickened; and ultimately a firm, fatty, fleshy-looking mass is formed, which may be expelled months after the arrest of development has taken place: it is then called *a mole*. We once observed, in a placenta expelled after ordinary labour, a portion which had undergone this fatty change; it was of about the size and shape

of a small kidney. The child was rather small, but otherwise healthy.

Diseases of the Fœtus are as yet imperfectly understood. Arrests of development and deformities are the results of disease in the membranes of the ovum; but, independently of this, the fœtus itself may be the subject of disease. Poisons, for instance, may be communicated to it, and produce their malignant effects. Of these the most remarkable is the—

Syphilitic Poison, the insidious character of which is so well known. The ovum may be destroyed by it and expelled within the first month; or it may not show its influence until just before birth, when the death and what is called "the putrescency" of the fœtus takes place. These terms "putrescency" and "putrid" do not express correctly the changes which occur. The cuticle certainly desquamates, as in putrescency; but this desquamation has been observed in the *living child*, and depends upon a different cause. It is questionable also, whether those changes produced on the body after death, arising from the action of the air and other elements which cause its decomposition, could take place where their influence is removed. Putrescency of the fœtus we take, therefore, to mean the destruction of its tissues by poison. And of the poisons which thus act, the best known is *syphilis*.

The first effect of the syphilitic poison is on the integument. The colour gradually becomes a dark red; before this takes place, the cuticle desquamates from the extremities, which are usually livid. With the increasing discoloration, the desquamation extends; the abdomen swells up; and, if examined, creamy exudations may be observed over the peritoneum, just the same as in puerperal fever in the adult. A general softening of the tissues then takes place; and, if not previously expelled from the uterus, the whole may be removed by absorption, except the skeleton. A case of twins once presented itself to our notice, in which the skeleton of one child (about the sixth month) was found in the membranes of the placenta of a child delivered at the full time. Was this the last remains of a putrid child destroyed by a poison? The question presents this difficulty. It assumes a power of selection in a poison—in a case of twins, one child is

destroyed, the other escapes, although both are supplied from the same blood. Yet poisons certainly exert a power of selection. The puerperal and typhus poisons do not seize on all indifferently: certain constitutions yield; others resist the poison. In the case of twins, therefore, may it be that a difference of formative force explains such a result? and that, just as sometimes a large healthy twin is born with another small and weakly, so the poison may seize and destroy the weaker, while the more vigorous escapes?

The fœtus affected with syphilitic poison generally presents the characters described; and, if the condition be recognised, means may be adopted to check its progress. A lady who had had several miscarriages once came under our notice. She had just miscarried at the fifth month. The fœtus was "putrid"; and syphilis was assigned as the cause. After her recovery, she was placed for a short time under the influence of mercury; which was resumed when she became again pregnant. She carried the child to the seventh month: labour came on, and expelled a putrid child. Subsequently to this, however, she carried the child to the full term. In this following pregnancy, the child was born living at the ninth month; but with the hands and feet livid, the cuticle desquamating. Thus the destructive course of the poison was gradually arrested.

One of the most difficult and delicate questions which a professional man can be asked springs out of these appearances. Is syphilis the cause of the state of the fœtus? There are cases in which the lady is totally above suspicion, and has no evidence of infection. The gentleman, perhaps, is not so much so. He may have had the disease; but it has left him for some time, and there are no symptoms that it has been communicated. If, therefore, such morbid changes be the result of syphilis, the poison must have lingered in the blood long after its usual effects on the tissues had disappeared. There is, therefore, a difficulty in connecting cause and effect. This is increased by a history of these cases.

Professor Simpson, in his valuable papers on "Peritonitis in the Fœtus," quotes some cases (Cases V. IX.) in which the history

and the appearances point rather to a poison than to inflammation as their cause. In Case V., a girl, aged nineteen, was delivered in the Lock Hospital, having had four different attacks of syphilis. She was delivered of a putrid child. "The cuticle was loose and easily separated; the cavities of the pleura and pericardium were filled with a reddish serous effusion . . . The cavity of the peritoneum contained upwards of an ounce of a still deeper coloured reddish serous effusion . . . A considerable portion of the liver was much congested, more deeply coloured and *softer* than the remainder of the viscus. The gall-bladder was filled with a quantity of viscid bile, and its coats thickened to about a line and a half or two lines by serous effusion. The surface of the abdominal peritoneum was coated by a beautiful lace-like and adherent layer of tough coagulable lymph, which was of considerable thickness at some points, and threw out long lines or fibres that were in contact with the surface of several of these abdominal viscera, but *were not in any place adherent to them.*" (Simpson's *Obstetric Works*, vol. ii. p. 188.) In Case IX., a of girl eighteen, also in the Lock Hospital, suffering from severe gonorrhœa and who had the remains of a chronic syphilic eruption on the skin, aborted between the fourth and fifth months. The external appearance of the fœtus is not described; but the peritoneal cavity contained a considerable quantity of serous effusion, having numerous flocculi and shreds of coagulable lymph floating in it. Patches and small masses of this lymph were deposited in considerable abundance upon the peritoneum covering the abdominal parietes and different abdominal viscera, but "*nowhere did we find any of this exudation adherent to the serous surface.*" (*Op. cit.* p. 162.) Thus an extensive deep reddish-coloured effusion, a softening of the tissues, a lymph-like non-adhesive exudation in the serous surfaces, all characterise the action of a poison, the presence of which the history of the cases seems to confirm, because there was no difficulty in connecting cause and effect. The close resemblance of the exudation to that observed in puerperal fever—the non-plastic lymph of a poison—is also remarkable.

These cases may be contrasted with Professor Simpson's first case of peritonitis, which is extremely interesting as having been

a case of twins; one child was born living, the other dead from intra-uterine peritonitis.

Case I. — "On the morning of the 15th October, 1836, Dr. Simpson's attendance was requested at the Lying-in-Hospital in a case of twins. The first child was living, healthy, and well-formed: the second had apparently been dead for some days; its cuticle could be easily peeled off, and was raised into bullæ at various parts by a sero-sanguinolent effusion beneath it. Its body was, however, by no means emaciated, but *as plump and fat as that of the first child.* Professor Simpson, finding no appearances in the placenta to account for its death, made a *post mortem* examination. There was a considerable accumulation of serous and sero-sanguinolent effusion in the cellular tissue in different parts of the body, and in the cavities of the pleura, pericardium, and peritoneum. Over the surface of the last-mentioned membrane (the peritoneum), there were also deposited several isolated patches of soft coagulated lymph, *which had produced at various points adhesion of the folds of the intestines to one another and to the internal serous surface of the abdominal parietes.* In this case, the consistence and other characters of the effused coagulable lymph were such as sufficiently indicated that it was the result of recent and acute peritoneal inflammation." (*Op. cit.* p. 155.) True peritonitis may take place in the fœtus; and also false peritonitis, the result of a poison, just as in puerperal fever; but, in the former case, the general discoloration of the skin and softening of the tissues are absent.

In those cases of severe labour in which the death of the child takes place, decomposition follows; the membranes are ruptured; the air is admitted; and true putrescency takes place if the child be left sufficiently long for the purpose. The few cases of this kind which have come under our notice did not present exactly the same kind of discoloration of the integument and softening observed in syphilitic cases. There was desquamation of the cuticle in both; there was not the same dusky red hue over the skin; the appearances rather resembled those observed in the adult under similar circumstances.

Hence, in answering the proposed question as to the cause of

death, the peculiar colour of the integument will be a guide; and if the non-plastic exudation be found in the peritoneum, and the tissues be generally softened, the evidence is in favour of a poison as a cause; but we must bear in mind that inflammation of the peritoneum may also cause death, followed by certain *post mortem* changes which should not be confounded with toxæmic appearances. The answer therefore should not be given, until a careful *post mortem* examination is made. In any case where, in consequence of previous abortions or other causes, there is a suspicion of the syphilitic poison existing in the constitution, a mild mercurial treatment, accompanied by tonics, will frequently arrest its progress, and save the child.

Abortion and Miscarriage.—Any diseases, whether existing in the membranes or in the fœtus, lead to a separation between the ovum and the uterus, and hence are among the chief causes of abortion or miscarriage. It is not easy to detach the healthy ovum from the uterus. Pregnant women have met with the most serious accidents without aborting; even those enfeebled by disease—as phthisis—have gone their full time, the progress of their malady being arrested by pregnancy. Hence, when sudden shocks, falls, and such like accidents, are stated as producing abortion, they are much more likely to be secondary than primary causes. The ovum being diseased and prepared to separate, an accident, perhaps of the most trifling character—a fit of laughter—will be sufficient for the result.

Abortion, miscarriage, premature labour, are terms intended to express the time at which the separation takes place. When the ovum is detached before the fourth month, when the placenta and the form of the fœtus are imperfect, it is called *Abortion*. If it take place between the fourth and seventh month, or before the period at which a living child can be born, *Miscarriage* is the term applied; and *Premature Labour* signifies the delivery of a viable child.

Abortion most frequently takes place within the first three months of gestation. It may be preceded by severe pains or by hæmorrhage; perhaps by both. If pains alone give evidence, it may be possible to save the ovum. Perfect rest, anodynes, and

tonics, especially iron, may prevent the occurrence of abortion; but, if hæmorrhage be the symptom, the chances are very unfavourable, because this proves that the ovum is already separating, and a reunion can hardly be expected.

The *Treatment* of such cases must be based upon the probability that abortion will follow. The patient's strength must be supported; beef-tea, wine, brandy, if necessary, may be given her; and iron, in the form of the tincture of the sesquichloride combined with the liquor secalis, may be administered, to cause the womb to contract so as to arrest the discharge. The chief means, however, for the purpose, is to plug the vagina carefully. Small plugs should be used; one being applied directly against the os uteri, and below this a second, a third, and even a fourth, gradually increasing in size, so that the vagina may be filled but not painfully distended. Sponges are the most convenient for this purpose; and, if a string be tied round each and knotted with one, two, or three knots, according as it is the first, second, or third plug introduced, they can be more easily withdrawn afterwards. If the hæmorrhage be thus checked, an anodyne may be given; and after the patient has rested, an examination may be made. As each plug is withdrawn, any renewal of the hæmorrhage will be observed, when it may be again arrested in a similar manner; but, if none take place when the last plug is withdrawn, the ovum may be found in the vagina, or perhaps protruding through the os uteri. In the former case, it is easily withdrawn; in the latter, however, there is more difficulty. The fingers may sometimes be insinuated within the os uteri, so as gradually to dilate it and withdraw the ovum. In doing so, the fundus uteri should be firmly pressed down, which will bring the os uteri nearer the vulva, and perhaps, by exciting its action, aid in the dilatation of the os uteri. When the ovum is removed, the most careful examination should be made to ascertain the probable cause of abortion, and, if necessary, it should be prepared for the microscope. If this rule were more generally adopted, there would be far less obscurity on the diseases of the ovum than at present exists.

Miscarriage takes place at the middle period of pregnancy,

when the placenta and membranes assume their permanent characters, and the form of the fœtus is completed. A separation occurring at this time is more dangerous than at an earlier period; because the vessels which carry on the placental circulation are larger, and the hæmorrhage is proportionately increased.

The *Treatment* of these cases is almost the same as of those of flooding at the time of labour; only that while in the latter case the plug is not essential, while here it cannot be dispensed with. Stimulants, opium, ergot of rye, are all essential. If the ovum be expelled, the fœtus generally comes first, leaving the placenta behind. Attempts are frequently made to remove the placenta; and if one consider for a moment the much more intimate connection between the uterus and placenta at this time than at a later period; the unyielding character of the cervix and os uteri; and the size of the uterine cavity; the difficulty and the danger of such attempts may be easily understood. The difficulty of completely separating the whole placenta is obvious; and if fragments be left behind, they may maintain the hæmorrhage or be the foundation of other diseases. The danger consists in the consequences of a failure, the risk of an immediate increase of the hæmorrhage, and, even if this be escaped, the more remote danger of inflammation from violence. Hence it is preferable to plug the vagina carefully, and to wait until the womb separates the placenta after birth. This may not occur for one, two, or more days after the expulsion of the fœtus; and at any time, the separation will be followed by serious hæmorrhage. Therefore, while the vagina is thus plugged, the patient must be most carefully watched until the placenta is expelled. During this time perfect rest must be enjoined, and the plugs frequently changed and examined. The placenta will generally separate within twenty-four hours after miscarriage; but one case came under our notice, in which it was only discharged on the *tenth* day.

Premature Labour differs from the preceding—in the fact, that the child is capable of sustaining respiration, that is, life. It therefore comes more properly under the head of Labour. There are, however, two points of difference. One is the question of viability, the earliest period at which a living child can be born:

this we have already considered. The second is the risk, if any, that is incurred by premature labour. The neck of the womb is not prepared in the same way to yield to the action of the uterus, nor is that action as uniform and regular as at the full period; therefore in these cases the action is very irregular—at one time violent, and again suspended. The child, however, is small, and requires but little force to expel it, so that a few regular pains are sufficient for the purpose. In these cases, also, hæmorrhage, especially unavoidable, is likely to occur; but this we shall consider hereafter.

In connection with this branch of our subject, there remain some questions for consideration which are interesting rather in a physiological than in a practical point of view.

Superfœtation and Extra-uterine Pregnancy.

Superfœtation has received ample discussion. We shall not enter into it further than to state, that the question is founded upon the fact of remarkable differences observed in twin-births, presenting a full-grown and an undeveloped fœtus, a white and a black child, &c.; hence it has been assumed that a second conception followed the first. There are also some extraordinary instances of a second child being delivered some months after the first.

Differences in the appearance of twins in respect to their development prove nothing, because there is abundant evidence that ova entering the womb at the same time are perfectly independent of each other. One may be diseased, arrest of development being the consequence; and the other may be healthy. Differences of colour cannot be explained in the same way; but the only cases on record of this kind were the result of intercourse with a black and a white man following in immediate succession. There is no recorded case of this kind in which the interval between the two connections was of any duration. The ovum occupies some days before it enters the womb; and hence it is not necessary to assume a second conception in these cases.

The third class of cases are more difficult of explanation. Dr. Maton published in the *Transact. of the College of Physicians*, (vol. iv.) the following case. "Mrs. T., an Italian lady married

to an Englishman was delivered of a male child at Palermo, Nov. 12, 1807. . . . On the 2nd of February, 1808, she was delivered of a second male infant. Both children were born perfect." There is here an interval of three months between the birth of the children. Is it to be explained by a second conception at three months' interval? Other explanations have been offered; the unequal development of twins—the second arriving at maturity three months after the first; a double uterus—each cavity expelling its contents at different intervals; but the most ingenious and plausible is that of Dr. M. Duncan, who believes that a second impregnation of ova may take place, so long as the communication between the vagina and ovary is free; and, inasmuch as the decidua reflexa does not come into contact with the decidua vera until the third month, it is only then closed. Nothing, however, is said with regard to the condition of the uterus in such cases; whether its action may be suspended after the expulsion of a portion of its contents, to be renewed at any given time. It is perfectly well known, that twins are frequently expelled at intervals of hours and days, during which time the action of the uterus is quite suspended. May there not be an occasional rare exception, where this suspension exists for months? Cases of protracted gestation have occurred, in which the action of the uterus commenced at the ninth month, was suspended, and did not return for weeks—or even months—afterwards. (pp. 82-7.) Hence, we do not think the cases quoted sufficient to prove absolutely the truth of superfœtation; a doctrine against which there are very strong physical objections.

Extra-uterine Pregnancy.—An ovum is sometimes arrested in its progress from the ovary to the uterus; it may be retained in the ovary or in its passage through the Fallopian tubes; or even within the walls of the uterus. This causes no arrest of development; the ovum goes on to increase, converting the ovary or Fallopian tube into a kind of uterus. Hence the terms *Ovarian Gestation*, *Tubal Gestation*, and *Interstitial Gestation*, or that within the walls of the uterus. *Ventral Gestation* is also mentioned, signifying that the ovum has escaped from the fimbria of the Fallopian tube, and, arriving in the abdominal cavity, is developed there.

This view has however been, we think, refuted by Dr. Campbell, who considers such cases to be only ovarian or tubal gestations in which the walls of the cyst have given way. These accidents are rare. A case of *Ovarian* gestation is related by Dr. Campbell as occurring in the practice of Dr. Granville. *Tubal* gestation is more frequent. *Interstitial* gestation is the rarest form.

The *Symptoms* may be best understood by the relation of a case which, many years ago, came under our notice.

A woman, believing herself pregnant in the usual manner, entered the Dublin Lying-in Hospital to be confined. She did so because of her pains; but, on examination, the os uteri was quite undeveloped and rather pushed aside; and an undefined tumour was felt on the left side, evidently part of that in the abdomen. Auscultation was tried, and the fœtal heart was distinctly heard, much more plainly than usual. The placental murmur was not so distinct; it was a confused uncertain sound. In every respect this woman's health had been good. The abdomen gradually enlarged; and she believed herself pregnant; the menses, however, had not quite ceased—they returned *irregularly;* but when she felt the motions of the child she was satisfied. She remained in the Hospital only a few days, when the pains returned, and sudden collapse took place. After death, the child was found dead in the peritoneal cavity, surrounded by an immense quantity of coagula. The Fallopian tube, converted into a large cyst, had burst.

The *Treatment* of such cases is out of our reach. Death is generally the result; but a few instances are recorded where the patient survived, and the child remained in the abdomen for years. Dr. Campbell records seventy-five cases in which the fœtus was retained at different periods from two months to fifty-six years! Usually the child becomes putrid; an abscess is formed, and bursts either at the umbilicus or in the vagina or rectum, discharging the morbid fragments. Lastly, the bones are removed.

Second Division.—Parturition.

LECTURE IX.

THE FEMALE PELVIS; ITS ANATOMY, AND RELATION TO THE FŒTAL HEAD.

The first subject to which we shall direct attention in this divison is the anatomy of the pelvis, so far as it is connected with the process of parturition. It would be unnecessary to enter minutely into its descriptive anatomy; we shall dwell only on those points that are connected with practical midwifery. In this sense, it will require particular attention. The difficulties, sometimes almost insuperable, which occur in the process of parturition, arise most frequently from the disproportion that exists between the head of the child and the space through which it has to pass. The source of many of these difficulties is in the pelvis; and the irregularities in its shape are among the most frequent causes of difficult labour. Independently of this, the beautiful mechanism which Nature adopts in the passage of the child through this bony cavity, requires an accurate knowledge of its anatomy, in order to understand the perfection of the contrivance.

Pelvic Bones.—The bones of the pelvis are three: two *Coxal or Hip Bones*, and the *Sacrum* with its appendix the *Coccyx*. In the process of ossification, the coxal bone is not completed until a late period; consequently, the older anatomists have been in the habit of describing it as consisting of three bones—the ilium, the ischium, and the os pubis. But this is evidently incorrect; we we shall, therefore, consider the bone as one, consisting of an iliac, an ischiatic, and a pubic portion.

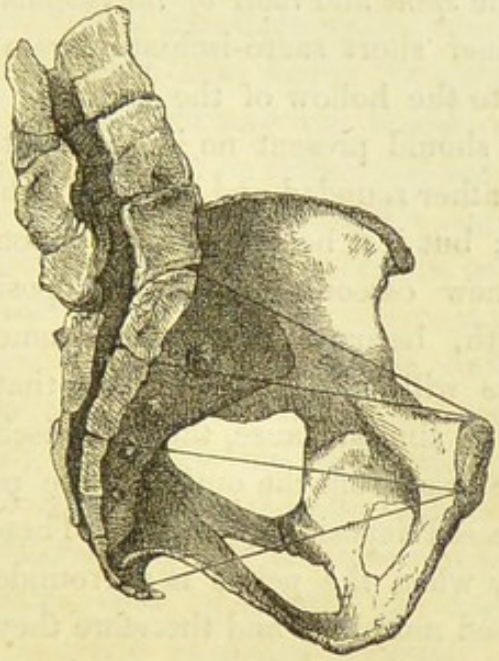
The *Iliac Portion* is much the largest, and is divided into two parts by a well-defined line of demarcation, which is a continua-

tion of the linea ileo-pectinea, and terminates at the sacro-iliac articulation. Superior to this line is the iliac fossa, being the internal surface of a broad irregular portion of the bone sometimes called the *ala* of the pelvis: it belongs to the abdominal cavity. This portion is completely surrounded by very powerful muscles. The iliac muscles are attached to its internal surface, the gluteal to its external; and into its crest are inserted the muscles of the abdominal parietes. Being, therefore, a common point of attachment to muscles of such power, it is necessarily very irregular both in its shape and thickness; the crest is rough and waving, the centre of the bone thin, smooth, and sometimes even diaphanous. In the female pelvis it is more expanded than in the male, gives a greater breadth to the hips, and, being sufficiently conspicuous, it is often taken as an index of the proportion of the pelvis itself; here, however, an error may be very readily committed, inasmuch as the cavity may be narrow, and yet the alæ of the pelvis very much apart. This greater breadth is obviously very advantageous, when the increasing uterus begins to occupy the abdominal cavity. In the well-formed pelvis, the distance from one antero-superior spinous process to the opposite is about ten inches.

The inferior portion forms a part of the true pelvic cavity, and principally consists of the *Ischium*. Its internal surface is bounded by the obturator foramen on the one side, and the ischiatic foramen on the other: it is smooth, and corresponds to the acetabulum on the external surface. This surface is called (in obstetric language) *the plane of the ischium*, because the head of the child glides upon it in its descent, and passes forwards under the pubic arch; but, if carefully examined, it will be found to consist of two planes very slightly inclined in opposite directions, and divided by a line passing from the pectineal eminence to the spine of the ischium. In some pelves, this is more obvious than in others; but when the soft parts are attached, this will be found nearly corresponding to the reflexions of the peritoneum which form the broad ligaments. Thus the internal surface of the ischium, before the soft parts are removed, presents two broadly curved surfaces, one anterior, the other

posterior; these greatly contribute to facilitate the rotation of

Fig. 26. *



the head of the child in passing through the pelvic cavity. The *anterior plane* terminates at the obturator foramen, an opening nearly filled with membrane, giving support to the internal and external obturator muscles, and offering less resistance to the advance of the head forwards than if it consisted of bone. The obturator foramen is bounded by the ischio-pubic ramus, the pillar of the pubic arch. It presents a smooth surface, bevelled off towards the arch; and when the head passes from the obturator foramen, this inclination greatly assists its exit under the pubic arch. The *posterior plane* terminates in the ischiatic foramen, and the portion of the head which comes upon it glides in a similar manner upon the coccygæus and pyramidal muscles, and shorter sacro-ischiatic ligament, towards the hollow of the sacrum. Thus the inclinations of these surfaces oblige the head to pass through the pelvic cavity in a

* Fig. 26. Vertical section of pelvis, showing the anterior and posterior surfaces of the plane of the ischium. The lines represent the inclined plane of the promontory—plane of the brim—of the cavity—of the outlet.

spiral direction. The *pubic portion* of the bone is smooth on its internal surface, which also greatly favours its advance.

The only remaining points connected with this bone worthy of your notice, are the *spine* and *tuber of the ischium*. To the former is attached the inner short sacro-ischiatic ligament, upon which the head glides into the hollow of the sacrum. It is, therefore, important that it should present no impediment to this motion; and being short, rather rounded and smooth in the normal pelvis, it does not do so; but if it be much acted upon by the muscles attached to it, new osseous matter is deposited; the spine increases in length, becomes rough, and sometimes is drawn inwards, and thus will present an obstacle that at once arrests the head. From a similar cause, the tuber ischii often opposes the escape of the head from the outlet of the pelvis, when it is enlarged by increased deposition of bone. These causes of delay are met with only when the pelvis is surrounded by strong and constantly exercised muscles; and therefore they are found more frequently among a healthy, vigorous, rustic population, than in towns or manufacturing districts. But in the latter class, a similar impediment may arise from a cause of a perfectly opposite character, wherein the pelvis becomes diseased, its osseous matter diminished, and the spines and tuberosities of the ischium are pressed too close together.

The next bone to which I shall direct your attention is the *Sacrum*. This bone is placed between, and is very firmly united to the two other bones: it forms a kind of key-stone to the pelvic arch, upon which the spinal column rests. Its external surface is extremely rough, and gives insertion to the most powerful muscles of the back; the internal is smooth, and forms what is called, in obstetric language, *the hollow of the sacrum*. The curvature of the sacrum, which forms this hollow, is worthy of attention: it varies very much in different pelves; if it be too straight, the antero-posterior space of the pelvic cavity is diminished; if it be too abruptly curved, the coccygeal extremity resists the progress of the head.

That portion of the bone, however, which has received most attention, is distinguished by the remarkable title of the *promon-*

tory of the sacrum, a term used by the older authors, and a sufficient evidence of the frequent instances in which the difficulty of labour has been attributed to this projecting point. It is rather the intervertebral cartilage which unites the sacrum to the last lumbar vertebra that forms the projection, than the superior surface of the sacrum; and therefore the promontory lies a little above the sacrum, or rather, the sacrum is its inferior boundary. The opposite extremity of the sacrum terminates in the *Coccyx;* which, in the female pelvis, is generally moveable, and by its mobility contributes to increase the outlet of the pelvis, when necessary to parturition. If, unfortunately, ossification should take place between it and the sacrum, great difficulty is necessarily produced; but this accident is very rare in the healthy pelvis during the parturient period.

Pelvic Articulations. Let us now consider the manner in which the bones that constitute the pelvis are united. Every provision is made to secure strength, and at the same time to avoid the effects of concussion. In this respect, the union of the coxal bones to each other affords a very perfect example.

The *Symphysis Pubis* consists of a mass of highly elastic fibro-cartilage, arranged in concentric laminæ, the outer layers being firm and resisting, while those within are softer; and in the centre of them is placed a small arthrodial articulating surface, moistened with a portion of synovial fluid. The shocks to which the pelvis is liable in the more violent motions of the body, as in leaping, especially downwards, are all more or less concentrated upon the symphysis pubis, and hence a provision of this kind is necessary. In the female pelvis, by its greater breadth, the space between the pubic portions of the coxal bones is increased, and at the same time, a perfectly smooth surface is presented posteriorly to the head. If, unfortunately, the reverse should take place, if the symphysis were narrow, and still more, if it were made rough from ossific depositions, serious injury might be done to the soft parts lying between it and the head; and, as the urethra lies in this position, the risk that

might occur is obvious. Hence it is necessary that the symphysis pubis should be broader and smoother in the female than in the male pelvis.

The *Sacro-iliac Articulation* is remarkable in its contrivance to preserve immobility. The articulating surfaces of the sacrum and ilium are so adapted to each other, or, if I might use the expression, so dove-tailed on one another, as when pressed together not to admit of the least motion. Such is the case even in the dried bones; but, when in the recent state, we find a firm cartilage intervening, the articulation surrounded by the strongest ligaments, and additional strength given by the tendinous expansion of the neighbouring muscles, we at once perceive, by the provision that is made to prevent disturbance, the importance of preserving the union of the sacrum and coxal bones. When we recollect the relative position of the sacrum, the keystone of the arch we have described, the centre upon which the spinal column rests, the wedge which keeps the coxal bones apart, and of course the point of resistance to any force tending to compress these bones, (as the lower extremities necessarily would, if not in this way prevented), we can understand why a compact and firm articulation is so essential.

Sacro-coccygeal Joint. The inferior extremity of the sacrum is united to the coccyx by a fibro-cartilaginous lamina similar to the intervertebral cartilages, and by anterior and posterior ligaments. This articulation, as well as those connecting the small bones of the coccyx together, admits a certain extent of motion of one bone upon the other, so that the coccyx from being curved may be rendered nearly straight—a highly essential advantage in the female pelvis.

Lumbo-Sacral Articulation. The superior surface of the sacrum is united to the last lumbar vertebra by an intervertebral fibro-cartilage, which differs from the others in being much deeper before than behind; the aspects of the two articulating surfaces are consequently oblique to each other, and the cartilage presents anteriorly a broad surface which, strictly speaking, forms what is called the promontory of the sacrum. It is the most prominent point of the spinal column anteriorly, the whole

weight of which rests upon it; and this part would necessarily be pressed forward, if the pelvis were weakened by disease.

The Pelvis. Having thus given a detailed description of the several bones composing the pelvis, and of the manner in which they are united together, we shall consider the pelvis collectively. It is divided into two portions by the line already alluded to, a continuation of the linea ilio-pectinea on each side, passing along the lower margin of the iliac fossa, and terminating at the sacrum: this is the brim of the pelvis, which in the older language of midwifery was called by the English term, "basin" and "brim of the basin;" a term which included not merely the line described, but the parts of the ilia above it. These divisions have been called by different names,—"the greater and the lesser pelvis," "the true and the false pelvis." Sometimes the whole portion above the line is still called "the brim," and that below it "the cavity," of the pelvis.

It is more important, however, to recollect that the superior portion belongs to, and forms part of, the inferior boundary of the abdomen, and must be taken in connection with it: the axis of this part of the pelvis is therefore the same as that of the abdomen. The pelvis, and consequently the abdomen, are wider here in the female than in the male, in order to accommodate the uterus when it becomes an abdominal viscus. It may, however, be too wide or too narrow. If the ilia (the alæ of the pelvis) be too open, they give no support to the uterus when it enters the abdomen; the natural obliquity of the uterus is therefore greatly increased—it falls too much to one side, and so may remain until labour begins, and then the action of the uterus becomes irregular and inefficient, and labour is delayed from this cause alone: if they be very upright, the uterus rises into the abdomen too much in the middle line of the body. If the brim be too wide, the weight of the uterus presses down on the soft parts beneath it—it may descend even into the vagina, and give rise to the disease called prolapsus uteri: if it be too narrow, the uterus has not room to pass between the pubis and the promontory of the sacrum, irritation takes place, premature action of the muscular fibres is induced, and miscarriage is the result.

Thus you see that even here exactness of proportion is important. But this is still more remarkably the case, when we consider the "pelvic cavity," or "true pelvis," through which the head of the child has to pass: it will therefore require an attentive examination.

True Pelvis. This cavity, which is destined to contain the genito-urinary organs, is bounded above by the brim of the pelvis, below by the tubera ischiorum and coccyx. The smooth posterior surfaces of the bodies of the pubic bones with their connecting symphysis, the obturator spaces, and the ischio-pubic rami, form its anterior wall; the sacrum and ischiatic notches, the posterior boundary; and the planes of the ischia, already described, constitute its sides. A very imperfect idea of the cavity is formed if it be confined to the dried pelvis: it is necessary to consider the empty spaces left in the bones as being filled up with the soft parts which belong to them, in order to obtain an accurate notion of it.

In the *recent pelvis*, therefore, we find, in the anterior wall, each obturator space occupied by fibrous membrane, to which the obturator muscle is attached, leaving a small opening above for the transmission of the obturator nerves and vessels. This muscle is concealed by the levator ani, and both are enclosed in fibrous membrane; so that in this space a kind of muscular cushion is formed for the head, as it advances into the cavity of the pelvis. Immediately below the symphysis lies the subpubic ligament; and beneath it a continuation of the same fibrous membrane, giving passage to the urethra.

In the posterior wall, on each side, the ischiatic notch is converted into a foramen by the lesser sacro-ischiatic ligament, which unites the sacrum to the spine of the ischium; and a second opening is formed by the greater sacro-ischiatic ligament, which passes from the sacrum to the tuber ischii. The larger sacro-ischiatic foramen is occupied by the pyriform muscle, by the thick branches of the sacral plexus of nerves which converge to form the great sciatic nerve, and by the gluteal and ischiatic vessels. The smaller foramen is filled by the tendon of the obturator muscle, and by the pubic vessels; but, lying in a plane

posterior to the former, it is rather withdrawn from the cavity of the pelvis. The sides of the posterior wall of the pelvic cavity present also, to the advancing head of the child, a muscular cushion similar to the anterior. The planes of the ischia form the sides of the cavity; and the aspect which they present, their double inclination anteriorly and posteriorly, shew the effect which this must have on a body passing along their surface,—that it cannot preserve the same direction, but must necessarily be rotated slightly as it advances. If, for instance, we assume that the head is so placed that it enters the pelvic cavity nearly transversely, with the occiput corresponding to the plane of the left ischium, and the sinciput to that of the right,—if the occiput descend on the anterior plane, it is directed forwards toward the obturator space, while the sinciput, gliding along the posterior plane of the opposite side, is directed backward to the ischiatic space; thus slightly altering from the transverse to the antero-posterior direction. As the head descends still lower in the cavity of the pelvis, it meets anteriorly the ischio-pubic ramus, and posteriorly the inner short sacro-ischiatic ligament; the former is so bevelled off, that the occiput glides from it under the pubic arch, while the latter forms a smooth inclined plane upon which the sinciput passes into the hollow of the sacrum. When this is accomplished, the head will lie in the antero-posterior direction; so that, if it enter in the direction which has been supposed, it cannot pass through the pelvic cavity without performing a rotation.

Let us now consider whether, when the head enters the pelvic cavity, it is placed in the manner which has been assumed. This leads us to examine what is called the *Brim of the Pelvis*. The shape of the brim in the dried female pelvis is rather elliptic, the long axis being its transverse measurement; consequently the brim affords more room to the head when it enters it in the transverse than in any other direction. But this applies only to the denuded bones. If we examine the brim in the recent state, we find it not elliptic but triangular; the psoæ muscles form the sides; the promontory of the sacrum, the apex; the base being the anterior portion of the pelvis, lying between the pectineal eminences on each side; hence the greatest space of the brim

would not be in the tranverse but in the oblique direction: the head therefore enters the pelvis in the oblique measurement of the brim, and when the occiput lies anteriorly (its usual position) it at once meets the anterior plane of the ischium, and is rotated in the manner stated.*

The *Outlet of the Pelvis* also requires some attention; but there is so much more of the soft parts than of bone entering into its formation, that here also the dried pelvis gives but an imperfect conception of it. As we should wish, however, to reserve a more particular description of the perinæum, it will be sufficient at present to assume that this is a firm resisting structure, partly closing up the lozenge-shaped space which the outlet forms. The sides of the quadrangle are constituted by the greater sacro-ischiatic ligaments and the ischio-pubic rami; the angles are antero-posteriorly at the pubic symphysis and coccyx, and laterally at the tubera ischiorum; the perinæum closes up the posterior half; the vulva lies in the anterior. The sides are not in the same plane; those formed by the ligaments run downwards and forwards, while the ischio-pubic rami run downwards and backwards, both meeting at the tubera ischiorum, as if the lozenge were bent in the middle. If we suppose the head advancing still onward, and endeavouring to escape from the outlet, we find that a change in its motion takes place. The occiput passes down along the anterior sides, until it has sufficient space to emerge under the pubic arch; it then becomes a fixed point, a centre of motion, round which the head rotates from behind forwards, passing along the curve of the sacrum, straightening the coccyx, and pressing upon, distending, and forcing open the soft parts which form the perinæum, with a force which can only be understood by recollecting the kind of power employed. It is, in fact, a lever of the third

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* In the description here given of the progress of the head through the pelvis, it is assumed that the pubic angle is 90°, sufficient to allow the occiput to escape completely under it; but many pelves, in other respects well formed, have the pubic angle less than this; the occiput therefore descends along the ischio-pubic ramus still further, and the head is expelled in the oblique direction. The latter is the more frequent course.

order. This force of distension is so great that the perinæum would seldom be preserved from laceration, if nature did not adopt other provisions to prevent such an accident. Even in the best formed pelvis, the outlet is narrow, and affords but little space for the head to pass; you can therefore readily perceive the difficulties which must arise, if there be any diminution of its transverse measurement.

Measurement of the Pelvis. — The passage of the head through the pelvis shews mechanical contrivance in the construction of the latter. The more it is examined, the more perfect this mechanism will be found. The human head is larger in proportion to the size of the offspring than that of any other animal; and, in consequence of man's erect position, the cavity and outlet of the pelvis are more closed in, for the purpose of supporting the weight of the viscera above. The head being large and the pelvis narrow, every contrivance that nature can adopt is essential to accomplish her purpose; and also the proportions between both must be so exact, that the slightest deviation becomes an obstacle. Hence obstetricians, even from an early period, knowing the importance of accuracy in these proportions, have endeavoured to reduce them to a standard of measurement. They have sought to ascertain the dimensions of the perfectly formed pelvis; and, that having been fixed upon as the normal standard, it has been supposed that every deviation from it would explain one or other of the difficulties which may be met with. How far this is possible, we shall have again to consider; at present let us observe the manner in which the measurements have been made. Every impediment to the passage of the head seems to have been referred to two sources —either to irregularity of the brim, or to narrowing of the outlet. In nearly all the popular works on Midwifery, these are the only parts that are measured;* and, consequently, all difficulties are attributed to their irregularities. As the brim seems to be most commonly at fault, it has received a proportionate share of

* Dr. Churchill's valuable little work is, however, an exception.

attention. It has been measured over and over again in the dried pelvis; very ingenious instruments have been contrived for the purpose of measuring it in the recent state, and during life; and every attempt has been made to determine by such means, beforehand, when the head can pass, and when it cannot.

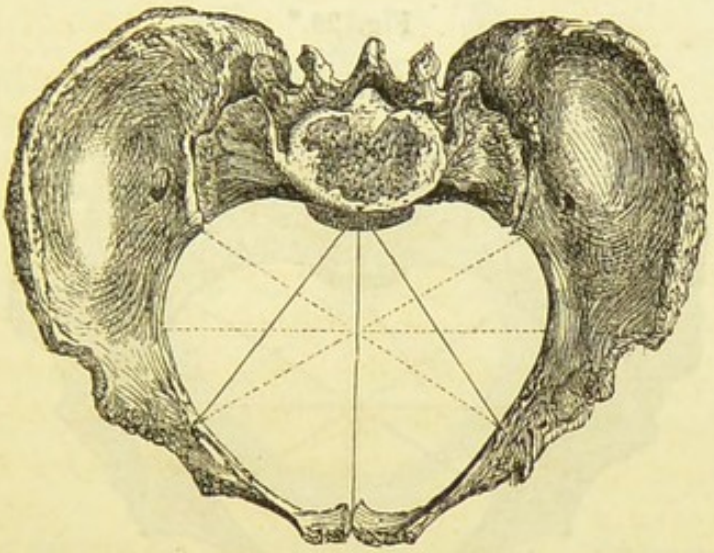
Measuring the pelvis in this way, and with this intention, may serve our purpose in detecting pelvic deformities where the disproportion is great; but it is very questionable whether it will enable us to discriminate those slighter degrees of disproportion which are so often the causes of delay and difficulty in parturition. It is not, therefore, with this object in view, that we would direct your attention to these measurements, but rather for the purpose of still further illustrating the mechanism already alluded to, as well as of pointing out that irregularities in the brim and outlet are not the only difficulties met with in the pelvis.

Pelvic Axes. Let us first consider the axes of the pelvis. If it be supposed that the brim of the pelvis is a plane surface, and that a straight line passes perpendicularly through its centre and is continued on both sides, this line would touch the hollow of the sacrum near the coccyx in one direction, and would pass out below the umbilicus in the other. This is called the *axis of the brim.* This line intersects and forms a more or less acute angle with the perpendicular of the body; the angle is generally 45°, but it may be much greater: sometimes it is less. The *outlet* has a different axis, which would be represented by a line passing downwards and forwards from a point below the promontory of the sacrum nearly in the direction of the vagina; but, as this is curved, it would be more correct to describe it as touching the floor of the vagina, and passing out through the centre of the perinæum. These lines intersect each other; and, in order that the head should pass from one axis into the other, it must describe a curve from above downwards, which takes place when the occiput rests upon the pubic arch.

Pelvic Planes. We shall consider the pelvis as consisting of a series of planes taken from above downwards, having different aspects and different measurements.

The first of these is *above the brim* posteriorly, but meets it anteriorly at the symphysis pubis: it is therefore an inclined plane, forming an acute angle with the plane of the brim. The

Fig. 27.*

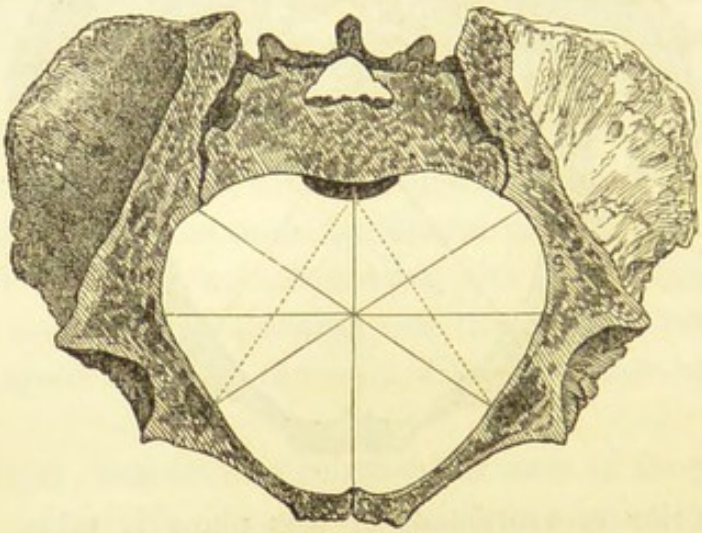


antero-posterior measurement of this plane is taken from the centre of the lumbo-sacral intervertebral cartilage to the top of the symphysis pubis; it is generally 4 inches, and is of importance, because it gives the projection of the promontory of the sacrum much more accurately than the same measurement of the brim: in fact, the true promontory is above the brim. The lateral measurements are taken from the same point to the pectineal eminence on each side; these are about $3\frac{1}{2}$ inches, but are very seldom found exactly equal. It is necessary to recollect these distances, because of the effect sometimes produced by their inequality. For instance, if the promontory be very much directed towards the right pectineal eminence, the head would be at once prevented from entering the brim if it preserved its usual position, that is, with its anterior part opposite the right sacro-iliac synchondrosis; but if it took the other direction, so that the

* Fig. 27.—Horizontal position of pelvis made at the brim of the pelvis. The superior surface shews the antero-posterior and lateral measurements of the inclined plane of the promontory. The dotted lines represent the transverse and oblique measurements of the brim.

same part was applied in the same way to the left side, it would pass quite easily. Hence, in the same patient, one labour may be difficult and another easy, merely from the accidental position of the head.

Fig. 28.*



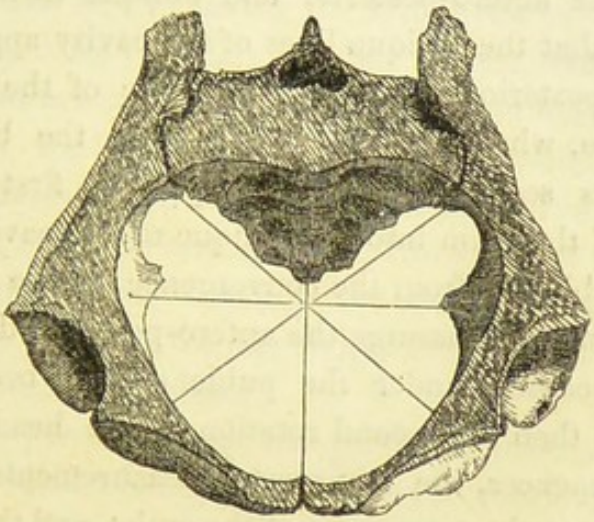
The second is the *plane of the brim*, of which the antero-posterior measurement, from the centre of the upper edge of the sacrum to the top of the symphysis pubis, is about 4 inches; the transverse, from the centre of one ilium to that of the other, is $5\frac{1}{8}$ inches; and the two oblique measurements, passing from each pectineal eminence to the sacro-iliac articulation of the opposite side, about 5 inches.

We have next the *plane of the cavity*, one most generally omitted, and perhaps the most important of the three. The antero-posterior measurement of this plane passes from immediately below the symphysis pubis, parallel to that of the brim, directly backwards to a point above the middle of the sacrum; it is about $4\frac{1}{4}$ inches. The transverse diameter passes from the centre of the plane of one ischium to that of the other, and is $4\frac{1}{2}$ inches;

* Fig. 28. Inferior surface of same section, showing the antero-posterior, transverse, and oblique measurements of the brim of the pelvis. The dotted lines represent the lateral measurements of the inclined plane.

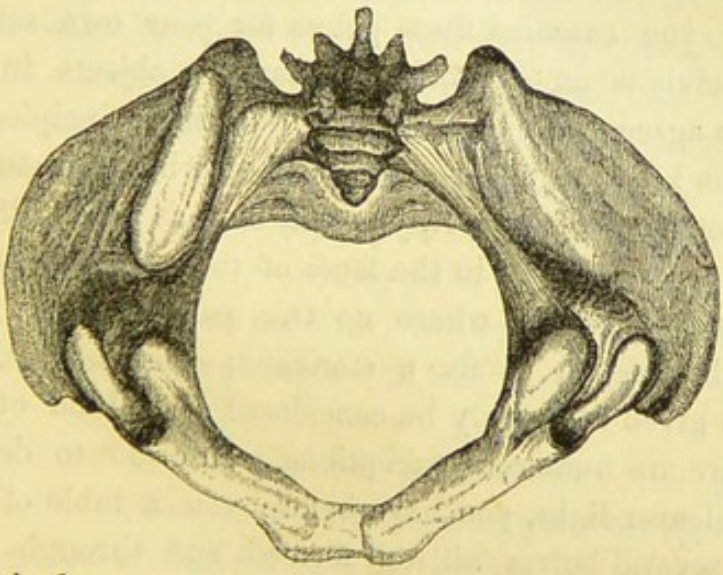
and the oblique lies between the centres of those muscular masses which fill up the obturator and ischiatic spaces. Their measurement is uncertain, but is more than 5 inches.

Fig. 29.*



The *outlet* cannot be considered as a plane. Its antero-posterior measurement is taken from below the symphysis pubis to the extremity of the coccyx, and, when the coccyx is extended, is

Fig. 30.†



about 4½ inches. The transverse measurement between the tubera of the ischia lies above this, and is about the same; so

* Fig. 29. Remaining section of pelvis, showing the antero-posterior, transverse, and oblique measurements of cavity.

† Fig. 30. Outlet of pelvis.

that, when the head is pressing through the outlet, it forms a pretty accurate circle round it.

Comparing the plane of the brim with the plane of the cavity, we see that the transverse measurement of the cavity is diminished, while the antero-posterior and oblique distances are increased; and that the oblique lines of the cavity approach nearer to the antero-posterior direction than those of the brim of the pelvis. Hence, when the head passes from the brim into the cavity, always seeking the widest space, it first rotates from the oblique of the brim into the oblique of the cavity, and as it descends, is obliged, from the convergence of the planes of the ischium, still more to assume the antero-posterior direction, until, the occiput escaping under the pubic arch, it becomes fixed in this position: then the second rotation of the head from behind forward commences, the transverse measurements of the head corresponding to the transverse of the outlet, and the longitudinal passing out in the antero-posterior measurement of the outlet.*

In stating to you these measurements as being those of the standard pelvis, I am very far from wishing to convey to you that they are constant or immutable: on the contrary, you will find, when you examine these points for your own satisfaction, that the pelvis is no exception to natural objects in general, and that it agrees with them perfectly in this principle, that two of the same kind are never exactly alike; when you study it, and are accustomed to observe it, you will find as much difference in the pelves as you would in the faces of those to whom they belonged; and therefore, where no two pelves exactly agree, it would be impossible to fix a standard: consequently, the measurements given must only be considered as a kind of mean, to which there are numerous exceptions. In order to demonstrate this in a clearer light, you have before you a table of measurements of several pelves, all well formed, and through which the head of the child would readily pass, but no two of them agree;

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* It is here assumed that the pubic angle is sufficiently wide to allow the occiput to pass completely under the arch, and to place the head in the antero-posterior direction.

you have also before you the measurements of the pelvis given by different popular authors.*

The transverse space of the outlet is sometimes measured differently, so that the whole space within the ischio-pubic rami may be included; that is, by making the symphysis pubis the centre of a circle, of which these pillars (as they are sometimes called) are the radii. The arc of the circle is measured in degrees, which, of course, gives the angle at the symphysis pubis. The pubic angle in the standard pelvis is 90°. Other measurements are given, which are not of equal importance. The depth of the cavity, anteriorly, posteriorly, and laterally, is stated thus by Dr. Burns:—depth of symphysis, $1\frac{1}{2}$ inches; depth of sacrum, 5 to 6 inches; depth of ischium, $3\frac{3}{4}$ inches.

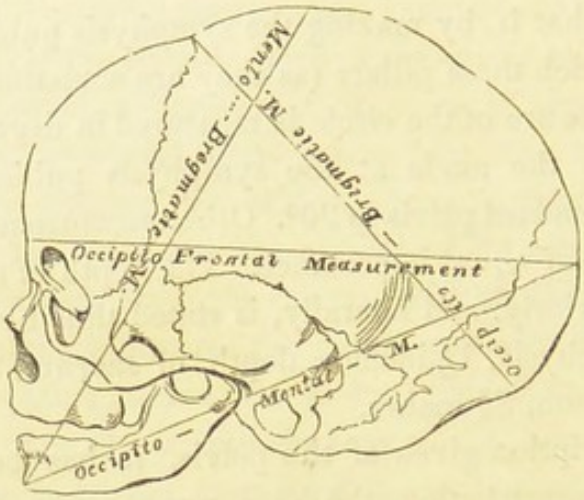
In the description given of the pelvis, it has been explained that, from its construction, the head must rotate first laterally, and then in the antero-posterior direction, before it is expelled. These, however, are not the only motions of the head in its passage through that cavity; there are others which still further illustrate mechanical contrivance, and which deserve attention. Before alluding to these, however, we would wish it to be understood that, when we speak of the *head* passing through the pelvis, and that in a certain direction, we do not mean that this is *constantly* the case: on the contrary, the head may enter the pelvis in a different position; and sometimes the breech or the foot passes first. It is only for the purpose of illustration, that we would assume the head as the presenting part, as it is called obstetrically, and its position as uniform; the variety of these positions, and the mode of ascertaining them, will come under our consideration.

Measurement of the Child's Head.—Like the pelvis, the child's head has been measured in different directions. There are three measurements given of its longitudinal axis. One from the occiput, just above the neck, to the middle of the open membranous space between the frontal and parietal bones called the

* Vide Tables placed at the end of this Lecture.

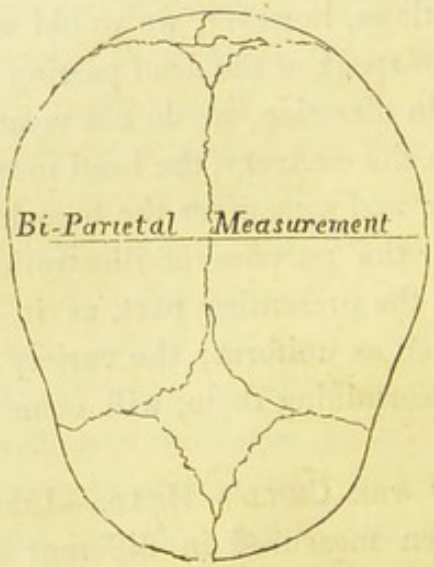
"bregma" or "anterior fontanelle," is generally about 3½ inches. Another passes horizontally from the most projecting point of the

Fig. 31.*



occiput to the centre of the frontal bone, above and between the superciliary ridges; this is usually 4½ inches. The third lies

Fig. 32.†



between the same point of the occiput and the centre of the chin; this is 5⅛ inches. There are also three transverse measurements.

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* Fig. 31. Longitudinal measurements of the child's head.

† Fig. 32. Transverse measurement of the child's head.

One is between the parietal protuberances, which is $3\frac{1}{2}$ inches; another between the temporal fossæ, which is from $2\frac{1}{2}$ to 3 inches; a third between the zygomatic arches, which is from $3\frac{1}{2}$ to 4 inches. Sometimes three distances are given from the chin, as a central point; one gives the length of the face and forehead (mento-frontal) $3\frac{1}{2}$ inches; a second, from the chin to the bregma, is 4 inches; a third, from the chin to the occiput, is rather more than 5 inches, as has been already stated. We have arranged them thus in a tabular form.

From the Occiput.	In.	From the Chin.	In.	Transverse.	In.
Occipito-Bregmatic	$3\frac{1}{2}$	Mento-Bregmatic .	4	Biparietal	$3\frac{1}{2}$
Occipito-Frontal ...	$4\frac{1}{2}$	Mento-Frontal ...	$3\frac{1}{2}$	Bitemporal	$2\frac{1}{2}$–3
Occipito-Mental ...	$5\frac{1}{8}$	Mento-Occipital ...	$5\frac{1}{8}$	Bizygomatic	$3\frac{1}{2}$–4

The shortest of these measurements from the occiput in the longitudinal axis is the occipito-bregmatic; and when the head enters the pelvis, which it does obliquely, this is made to correspond to the oblique measurements of the brim, by the anterior part of the head being so pressed up that the chin rests upon the chest of the child: but as the head descends into the cavity, and gains more space in the oblique and antero-posterior direction, the forehead advances more than the occiput, so that the occipito-frontal measurement corresponds nearly to the oblique of the cavity. A little lower down, at the short sacro-ischiatic ligament, the forehead becomes a resting-point, and the occiput again descends obliquely along the ischio-pubic ramus until it emerges, with part of the parietal bone, under the pubic arch. The head therefore, in its descent, seems, as it were, to oscillate upon its transverse axis.

The biparietal measurement of the head is generally stated to correspond to the conjugate or antero-posterior axis of the brim; and as the former is $3\frac{1}{2}$ inches, the latter 4, only half an inch is allowed for the soft parts, even in the best formed pelvis; consequently, the least diminution of the conjugate axis causes a difficulty, a greater one becomes an obstruction. Hence, among

accoucheurs, it has been an anxious problem to determine the smallest conjugate diameter (as it is improperly called) through which the head can pass without destroying the child. Its solution has been attempted by comparing the biparietal measurement of the head with the conjugate of the pelvis; and it has been stated by Dr. Joseph Clarke (a high practical authority), that if the conjugate be less than $3\frac{1}{2}$ inches, a living child cannot pass the brim of the pelvis. But, in all these discussions, it has been too confidently assumed that these two measurements of the head and the pelvis exactly coincide. They do not do so; on the contrary, as the head is entering the pelvic cavity, the parietal protuberance next the symphysis pubis descends lower than that next the sacrum, so that the biparietal axis lies obliquely downwards, and so it remains more or less until the occiput escapes under the pubis. The part of the head, therefore, which would be felt lowest in the pelvic cavity, is the parietal bone next the symphysis. By this means nature avoids the difficulty which would often arise, if both parietal protuberances descended in the same plane.

Thus the head slightly rotates on its longitudinal axis also; and, in order to effect its passage through the pelvis, combines four distinct movements: two of them upon the vertebral column—one in the lateral, and one in the antero-posterior direction; two on the head itself—one on its longitudinal, and a second on its transverse axis. By the combination of these motions, the passage of the head is ultimately effected.

TABLE OF MEASUREMENTS IN EIGHTEEN PELVES NOT DISEASED, SHEWING THE VARIETY IN THEIR PROPORTIONS.

No. in Museum.	No.	Inclined Plane of Promontory.*			Plane of Brim.				Cavity.†		Outlet.		Pubic Arch.	Character of Pelvis.
		Prom. to Pubis.	Prom. to L. P E.	Prom. to R. P. E.	Ant. Post.	Transverse.	Left Oblique.	Right Oblique.	Ant. Post.	Transverse.	Ant. Post.	Transverse.		
7	1	4	3½	3¾	4⅛	5½	4⅞	4⅞	4⅝	4⅞	4⅜	4⅝	70°	Normal (nearly).
14	2	4	3¼	3¼	4	5	4¾	4⅞	5	4½	3¾	4	75	"
8	3	3⅞	3½	3¼	4	5⅛	4¾	4¾	4¾	4¼	4⅛	3⅞	60	Nearly normal (small).
15	4	3¾	3½	3⅜	4	5½	4⅞	5	4½	4⅝	4½	3¾	70	" "
10	5	3⅞	3⅜	3⅛	4	5½	4⅞	5¼	4½	5⅛	4½	4¾	90	Normal.
33	6	4¼	3½	3½	4	4⅝	4¾	4¾	4⅞	4½	4	4⅜	75	"
9	7	3¾	3⅜	3½	3⅞	3⅜	4⅞	5	4⅜	4¾	4⅝	4⅝	70	Rather small.
16	8	3⅞	3½	3¼	3⅞	5¼	4⅞	5⅛	5⅛	5	4	4⅜	80	Irregular.
18	9	4⅛	3⅞	4	4⅜	5⅜	5⅛	5	5	5	3¾	4¾	100	Very large.
22	10	4½	3⅞	3¾	4¾	5½	5	5⅛	5⅝	5	4½	4¼	80	Large. [ment, narrow outlet.
21	11	5⅛	3⅞	3¾	5¼	5⅜	5⅛	5½	5½	4¾	4¾	3⅞	60	Very long conjugate measure-
19	12	4⅞	3⅞	3¾	4⅞	5½	5	5⅛	5⅛	5¼	3⅞	4⅞	95	Large, and like young Pelvis.
17	13	4⅞	4⅞	5⅛	4⅞	5¼	4⅞	5⅛	5⅛	5	4	4⅜	90	Large and normal.
6	14	5½	4¼	4¼	5	5½	5	5	5	4⅞	3⅜	5	90	Large and round. [tracted.
20	15	4⅜	3⅞	3¾	5	5⅝	5⅛	5⅛	5⅞	4⅞	4⅞	3¼	45	Very large, but outlet con-
12	16	4¼	3⅞	3¾	4⅝	4¾	4½	4⅝	5	4½	4⅛	4	75	Large, but like male Pelvis.
11	17	3¾	3⅜	3⅛	3¾	4½	4¼	4⅜	4⅛	3⅝	3⅞	3	45	Like male Pelvis: bone very light
13	18	3½	3	2⅞	3¾	5⅛	5	5	4½	4¼	4¼	3⅜	65	Like male Pelvis. [as if diseased.

* L. P. E. Left pectineal eminences. R. P. E. Right pectineal eminences.

† The oblique measurements of the cavity cannot be given in the dried bone.

MEASUREMENTS OF THE PELVIS STATED BY VARIOUS AUTHORS.

	Burns.	Monro.	Ramsbotham.	Rigby.	Lee.	Baudeloque.	Cloquet.	Moreau & Velpeau.	Boivin.
	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
Brim.									
Antero-posterior	4	$4\frac{1}{2}$	4	4·3'	4	4	4	4	$4,4\frac{1}{3}$
Transverse	$5\frac{1}{4}$, $5\frac{1}{2}$, 6	$5\frac{1}{8}$	$5\frac{1}{4}$	5·4'	5	5	5·2 lines	5	5
Oblique	$5\frac{1}{3}$, $5\frac{1}{2}$,	5	5	4·8'		$4\frac{1}{2}$	4·6 l.	$4\frac{1}{2}$	$4\frac{1}{3}$
Outlet.									
Antero-posterior	4, 5	$5\frac{1}{8}$			5		4,4·10 l.		
Transverse	4	$4\frac{1}{4}$, $5\frac{1}{4}$			4		4		
Oblique	4						4		
Depth of Cavity.									
Depth of Symphysis	$1\frac{1}{2}$				$1\frac{1}{2}$		1·6 l.		
,, of Sacrum	5, 6				6		4·7 l.		
,, of Plane of Ischium	$3\frac{3}{4}$				3		3·6 l.		
Pubic Arch.									
Base	4								
Sides	$3\frac{1}{4}$								
Perpendicular	2								
False Pelvis.									
Between Spines of Ischia	10						9·6 l.		
,, Centres of Cristæ							10·6 l.		
Centre of Crista to Brim	$3\frac{1}{2}$						3·4 l.		
,, ,, to Tuber Ischii							7		

LECTURE X.

DEVIATIONS AND DEFORMITIES OF THE PELVIS.

HAVING, in the preceding lecture, explained the structure of the pelvis, its obstetric characters, its normal proportions and the manner in which the head of the child passes through it, we shall consider those numerous exceptions to the standard pelvis which are so often met with, and which become causes of delay or difficulty in parturition. Some of these are only *Deviations* from the just proportions of the pelvis; others are *Deformities*, the consequence of disease. We shall therefore examine each class separately.

DEVIATIONS.—The deviations or irregularities in the pelvis are various. It may be altogether too large, or too small; it sometimes retains its infantile shape, although increased to its full size; it may resemble the male pelvis; and, again, some one or perhaps all, of its proportions may be irregular. All these deviations may be met with in the healthy pelvis.

Pelvis too Large. The pelvis may be altogether too large. Such a pelvis as this could never be a cause of delay in parturition; but it may cause danger notwithstanding. For instance, when the uterus is increased in its weight and size during pregnancy, and occupies the abdomen, the pelvis is its great support below; but if the latter be too large, the uterus presses into the vagina, gradually inverting it; there are instances in which it has passed quite through the vagina and thus appeared at the vulva, before labour commenced. But, although this may not happen, yet, when the vagina is at all distended and inverted in this manner, the foundation is laid for that troublesome disease, prolapsus uteri. Hence the accoucheur, in such cases, uses every precaution after delivery to prevent the uterus from pressing upon the vagina, until this organ returns to its original

size. Another danger of a very large pelvis is, that the child may be too suddenly expelled. In most cases of parturition, the action of the uterus is continued a certain time before delivery takes place; and, without entering into any inquiry as to the cause of that action, we know by experience that, when once set up, it does not suddenly cease, even when the immediate exciting cause is removed. If you watch the uterus after labour when the placenta is detached, you will find contractions and relaxations still going on, although slight in their degree; these contractions sometimes increase so as to become "after-pains" (as they are called). Now, when the child, meeting no resistance from the pelvis, is suddenly expelled, the uterus may still continue to relax and contract, although the stimulus of the child be withdrawn; hence there is a danger of hæmorrhage taking place; and if the uterus (as is very probable) be thrown into irregular contractions, a stricture may be formed at the cervix uteri. The blood may only flow into the uterine cavity, being retained by a clot formed above the stricture; and thus a case of internal hæmorrhage may arise. Again, during pregnancy the abdominal vessels are more pressed upon than usual, by the addition of the uterus in the abdominal cavity; the inelastic coats of the veins yield to this pressure; and the column of blood in the cava and large iliac veins is of necessity diminished; nevertheless the same quantity of blood ascends through other channels to the heart. When that pressure is suddenly removed, a most dangerous syncope may follow: the circulation being suspended in consequence of the right side of the heart being nearly emptied of its venous blood. Another accident, which is sometimes the result of this kind of pelvis, is inversion of the uterus. The fundus of the uterus, meeting no opposition from the pelvis, sinks within itself as the child is being expelled; it is sometimes turned completely inside out, but more commonly the depressed fundus forms a kind of cup-shaped cavity at the top of the uterus: this irregularity immediately excites the fibres of the uterus into an action somewhat resembling intussusception of the intestines; the inversion of the fundus is increased; and it is ultimately forced in this state through the vagina. A very large pelvis is not, therefore, quite so advantageous as it may appear to be.

Pelvis too Small. The pelvis may be too small in proportion to the size of the head of the child. A female who is well-formed may have all the bones small; she is consequently low in stature, but not disproportioned; and, although the pelvis bears the same relation to the rest of the skeleton that the standard pelvis does, still all the measurements of the former are less than the latter. The pelvis is diminished, but diminished equally in every part. In such a case, a child of the average size would pass with great difficulty. Instances of this kind are rare, although sometimes met with. It would, however, be quite incorrect to assume that the pelvis must be small in females of low stature; it is much more frequently the reverse, the bones of the extremities, though diminished in length, are large, and so is the pelvis; but in the instance referred to, the bones are not only short but proportionately small, and the pelvis is of corresponding dimensions; hence in this, as in other instances, an accurate observation of the bones of the extremities will assist in forming an opinion of the pelvis. Again, sometimes the same kind of small pelvis is met with in women of the average height. Dr. Rigby quotes three such cases, from Busch's *Berlin Reports*, in all of which labour terminated fatally. (*Midwifery*, p. 185.)

Arrested Development of Pelvis. If the pelvis be examined at the time of birth, its form is imperfect, its ossification is incomplete, the viscera that properly belong to it are in the abdomen, because there is no pelvic cavity. During childhood its development is only slowly advancing; and the form of the pelvis is constantly undergoing alteration to the period of adolescence, when it at length attains a tardy maturity. Thus the osseous covering which protects the generative organs is not completed, until the time when they are prepared to enter upon their proper function. It is important, therefore, to attend to the changes going forward. In the infant pelvis the unfinished ilia are short, rounded, very patulous, and without any fossa. The brim of the pelvis looks almost directly forwards, in consequence of the os pubis lying so much below the sacrum, that a line passing horizontally backwards from the symphysis pubis would pass through the extremity of the coccyx. The antero-posterior

measurement of the brim is the longest, the transverse is the shortest, just as in the lower animals. There is scarcely any pelvic cavity; the ischia are closed in, and consequently the tubera approximate, and the pubic arch is contracted; hence the transverse measurement of the outlet is very small, while the antero-posterior is equally long, and almost parallel with that of the brim, so that the pelvis resembles in this respect also that of quadrupeds. From this extreme, a gradual change goes forward, until the pelvis assumes its permanent character.

It may happen that this alteration of the pelvis is so arrested in the middle of its progress, that no further change of shape takes place, but the pelvis continues to increase, just as you see in monstrous fœtuses an arrest of development at the sixth week of gestation magnified into a monstrosity in the full-grown child. Comparing for instance, the pelvis (fig. 34), which is rather large, with the young pelvis (fig. 33), you will observe the resemblance between them; the antero-posterior measurement of the

Fig. 33.*

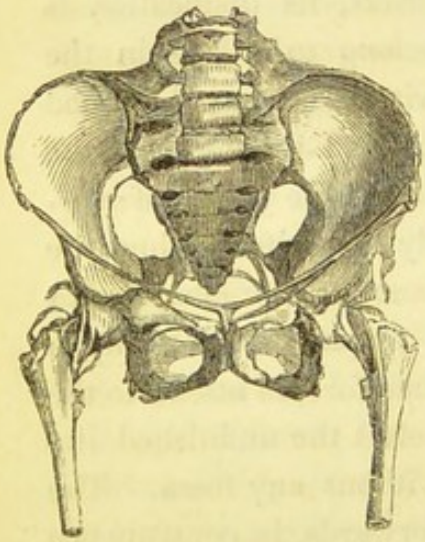
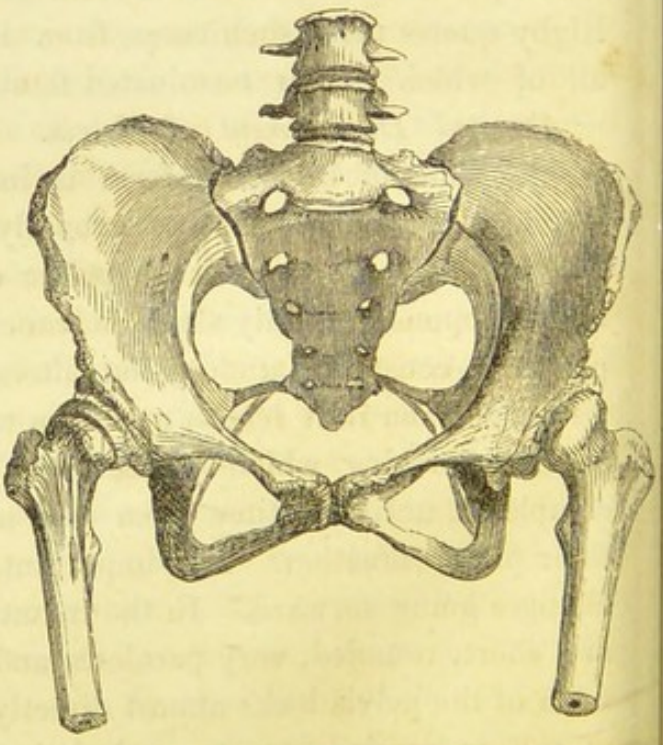


Fig. 34.†



* Fig. 33. Child's pelvis.

† Fig. 34. Large female undeveloped pelvis.

brim (5½ inches) longer than the transverse, the transverse of the outlet proportionately diminished, and the cavity rather shallow. Yet this pelvis is above the standard size; and any difficulty or delay in the passage of the head could only arise from the outlet being incomplete. This also shows that the development of the pelvis may be arrested, although its size continues to increase.

An arrest of development may take place, and the growth also be retarded. You may have in the adult woman the pelvis of the girl, with all its proportions below the standard, but not irregular nor deformed. This had been pointed out by Mr. Shaw some years ago (*Medical Gazette*, vol. xvi. p. 45.); and the manner in which it occurs is very clearly explained. The rate of growth of the whole body is not equal. In the infant, the head, thorax, and upper extremities are much more advanced in their formation than the pelvis and lower limbs. In the adult, it is the reverse; the latter exceed the former in their proportionate size. But if, from any cause (as rickets), the general growth of the bones be retarded, the pelvis and lower limbs will not increase so rapidly as they should do; they will still retain something of their immature character; consequently the pelvis may be too small, although not deformed. The gorilla might be considered an example of infantile development of monstrous growth. The enormous power of the upper part of the body, as compared with the evident want of power in the lower limbs, is an exaggeration of this irregular development; and it is remarkable that the form of the pelvis is that of the infant, the antero-posterior measurement being the longest.

The development of the pelvis may be almost completed, and yet be too small for the passage of the head; and, as the difficulty may happen just at the time of puberty, it becomes an objection to early marriages. During the growth of the pelvis, the transverse and oblique measurements of the brim are constantly increasing and the outlet becoming wider; but they do not begin to exceed the antero-posterior until after puberty, as may be readily perceived in the altered shape and carriage of the female at that time. At puberty, therefore, these measurements may only equal the antero-posterior; the outlet, and perhaps the

cavity, being still in diminished proportions. Hence the young girl, although perfectly well formed, but pregnant at too early an age, may be the victim of a difficult labour.

Masculine Pelvis. Another deviation from the standard pelvis is, when it assumes the character of the male pelvis; and as this circumstance is much more frequently the cause of severe labour

Fig. 35.*

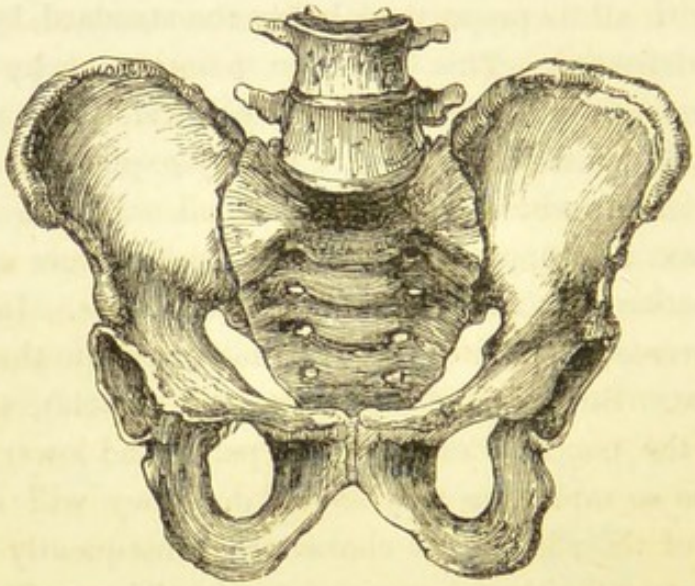
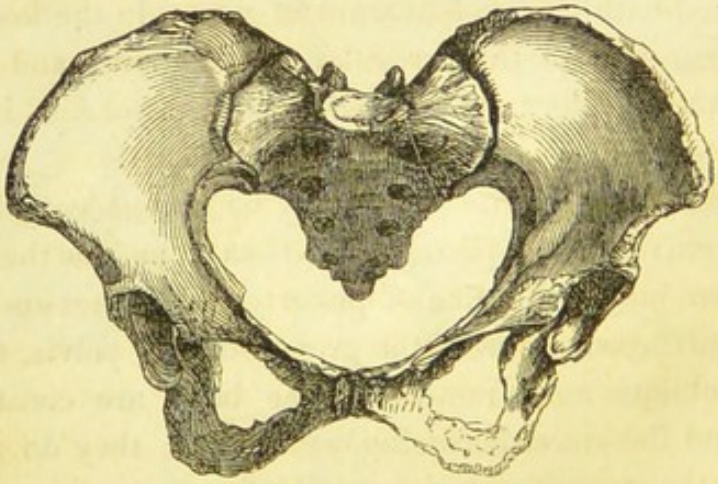


Fig. 36.†



* Fig. 35. The male pelvis. † Fig. 36. The female pelvis.

than is generally supposed, or at least than is stated, it deserves particular attention. The contrast between these two pelves (Figs. 35 and 36) must at once strike attention. The iliac bones of the male are more upright, the crista ilii is rougher and more waving, and the iliac fossa rather deeper. The brim of the pelvis is more triangular than in the female, in consequence of the transverse measurement being less. Its axis is also directed more upwards. The cavity is much deeper; anteriorly, the symphysis pubis is narrower and longer, often ossified; laterally, the planes of the ischia are closer to each other; and, posteriorly, the sacrum is longer, narrower, and rather straighter; hence it is something like an obliquely truncated cone, inverted. The ischio-pubic rami form a more acute angle, which measures generally between 60° and 70°. The tubera of the ischia are closer; and, if the coccyx be much curved, the outlet of the pelvis is very much closed in. The male pelvis is also much more ossified, and is consequently heavier than the female pelvis.

The cause of this difference may be understood, if we recollect the different circumstances in which each pelvis is placed, and the law which seems to be observed in the growth of bone; viz., that it bears a strict relation to the purpose which it is intended to fulfil. If it be for an osseous covering, its size corresponds exactly to the development of the organs it protects: thus the alterations of the cranium keep pace with the varying development of the brain; a deformity from sinking of the thorax is produced when the lungs are compressed. If it be as a centre of muscular action, it is strengthened and increased directly as the action of the muscles attached to it. Applying this rule to the pelvis, we find one organ, and that an important one, absent in the male which exists in the female: hence the pelvic cavity is narrower in the former. The pelvis is also the centre of the most powerful muscular actions in the body; and where those muscles are stronger, and are called more frequently into action, they exert a proportionate influence upon the pelvis; therefore the male pelvis is more ossified and heavier than the female, and its shape is such as will give its muscles points of insertion the most favourable to their action. Hence the distance between

the opposite attachments of the same muscle is, as far as possible, lessened; consequently in the male pelvis the ilia are more upright, and nearer to the linea alba; the acetabula are closer, in order to diminish the distance between the pelvis as a centre of motion and the thigh-bones; and thus the pubic arch is narrower, and the ischiatic tuberosities closer, than in the female pelvis. If we have sufficiently explained this principle, let us consider for a moment how far the female pelvis might be influenced by it. It is true that the uterus is here contained; and therefore we cannot explain by its absence any narrowness of the pelvic cavity which may exist: nevertheless, if we suppose the muscles connected with the pelvis to be large, strong, and constantly exerted, the effect would be nearly the same; the acetabula would be drawn closer to the centre, the planes of the ischia would converge more; not, as in the diseased pelvis, protruding into the cavity, but by the bone in its growth adapting itself to the diminished distance. In a similar manner, the ilia would be more upright, and the pelvis of the female would gradually assume many of the characters of the male. Such is frequently the case with women in the rural districts, who are strong, healthy, and constantly employed from early youth in carrying weights, and in other active muscular exertions. The difficulties offered by such a pelvis are altogether different from those of the diseased pelvis; which, from all that is written on the subject, would seem to be the only source of all the embarrassments that are met with. The obstacles, therefore, which the female pelvis may present to the passage of the head, when it approaches the characters of the male pelvis, deserve attentive consideration. The triangular shape of the brim is not generally an impediment; because, although the transverse measurement is diminished, the oblique is sufficiently wide, and the head will usually pass into the cavity. But here all the difficulties seem to centre. Anteriorly, the symphysis pubis is narrower and more unyielding; even a deposition of bone is sometimes found behind it, which may be extremely dangerous, if the intervening soft parts be pressed against it by the head. Posteriorly, the promontory of the sacrum offers no opposition; but, the sacrum it-

self being straighter, there is less facility in the head performing the lateral rotation which has been already described. This difficulty is still more increased by the convergence of the ischio-pubic rami: the head is obliged to descend much lower in the pelvic cavity before it can escape under the pubic arch, and it is prevented from doing so in consequence of the space being so much lessened by its funnel-shape. In addition to this, the tuberosities and spines of the ischia are more ossified; the former thicker and rougher, the latter larger and more projecting. Thus, as the head advances, its passage becomes more and more impeded, until it is ultimately arrested, perhaps close to the outlet. In women who have pelves of this description, it is possible, also, that the head of the child may be more than usually ossified, and the action of the uterus is always strong; so that a most disadvantageous combination of circumstances may take place in a healthy pelvis of this kind. On another occasion we shall have to refer to it; at present, we would only notice its anatomical peculiarities, as it is important thoroughly to understand them; and here again we would observe, that the bones of the extremities will be a useful guide. The wrists and ankles are large, the phalanges thick and short: hence the old popular opinion amongst midwives, that "a thick, short hand is a bad sign when a woman is in labour," has a more just foundation than, at first sight, might appear reasonable.

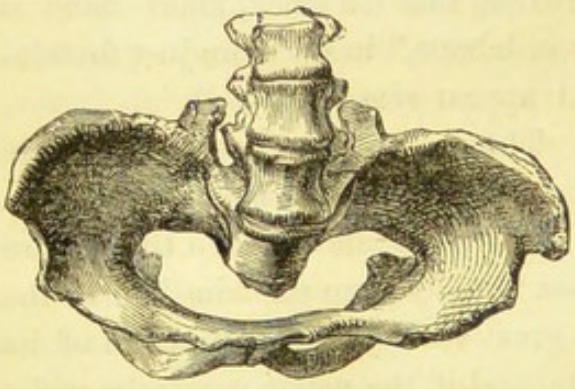
Irregularly formed Pelvis. The last of the deviations in the pelvis is an irregularity and a want of correspondence between its different proportions. The effect produced when the ilia are too patulous or too upright, has already been explained. In the brim of the pelvis, there is a great variety in the direction of its axis. It may be too upright; and if the pelvic cavity be wide, it will cause prolapsus uteri in the manner that has been stated: but the axis is more generally in the opposite direction, and approaches too much the horizontal line. When this is the case, the weight of the gravid uterus is thrown very much upon the lower part of the abdomen, its parietes gradually yield to the pressure, and the uterus projects much more forwards than it should do. Sometimes, after several pregnancies, the abdomen

has become so weak as to give no support whatever; and the uterus has been reverted over the pubes so as to rest on the thighs. We shall have again to point out how such a deviation may cause considerable delay in parturition.

The greater inclination of the promontory of the sacrum to one side than to the other has been already alluded to.

The cavity of the pelvis, although sufficiently well-formed, often varies very much in shape and depth: it may be round, oval, triangular, deep or shallow, and yet cause little alteration in the passage of the head. One variety of this kind, however, deserves notice, as it forms a pretty accurate contrast to the pelvis resembling that of the male. Here also the pelvis is funnel-shaped; but the funnel is reversed. There is rather less space in the brim than in the standard pelvis; it is a little more oval, having its short axis (antero-posterior) less than 4 inches; but the cavity is wider, the planes of the ischia are more apart, and the outlet is much more open than in the normal pelvis. It is almost doubtful whether a pelvis of this character may not be *slightly* diseased, and consequently beginning to assume something of that shape, the extreme of which forms the distortion of rickets.

Fig. 37.*



Deformed Pelves.—A very great difference may be observed in the shapes of the distorted pelvis.

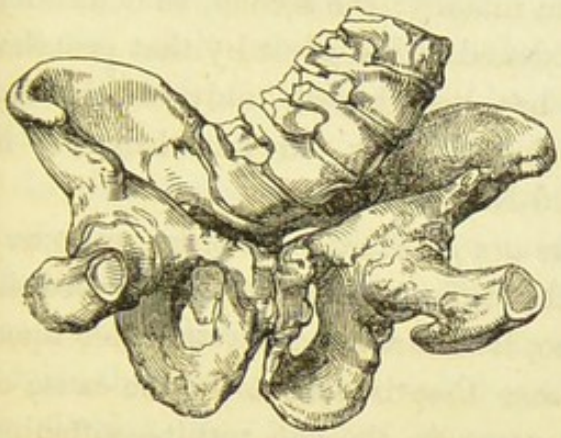
In one variety the brim is not only oval, but inclines to an hour-glass shape by the close approximation of the promontory of the sacrum to the symphysis pubis: at the same time the cavity is shallow and open, and the outlet very wide (fig. 37).

In another example, the ilia are very upright and almost doubled on themselves. The brim is called cordiform; that is, it resembles the ace of hearts: but, when the distortion is great, it approaches much nearer to the letter Y. The

* Fig. 37. Ovate pelvis: case of Elizabeth Sherwood.

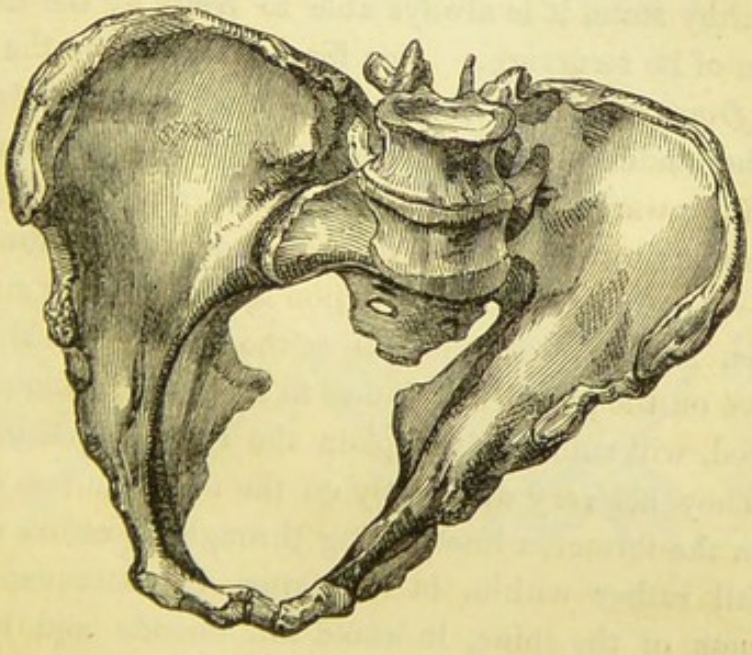
promontory of the sacrum and the pectineal eminences are quite close, and the bodies of the pubic bones are doubled back upon each other. The cavity is quite contracted, in consequence of the planes of the ischia being pushed into it by the heads of the thigh-bones. The sacrum looks as if it were broken; it is bent up so abruptly at the coccygeal extremity. The tubera of the ischia are scarcely two inches apart; and the ischio-pubic rami are nearly parallel; hence the pubic angle is in some cases only 100°. (Fig. 38.)

Fig. 38.*



In a third instance, one side of the pelvis is of its usual shape; but the opposite side seems to run almost in a straight line from the sacro-iliac synchondrosis to the symphysis pubis, as if, while soft, it had fallen on that side and were flattened (Fig. 39.)

Fig. 39.†



* Fig. 38. Cordiform pelvis: case of Elizabeth Thomson.

† Fig. 39. Obliquely ovate pelvis of Naegele.

These three are the leading varieties with which we meet in the *deformed* pelvis; but from the former two there are numerous deviations, still, however, preserving their specific characters. The first of the three forms of deformity which we have mentioned is generally described as the deformity from *rickets*, and as being caused in infancy; the second, as deformity from *mollities ossium*, and produced in the adult by that peculiar disease. The third variety has been known only within the last few years; and we are indebted for our knowledge of it principally to the distinguished Naegele.

Manner in which Deformities are produced. In order to understand the cause producing the difference of shape observed in either of the pelves alluded to, it is not necessary to enter upon the consideration of the disease that is said to be the cause of it. Rickets and malacosteon agree in the one result—softening of bone. This condition of the pelvis may therefore be assumed; but the causes under which, softening being present, the different appearances manifested by distorted pelves are produced, require examination.

There are two forces constantly acting upon the pelvis, which, in its healthy state, it is always able to resist by the mechanical perfection of its structure. One force is caused by the *weight of the body from above*, and the *resistance of the thigh-bones from below:* the tendency of the former is to press the promontory of the sacrum inwards and downwards; that of the latter, to press the acetabula inwards, upwards, and backwards, towards the sacrum. Another force is the action of the muscles attached to the pelvis. A careful examination of the effect which these forces must have on the pelvis, in relation to the circumstances in which it is placed, will sufficiently explain the cause which modifies its form. They act very differently on the adult and on the infant pelvis: in the former, a line passing through the centre of gravity would fall rather within, in the latter, in consequence of the straightness of the spine, it would fall outside and before the pelvis. In the one case, if the pelvis yielded, the spine and femora would press in towards the centre—the cavity of the pelvis; in the other, the weight of spine would fall in front of the

pelvic cavity, while the acetabula would press up behind it. Hence the effect on the cavity would be that, when the line of gravity fell within it (as in the adult pelvis), it would be pressed inwards; when beyond it (as in the infant pelvis), it would be drawn outwards by the divergence of the acetabula, the sacrum pressing down between them. Of necessity, therefore, the softened adult pelvis would take the shape called cordiform; while the infant pelvis would be lengthened in the transverse direction.

In this explanation, it is assumed that the spinal column preserves its proper direction, and that it is not altered by disease. But it frequently happens (although by no means constantly) that the spine is softened and bent, as well as the pelvis; this circumstance would modify the shape of the pelvis, by altering the line of gravity. Thus (fig. 41) the pelvis of a child is distorted like the adult pelvis—cordiform; but there is a posterior curvature of the lumbar vertebræ, by which the weight of the body is thrown more upon the pelvic cavity.

Fig. 40.*

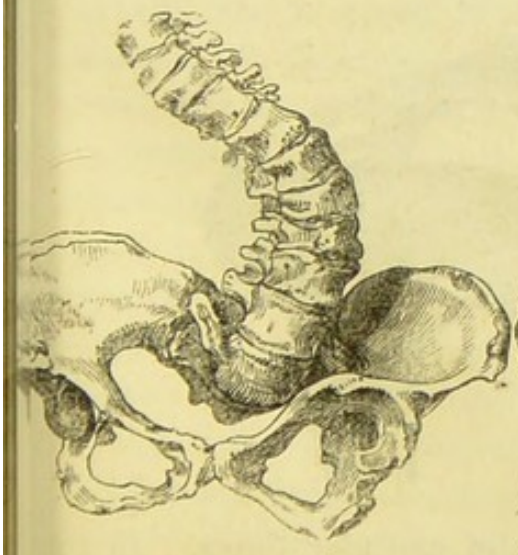
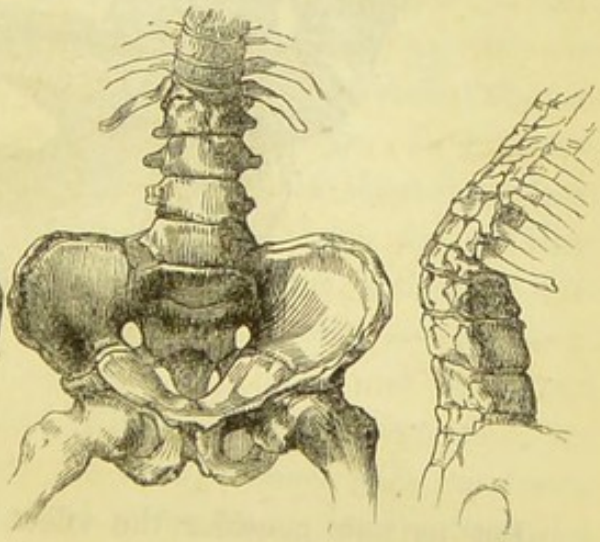


Fig. 41.†

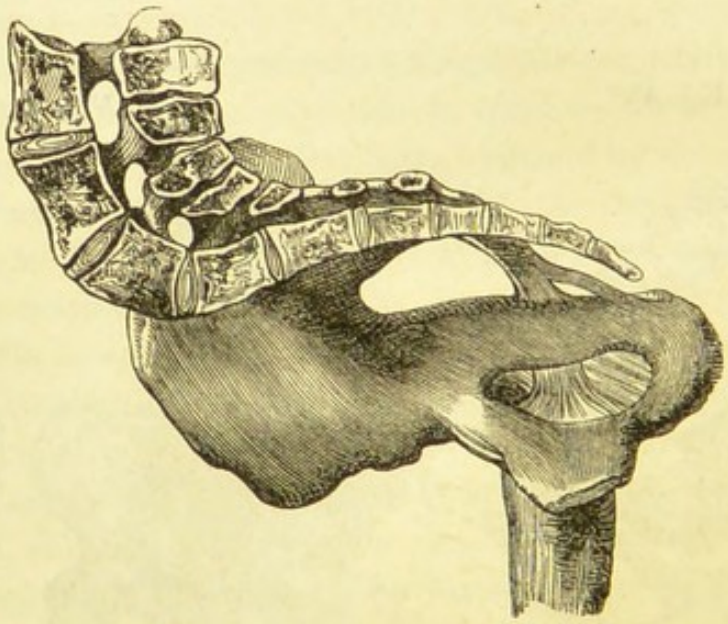


* Fig. 40. Ovate pelvis with lateral spinal curvature.

† Fig. 41. Cordiform pelvis with curvature backwards in a child.

Moreau, in his *Atlas of Plates*, gives a remarkable instance of the opposite kind: an adult pelvis, in which the spine just above the promontory of the sacrum is bent so much forwards, that the brim of the pelvis looks rather downwards. The weight of the body falls in front of the pelvic cavity, while the acetabula are pressed up behind it; consequently it so far resembles the oval pelvis, that its transverse measurement is increased. It differs from the oval pelvis in the conjugate measurement not being lessened: but the cause of this is obvious; the os pubis lies completely behind the promontory of the sacrum, almost opposite the coccyx, which nearly rests upon the tuber of the ischium. Therefore, although the distance between the os pubis and sacrum, measured directly backwards, is greatly diminished, that between the os pubis and promontory is, if anything, increased, in consequence of the latter projecting so very much before the former. These exceptions, therefore, seem rather to prove the rule.

Fig. 42.*



Let us now consider the effect of *muscular forces*. In the motions of the body there are two sets of muscles connected with

* Fig. 42. Anterior curvature of spine, with a singular deformity of the pelvis. (Moreau.)

the pelvis to be considered, each having a distinct office to perform. One set, passing anteriorly and posteriorly between the pelvis and the thigh-bones, keep the pelvis fixed in its position; these, therefore, would act very powerfully in distorting the softened bone to which they are attached, but would manifestly produce a much greater effect when the body is upright and the pelvis is made a centre of motion, as in the adult pelvis, than when the body is bent forward and moves less upon the pelvis, as in the child. Such we find to be the case: the lower portion of the sacrum and the coccyx are bent nearly at a right angle by the great gluteal and pyramidal muscles, and close up the outlet. Anteriorly, the effect is not so apparent in the adult pelvis, because it is counteracted by the acetabula and ischio-pubic rami being pressed in towards the centre; but still the edges of these rami are more everted, and the pubic arch itself, immediately beneath the symphysis, is wider than it ought to be. The other set of muscles are those that maintain the body in its erect position: posteriorly, the dorsal; and anteriorly, the abdominal muscles. The tendency of the former is to draw the sacrum towards the spine, and thus to increase the projection of the promontory: the effect of the latter is to draw the ilium more upright, and to render it more irregular. The action of these muscles will therefore explain the character of some of the distortions in the adult pelvis. In the infant pelvis, their influence is modified by the altered position of the body. In this case, the weight from above presses down upon the thigh-bones and tends to separate them more from each other; the muscles, therefore, passing between them and the pelvis, will draw outwards that portion of the pelvis to which they are attached: hence the ischio-pubic rami are more separated, and the tubera of the ischia more apart than natural; but, the distance of the thigh-bones being increased, the coccyx must still be drawn forwards by the muscles attached to it; consequently, the outlet is much more open than it ought to be, and the abruptly curved sacrum becomes the only impediment to the escape of the head.

Rickets and Mollities Ossium. In this explanation of the distortions of the pelvis, we have confined our remarks to mechanical

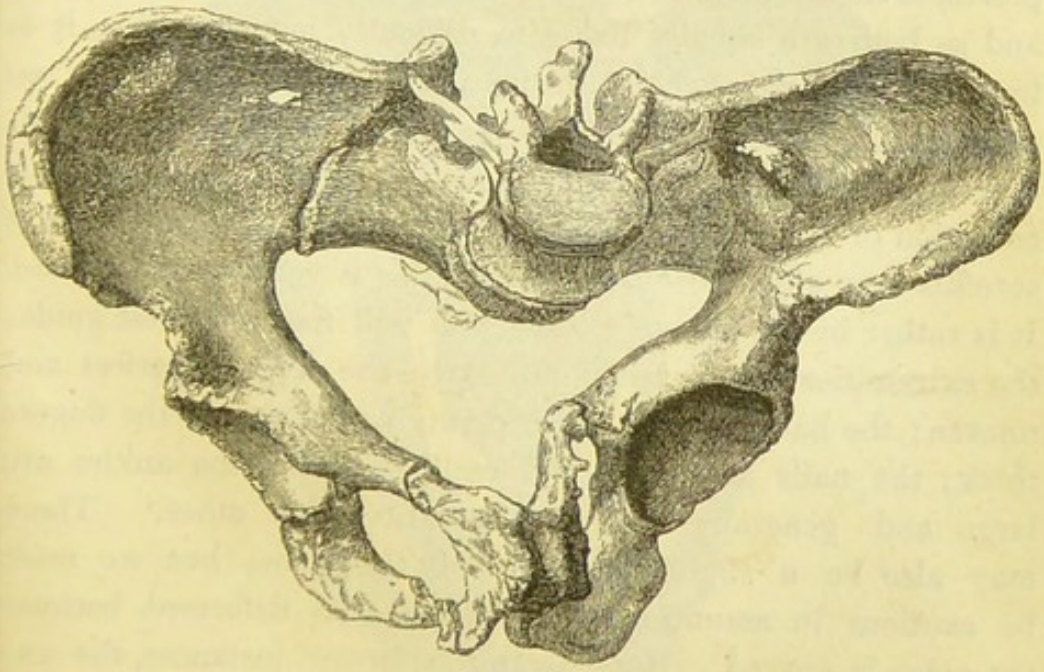
causes alone, and have made no allusion to the nature of the disease that gives rise to the softened state of the bone which prepares the pelvis for these alterations. We have done so, in order not to confound the deformity of the pelvis with the disease to which the distortion is attributed, nor to suppose, as sometimes has been imagined, that the deformed pelvis is oval because it is rickety, or that its cordiform shape is the necessary consequence of mollities ossium.

The term *rickets* has its origin in ραχις the spine, because spinal distortions form so prominent a feature in the disease; but the term *mollities ossium* might be equally well, if not better, applied to it. It is met with generally at that period of infancy (dentition), when there is a formation of new bone going forward, and arises when the demand for ossific matter is not sufficiently supplied. Whatever be the cause that deranges the health of the child—imperfect nutrition, impure air, or hereditary disease—the effect is the same; the blood does not supply the want that is felt; the teeth are always very late in their appearance; the bones have not firmness to resist the forces that act upon them, and hence the deformity. Under proper management, the child generally recovers from the disease, but not from the effects of it; and the pelvis, distorted in infancy, is never restored to a perfect state. Now this softened state of the bones can scarcely be considered as an essential disease; rickets is only one of the manifestations of a general derangement of the health in which other structures than bone are equally affected; and then the question arises, whether the same causes, acting at a later period in adult life, may so derange the health as to produce rickets? Whether, in fact, healthy girls brought into large factories, or other confined situations, may have their health ultimately so deranged as to have rickets, and consequent deformities of the pelvis? If such were the case, the rickety pelvis in these instances would be cordiform and not oval. We have every evidence, if we call to mind the number of instances in which spinal deformities occur about the same period, that these distortions of the pelvis are likely to take place, in the same manner as they do in infancy, from a deficient supply of osseous matter; that rickets is the

consequence of a general derangement of the health; and therefore, that it should not be confounded with mollities ossium, which is a distinct and very rare disease.

Mollities ossium is accompanied by distinct and sometimes urgent symptoms. Pains are felt down the limbs; the difficulty in walking increases until ultimately the patient cannot move; a white sediment is observed in the urine. In these cases, the the destruction of bone is more or less rapid. In that of Madame Supiot, quoted in Cooper's *Surgical Dictionary*, the bones consisted of only thin shells covering a grumous liver-like substance. In one which came under our notice, the pelvis was perfectly brittle, all the articulations were loose, and the iliac bones perforated in several places.

Fig. 43.*



In some instances the progress of the disease has been arrested, the distortion remaining; as in the case of Elizabeth Thomson, operated on by Mr. Wood of Manchester.

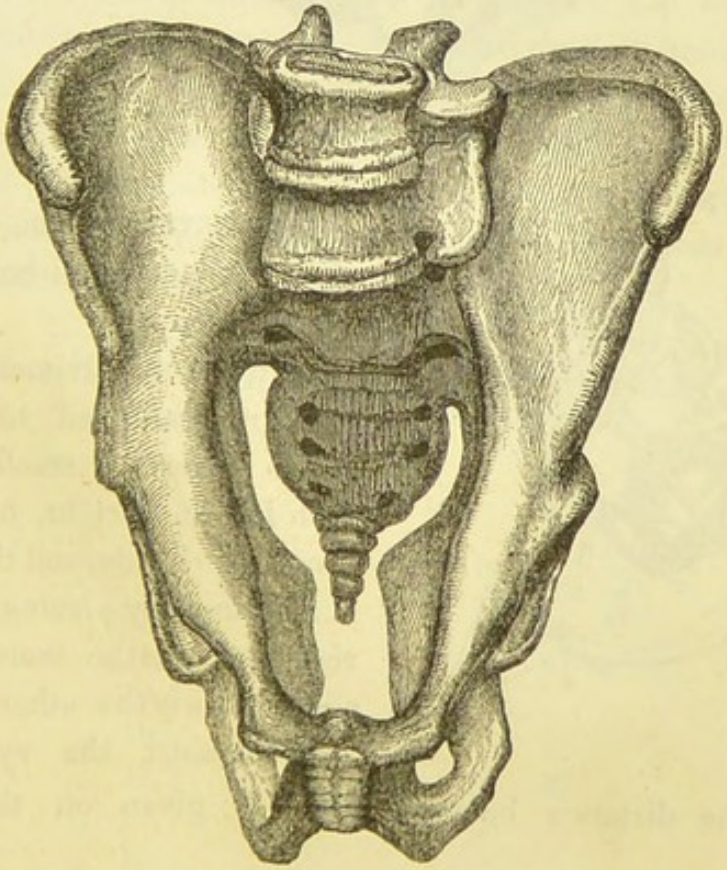
* Fig. 43. Pelvis distorted by mollities ossium: described in the Lecture on Cæsarian section.

But such cases, taken in comparison with the general number of deformed pelves, are only remarkable exceptions—"rari nantes in gurgite vasto"—which by no means authorise us to consider the cordiform shape of the adult pelvis as an indication that mollities ossium has been its cause. If, therefore, we may assume that derangement of the general health, arising from other causes than mollities ossium, close confinement, poor diet, impure air, or hereditary disease, may produce deformities in the adult pelvis, just as in infancy, we have the source of a class of cases (unfortunately too large) where these deformities are met with. You will find them in the large manufacturing towns and districts; perhaps also among the poor needle-women of London, sometimes even in the higher ranks of the aristocracy, and, in all these, the deformity of the pelvis will present those characters, more or less, of which this is the extreme. Such patients are a perfect contrast in their appearance, and in their pelves, to those strong active women having pelves like the male; and as both are equally liable to difficulty in parturition, it is important to remember the distinction between them. This we shall again consider; at present, we would merely direct attention to some of the external characters, which accompany this condition of the pelvis. The peculiar and well-known aspect of scrofula may often be observed; but this is not always the case. It is rather in the osseous system you will find the safest guide; the extremities of the bones are large, the teeth imperfect and uneven; the hands fine, but the points and joints of the fingers thick; the nails are short and easily broken; the ankles are large and generally bent in towards each other. There may also be a slight curvature of the spine, but we must be cautious in assuming that the pelvis is deformed because the spine is curved. Here, as in the former instances, the extremities will be the safest indices of the character of the pelvis.

Obliquely Ovate Pelvis. The next variety of deformed pelvis is the pelvis of Naegele, which he calls "the obliquely ovate" (fig. 39. p. 157). One side is quite normal, but the opposite is not all expanded; on the imperfect side, the sacro-iliac synchondrosis is ossified. The deformity might therefore be

explained, by supposing that absorption of bone, the consequence of disease, had taken place at that symphysis ; but we have no evidence, in the history of these cases, of any such previous disease; the assumption is consequently gratuitous, and the deformity of the pelvis still remains a problem to be solved. Dr. Knox, late of Edinburgh, attributes it to arrest of development at the period when the ossification of the sacrum is incomplete; one side of the pelvis advances to completion, while the opposite remains stationary; so that in the adult pelvis one side is perfect, but, on the opposite, the undeveloped pelvis is magnified, just as if lateral halves of the full-grown and infant pelves were joined. The eminent professor of midwifery in Copenhagen presented me with a cast of a pelvis, in which the arrest of development occurred on both sides (fig. 44).

Fig. 44.*



* Fig. 44. Doubly oblique pelvis: showing the form of the fœtal pelvis at an early age. This may be compared with an apparently similar pelvis figured by Moreau in his Atlas.

Moreau has figured a pelvis in which the conjugate axis is greatly lengthened; in this respect resembling the pelves of the gorilla and chimpanzee, but not exactly similar to that which we have described.

Fig. 45.*

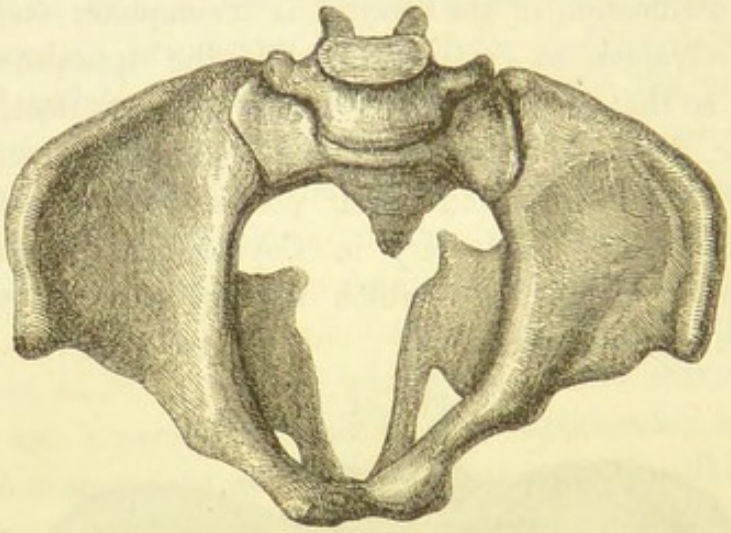
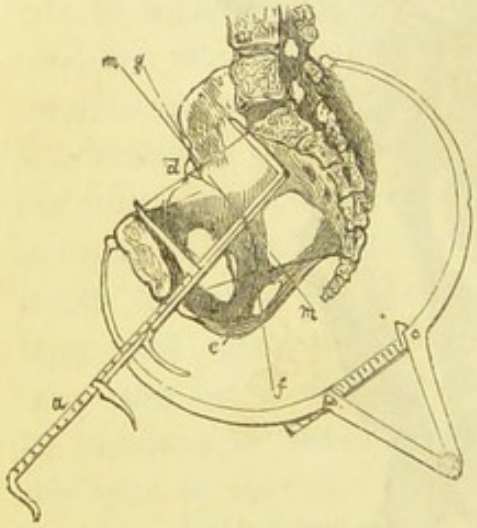


Fig. 46.†



PELVIMETERS.—The varieties of pelvimeters need but a brief description.

Contouly's pelvimeter is a straight graduated rod, upon which slides a smaller one; each has an upright, just like a shoemaker's rule, and the pelvis is measured by placing one upright against the sacrum, and sliding down the other until it rests against the symphysis pubis; the distance between each is given on the scale.

---

* Fig. 45. Pelvis with lengthened conjugate axis. After Moreau.

† Fig. 46. Contouly's pelvimeter.

How this can be managed in the living pelvis, with all the soft parts attached to it, and the uterus, or perhaps the head, in the way, I must leave the reader to find out. Baudelocque employed a different instrument, a pair of callipers. He expected that, by measuring between the antero-superior spines of the ilium in one direction, and from above the spinous process of the sacrum to the symphysis pubis in another, he could calculate the pelvis. We have already explained the uncertainty of any conclusion as to the pelvis, derived from the distance between the ilia. Little dependence, therefore, can be placed upon the transverse measurement. Baudelocque assumed that the thickness of the base of the sacrum was always three inches; therefore, if the callipers gave seven as the antero-posterior distance, the true measurement of the brim would be four inches, and so on. The late Professor Davis put this to the test. He measured the distance between the promontory of the sacrum and the middle point of the spinous ligament passing from the last lumbar vertebra to the sacrum, in seventeen pelves, taking them indifferently, well-formed and distorted. He found that there is a full inch of difference in the thickness of the base of the sacrum; which would be no trifling matter, if added to or taken from the conjugate measurement of the brim.

In No. 1,	pelvis,	the distance was	3 inches.
„ 2,	„	„	$2\frac{7}{8}$ „
„ 3, „ 4, „ 5,	„	„	$2\frac{5}{8}$ „
„ 6,	„	„	$2\frac{13}{16}$ „
„ 7, „ 8, „ 9,	„	„	$2\frac{3}{4}$ „
„ 10, „ 11, „ 12,	„	„	$2\frac{3}{8}$ „
„ 13, „ 14, „ 15,	„	„	$2\frac{1}{2}$ „
„ 16,	„	„	$2\frac{1}{4}$ „
„ 17,	„	„	2 „

These two instruments are the best known and most frequently employed, especially on the Continent. But there are others also employed, liable to similar objections.

Besides these modes of measuring the pelvis, none of which can be depended upon, there are what have been called "digital measurements;" or, in other words, the experienced accoucheur, from constant habit, when he passes the fingers or hand into the vagina, will form a very accurate estimate of the space in the pelvis. This is done in different ways: if one or two fingers be pressed towards the promontory of the sacrum, and they at all approach it, it is certain the promontory projects too much; for otherwise this never could happen. At a future opportunity we shall explain the digital mode of measuring the pelvis.

Fig. 47.*

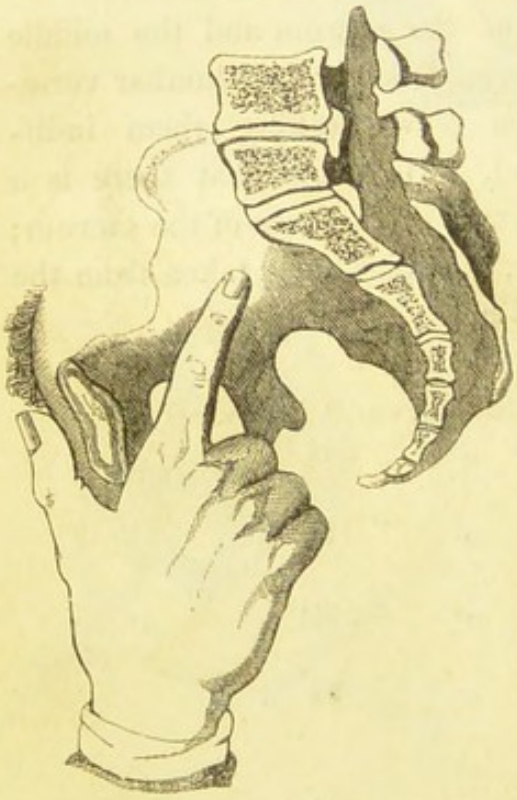
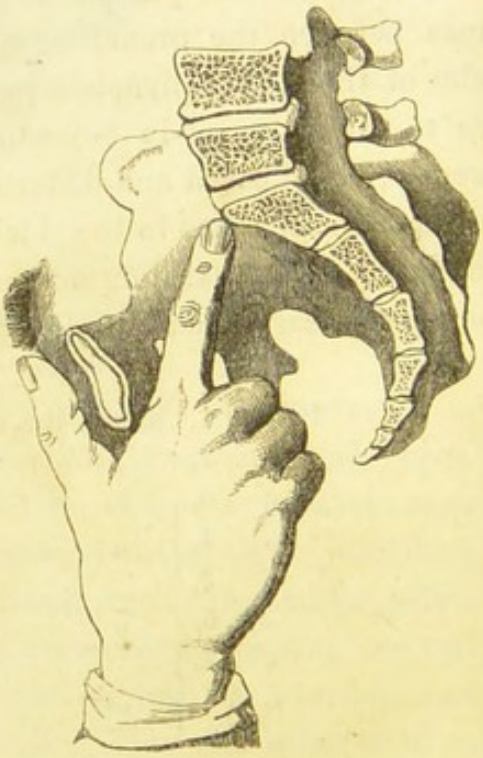


Fig. 48.†



* Fig. 47. Digital measurement of pelvis. Size normal.

† Fig. 48. Digital measurement of pelvis. Promontory of sacrum projecting too much.

Table of Measurements in Nine Diseased Pelves.

No. in Museum.	Num.	Inclined Plane of Promontory.			Plane of Brim.				Cavity.		Outlet.		Pubic Arch.	Character of Pelvis.
		Prom. to Pubis.	Prom. to L P.E.	Prom. to R.P.E.	Ant. Post.	Trans-verse.	Left Ob-lique.	Right Ob-lique.	Ant. Post.	Trans-verse.	Ant. Post.	Trans-verse.		
23	1	4½	3	2⅞	4⅛	4	3⅞	4	5½	3⅜	4¼	3¼	40	Cordiform.
24	2	3⅝	2¼	2⅝	3⅞	4⅝	3½	4½	4⅜	3⅝	4⅜	3½	40	Ditto.
25	3	4⅛	2⅝	2⅝	4⅛	4⅜	4	4⅛	5⅛	3⅜	4⅜	1½	10	Ditto.
26	4	2	¾	⅝	2	2½	3¼	3¼	3⅛	2⅞	3½	2¾	10	Cast of Elizabeth Thomson's Pelvis, delivered by Cæsarean Section, by Mr. Wood.
27	5	3	2⅝	2¾	3¼	5	4½	4½	3½	4½	4⅛	3⅝	70	Ovate.
28	6	2⅞	2¾	2½	2⅞	5½	4¾	4¾	3½	5	4	4⅛	85	Ditto.
29	7	2½	2½	2⅝	2¾	5¼	4¾	4¾	3½	5⅛	4⅝	4¾	90	Ditto.
30	8	1⅞	*1⅞	*1⅜	1⅞	4⅝	4¼	4⅜	2⅞	4⅝	2⅞	4⅜	85	Wooden Model.
31	9	1⅛	*1¾	*1⅞	1¼	5	4¼	4½	2¼	5	2⅞	4½	100	Cast of Elizabeth Sherwood's Pelvis, delivered by Crotchet, by Dr. Osborne.

*The oblique measurements of Pelves 8 and 9 are taken from the side, not from the centre of the promontory.

LECTURE XI.

MECHANISM OF PARTURITION.

At the termination of the period required for the complete development of the ovum, a new series of operations are entered on, for the purpose of giving birth to the fœtus which has been matured; these are included under the term *Labour*. It usually commences at the completion of the ninth month of gestation; in some instances it occurs before that time, when it is called *Premature Labour*. In this comprehensive sense, therefore, we would define Parturition to be—*the action of the uterus to expel its contents when the fœtus is sufficiently mature to sustain respiration.*

Divisions of Labours.—There are many circumstances depending either upon constitutional peculiarities, upon irregular formation, or upon accident, which may derange parturition or render it dangerous; hence labours have been divided and subdivided to meet these different conditions. Some adopt only two divisions. The first includes those labours which proceed regularly to their termination without interruption. The second embraces those which do not do so. The one is the rule, the other the exception; but as the exception includes several varieties, this second class is subdivided into corresponding heads. Others place the most usual form of labour, termed *Natural*, in the first division, and then add separately two, three, or four subsequent divisions, according to the importance which they attach to these deviations. In this manner, from two to seven divisions have been made.

DIVISIONS OF LABOURS BY VARIOUS AUTHORS.

tural } itocia }	Difficult Dystocia	with 15 subdivisions or orders.	.. ..	.. ..	.. ..	.. ..	Merriman
tural } itocia }	Abnormal Dystocia	with 6 subdivisions	.. ..	.. ..	.. ..	.. ..	Rigby
tural	Laborious	Preternatural	.. ..	.. ..	.. ..	.. ..	Dewees
tural	Unnatural,	with 6 orders	Complex with 6 ord	.. ..	.. ..	.. ..	Churchill
tural	Difficult	Preternatural	Complex	.. ..	.. ..	.. ..	Denman
tural	Instrumental	Preternatural	Complex	.. ..	.. ..	.. ..	Davis
tural	Laborious	Preternatural	Anomalous	Flooding	.. ..	.. ..	Blundell
tural	Premature	Preternatural	Tedious	Laborious	Impracticable	Complicated	Burns

These numerous divisions, to which many more might be added, are a sufficient reason for not wishing to complicate the subject by proposing another. It is preferable to adopt that which is most generally known, sufficiently distinct, and in many respects more simple and practical than some of those enumerated. Denman's division is sufficient for our purpose; we propose it to you for selection, and shall consider labour under the several heads of *Natural*, *Difficult*, *Preternatural*, *and Complex*. Denman defines labour to be *natural*, "if the head of the child present; if the labour be completed in twenty-four honrs; and if artificial assistance be not required." (*Midwifery*, p. 165.) Labour is called *preternatural*, when some other part than the head of the child presents. It is called *difficult labour*, when it exceeds twenty-four hours; and *complex labour*, when some accidental cause of danger occurs which may render interference necessary.

STAGES OF LABOUR.—In order to study parturition efficiently, it is necessary to divide it into certain stages. The means by which the uterus is opened is not the same as that by which the child is forced through the pelvis; and again, the manner in which the placenta is separated and expelled is different from either; hence, labour has been divided into three stages, sometimes into four, and even five. The most usual division is that of Denman—the *first stage* being the dilatation of the os uteri; the *second*, the expulsion of the child; and the *third*, the separation of the placenta. Other authors subdivide the first into premonitory and dilating stages; and some subdivide the second stage into two; as may be seen in the following table.

STAGES OF LABOUR BY DIFFERENT AUTHORS.

1st Stage.	*2nd Stage.*	*3rd Stage.*	*4th Stage.*	*5th Stage.*	*Authors.*
Dila	ting	Expul	sive	Placental	Denman.
Promonitory .	Dilating ..	Expul	sive	Placental	Velpeau.
Dila	ting	Passage through the pelvis.	Expulsive	Placental	Jno. Clark.
Dila	ting	Occiput under the arch of the pubis.	Expulsive	Placental	Merriman.
Promonitory .	Dilating ..	Rupture of membranes and passage of the head.	Expulsive	Placental	Naegele.

Of these divisions, we would select that of Denman; it is the most generally adopted, and seems to be that which is marked out by nature herself.

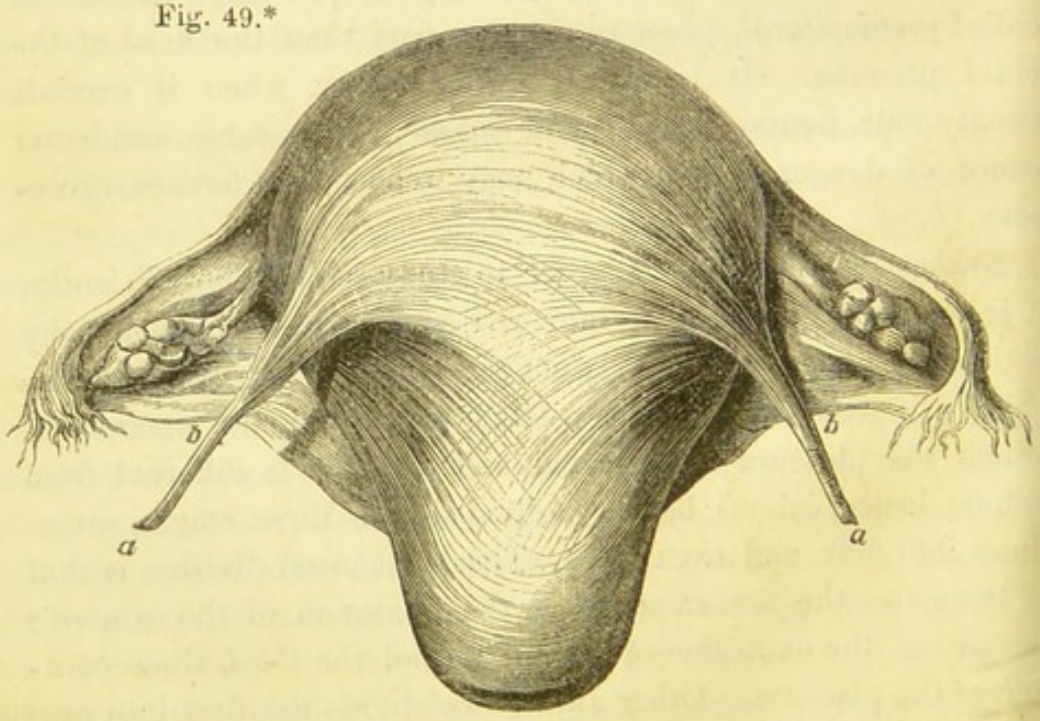
The *first stage* is dated from the opening of the os uteri to its complete dilatation.

The *second stage* commences when the os uteri is perfectly dilated, and terminates in the expulsion of the child.

The *third stage* is occupied with the expulsion of the placenta.

MUSCULAR STRUCTURE OF THE UTERUS.—Before describing the manner in which the dilatation of the uterus takes place, it is necessary to recapitulate very briefly the arrangement of the muscular fibres of the organ.

Fig. 49.*



* Fig. 49. Muscular fibres on the external surface of the uterus, terminating in the round ligaments *a b*.

The fibres *on the external surface* form two broad fan-shaped muscular layers, spreading from the round ligaments over the fundus uteri (fig. 49). *On the internal surface*, there are two distinct sets of fibres, which surround the Fallopian tubes in a concentric arrangement (figs. 50, 51). The third set, very indistinct, pass circularly round the body of the uterus; the outer fibres of the former two layers gradually pass into and intermix with those of the latter. The mass of fibres lying between the external and internal layers have no determinate direction, (p. 40.) but may be supposed to give increased powers to those which we have described. Sir C. Bell, in his valuable paper "On the Muscularity of the Uterus," has mentioned fibres which pass in a "vortiginous" direction from the fundus to the mouth of the uterus. Such, then, is the arrangement of the muscles or muscle of the uterus, so far as it has been demonstrated.

Fig. 50.*

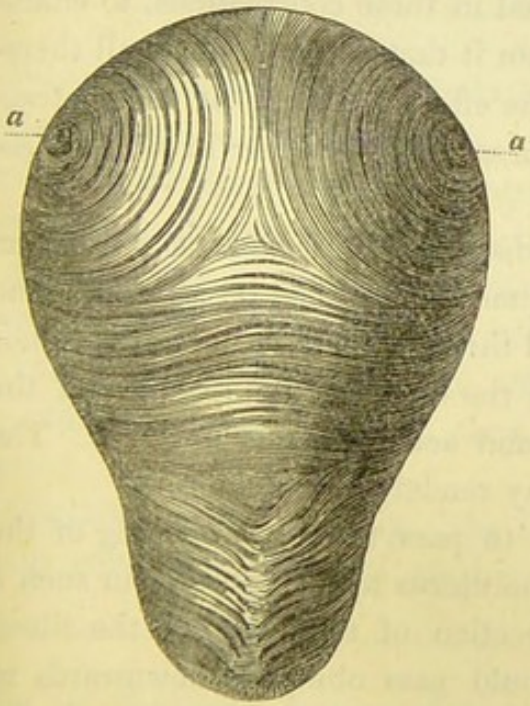
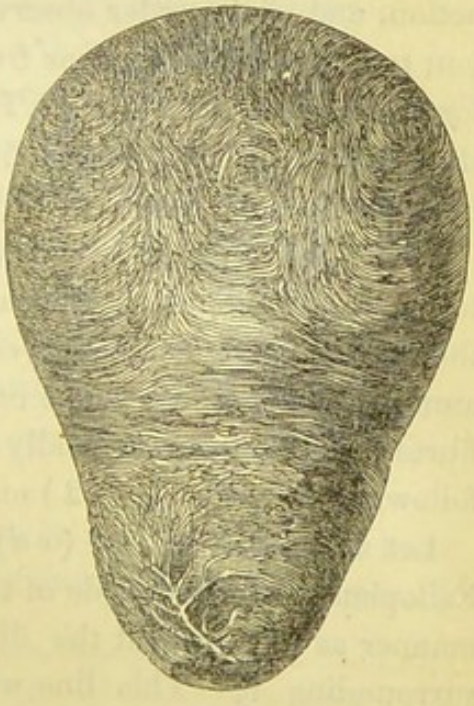


Fig. 51.†



* Fig. 50. Exaggerated view of the fibres on the internal surface of the uterus: *a a*, the orifices of the Fallopian tubes.

† Fig. 51. Uterus inverted, to show the *natural* appearance of the fibres on its internal surface.

Action of the Uterine Muscles. The *external muscular layer* slowly contracts for some time before labour has actually commenced, and draws the uterus gradually towards the pelvis. By this means, also, the fundus is maintained in its proper direction, and prevented from inclining too much to either side. This gradual contraction is unaccompanied by pain, and therefore is not taken notice of; but its effect in altering the size of the abdomen, and making it less prominent, has always been observed, and noted as a premonitory sign of labour. These fibres also serve a useful purpose when the dilatation of the os uteri commences; the fundus being thus supported, the fibres on the internal surface contract more efficiently.

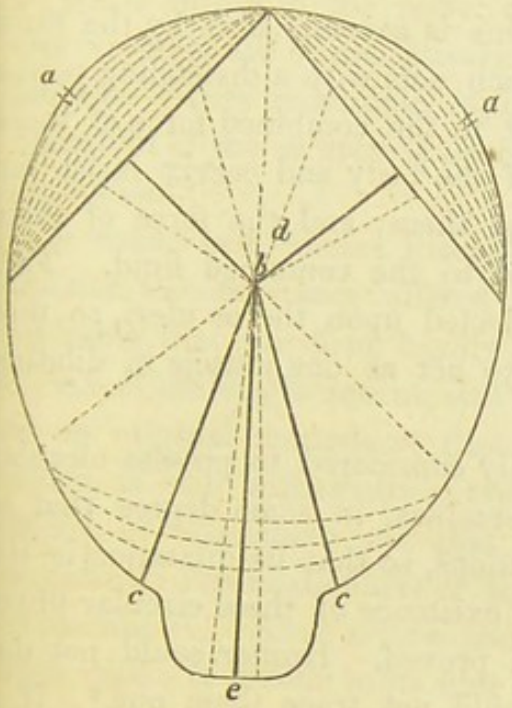
The *Action of the Internal Sets of Fibres* requires a more careful examination, inasmuch as different, and, it appears to me, incorrect explanations have been given both of the arrangement of these fibres and of the manner in which they contract. Besides this, it is necessary for you to have a correct view of uterine action, and of the order observed in these contractions, to enable you to notice the deviations from it that occur. We shall therefore consider separately; 1. The effect produced by the contractions of the different sets of fibres; 2. The order in which these contractions take place.

1. When *the fibres surrounding the Fallopian tubes* contract together, the fundus uteri is equally diminished on all sides; and their combined effect, conveyed through the medium of the liquor amnii, is precisely the same on the mouth of the uterus as if the fibres passed down vertically and acted directly upon it. The following diagram (fig. 52.) may render this intelligible.

Let us suppose a line (*a d*) to pass from the opening of the Fallopian tube of one side of the uterus to the opposite, in such a manner as to represent the direction of the force of the fibres surrounding it. This line would pass obliquely downwards to the opposite side. If, therefore, these fibres alone acted, the fundus on that side would be diminished in its size, and the contents of the uterus pressed toward the lower section of the opposite side, but not against the os uteri. If, further, two such lines (*a d*), passing from the orifice of each Fallopian tube

represented the force of each set of these concentric fibres, the intersection of these lines would be the common point where these forces meet, and, to a certain extent, are opposed. The combined force must, therefore, take an intermediate direction equidistant from both lines, which would be represented by a line (*d e*) passing in the axis of the uterus, and through the os uteri. It follows, therefore, that when the fundus of the uterus contracts equally, the resulting force must be communicated to the os uteri, as perfectly as if the fibres passed vertically from the fundus to the mouth of the uterus.

Fig. 52.*



When *the circular fibres of the body and cervix* contract, their tendency is to render the uterus more and more cylindrical, according to the degree of their contraction, at the same time that they close in the cervix. Again, if the uterus were emptied of its contents, the simultaneous action of all these different sets of fibres would be, to draw the parietes equally towards the centre of the cavity. But when the uterus is gravid, and makes an effort to expel the fœtus, they cannot all contract in this manner.

Dilatation of the Os Uteri. The *fundal muscles* are those which chiefly effect the dilatation of the os uteri and the expulsion of

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Fig. 52. The lines *a*, *b*, represent the direction of the force of the fundal muscles: *c d*, the direction of that of the circular muscles of the body of the uterus: *d e*, the combined force of these muscles. The dotted straight lines represent the direction of the force reflected by the liquor amnii; the dotted curved lines, the direction of the circular fibres of the body of the uterus.

the child, the fibres of the body and the cervix remaining comparatively passive. It has already been explained, that their united action is in the direction of the os uteri; but there is still a necessity for a means by which the result of that action should be perfectly conveyed to it. This is accomplishsd by the fluid enclosed within the amnion, which acts with a distending power upon the os uteri exactly equal to the combined force of these muscles. The circular fibres of the body and cervix resist the efforts of the fundus to distend them; and the force of their resistance is also communicated to the contained fluid. This force is therefore, as it were, reflected upon the os uteri, so that the whole uterus may be said to act as one muscle in dilating the mouth.

The os uteri has been generally considered to possess circular fibres, the action of which resembles, in some degree that of sphincter muscles in other situations, so that its dilatation is the effect of their relaxation. The existence of these circular fibres at the os uteri has never been proved. Hunter could not demonstrate them; Sir C. Bell could not trace them out.* If a sphincter muscle exist in that situation, why should not its fibres

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* "I have not succeeded in discovering circular fibres in the os tincæ corresponding in place and office with the sphincters of the other hollow viscera; and I am therefore inclined to believe, that, in the relaxation and opening of the orifice of the uterus, the change does not result from a relaxation of the muscular fibres surrounding the orifice. Indeed it is not reasonable to conceive, that the contents of the uterus are to be retained during the nine months of gestation by the action of a sphincter muscle. The loosening of the orifice, and the softening and relaxation which precedes labour, is quite unlike the yielding of a muscular ring." Sir C. Bell, on the Muscularity of the Uterus.—*Med. Chir. Trans.* vol. iv. p. 346.

Dr. William Hunter, whose perfect accuracy of description is now established, states, "The cervix uteri, where the penniform rugæ are situated, had not such regular nor so large fasciculi as the rest of the uterus. In the body of the uterus, the fibres are very regularly circular. The fundus was made up of two concentric circular planes of fibres, at the very centre of which was the orifice of the Fallopian tube."—*Anatomical Description of the Gravid Uterus.*

be as distinct and as easily made out as the sphincters of other hollow muscular viscera? Nor does the manner in which the os uteri dilates support this assertion. It expands very gradually; it yields slowly to the power described; and the dilatation does not resemble the comparatively sudden relaxation of a sphincter muscle. Were it similar, rapid labours (at least so far as the dilatation of the os uteri is concerned) would be the rule, not the exception.

It would be incorrect, therefore, to attribute to muscular contraction the resistance offered by the os uteri. It seems more probable that the firm, highly condensed tissue that forms the cervix of the virgin uterus, still retains, in its altered state, many of its original characters; that this tissue, although more unfolded, is still sufficiently compact and elastic to offer a great degree of resistance; and that its dilatation is effected by the incessantly repeated efforts of the uterus slowly overcoming and expanding it. Such a view seems to be fully supported by the observation of labour in its first stage, where we can perceive the os uteri first becoming thinner, and then progressively (not suddenly) opening. It has been stated that the sudden relaxation of the mouth of the uterus, after a continued contraction, can only be explained on the assumption of its muscularity. The same effect, however, may be observed in other tissues besides muscle; the perinæum, for instance, often resists for a long time the action of the uterus, and then yields suddenly to its full extent, so that the head is most unexpectedly delivered; and yet the distended portion of the perinæum is not muscular. Besides, these sudden dilatations are only exceptions to the general rule. In ordinary cases, dilatation occupies a certain period of labour (often a very long one), and the mouth of the uterus yields very gradually to the power employed.

Use of the Liquor Amnii. If the uterus exerted its full power upon the undilated os uteri, and if the unyielding head of the child were driven forcibly against it, the almost certain consequence would be, that the irritation would excite increased resistance, and ultimately terminate in inflammation of the mouth of the uterus. To obviate such an effect, nature interposes a

fluid medium between the power and the resistance. The liquor amnii, contained within the membranes, occupies the cavity of the uterus; and when the parietes of the organ contract upon it, the force exerted is (as we have explained) by this means accurately conveyed to the os uteri. When the latter dilates in the slightest degree, the fluid insinuates itself within the smallest opening, and expands it by a direct lateral pressure against its edges. The power of the uterus is thus made to act in the most favourable manner for distending its mouth.

Other advantages are also gained. The os uteri may dilate irregularly; but any attempts to overcome forcibly the undilated portion, is prevented when the force is conveyed through a fluid, which, while it readily yields to an undue resistance, still maintains an equable pressure upon the edges of the os uteri. Any irregularity in the action of the uterine fibres is also, to a certain extent, obviated; because these contractions, although irregular, being still conveyed by the fluid, are thus equally communicated to the os uteri. Further, so long as the tissue of the uterus intervenes, it is necessary to moderate the great power which the uterus is capable of exercising to dilate it; this is effected by the liquor amnii. The force conveyed by a fluid does not act in one direction only, but is distributed to every part of the surface to which the fluid is applied. The force, therefore, which is exerted to expand the mouth of the uterus, being communicated by a fluid, is not only directed against the os tincæ, but against the fundus and sides of the uterus. The fundus, consequently, is opposed, not only by the os uteri, but by its own action reflected by the liquor amnii. Hence, so long as the fluid remains and the os uteri is undilated, the more powerful the action of the fundus, the greater is the resistance to it. The actual force employed is therefore very moderate, and any sudden or violent effort at distension is altogether obviated. This may be observed in the character of the pains during the first stage; because, however severely they may commence, they last but a short time, and the effect on the os uteri is comparatively slight. If these short, though severe pains, be contrasted with the long-continued and powerful pains which follow them when the liquor amnii is

discharged, and the os uteri dilated, the difference in the effect will be sufficiently obvious. As a means, therefore, of conveying the whole muscular power of the uterus upon the os uteri—of moderating and equalising the force employed—of dilating the mouth of the uterus without exciting irritation—the liquor amnii is of essential importance.

2. *Order of Uterine Contractions.* The order observed by the uterus in the contractions which take place may be ascertained experimentally. For instance: when the hand is passed into the uterus after delivery, to remove the placenta, we find that it may remain for some time in the cavity without exciting its contraction; but the moment the hand is being withdrawn, the fundus instantly contracts, and, as it passes along the vagina, the contractions are continued from above downwards. So also, in other instances, when the os uteri is only irritated by the fingers of the hand introduced into the vagina, and an attempt is made to dilate it, the fundus immediately contracts, not the os uteri. You have thus a very favourable illustration of the reflex nervous function. Hence we infer that the order of uterine contractions is from the fundus downwards, and that the action is commenced there.

In opposition to this view of the order of uterine contractions, there is the authority of Wigand, who gives an explanation altogether different from what we have stated. In order to place his opinion clearly before you, I shall quote the following passsage from Dr. Rigby's work (p. 99), in which Wigand's views are faithfully given:—

"In examining the course of a true pain, we shall find that the contractions of the uterus *do not begin in the fundus, but in the os uteri*, and pass from one to the other. *Every pain which commences in the fundus is abnormal;* and either arises from some derangement in the uterine action, or is sympathetic with some irritation not immediately connected with the uterus, as from colic, constipation, etc. We very seldom find that a contraction of the uterus which has commenced in the fundus, passes into the cervix and os uteri, and becomes a genuine effective pain; usually speaking, the contraction is confined to the circumference

of the fundus, without detruding the fœtus at all. When a genuine pain comes on, so far from the head being pressed against the os uteri, it at first rises upwards, and sometimes gets even out of reach of the fingers, *whilst the os uteri itself is filled with the bladder of membranes;* if it had commenced in the fundus, instead of the inferior segment of the uterus, so far from the head being drawn up at the first coming on of the pain, it would have been forcibly pushed down against the os uteri. In the course of a few seconds, the contraction gradually spreads over the whole uterus, and is felt especially at the fundus; the head, which has been raised somewhat from the os uteri, is now again pushed downwards to it, and seems to act as a wedge for the purpose of dilating it; it is not until the whole uterus is beginning to contract, that the patient has a sensation of pain. We may, therefore, consider that a genuine uterine contraction consists of certain phenomena which occur in the following order:—First, the os uteri grows tight, and the presenting part rises somewhat from it, then the rest of the uterus, especially the fundus, becoming hard, the patient has a sensation of pain, and the presenting part of the child advances." (Wigand, *op. cit.* vol. ii. p. 197.)

Now, if we desired an additional evidence to prove that the fundus was the first part of the uterus to contract, and not the os uteri, we could not have a stronger proof than that advanced by Wigand to support a contrary opinion—viz., the head, when the contractions commence, getting "even out of reach of the fingers, whilst the os uteri is filled with the bladder of membranes." In Wigand's explanation, the influence of fluid pressure seems to be altogether forgotten. The immediate effect of contraction commencing at the fundus would be to compress the liquor amnii, which of necessity forces its way before the head, on to the mouth of the uterus. The fluid in this position reacts against the head with power equal to that which compresses it, and therefore pushes the head up until the increasing contraction of the fundus forces it down again, so that the phenomena quoted are quite consistent with the statement that uterine contraction begins at the fundus; in fact, it could not be otherwise, so long as the waters remain in the uterus. But if the contraction com-

menced from below, the fluid must be driven upwards towards the fundus, and that portion between the os uteri and head pressed aside; at least in the first instance, so that the head might be easily felt when the pain commences, although not so afterwards; but the reverse is the case, and you will find that, in those cases where the liquor amnii is in large quantity, it is difficult to feel the head at all, except in the interval of the pains. "The tightening of the os uteri," alluded to by Wigand, seems to be another source of error on this point; it being generally confounded with muscular contraction of the os uteri. It seems to me to be produced by the pressure of the fluid downwards against the sides of the uterus, combined with the increased determination of blood towards the os uteri, which arises from the vessels at the fundus expelling a portion of their blood during its contraction. The os uteri is rendered fuller, and the lips are more closed than before; hence the opinion that this "tightening" is the result of muscular contraction, the evidence for which does not seem to me sufficient to establish so important a fact.

These objections to Wigand's view of the order of uterine action are made in entirely a practical sense (see p. 43). It is not our purpose to enquire where the point of peristaltic action commences, but whether the uterus contracts from below upwards or from above downwards. Everyday's experience convinces us that the latter is the order of contraction which it is most essential to secure; because, when that order is reversed, not only is the arm or funis, as Wigand says, prevented from descending, but the child itself; and if the child be delivered, the placenta is retained by these irregular contractions.

We have already pointed out the advantage of the liquor amnii; hence the times at which the membranes are ruptured often makes a material difference in the effect produced upon the mouth of the uterus. If they be ruptured when the dilatation is very slight, the suddenly increased power of the fundus, forcing the head of the child against the os tincæ, soon excites irritation, prevents its expansion, and sometimes causes inflammation. But if they be broken when the uterus is sufficiently open to

allow the membranes to protrude into the vagina, and the contractions of the fundus to increase, it is probable that the dilatation will be advanced more rapidly, because of the diminished resistance from below, and the increased force from above. This is not, however, invariable. It occasionally happens that, even under these circumstances, the os uteri becomes irritated and retarded in its dilatation.

Conditions of the Os Uteri.—The os uteri varies greatly in its density and firmness; it consequently offers different degrees of resistance to the fundus uteri. During gestation it has gradually undergone certain changes, preparatory to its dilatation. The highly condensed cellular tissue of which it consists has become looser, and is traversed by more numerous vessels. The cervix is nearly, if not altogether obliterated; and the circular orifice of the os uteri alone remains. Its edges may be either thick, full, and soft, or extremely thin, according to the degree to which its cellular tissue is unfolded. They are always moistened with the viscid mucus which is secreted so abundantly at this time. If the fingers be passed within the os uteri and separated, the edges yield readily to a moderate pressure; there is a very slight increase of temperature; and there is no tenderness or pain produced when the os uteri is touched. This is the most favourable state for dilatation; the os is quite prepared to yield to the action of the uterus, and is called, in obstetric language, the *dilatable os uteri.*

Rigidity. There are many exceptions to the condition of dilatability, varying with the degree to which the density of structure in the os uteri may be increased. The cellular tissue is never so loose and permeable in the first instance as it becomes afterwards; the mouth of the uterus is therefore more resisting in first than in subsequent pregnancies. Its structure retains more of its elasticity and firmness in young women pregnant for the first time, and consequently much more time is required in unfolding it; hence the first stage of labour is always longer in primiparæ than in those who have had many children. The os uteri is still more firm and resisting if, in addition to a first pregnancy, the woman be advanced in years; the cervix and os uteri remain

close, compact, and impermeable to the moment of parturition: this state may be attributed to the increased firmness and diminished vascularity which age produces in the tissues generally. It then obtains the name of *rigid os uteri*. But there are different degrees of rigidity. Sometimes the structure is only *tough*. It gives way very slowly to the action of the uterus; nevertheless it yields, although, as it were, reluctantly. In such cases the os uteri may remain cool and free from tenderness, but oppose a firm resistance to the pressure of the finger, and always requires a long time before the dilatation is accomplished. There are, however, a certain class of cases in which this condition of the uterus is in the extreme. It might almost be called the *undilatable os uteri*. In this state its structure is unusually dense, and feels like cartilage. The edge of the os uteri is perfectly unyielding; when thick, it might be compared to the feel of Gimbernat's ligament. If very thin, it still offers the same resistance, and is to the touch like a hole made in parchment. Instances of this extreme rigidity are met with, not only in women who are advanced in life, but in those who have been all their lives accustomed to much bodily exertion, and exposed to the vicissitudes of laborious occupations. They are generally hard-featured, coarse-skinned, muscular women, of low stature, with thick short fingers, large wrists, and the bones generally prominent. It is in these cases we meet with that form of pelvis that I have described as possessing many of the characters of the male pelvis.

Inflammation. All these varieties are included under the term "rigidity." But beside, there are cases where the os uteri becomes *rigid, although previously dilatable.* If the os uteri become inflamed, rigidity is the result of it; the os tincæ grows hot and tender, is swollen, and becomes rigid. This alteration may arise from any irritation; premature rupture of the membranes for instance, by which the head is brought into direct contact with the undilated os uteri. It is also often induced, not by accidental causes, but by too much meddling, making too frequent examinations, attempting to dilate the os uteri artificially, &c. Sometimes the head of the child presses so unequally upon the os uteri as to excite inflammation in it. The

head may not be directed exactly in the axis of the brim, but may rather rest upon the pubic portion of it, compressing the anterior lip of the uterus with every pain. While the remaining portion of the mouth of the uterus expands, this remains undilated, and forms a band in front of the head. When the membranes are ruptured, the pressure is so much increased that the anterior lip often inflames and grows quite rigid. Again, there are cases where the os uteri is driven down with the head into the pelvic cavity, and the whole circle of the os tincæ is compressed so tightly against the pelvis as to produce inflammation; further dilatation is arrested, the os uteri is rigid, and, if it remain long in this condition, slough may be the result: the whole os tincæ has been completely separated in this manner, and expelled with the head of the child.

In conclusion, we would direct attention to the difference in the action of the uterus, when it has to overcome an unusual opposition arising from this state of rigidity. The contractions take place continuously for a certain time; but when the usual period required for dilatation is exceeded, or when the os uteri becomes irritated, the pains grow feeble, and the uterus often suspends its action altogether. By this means an interval of rest is gained, the irritation may subside, the patient may get some sleep, and recover from her fatigue, which otherwise might end in exhaustion. When the action of the uterus is renewed after a suspension of this kind, the dilatation is often rapidly completed. Much confusion has arisen as to the duration of labour in consequence of neglecting this fact. Its commencement is generally dated from the sanguineous discharge (*the show*) which marks the first opening of the os uteri. But if the first stage occupy a very long time, including these intervals of suspension, some altogether discard the previous irregular labour, and date its commencement from the time that the pains return regularly and continuously. Thus a labour which one author would describe as being very much prolonged, another might bring within the usual limit of twenty-four hours, meaning by this, twenty-four hours' continuous labour; and hence arises much contrariety on this point amongst obstetric authorities. This

suspension of uterine action affords an additional illustration of the principle which Nature seems to observe in the dilatation of the os uteri—*to do nothing by violence.* In all ordinary cases, the liquor amnii moderates the action of the uterus; but, if there be an unusual resistance offered to it, and the waters be discharged, the increased action does not continue; it is suspended, and again renewed; so that the object is obviously to accomplish by time what Nature avoids effecting by force.

LECTURE XII.

MECHANISM OF PARTURITION (*concluded*).

SECOND STAGE OF LABOUR.—We have now to examine the manner in which the child passes through and is expelled from the cavity of the pelvis. This is the *second stage of labour.* So long as the tissue of the uterus was interposed to the advancing head, the design of nature was evidently to moderate the action of that organ, and to prevent too violent a distension of its structure. But when this no longer arrests its progress, and the pelvis becomes the impediment, the full power of the uterus is exercised to force the head through the osseous cavity which resists its advance. You will therefore observe a marked difference in the character of the uterine contractions. Not only is the entire force of the uterus employed, but it is aided by the muscles that bound the abdominal cavity. This change will explain a difference in the character of the pains which are the effect of these contractions. In the first stage, they are sharp, severe, but short in their duration. They are called, in obstetric language, "*grinding pains.*" In the second stage, they are less acute, perhaps dull, but are steady and long-continued; a full inspiration is taken previously to their commencement, and the pain is expressed by a gradual inspiration, accompanied by a deep tone of

voice. These pains are called "*bearing pains*," and their deep continuous groan forms a strong contrast to the shrill and almost agonizing cry that accompanies the grinding pains. When the action of the uterus is so much increased, the hazard that would arise if the adaptation of the head to the pelvis were not exact is obvious, if the former were too large, or the latter too small, serious danger might be the consequence. Hence the second stage of labour, and the passage of the head through the pelvis, requires the closest attention. It is necessary not only to understand all its varieties in theory, but also to take every opportunity of becoming *practically* acquainted with them.

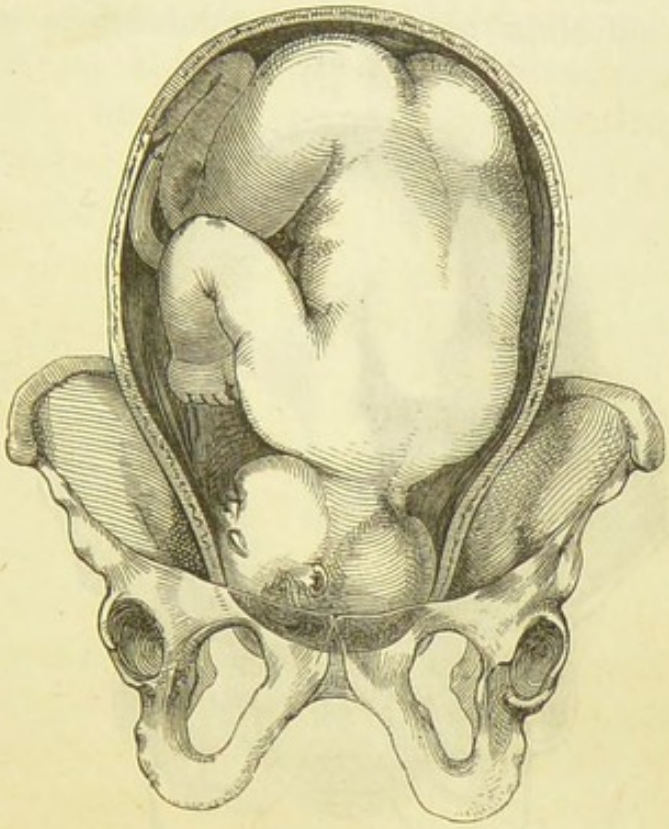
We would urge this with the greater earnestness, because it too frequently happens that the practitioner is satisfied if he can distinguish the head, without caring much about its position, and hence decides upon the necessity for interference, not by his knowledge of the cause of the difficulty, but the length of time this stage may occupy. We would therefore refer to the observations which we made when describing the obstetric anatomy of the pelvis; in which we pointed out the influence of the varieties of its shape on the progress of the head of the child, and explained (p. 133) that the passage of this was accomplished by a combination of four distinct motions harmonising in one effect. These observations we shall briefly recapitulate.

Passage of the Head.—1. When the head is above the brim of the pelvis, the forehead and occiput are nearly on the same level (fig. 53); but when the head enters the brim, the occiput descends lower than the sinciput, and glides a certain distance along the plane of the ischium, against which it rests. The forehead then advances more rapidly at the opposite side of the pelvis, until it is arrested by the convergence of the ischium and shorter sacro-ischiatic ligament. The occiput again descends obliquely along the ischio-pubic ramus, and emerges with part of the parietal bone beneath the pubic arch. The head, therefore, might be said to oscillate on its biparietal measurement.

2. Simultaneously with this motion, there is a very slight rotation on the longitudinal axis of the head, by which that side of the head next to the symphysis pubis descends lower than that

near the sacrum, so that the parietal protuberance of the pubic side becomes the presenting part (fig. 54).

Fig. 53.*



3. As the head is so advancing through the pelvic cavity, the shape of the pelvis obliges it to pass in a spiral direction; hence the head, which may enter the pelvis in the oblique or transverse measurement, is turned, as it descends, towards the conjugate axis (fig. 55).

4. When the head escapes from the outlet, the occiput rests against the ramus of the os pubis and ischium, and becomes a fixed point, round which the remaining portion of the head successively passes out. In some instances, the occiput rests directly against the pubic arch, and the head is expelled in the conju-

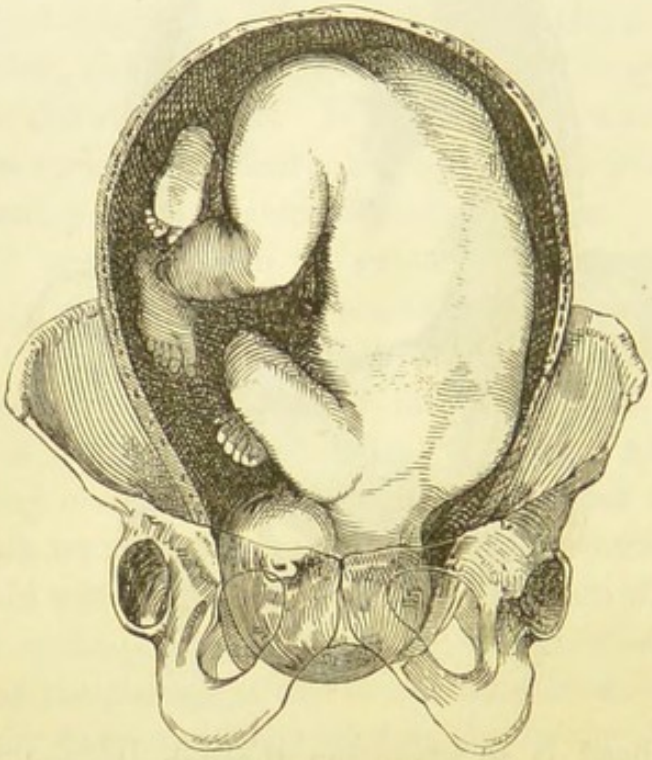
* Fig. 53. The head above the brim of the pelvis; the anterior and posterior fontanelles being nearly on the same level.

Note. In order to render the relation of the head and pelvis more intelligible, the pubic side of the pelvis is represented as being transparent in this and the following views.

gate axis of the outlet. According to its more usual course, it passes out obliquely.

Positions of the Head. The head does not descend always in the same position, and there are accidental displacements that may

Fig. 54.*

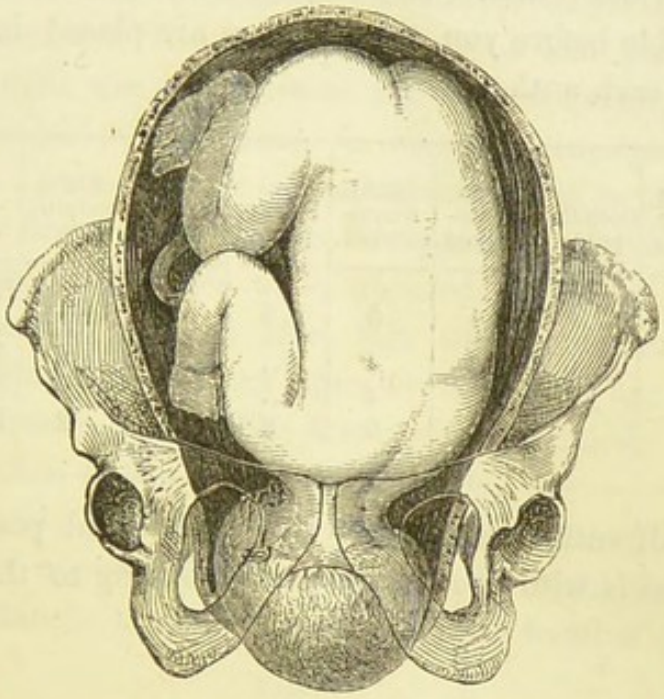


retard its progress. It is necessary, therefore, to understand these deviations. Formerly, the varieties in the position of the head received but little attention. The older writers only observed the manner in which the child was expelled (Sir Fielding Ould, however, is a noble exception). They found the occiput generally towards the os pubis, when the head escaped from the vulva, but sometimes the face; hence they made only two divisions, or, to speak more correctly, they considered the former to be the rule, the latter an accidental exception to it. Baudelocque, however, observed the progress of the head while it was within

* Fig. 54. The head within the pelvic cavity. The occiput and right parietal bone are the most dependent parts, the occiput resting against the plane of the ischium and obturator space, and the ear to the right of the symphysis pubis.

the pelvis, and determined the position by touch, not by sight. He described six different positions; and, since his work appeared, every division that has been made, whether into four, six, or eight positions, has been formed on the basis which he has laid down—that of determining the position while the head was in

Fig. 55.*



the pelvis, and not when it was expelled from it. Authors have not agreed upon the number of these positions, nor upon their order of frequency. It will be necessary, therefore, in order to prevent confusion, to arrange their divisions in a tabular form, before describing the positions, and the mode of ascertaining them. The terms employed require a brief explanation. The position of the head is generally determined by that part of it which corresponds to the plane of the ischium, and therefore is opposite to the cotyloid cavity. If the occiput be in that situation, it is called the occipito-cotyloid position; if the forehead,

* Fig. 55. Further advance of the head through the pelvic cavity, previously to emerging from the pubic arch. The parietal bone, and part of the occiput present at the pubic arch—the head more in the antero-posterior direction, and the anterior again descending to the level of the posterior fontanelle.

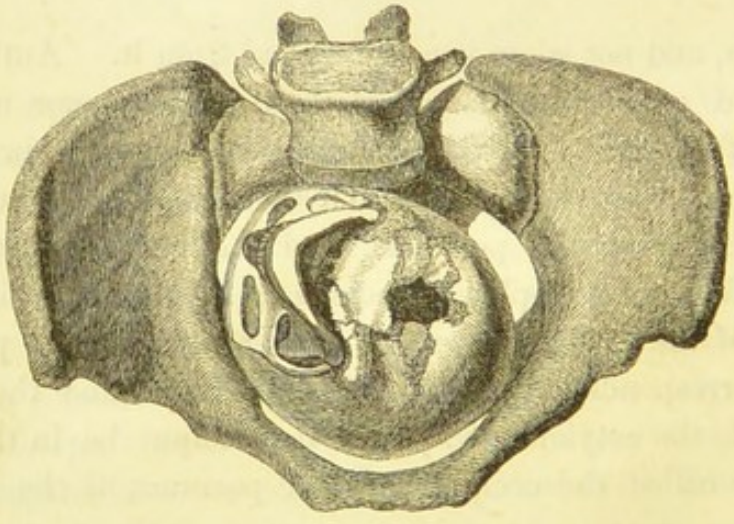
the fronto-cotyloid. In the same sense you may have the occipito- or fronto-pubic, when the occiput, or the forehead, is applied to the os pubis instead of to the ischium; or the occipito-iliac, when the occiput is opposite the centre of the ilium. The occiput, also, may be to the left or the right side of the pelvis; and thus you have the right occipito-cotyloid position, the left occipito-cotyloid position, and so on.

In the table before you, the numbers are placed in the order adopted by each author.

Left occipito-cotyloid.	Right occipito-cotyloid.	Occipito-pubic.	Left fronto-cotyloid.	Right fronto-cotyloid.	Fronto-pubic.	Left occipito-iliac.	Right occipito-iliac.	
1	2	3	4	5	6	...	...	Baudelocque, Dewees, etc.
1	2	...	3	4	...	5	6	Lachapelle.
1	3	...	2	4	...	...	...	Naegele.
3	4	7	5	6	8	1	2	Ramsbotham.

Nearly all authors agree that the most usual position for the head to pass is with the occiput corresponding to the left plane

Fig. 56.*



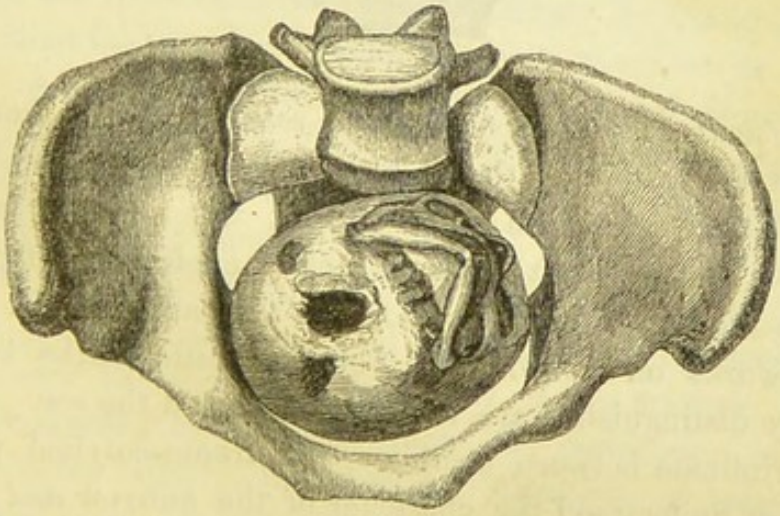
of the ischium. This is called the *first position* (or *left occipito-cotyloid*) (fig. 56). When the head is in this situation, the occiput

* Fig. 56. First position.

has the relation to the ischium which we have stated. The forehead corresponds to the right sacro-iliac synchondrosis. The right parietal bone is lower than the left; and its protuberance is the lowest part of the head which presents. As the head advances, the occiput becomes gradually more anterior, and the forehead dips down a certain distance in the pelvis, but the parietal bone remains unaltered. As it approaches the outlet, the forehead ceases to advance, and the occiput and parietal bones press down upon the perinæum to the utmost extent, descending along the ischio-pubic ramus, in order to emerge under the pubic arch. In making a vaginal examination to ascertain this position, the finger first touches the parietal protuberance; the sagittal suture is felt close to it, directed obliquely backwards. Anteriorly, and to the left side, this suture terminates in the posterior fontanelle; but the anterior fontanelle cannot yet be felt at the opposite side. The first position is chiefly determined by this situation of the posterior fontanelle.

In the *second position* of Baudelocque (or *right occipito-cotyloid*), the occiput is opposite to the plane of the right ischium; the posterior fontanelle is, therefore, in the same relation to the right

Fig. 57.*



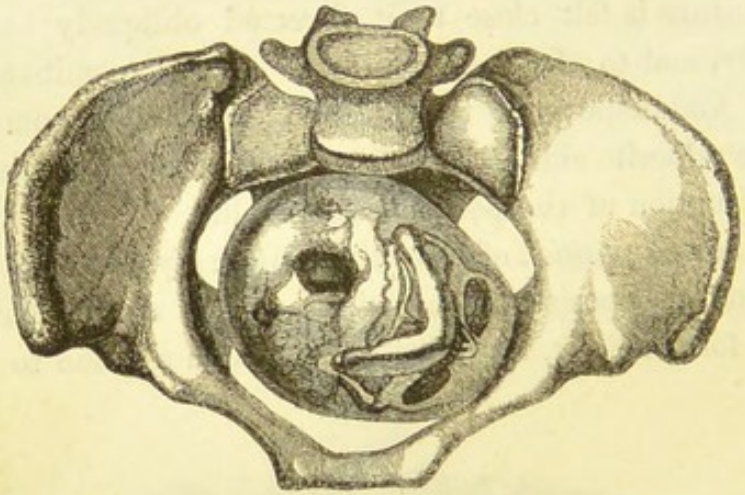
side of the pelvis that it was to the left in the first position, being anterior to its transverse axis. The sagittal suture passes

* Fig. 57. Second position.

obliquely backwards, from right to left; the left parietal bone is on the pubic side, and descends lower than the right (fig. 57).

The *third position* (or *left fronto-cotyloid*) is the converse of the first. The frontal bone and anterior fontanelle correspond to the plane of the left ischium; the sagittal suture passes backwards from left to right; the posterior fontanelle is opposite, and near the right sacro-iliac synchondrosis; the left parietal protuberance is the most dependent point; and the ear is situated as in the second position, only more withdrawn from the pubis, and nearer the groin (fig. 58).

Fig. 58.*



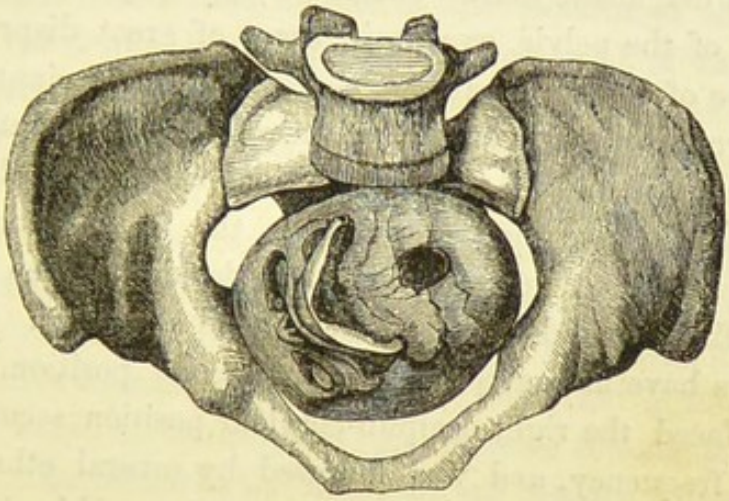
The *fourth position* (or *right fronto-cotyloid*) has the frontal bone opposite the plane of the right ischium; the sagittal suture passes backwards, from right to left; the right parietal bone presents; and the right ear is opposite the left groin (fig. 59).

Such are the principal positions, as they are given in the different works on midwifery. The diagnostic marks by which they are distinguished are the *fontanelles* and the *ear*. In order to discriminate between occipito- and fronto-cotyloid positions, you must understand the character of the *anterior and posterior fontanelles*, judging of them by touch, not by sight. In the dried bone, the posterior fontanelle is a triangular space. In the

* Fig. 58.—Third position.

head of the child, the finger will often detect no space, but only a point, the centre in which three lines of suture terminate. The anterior fontanelle, being so much larger, lozenge-shaped, and

Fig. 59.*



having four lines of sutures terminating at its angles, could be easily distinguished from the posterior, if the eye were to decide the question; but, as we must judge by the finger alone, these characters are not always obvious. The anterior fontanelle is higher up, and more removed from the finger in fronto-cotyloid positions than the posterior fontanelle is in the first or second positions; consequently, the finger cannot reach sufficiently far to trace its exact shape. The divergence of the parietal bones may be felt, and perhaps the coronal suture, but the two remaining sides of the lozenge formed by the frontal bone are too distant, neither can the frontal suture be felt; hence there is some resemblance to the triangular space of the posterior fontanelle, the only difference being in the greater size of the triangle in the anterior fontanelle: but in cases where the ossification of these bones advances slowly, the posterior fontanelle is large, and might resemble the anterior. It is possible, therefore, to confound the one with the other, and it requires practice in exam-

* Fig. 59. Fourth position.

ining by touch, in order to discriminate between them in all cases. As a general rule, however, the posterior fontanelle is felt like a central point, in which three lines meet; the anterior more distinctly as a membranous space, but usually undefined. If there be any difficulty, it may be removed by a careful examination of the second diagnostic mark—*the ear*, which may be felt on the pubic side of the pelvis, except in cases of great disproportion. As the lobe of the ear is always nearest to the occiput, we can by it determine the side of the pelvis where the occiput lies, and therefore can distinguish the two positions which have the occiput on the left side from the two that have the frontal bone in the same situation; but we cannot so easily decide between collateral positions the first and fourth, or the second and third.

Authors have not agreed as to the second position. Baudelocque placed the right occipito-cotyloid position second in the order of frequency, and was followed by several other writers, until Naegele made these positions the subject of his observation. The result of his examinations led him to doubt the accuracy of the description which had been given, and ultimately to deny it altogether. He found that, although the head was expelled in Baudelocque's second position, it did not enter the brim of the pelvis in that direction, but that it passed down first in the third position, with the occiput towards the right sacro-iliac synchondrosis, and, as it descended, rotated gradually into Baudelocque's second position, in which it was expelled. Thus the occiput, and of course the head, might be said to describe a kind of spiral curve from right to left, as it passed through the pelvis. Naegele's explanation has been since confirmed by other observers, and is in the main correct—a conclusion at which I have arrived from personal observation. Being anxious to determine this question, I availed myself of the opportunities afforded me in the Dublin Lying-in Hospital, of putting it to the test, and found that the head entered the brim in the third position in nearly an equal number of cases as in the second; that when it descended in the third, it passed generally without any difficulty into the second, and was so expelled, while in a very few cases it remained in its original position. The whole evidence establishes Naegele's

accuracy of description; and it may be admitted that, as a general rule, the head rotates from the third into the second position, when it is passing through the pelvis; but, that there are exceptions. The fourth position also passes into the first; but sometimes, although very rarely, preserves its original direction.*

It has been stated that, in one of the motions of the head of the child, the frontal bone descends to the level of the occiput. In some instances, however, from an accidental cause, the forehead is driven down too far; and, the head becoming fixed in the pelvis transversely, its progress is thus arrested. It is essential to understand this cause of delay in the second stage, because it is very easily corrected; and any ignorance respecting it might lead to the erroneous impression that the head should be delivered by instruments, because it was so long fixed in its position. When this accident takes place, the anterior fontanelle may be observed to be remarkably distinct; we readily trace out its lozenge shape, and feel the four sutures distinctly at the angles. The finger also passes very easily between the os pubis and the head, so that there appears to be rather more space in that situation than usual. Finding, therefore, this evidence of room in the pelvis, the anterior fontanelle perfectly within reach, and, at the same time, the head not advancing, we have sufficient proof of this deviation. It is described by many authors as the *premature separation of the chin from the chest of the child.* The mode of correcting it is sufficiently simple. The head should be dislodged from its position in the interval of a pain, and the fingers pressed against the frontal bone until the uterus again contracts; the occiput will at once descend, and the labour proceed without further difficulty. There are rare instances, in

* Of seventy-four cases examined, the following results were noted:—

First Position.	Fourth into First.	Second Position	Third into Second.	Third Position.	Irregular.	Face.
43	3	11	9	2	4	2

which the forehead descends completely into the cavity of the pelvis, and becomes the presenting part; when this occurs, the displacement cannot be corrected, as in the former instance, and the position is so unfavourable, that the head soon becomes arrested in its progress. It acts upon the pelvis something like a wedge; the forehead being the narrow end, and the occiput and neck of the child its broad base. The more the head advances, the more the difficulty is increased. When this accident takes place, the exploring finger feels the frontal bone, traversed in the centre by the frontal suture; there is, therefore, some resemblance to the vertex position, but it may be easily distinguished, because the forehead is smaller than the occiput, and the anterior fontanelle, being near, can be very easily traced. The inexperienced observer would imagine that there was more space than usual in the pelvis for the passage of the head, and might not be able to explain why its progress should be delayed; but if the finger were passed sufficiently high, he would soon perceive the anterior fontanelle, and discover that the head was wedged in the pelvic cavity.

Face-Presentations. Sometimes there is a complete rotation of the head on its transverse axis, so that the forehead rests upon the brim of the pelvis, and the face descends into the cavity. This constitutes the *face-presentation.* Two varieties of this position are generally met with. In one, the chin corresponds to the plane of the right ischium (the *right mento-cotyloid position*). In the other, the chin has the same relation on the left side (*left mento-cotyloid*). When the former position presents, the *right malar bone and cheek* are the most dependent parts, the mouth and nose being rather posterior on the sacral side. In the latter, the *left side of the face* presents. In each instance, there is the same obliquity observed as in vertex positions. Two other varieties are described, where the chin is directed backwards towards the sacro-iliac synchondrosis of either side; but I believe that they are very rarely met with.

If it be correct to consider face-positions as the result of a rotation of the vertex, the manner in which they occur might

be explained in this way: so long as the head is above the brim of the pelvis, its position can always be very easily altered, and it frequently changes from one into another. If it should happen that, in any of these alterations, the occiput is placed upon the brim of the pelvis, it may glide therefrom towards the ilium, the forehead may take its place, and the face descend as described. If this were true, the first position of the face would be the result of a rotation of the fourth position of the vertex, which rarely enters the pelvis; and the second of the face, a rotation of the third of the vertex.

It is more important, however, to consider the mode of distinguishing these positions, because the situation of the face is such that it is exposed to great tumefaction. The face is much more vascular than the vertex; and, it being the most dependent part, and very much compressed, the cheek, the eye, and the portion of the mouth which presents, are always very much swollen. Even with the most careful management, the features of the child are more or less disfigured; but this may be greatly increased by frequent examinations. Unfortunately, the infant is too often a severe sufferer from this cause. The unusual characters of the position lead the inexperienced practitioner to make several fruitless attempts to determine what it is; the tumefaction is much greater than before, and the outline of the features more confused; thus serious injury to the child is sometimes the result—the eye has been destroyed in this way.

In examining a face-presentation, the first point that attracts attention is, the *irregularity of the soft surface* which presents itself. The soft cheek and the malar bone have some resemblance both to the breech and the shoulder, and we cannot define the outlines of the features with the same accuracy by touch as by sight: it is this difficulty that leads to the frequent examinations that are made in these cases. We generally first feel the nose like a soft fleshy elevation: if this be cautiously traced, the finger passes on one side to the bridge of the nasal bones, and on the opposite, to the lips and mouth. This may be taken as a diagnostic mark of the position. When the finger passes from

the lips to the gums, and thence to the tongue, the sensation communicated by the firm ridge of gums cannot be mistaken.

These face-presentations were formerly considered to be very unfavourable, and to give rise to great delay and difficulty in the progress of labour; but this impression seems to have been created much more from the novelty of the position than from experience. In the extensive hospital at Vienna, Boer noted eighty face-presentations, and observes, "there were three, or at the most, four, where the children were born dead. None of the patients suffered in the slightest degree from any of these labours, and, *except one case*, all were left entirely to nature. In one case only, *on account* of the *weakness* of *the pains* and doubtful character of the symptoms, I deemed it necessary to terminate the labour by the forceps."—(Rigby, p. 130.) In the Dublin Lying-in Hospital, Dr. Collins gives thirty-three cases in his report, and states, "Four of the thirty-three were still-born. With the first, the labour lasted thirty-six hours (the only instance); the second was an acephalous fœtus; with the third, the labour lasted eight hours; with the fourth seven hours: all were delivered without assistance."—(*Report*, p. 83.) Of these thirty-three cases, thirty-one were delivered within twelve hours; and Dr. Collins further adds, in explanation of the small proportion thirty-three cases bear to the total number in the report, 16,654:—"Some cases of face-presentation, I am disposed to think, were not noted, *delivery having taken place so very speedily* as to excite little attention, and to cause it to be overlooked." (p. 34.) These statements coincide with my own observations in the same hospital. The total number of cases which came under my notice during three years, and the results of which had been noted, were 5,699; of these there was not a single face-position which required aid in the delivery, nor did the labour in any occupy twenty-four hours. The only danger, therefore, which might arise from these positions, is the danger of meddling too much with them.

The reports of Drs. Hardy and M'Clintock, and of Drs. Johnston and Sinclair, confirm these observations.

Time occupied in Labour in Face-Presentations.

Drs. Hardy and M'Clintock.				Drs. Johnston and Sinclair.	
					Total.
Under	6	hours	4	8	12
„	12	„	6	15	21
„	18	„	3	6	9
„	24	„	1	2	3
			—	—	—
			14	31	45

The cause of the facility of labour in these cases may be readily understood. When the chin rests against the plane of the ischium on the right or the left side, the measurement of the head between the chin and forehead is not greater than the occipito-bregmatic; the face may descend as easily as the occiput; and, when the chin escapes under the pubic arch, it is pressed forwards, and affords even more room for the escape of the head than when the occiput is in the same position. The forehead glides over the perinæum; then the parietal bones, and lastly the occiput. The increasing space required in the passage of the head may therefore endanger the perinæum; but the strain is not much greater than in an ordinary labour.

If the chin be unfortunately directed backwards towards either sacro-iliac synchondrosis, then indeed the delivery is difficult; because, as the face descends, the forehead and parietal bones pass in succession along the pubic side of the pelvis, and the increasing transverse measurement of the head makes it more difficult to escape under the pubic arch.

Dilatation of the Perinæum. When the head (which we will suppose to be in the first position) approaches the outlet of the pelvis, and descends along the ischio-pubic ramus, it is opposed by the *perinæum;* when this takes place, every provision is made to obviate the effects of the struggle about to ensue. The mucous secretion flows much more abundantly from the vagina; the presenting part at first just touches the perinæum and then retreats from it; and the action of the uterus seems again to alter its character—the pains are not so vigorous as before, but for some

time are shorter in their duration, and apparently less efficient. The same caution is exercised to guard against violence here as in the first stage, and we often find the head or the membranes advancing and retreating for a long time before it descend so far as to allow the occiput and parietal bone to pass between the pillars of the pubic arch. During this period the structure of the perinæum becomes more and more unfolded; so that the delay which usually takes place in the labour at this point seems to arise much more from the feeble character of the pains, than from the resistance of the perinæum. At length, when the head is enabled to pass down so far that the occipital portion can emerge from the outlet, the perinæum suffers its greatest degree of distension. The occiput then first rests against the ischio-pubic ramus, and, as it is expelled, rises upwards towards the pubic arch. It becomes a fixed centre, round which the remaining portion of the head moves; the whole force of every pain is, therefore, spent upon the perinæum; and, if the pains return with much rapidity or violence, there is danger that this part may be lacerated. In the majority of cases, however, the head retreats in the intervals of the pains, even where it seems to be almost expelled. At this time, also, the pains become much stronger, and are more severe and more trying to the patient than any that she has yet experienced. At the conclusion of this stage one or two very strong pains take place, by which the head is first protruded so far that it does not retreat, and it is then delivered. As soon as the head is born, we have a favourable opportunity of confirming the diagnosis as to the position. In the first position, the face is directed obliquely upwards towards the right thigh of the mother; because, when the shoulders and body of the child pass into the pelvic cavity, they enter the brim of the pelvis in the oblique measurement, opposite to that in which the head has passed: and therefore, as the child goes through the cavity of the pelvis, the thorax and abdomen correspond to the right or superior side of the pelvis, and the face looks in the same direction.

When the shoulders are being expelled, the perinæum is again put upon the stretch, and is sometimes unequally protruded by

the arms of the child; if care be not taken, it might be lacerated by them, but as soon as they escape there is no further danger. The uterus also ceases to act with the same force; the remaining pains are weaker, so that the body and limbs of the child are very slowly expelled.

Such is the manner in which the child, in its most usual position, is delivered, and this stage completed; but before entering upon the consideration of the *third stage*, we would direct attention to the mode in which other positions of the head are expelled, and to their influence on the perinæum. When the head passes out in the second position, the back of the child is to the right side of the pelvis, in the same relation as the thorax and abdomen are in the first position; the face therefore looks downwards to the left thigh. When the shoulders are passing the perinæum in this position, great caution is necessary, because we do not feel the hands and arms coming out, as in the first position; they might therefore press on the perinæum unequally, and lacerate it without your knowledge. When the face is towards the os pubis, the perinæum is very much endangered, in consequence of the greater distance to which the head must descend before it can pass under the pubic arch; and in order to do so, the direction of its motion is downwards and backwards, the reverse of what usually occurs: consequently the perinæum suffers a much greater degree of tension than in ordinary cases, and there is a proportionate risk that it will give way. In face-positions, from a similar cause, the perinæum also suffers; but not to the same extent, because the tension upon it is continued only until the chin passes under the arch, when the pressure is at once relieved.

Third Stage of Labour.—*Separation of Placenta.* As soon as the expulsion of the child is accomplished, the uterus ceases to contract for some time, the interval varying from five to fifteen minutes; then the contractions are renewed, for the expulsion of the placenta. This constitutes the *third stage of labour*. These contractions can scarcely be called pains; they bear no resemblance to those which preceded them, and are but little noticed by the patient. The manner in which the placenta is separated

depends very much upon the mode in which the uterus contracts while expelling the body and limbs of the child. If the fundus receive due support from the abdominal muscles, so as to ensure an uniform and efficient contraction from above downwards, it often happens that the same pain which extruded the limbs of the child from the vulva, expels the placenta from the uterus into the vagina, where it may remain for some time. The same will occur if artificial support be given by pressure with the hand on the fundus: in either case, the uterine contractions have no further effect upon the placenta. It would, if left to itself, continue for some time in this situation, and either be gradually removed by the slow action of the fibres of the vagina, or suddenly, by some shock from above driving the uterus down upon it; as, for instance, coughing, retching, or much forcing with the slight pains which occur at this time. It is seldom, however, suffered to remain, but is generally drawn away by the funis.

Retention of the Placenta may arise from different causes. Sometimes the *sphincter of the vagina closes* upon it, and the placenta is thus retained until removed by the hand, or by firm pressure on the fundus of the uterus. In other instances, the placenta remains in the uterus after the delivery of the child, until it is expelled by its subsequent contractions, rendered efficient by similar contractions of the diaphragm and abdominal muscles. This additional aid is required, inasmuch as the action of the uterus alone is not sufficient for the purpose. Hence, when the *abdominal muscles are feeble*, so that the uterus can derive no support from them, the placenta is retained in this cavity. This cause of retention has been generally mistaken for *inertia* of the uterus; and, under this impression, the placenta has been, very unnecessarily, withdrawn from the uterine cavity. Attention to this point is needed especially, in order to understand the principle upon which the management of this stage depends. When the child leaves the uterus, a very powerful stimulus to the action of this organ is removed; and this stimulus the placenta is quite inadequate to supply. The uterus, therefore, first ceases to act for a certain time; and, when the action is renewed, it is weak, and continues only for a short time. If the uterus fail in dis-

charging the placenta by a few of these efforts, it becomes accustomed, as it were, to its presence; and it no longer acts as a stimulus, but remains with the uterus imperfectly contracted around it. A very efficient means of supplying this want of irritation to the uterus, is the pressure of the abdominal viscera which surround it. When the abdominal muscles are strong, they contract upon the retiring uterus, compressing the intestines, and consequently the uterus, on all sides. These weak pains, therefore, are greatly assisted and rendered effectual by the straining efforts of the patient acting as a stimulus to the uterus from without. But the abdominal muscles are not always strong: on the contrary, in most instances, they are extremely weak, in consequence of our civilised habits. They are too often reduced almost to a state of atony from the constant pressure of the corset; hence it follows that the uterus derives little or no support from them, and the placenta is retained, not from any want of power in the uterus to expel it, but from a want of sufficient stimulus to cause the uterus to contract. There is no *inertia* of the uterus, but only a suspension of its action. It is for this reason, and to supply this deficiency, that the pressure of the hand on the fundus of the uterus, during the expulsion of the child, is found so useful; and on the same principle, as we shall have again to explain, the application of a bandage round the abdomen is always necessary, in order to give it proper support. This *suspended action* of the uterus, as a cause of retained placenta, must be carefully distinguished from *true uterine inertia*, to which we shall allude under the subject of hæmorrhage.

The placenta may also be retained from *irregular contraction of the uterus*, either during the expulsion of the child or subsequently. One of the fundal muscles may contract, and not the other; or the fibres of the body may draw the uterus into a cylindrical shape, leaving the fundus relaxed; or lastly, there may be a spasmodic contraction of the fibres at the cervix, forming a kind of stricture. These irregular contractions may arise, either from the too rapid delivery of the child not allowing the uterus time to follow its usual order of contraction, or from

that order being inverted, in consequence of too great relaxation of the fundus, the result of deficient irritation. The effect may be, that the cervix or body contracts first, and therefore retains the placenta. Sometimes an irregular contraction of the fundus may exist and not be perceived, especially if friction be used over the abdomen for the purpose of exciting uterine action. The anterior wall of the uterus remains firm and contracted, and the fundus seems to be so too; but if the hand be passed down towards the sacrum, and along the posterior wall of the uterus (where the placenta is often situated), it will generally be found relaxed, and, when excited to contract, often expels the placenta, which had been, perhaps, for a long time retained. All these irregular contractions must be corrected by endeavouring to restore the order of uterine contraction from the fundus to the os uteri. The stricture at the cervix is, however, an exception; it must be overcome, in the same manner as strictures in other places, by direct dilatation.

Another cause of retained placenta is *adhesion*, either partial or general; but this, like uterine inertia, is so constantly accompanied with hæmorrhage, that we must defer its consideration to that part of our subject.

When none of these causes operate, and the placenta is expelled in the usual time, the uterus does not altogether cease its contraction for some time afterwards. If it be left altogether to itself, without being properly supported, there is a danger that there may be too great relaxation of the uterus, and hæmorrhage and severe after-pains may arise from the attempts made by the uterus to discharge the coagula formed in its cavity. There is abundant evidence that this is one of the most frequent causes of after-pains; because these after-pains occur far more frequently with women who have had many children, than with those who are only pregnant for the first time. In the latter case, the abdominal parietes, having been only once distended, retain a certain degree of tonic contractile power, which is altogether destroyed by frequent pregnancies.

LECTURE XIII.

MANAGEMENT OF NATURAL LABOUR.

HITHERTO we have considered the process of parturition as an interesting subject of observation, one of a thousand illustrations of the perfect adaptation of means to the end proposed, by which nature accomplishes her purpose. We have now to enter upon the more practical inquiry; the symptoms that attend the phenomena we have described, and the treatment required to secure the safety of the patient. We would therefore direct attention to the symptoms of labour, and to what are popularly called "the duties of the obstetrician."

PREMONITORY SYMPTOMS OF LABOUR.—During the period when the uterus is descending towards the pelvis, the size of the abdomen diminishes, and the patient feels much less inconvenience and distress than she did previously. Her respiration is less impeded, and she has less anxiety. In some instances, the woman seems almost to forget what has been the constant object of her thoughts for many previous months. As the time of labour approaches, some monitors present themselves to remind her of the event; sometimes the nerves are very much pressed upon, so as to cause sensations of numbness or tingling down one or other of the limbs: both are seldom affected. Occasionally the limbs are slightly paralysed, so as to cause lameness. As the uterus begins to press more on the pelvis, the patient becomes awkward in her carriage, and unable to walk even a short distance without fatigue. The neighbouring organs soon show the influence of the change going forward in the uterus. The bladder becomes irritable, so that constant micturition is the result: we may, however, find it in the opposite state, and the urine retained.

The rectum is also affected in a similar manner, and a fæculent diarrhœa frequently precedes labour: this is always salutary, because it secures the important object of having the intestines unloaded: so also constipation sometimes takes place, especially in hysterical habits. The length of time that the rectum may remain without an evacuation, and the woman feel no inconvenience from it, is often far beyond what might be supposed: a fortnight, and even three weeks, is not unusual. In these instances, the patient is sometimes deceived, and imagines that her bowels are quite regular, because there is a daily inclination to go to stool; there is then a scanty discharge of loose fæculent matter, leaving the mass of scybala undisturbed. You cannot, therefore, pay too much attention to this point of practice; because, when the rectum is in this state, the whole of the large intestines become distended with flatus, which causes spasmodic pains that are often mistaken for labour-pains. Should the patient escape this, and labour actually commence, the action of the uterus goes on imperfectly: the same influence which is exerted by the uterus on the rectum in suspending its ordinary action is, as it were, reflected on itself, producing a similar suspension of the uterine contractions. For some time previous to labour, the mucous secretion from the vagina begins to increase in quantity, and often amounts to an abundant viscid discharge. This change may appear even for three weeks before labour, and consequently is occasionally mistaken by the young and inexperienced mother for the well-known symptom of labour called "the show."

First Stage.—When this latter evidence presents itself, the discharge is tinged with more or less blood, arising from the ruptured vessels of the os uteri when it first dilates. As soon as this takes place, labour properly begins; *the patient has now entered upon the first stage.* The pains which accompany the first contraction of the uterus are slight, short in their duration, and return at long intervals. The French describe them by the expressive term, "les mouchettes." They generally also (like the mosquitos) attack the patient at night, and are sufficient to prevent her from obtaining her usual sleep, although not so severe

as to call for assistance. Towards morning, however, they increase in frequency and severity; all inclination to sleep is dissipated; the woman is anxious to rise in order to change her posture, and will move from place to place, and try every alteration of position that may seem to allay her suffering. Unless the patient have more than usual fortitude, and have great command of her feelings, she cannot help giving loud and almost agonizing expression to the pain she endures. She generally avoids to take a deep inspiration, or to use any straining effort. A short inspiration is followed by a shrill cry, which she cannot suppress. When you are accustomed to obstetric practice, you will learn to distinguish these *grinding pains* (as they are popularly called) from the *bearing pains* that follow them, by the peculiar cry that accompanies each. During the first stage, the irritability of the bladder and rectum generally continues, so that the patient has a frequent desire to evacuate them. A slight rigor may be observed in the commencement; or she may be seized with sudden vomiting. The latter is often very serviceable in those who are of a plethoric habit; because the nausea and sense of exhaustion that follow are often a means of controlling excitement, either in the mind or in the circulation.

Duties of the Practitioner. When any of these evidences prove that labour has commenced, the practitioner is generally hastily sent for. Sometimes, however, it is avoided until the pains seem to say, "He can no longer be dispensed with." If labour be preceded by false pains, he is often summoned unnecessarily, these spasms being mistaken for labour. The medical attendant, knowing that such a mistake is possible, and that, even if labour have actually commenced, it will occupy some time before he can be of use, might procrastinate; he might be disposed to think that he has quite sufficient time before him, and give but a dilatory attention to the message he receives. *A greater mistake cannot be committed.* Any summons from one who has placed entirely in your hands her own safety and that of her offspring, equally dear to her, should receive instant attention; neither are you to consider the urgency as measured by your own, but by her impressions of the case. You may be called upon without

there being the least necessity for haste; but by promptitude you will gain a considerable advantage in strengthening the confidence she has already given you. The necessity, however, may be real, and not fictitious. Cases have occurred in which the patient has been delivered before the practitioner arrived; and if such an accident arose from any negligence on his part, he must have a much greater influence over his patient than is usual, if he can recover from the effects of it.

If it be a first pregnancy to which you are summoned, it is advisable that your introduction be not too abrupt. Caution in this respect is of still greater importance, if you be called to a patient to whom you have not been previously introduced; the mere circumstance of a stranger entering the apartment of a parturient woman has caused a total suspension of her labour. Some preparation, in the way of announcement, is therefore necessary. For the same reason it would be prudent, when introduced, to direct your patient's attention as much as possible from contemplating the character in which you appear, to draw her away from the subject that brought you there, and to lead her to forget the office that you have to fulfil. You should not therefore catechise her too strictly about herself, or remind her of what is going to happen by too busy a display of preparation. A few minutes' conversation with the nurse is generally sufficient to learn every particular of importance; but your patient should only receive from you the words of comfort and encouragement. The nurse, however, does not require the same forbearance. It will be your duty to ascertain from her every point upon which you desire to be satisfied. When the pains commenced? Their character? If accompanied by much, or by little excitement? The state of the bowels, and whether the bladder has been relieved? If your patient has any constitutional peculiarity? You should also examine the bandage, pins, ligature, and every trifling matter which might inconvenience you, if not prepared according to your views.

Having satisfied yourself, you can then return and engage your patient, if possible, in general conversation. You may thus form your own opinion of the character of her labour. If it be in

the commencement, when the pains are short and the interval between them long, you can engage her attention with facility; but if the pains be severe, these attempts at conversation had better be dispensed with. The patient should be left in charge of the nurse, because your presence as a witness of her suffering may become unpleasant to her, and would be embarrassing if it interfered with the necessary evacuations: you may therefore retire to the neighbouring apartment, until you have determined upon the time for taking the first important step in your professional capacity.

Making a Vaginal Examination. Some have considered it as a matter of the first importance, that this should be done as early as possible in the labour, in order that any correction which might be required in the presentation should be effected before it was too late; as, for instance, if the funis or hand came down with the head, if the head descended in a wrong position, or if, perhaps, the shoulder presented. Before any of these complications can be interfered with, the labour must have passed beyond its commencement; the os uteri must be dilated, although the dilatation may be far from being complete. It would be precipitate, therefore, to require an examination before the steady frequency of the pains gives evidence that dilatation is likely to have taken place; and therefore a vaginal examination very early in the labour, when the pains return only slowly, would be unnecessary. Neither is the object for which such an examination is stated to be made, of that importance which seems to be attached to it. The funis cannot be interfered with, nor suffer any very dangerous pressure, so long as the membranes are entire. We shall presently point out the danger of meddling too much with supposed wrong positions of the head, or with the descent of the hand with it. The only position that should be ascertained before the waters are discharged is the shoulder-presentation; but if you examine for this too soon, when the os uteri is only slightly dilated, and the presenting part above the brim, you may fail to detect any presentation, and even if you do, you may, after all, be mistaken in the result; the hand and arm may be felt, and yet the head afterwards descend. It is certainly very

satisfactory to find out that the head presents as early as possible; but if this cannot be done in the beginning of labour, it is no proof that the position is preternatural. If, therefore, a decided advantage cannot be gained by making a very early examination, there is one strong reason for a little delay. When the patient is only enduring the first short pains that attend the first stage, she has always a great reluctance to be examined; all her natural feelings and prejudices are in full play against you: she submits very unwillingly, and complains loudly of the least pain or inconvenience you may cause her. Besides, it is not easy to make a satisfactory examination; and if you fail, you may not so readily obtain her consent to its repetition. When there is *no absolute necessity*, therefore, it is better to wait until these grinding pains increase in strength and frequency; her mind is then absorbed in her present suffering; she is willing to submit to anything which may be of use to her, and is often very anxious to know whether the labour will be safe: you have also the great advantage of being able to make the examination *perfectly*, because the dilatation of the os uteri has made some advance.

The proper time for making a vaginal examination having been determined upon, the nurse should communicate your wishes, which are now readily acceded to: she may then place the woman in the most favourable position for the purpose. The patient, loosely attired in her night-dress, should lie on the bed on her left side, as near to the edge as possible, having the knees drawn up towards the abdomen. You should then wait until the pain returns; and when it is about to cease, pass the forefinger of the right hand, anointed with cold cream, bear's grease, or any unctuous substance, within the vagina; examine carefully its condition, if it be relaxed and moistened with the usual secretion, or if dry and rigid. *Examine the rectum through the posterior wall;* this intestine, if empty, or nearly so, feels like a thick band; but if loaded, it projects into the vagina a surface so firm and irregular, that if it were your first case you might imagine it was the distorted sacrum, or perhaps the back of the child. You should also *examine the anterior wall of the vagina:* the

fundus of the bladder may press into it. Advancing slowly, *the middle finger* may then be introduced, in order to make *a careful examination of the os uteri*. One finger is not sufficient for this purpose, unless the uterus be low in the vagina. If it be above the brim of an ordinary sized pelvis, the fore-finger, or rather the nail of the fore-finger, just touches the anterior part of the mouth of the womb, and may also touch the head if it lie near to it, but scarcely any other information is gained; knowledge quite sufficient for those who only examine to find if the position be natural, but not at all adequate for the practitioner who is anxious to form a correct judgment of the time this stage may occupy, or of the causes which may retard its progress. The middle finger is longer, and reaches higher in the vagina: with two fingers, there is also a double advantage from the sense of touch. When you have acquired, from long experience, a perfect tact, then one finger may be sufficient. Both fingers being introduced, pass them first along the sacral side of the vagina; and, when you cannot advance them further, direct them forwards towards the os pubis. If the pains have ceased and the os uteri be dilatable, having the membranes lying loosely within it, you feel what seem to be the irregular folds of a flaccid bag projecting into the vagina; on examining this with caution, the edge of the os uteri, soft but more resisting, may be traced; and, if the finger be passed within it, you will sometimes feel, towards the os pubis, the head firm and round; you may, however, often fail, even though the head present.

The finger should not be withdrawn until you have ascertained the state of the os uteri, as to its dilatability and density, its exact direction, as nearly as you can judge, and the degree to which it is opened. The act of withdrawing the fingers sometimes induces a pain; you may then cautiously observe what takes place—the fulness and slight closing of the os uteri, the membranes descending as a tense bag, and the mouth of the womb tightly stretched over it: but beware of roughness, lest the membranes give way. Before the fingers are removed from the neighbourhood of the os uteri, examine the distance of the sacrum; and as they are being withdrawn, ascertain, if possible, the space in the pelvic

cavity. It would be well, also, in the commencement of practice, when it is so necessary to educate the sense of touch, to take this opportunity of examining the orifice of the urethra. For this purpose, when the fingers are being withdrawn, let the fore-finger follow the course of the canal to its termination in the trumpet-shaped, semi-cartilaginous opening. Be careful, at the same time, to avoid the clitoris. In order to make a sufficiently careful examination, a little time may be required, during which the pains may return; you should then cease until they subside, noting only those points which have been mentioned. But make it a rule not to withdraw from your examination until you have perfectly satisfied yourself as to the character of the labour. This having been accomplished, a second examination during this stage, unless it be prolonged, would be unnecessary.

Exploring the vagina and uterus in this way is called, in the popular language of midwifery, "trying a pain," or "taking a pain." And the object assigned to it by the patient and her friends, is to learn whether the labour is safe, and how long it may last. You are, therefore, generally asked, and expected to give a distinct answer to, both these questions. The first is usually easy, and may be replied to in the affirmative; but if you have any doubt, you should not precipitately sound an alarm. If you ascertain that it is a cross-birth, as shoulder-positions are called, you may state the nature of the case, and the kind of assistance required, *to the friends* of your patient, in order that they may select a consultant in case you find it necessary; but be cautious not to alarm the patient herself: it is quite time enough to inform her of her situation when you have determined to deliver her. In all other cases, the difficulty must be decided by time and further observation of the case; you should not, therefore, give way to apprehensions which may be unnecessary, or commit yourself to an opinion which the result might not justify.

The second question, as to the duration of labour, cannot be too cautiously answered. The friends may ask, "Is everything right?"—but, "How soon shall I be well?" is invariably your patient's anxious question. In order to tranquillise and encourage

her, it might seem pardonable to state a period for the termination of her sufferings earlier than what you know will be the case. But such a practice would be extremely injudicious; because, when the time had passed in which she expected a relief to her anguish, her disappointment would lead to impatience of further suffering, if not a secret dread that the delay arose from some cause dangerous to herself. The result might be a suspension of the uterine action, and a still further prolongation of her labour. Along with this, you being proved, as it were, a false prophet, your patient may lose all confidence in your opinion and judgment. It is better, therefore, to err on the other side; and if you are obliged to give a distinct and positive answer, to state a period beyond that in which you expect that delivery will take place. No doubt this will give but little comfort to one who requires every consolation, but it will induce her to summon that resolution and patience under suffering, which is the peculiar attribute of her sex; and it will enable her to go through her trial more favourably, because more patiently, than if she expected more prompt relief. Her confidence, also, in your judgment, would be rather increased if your prediction prove to be true; and if not, she would much more willingly forgive a deception which rendered her delivery an agreeable surprise.

If, from any accident, the membranes be broken during this stage, a second examination is necessary, in order to determine the presentation, and to ascertain any accidental complication which might occur. If, when the liquor amnii escapes, the dilatation be slightly advanced, and the orifice of the uterus increased only an inch or two in diameter, you may expect more or less delay in the completion of this stage, unless the cervix of the uterus be extremely thin. If it be at all thick, the irritation of the head generally renders it rigid, no matter how dilatable it may have been previously. In this second exploration, therefore, a very cautious opinion should be given as to the duration of the labour. The head, if presenting, may also be felt; but the position cannot be determined until the dilatation is more increased, and the head fully in the brim. The small portion of the head which occupies the slightly dilated os uteri is not suffi-

cient to determine anything about it; and if you pass the finger within the os uteri for the purpose of tracing the sutures and fontanelle, you will only succeed in exciting a great deal of unnecessary irritation in its tissue; nor can you define the characters of the position, through the os uteri, with sufficient accuracy to place any dependence on the evidence they give.

The time has not yet come to decide the position of the head. If this be true, then it is scarcely necessary to point out to you the absurdity of attempting to correct its supposed wrong position at such an early period of the labour. Yet this is one of the objects for which we are instructed that a vaginal examination is necessary, and are even recommended to rupture the membranes for the purpose of altering the position of the head.* The hand may be felt presenting with the head under similar circumstances, and the correction of this accident is also assigned as a reason for examining *per vaginam* as soon as possible. We very much question this necessity, or even the propriety of interfering with the presentation so soon. In order to correct this malposition, the hand and arm must be pressed up above the head, and there maintained until the succeeding pain drives down the head below it. If the os uteri be only slightly dilated, and the head not completely in the brim, you will find it very difficult to accomplish this, and in the attempt you expose yourself to a double risk. First, you may increase the irritation of the cervix uteri to a much greater degree than might otherwise take place. Secondly, in your manipulation, you cannot press up the hand without also pressing against the head, which we have assumed has not yet passed into the brim of the pelvis. The effect of this might be, that you might just succeed in pushing the head more on the brim than it had been; and as a necessary consequence, the head not being able to pass into the pelvis, the action of the uterus would be directed more upon the shoulder; the side of the face, ear, and neck, might first be directed towards

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* "If it be discovered early, it is certainly proper to rupture the membranes, and turn the vertex round, which is easily accomplished." Burns's *Midwifery*, p. 394.

the pelvic cavity, and then glide with the vertex towards the iliac fossa, while the shoulder would occupy the brim; so that, after an attempt of this kind, you would find the arm coming down into the vagina rather more than before, and, after a few pains, a natural converted into a preternatural labour—than which there cannot be a more awkward accident. Therefore we would question altogether the propriety of meddling with the position thus early, because it seems to us far more probable that a little awkward manipulation would produce this derangement, than that it would take place if the position were not interfered with. In fact, nature would be less likely to blunder than you would.

What we have stated to you does not apply to the same position when the os uteri is more dilated, and the head quite within the cavity of the pelvis; we would desire, at present, only to point out our reasons for objecting to submit your patient to a very early examination, with a view of necessarily endeavouring to make corrections. The only accident which would seem to render an early examination necessary is when the funis is prolapsed. So long as the membranes are entire, and the liquor amnii surrounds the funis, there is little danger that the circulation will be arrested. But if the waters prematurely escape, this alone renders an examination necessary; and therefore the funis may be detected in sufficient time to determine upon the course which it may be requisite to pursue. In ordinary cases of labour, such as we are now speaking of, the membranes seldom give way until the second stage has made some progress, and often remain entire until the head of the child is almost expelled. You seldom, therefore, have occasion to make more than one examination during the first stage; and every information you require having been obtained by this, it is better then to commit your patient to the nurse's charge, and to retire to the next apartment until you are again summoned by the urgency of her pains, or by some new symptom presenting itself.

Duration of the First Stage. The time which the first stage may occupy, when there is no cause to render it tedious, is very

uncertain. It is, of course, much longer with women pregnant for the first time than with those who have had many children. It may last from twelve to sixteen hours; but where this stage is prolonged, the following stages are generally short, and sometimes bear an inverse proportion to each other. You cannot take time as a criterion to judge when the first stage is about to cease and the second to commence; but you may do so by closely observing the pains. We have described to you the character of the grinding pains that accompany the first stage; they frequently merge into the bearing pains so gradually, as to require some attention to observe the change. You may remark, when the pain comes on, that the patient is obliged to grasp firmly whatever is within her reach; she retains her breath more than before, and sometimes makes an involuntary effort to force the child down. Her voice also alters, its tone is more subdued, and she seems more patient of her suffering than before. Sometimes the complete dilatation of the uterus is marked by constitutional symptoms; there may be a slight rigor or vomiting, perhaps a strong inclination to go to stool. Whenever any change of this kind is noticed, you have just reason to suspect the commencement of the second stage; and as you cannot tell with what rapidity it may proceed, the bed should be properly prepared for the patient's reception.

Mode of Preparing the Bed. A skin of morocco-leather, or a broad piece of India-rubber cloth, is usually placed next the bed, to protect it from being stained; and a blanket, folded very wide, enclosed in a soiled sheet, is placed underneath the hip of the patient as she lies upon the left side. They should be so fastened together, that the whole may be removed at once without difficulty. By this means the discharges are absorbed, and prevented from soiling the sheets of the bed; while these foul clothes may be withdrawn after the delivery of the patient without disturbing her. Trifling as these details may appear to you, we must direct your attention particularly to them, because of a practice which is prevalent among the lower classes here, that seems both inconvenient and dangerous. The parturient woman generally sits at the end of the bedstead, without making any change in

her dress. The bed and bed-clothes are doubled up in such a manner that she can recline against them somewhat as on a sofa, and so she remains during the whole of the second stage, until she is delivered. The intention of this arrangement is that, when labour is quite concluded, the clean bed and bed-clothes may be laid down, the patient's day apparel changed for her night-dress, and everything made "comfortable" as the midwives express it. All this may be, and often is, done without injury to the patient; but recollect the risk that is run by moving the patient so much, at a time when she should be kept perfectly quiet; and if an accident should happen, if hæmorrhage should result from it, imagine your perplexity. Her dress is in your way when you wish to command the uterus. You may not have time to get the bed laid down again, so as to place her in a horizontal position; even moving her for the purpose is dangerous. You are surrounded with a host of unexpected difficulties, and her life might even be the sacrifice of a little want of forethought. You should, therefore, always take care that your patient is loosely attired in her night-dress, and placed on her left side in the bed, guarded in the manner described, when there is any evidence that the first stage is near its completion.

When the os uteri is quite dilated, and the bearing-pains become more decided in their character, the patient is anxious to have her body fixed as much as possible during their continuance; she therefore requires to have something within her reach that she may grasp firmly. Her feet also should be supported while the pain lasts. For this purpose a sheet is generally fastened to the bed-post in such a manner that she can easily hold by it, while the nurse may support her feet by pressing a pillow against them. It is a very common practice to place between the knees a small pillow when the head of the child is beginning to press upon the perinæum, but you will find it both useless and inconvenient. The patient derives very little advantage from it; and it is constantly in the way when you wish to make a vaginal examination, or when the head is passing the vulva. On this point, we may be permitted to anticipate the consideration of the second stage towards its conclusion, and

observe that when the labour has so far advanced as to render the aid necessary which this is intended to afford, much more efficient assistance may be given by the nurse, if she raise the knee moderately with one hand and support the foot with the other.

Hygienic Instructions. When the second stage of labour has commenced, the patient experiences much more fatigue then she did before; as it continues, she feels exhausted by the struggle, becomes heated and thirsty, and often grows dispirited. Hence has arisen the pernicious practice of giving wine, spirits, and other such stimulants "to help her pains." You must imperatively *forbid heating drinks of all kinds* to be given to the patient. Such a practice would not only increase the sense of exhaustion when the stimulus had passed away, but it might also contribute to increase greatly any tendency to inflammation which might exist in the passages, while the head is passing through the pelvis. Barley-water, tea, thin gruel, or such like drinks only, should be given. A *free ventilation* of the apartment should also be secured; and at the same time care is necessary that your patient be not exposed to any draughts of cold air. For this purpose you must not fall into an opposite extreme, and, as is sometimes done, have the bed-curtains closely drawn to prevent all access of the air. In this manner the parturient woman has been kept in a vapour bath of impure air; an excellent excitant for miliary fever. On the contrary, it is better to have no curtains, or at least to have them only drawn sufficiently to prevent exposure to a draught of air. It is also very essential to have *as few persons in the room as possible.* You should only permit one person to remain with the nurse, the *nearest married relative* of your patient, with whom she will feel no restraint, and to whom she can communicate freely all her feelings. The officious assistance of friends should be sedulously shunned; it is often extremely disagreeable to the woman herself to have these witnesses of her suffering present; and, although she may silently tolerate the inconvenience because she is conscious of the kind motive which actuates them, still it is embarrassing and unpleasant. To the practitioner it is still more inconvenient, because

they are often unaccustomed to such scenes, and become alarmed at the agony their friend seems to suffer: their faces express even more distress than the patient's, and, like multiplying mirrors, reflect every pang she suffers with tenfold power. If this stage should continue longer than usual, their anxiety is proportionally increased. Anxiety is soon succeeded by a secret, if not open doubt, of the practitioner's competency, and their ominous expressions of distrust very rapidly produce a corresponding effect upon the patient. She soon becomes dispirited, and fearful for the result; so that, at a period when it is most important that the action of the uterus should continue regularly and efficiently, it may be altogether suspended. When years have given you not only experience but station in your profession, you may not be subjected to such misgivings; but be assured, that, in the opening of your career, when you are as yet but little known, and have to build up your reputation, you will be subjected to these inconveniences, if you are not decided in preventing them.

LECTURE XIV.

MANAGEMENT OF NATURAL LABOUR (*continued.*)

SECOND STAGE. — *Vaginal Examination.* When the second stage is about to commence, the proportion between the head and pelvis must be accurately observed, the exact position of the head ascertained, and the progress which it makes through the pelvis carefully noted. More than one vaginal examination is, therefore, necessary; but we must bear in mind, that the passages are now experiencing unusual pressure; there may be, probably, some congestion and increase of temperature, and this may be much increased if the vagina be irritated by frequent examinations. In order to obviate any injurious effects, nature provides a

resource in the increased discharge of slimy mucus which now flows abundantly from the vagina. But, if examinations be repeated too often, and the passages become irritated, this discharge is diminished; it may be arrested, and the parts become hot and dry; or perhaps it may be succeeded by a thin serous discharge, that rather increases the irritation. This change, therefore, in the character of the discharge, serves as an useful indication that caution is required in this respect. It had not been lost sight of by the older practitioners, who supposed that the frequent introduction of the fingers into the vagina dried up the parts by absorbing the discharge.

The *first object*, then, of a vaginal examination in this stage, *is to determine the proportion between the head and the pelvis.* For this purpose the fingers should be passed carefully between these in the interval of the pains; being directed, in the first instance, between the os pubis and head, and moved round on each side. The ear can be felt if there be sufficient space for the head to pass; but, if the head be high up in the pelvis, the finger can only just touch it. If the ear cannot be reached readily, and there seem to be a want of proportion between the head and the pelvis, you have still another means of testing the degree of disproportion, by examining the presenting part of the head. When this is only slightly compressed, the scalp is simply folded or puckered by the closing of the sutures; as the compression increases, these folds merge gradually into one, which ultimately forms a distinct tumour. This continues to enlarge; so that, in cases of impaction of the head, it is sometimes of great magnitude. The manner in which this change takes place, and its degree, generally afford sufficient proof of disproportion. If the tumour form very slowly, and never increase to any great size, you may infer that the head will pass safely through the pelvis; but if, on the contrary, it increase rapidly, and attain a great size, the indication must be unfavourable.

The *second object* of a vaginal examination is, to *ascertain the exact position of the head.* We have already pointed out the means of distinguishing the different positions from each other. We shall, therefore, at present only allude to those positions

which we are directed by some authors to alter as soon as they are found out, in order to prevent the head from becoming impacted in the pelvis afterwards.

One of these cases is when the head enters the brim in the left fronto-cotyloid position (p. 192). It is assumed that this cannot pass safely, but will cause great delay and difficulty in the labour: therefore, it is laid down that the correction must be made the moment the position is ascertained. We have already stated to you the experience of Naegele, confirmed by other observers ; that nature, if left to herself, will correct this deviation by rotating the head into the right occipito-cotyloid position. The probability is, therefore, that by meddling too soon you may prevent this, and prematurely force the head into a more unfavourable position than it has occupied. The moment this position is detected is not, therefore, the time for interference; it is more advisable to wait and observe the course the head will pursue. It may correct itself; it may advance and be delivered in the third position without injury; it may be arrested. The last is the only condition which would justify your aid. The head may then be displaced from its situation, and pressed back in the interval of the pains, and a *very slight rotation* is generally sufficient to make it glide easily in its proper direction when the pains return. The very same observation applies to those instances where the head and hand, or even arm, descend together. This accident is often the result of the pelvis being too wide, and, if so, both will be expelled without difficulty ; but sometimes the arm comes down a little too much and prevents the head from advancing, or the head may be arrested by the hand descending with it. In either case the hand or arm can be very easily pushed back when the pain ceases, and so maintained until the next pain advances the head, which generally passes down very rapidly as soon as the correction has been made When the head is in the cavity of the pelvis, there is not the same danger of displacing it as when it is only entering the brim; and consequently, our previous observations on this accident (pp,214-215) do not apply to the present case. You should not, therefore, when these deviations occur, too hastily assume

that the head cannot be delivered. It is more advisable to wait until they become causes of delay.

The *third object* of a vaginal examination is, to *note the progress which the head makes.* In natural labour, where no difficulty presents itself, a very few examinations, at proper intervals, will be sufficient for the purpose, because its advance is generally quite obvious; but in difficult labours, where the head makes a very slow progress, and there are other causes of embarrassment present, more care is required; their consideration, however, is beside our immediate subject.

Supporting the Perinæum. The position of the head, and its relation to the pelvis, having been ascertained, the next object of attention is its descent upon the perinæum. You must, therefore, be prepared to give the perinæum support the moment it suffers any degree of distension. The plan which I have found the most useful and convenient to adopt at this period of labour, is the following:—To sit behind the patient as she lies upon her left side, the back of the chair being towards the head of the bed; and while the head of the child is passing through the pelvic cavity, to press moderately with the left hand over the hip of the patient. Counter-pressure employed in this way is generally grateful to her, and seems to give her some relief; it assists also in keeping the pelvis fixed when the head is passing the perinæum, the most important part of this process. The left hand being so employed, the right can be used to support the perinæum. A single fold of a fine napkin should be placed along the edge of the perinæum, and the right hand so applied that the fold of skin between the fore-finger and thumb should correspond to this; the fore-finger and thumb passing on each side of the vulva, and the palm of the hand, resting against a thicker fold of the napkin, applied to the posterior part of the perinæum. By this means you have full power to make any counter-pressure with the palm of the hand which may be necessary; and, the fingers being quite close to the edge of the perinæum and vulva, you can easily trace the margin of the perinæum, and feel the head if necessary. Thus one hand fulfils the office generally assigned to two, and enables you to grasp with the left hand the

pelvis, to prevent the patient from moving away too suddenly when severer pains come on. If, the head being expelled, this be no longer necessary, you can employ the same hand to support the uterus during its contraction in expelling the body of the child. Beside these advantages, this method is certainly less fatiguing. The only inconvenience of it is that, when the funis is coiled round the neck of the child, so as to make it necessary that it should be removed, or that the delivery of the shoulders should be assisted, the hands must be changed, that the left may support the perinæum and the right make the required correction. But this is a temporary disadvantage, and only arises occasionally.

We shall suppose you, therefore, thus prepared to give the perinæum the required support; the only question is, when your assistance is needed. The young practitioner, fully impressed with the importance of preventing laceration, hardly ever commits the mistake of being too late in attending to this point. He very generally errs on the other side: he presses against the perinæum a great deal too soon, and causes unnecessary heat and irritation in consequence, which rather retards its distension. His mistake arises from supposing the perinæum in danger the moment the head touches it. We have explained to you that the head alternately touches and retreats from the perinæum, often for a long time before the perinæum suffers any dangerous distension. You must not, therefore, be too precipitate; it is better to wait until you feel the head protruding, with each pain, through the vulva; because at this time it is getting gradually upon the ischio-pubic ramus, against which it rests, while the anterior part of the head presses with considerable force against the perinæum. Caution is also necessary as to the manner in which the perinæum is supported. The object in view is to obviate the effects of too violent distension. The pains at this time are very unequal, sometimes weak and again very strong; you support the perinæum against the latter by moderate counter-pressure, to prevent accidents; but against the former no such precaution is necessary: you must not, therefore, press with every pain indifferently, but only when the uterus is acting with great force. Again, when the head is nearly protruded through the vulva,

anxiety to save the perinæum may be the cause of its rupture. For instance, if you attempt to draw the perinæum back over the head, it will be stretched too suddenly over the biparietal measurement, the widest part of the head. If, on the other hand, you push the head too much forwards, pressing with the pains from the sacrum towards the os pubis, the same effect will be produced in a different manner; you force the parietal portion of the head too rapidly through the vulva. At this point it is better to continue the same moderate counter-pressure, to make no attempt to hasten the delivery, and to allow the head to pass along the hollow of the hand, in the same manner as it moved along the curve of the sacrum.

Funis round Child's Neck. When the head is passing out of the vulva, you should direct it forwards; and when it is delivered, examine carefully lest the funis be coiled round the neck. If such be the case, and it be only a single coil, it will generally be sufficient to draw down a little more of the funis, and loosen it. A single coil seldom retards the delivery of the child, or arrests the fœtal circulation; but two and even three coils are sometimes met with, and the child placed in great danger of strangulation. In these cases, as much of the funis as possible should be brought down, and the coils so loosened that one may be drawn over the head. There are cases where this cannot be done, and the only resource left is to tie and divide the funis, and extract the child as soon as possible, in order that respiration may be established. This operation is hazardous to the child's life, and can only be viewed as the lesser of two evils.

Expulsion of Shoulders. If the funis be not about the neck, the perinæum must still be supported until the next pain, usually a tardy one, expels the shoulders. The same caution must be exercised as before, lest the arm or hand should lacerate the perinæum as it is coming out of the vulva. This should be particularly attended to in second positions of the head.

Sometimes the shoulders are very wide, and require to be assisted: this may be done by placing the fore-finger of the right hand within the axilla of the child's arm, on the pubic side, and guarding the perinæum carefully with the left hand. As soon as

the shoulders and thorax of the child are delivered, it can respire, and is, so far, beyond danger; no haste should, therefore, be used in extracting the body and lower limbs; it is preferable, to allow the uterus gradually to expel them, and, while it is doing so, the left hand should be immediately applied over the fundus, in order to maintain a moderate pressure upon the uterus while it is descending towards the pelvis. This should never be neglected; because it insures a uniform contraction of the uterus, and often the expulsion of the placenta into the vagina. When the child is born, such is the anxiety to remove it as soon as possible from the mother, that the tying of the funis is the immediate occupation of the attendant, while the uterus is generally left to itself. The motives assigned by friends for this haste, is their fear lest some accident may happen to the child: it may get cold, &c. Just as often the real cause is a little natural desire to see and exhibit it: you should not, therefore, suffer yourself to be hurried by these solicitations, nor withdraw your hand from the uterus until you have secured it, either by a temporary bandage applied in the manner we shall presently describe, or by the hand of the nurse, if she be sufficiently intelligent to understand your object. The latter plan is more convenient.

Management of the Funis. When the uterus is thus prevented from again relaxing, you may attend to the funis. The delay is serviceable to the child, because time is allowed for the transition from the placental to the pulmonic circulation, by which the latter is completely established before placental life altogether ceases. This is of great importance to the health of the child. When the pulmonic circulation is perfectly effected, that in the funis often ceases; but if its pulsations be felt, the funis may be tied if the child cry strongly. The manner of doing so is by applying a strong ligature of housewife thread, bobbin, or narrow tape, about two inches from the umbilicus, and a second about an inch further: the cord is then divided between the ligatures. You must be careful to see the part of the funis you are dividing, lest the fingers or any other part of the child should be in your way, and also in order to examine the cut surface of the umbilical portion. The blood should be squeezed out of the vessels, and the surface wiped

with a napkin, for the purpose of detecting any oozing of hæmorrhage that might take place if the funis were not properly tied. The child may then be removed, and the separation of the placenta attended to.

Third Stage.—*Removal of the Placenta.* If the bandage have not been previously used, the hand may be again applied to the fundus uteri, which is generally found in a semi-contracted state. With a little attention, you will presently observe it become harder from contraction, although the patient scarcely complains of it. A very moderate pressure on the fundus at this time is often sufficient to expel the placenta completely out of the vagina; but if not, it can be drawn out by the funis quite easily, directing the funis forwards in the axis of the vagina. But if the uterus should not obey the stimulus at first, it is always more advisable to wait for some time than to use too much irritation. Neither should an attempt be made to remove the placenta by the funis alone. By great violence, the funis may be broken, or the uterus inverted; and by pulling frequently, though less violently, at the funis to ascertain if the placenta be separated, an irregular contraction of the uterus is often excited. Passing the fingers into the vagina is often sufficient to excite the action of the uterus; and drawing the placenta by the funis may excite it still more. If the uterus contract, and the order of its action be not secured by the means already pointed out to you, the great probability is that, it being nearly emptied of its contents, the lower fibres will contract first, and retain the placenta. Thus, by too much pulling at the funis, the placenta may be retained. By a little caution, and by moderate pressure on the fundus of the uterus, you will generally secure its favourable separation. This being accomplished, the next and concluding object of attention is to preserve the uterus in that state of contraction which is so necessary to prevent subsequent hæmorrhage.

Abdominal Bandage. We have already explained the efficiency of the abdominal muscles, when they are strong enough to contract firmly upon the retiring uterus. But when these muscles are rendered inert from the constant distension to which they are exposed, they can give the uterus no support; and there is, consequently, a constant risk that the uterus may again relax

and pour out blood, if this want be not supplied by artificial means. Hence the use of the abdominal bandage. The mode of applying it demands attention; because it may be made useful or mischievous according to the manner in which it is employed, and many of the objections raised against its use have been founded upon its improper application. Sometimes it is bound so tightly over the uterus, that the patient can hardly breathe; or it may be so applied that the least motion of the patient displaces it, and it becomes twisted round the loins like a rope. All these inconveniences, distressing to the patient and useless for the intended purpose, arise from a mistaken view of the use the bandage is meant to fulfil. The waist is to be compressed into shape, and therefore the patient is bound up so tightly that she can seldom tolerate the pain of the bandage: it is soon loosened, and perhaps altogether discarded. A bandage properly applied may be made to effect two objects; one, to support the pelvis by compressing it as much as possible; another, to support the uterus by *moderate* and *equable* pressure over the whole abdomen. The articulations of the pelvis have undergone a great degree of tension during the passage of the head, and a dull pain sometimes remains, which is much relieved by counter-pressure. The uniform pressure of the intestines is necessary to prevent relaxation of the uterus. The mode of applying the bandage for these purposes is to commence by drawing it evenly over the pelvis, its lower edge, when so placed, being about one inch below the trochanter; this margin should be drawn as tightly as the patient will bear, and pinned securely below the right trochanter. The bandage should be again drawn and pinned in a similar manner across the ilia, so that the pelvis may be embraced by this portion of the bandage, about three inches in width, as tightly as possible. This having been accomplished, the remainder of the bandage should be drawn and pinned with moderate tightness, but equally from the pelvis to the diaphragm, so that the whole of the abdomen be included within it, and not permitted to project over the bandage in the unsightly manner which may sometimes be observed. When the bandage is properly applied, the patient always experiences comfort from it—a sufficient evidence of its utility.

There is a great variety in the materials employed for bandages. Sometimes a piece of calico or a napkin is used; and, again, you will find them more complicated in their mechanism than the most fashionable corset—both are equally inefficient. Calico and diaper are too unyielding, and, if pinned tightly, will hurt the patient; nor can they be employed unless they are so loose as to be useless. The *obstetric corsets*, if we might so call them, for drawing in the waist, are liable to all the objections which have been urged against bandages. It is necessary that a bandage should be elastic, so that, while it supports the abdomen, it may yield readily to its action; it should be sufficiently thick or firm not to wrinkle easily, should be soft in its texture, and at the same time strong enough to bear being tightly drawn. A double fold of flannel would answer the purpose, and has the advantage of being easily pinned; but if you remember the intention the bandage is to fulfil, your own judgment will best direct you to the kind of material which will suit your object.

From what we have stated, you will perceive that a bandage may be made useful or injurious, according to the manner in which it is applied. You should not, therefore, entrust this simple but important part of your duties to another. It is sometimes a practice to commit to the nurse its application; it would be imprudent to do so in the first instance, or so long as there is any risk of hæmorrhage from relaxation of the uterus; it will be sufficient time to leave its management to her when your patient is secured from danger. If ordinary discretion be used, it may be applied without offending the feelings of the most sensitive person; and therefore no motive of false delicacy should prevent the practitioner from fulfilling this essential duty.

When the bandage is applied, the folded sheet, etc., that had been placed under the patient during labour should be removed, and replaced by others dry and warm, in order that she may be induced to sleep, and that she may not afterwards be disturbed. It is more necessary to attend to this, because it too frequently has happened that hæmorrhage has been induced by imprudence on the part of the nurse, who, when the attendant has left his patient, immediately sets about making her "dry and comforta-

ble," and in doing so, causes so much excitement in the process of dressing her, and changing the bed-clothes, that hæmorrhage is the result.

The patient, after her delivery, always experiences a nervous shock, often very slight, but still sufficiently obvious. Although happy in her relief from suffering, and in the birth of her offspring, she still feels depressed; and this period, beyond all others, is that in which perfect repose is absolutely necessary. Too much caution cannot, therefore, be exercised to prevent her being disturbed. Having secured to your patient perfect quietness and freedom from interruption, your immediate duties are completed; but still caution is necessary, and, although you should retire from the apartment, it would not be advisable to leave the house for at least an hour after her delivery, or until she falls into a sound sleep.

Retention of Placenta without Hæmorrhage. It sometimes happens that the placenta is retained after delivery, without any hæmorrhage taking place; and although we shall have again to direct attention to these retentions, when accompanied by flooding, a few words may not be out of place here, in reference to these very frequent retentions, where no hæmorrhage arises. The causes generally assigned for retained placenta are either *inertia of the uterus*, *hour-glass contraction*, or *adhesion*; but one quite as frequent, if not more so, is *suspended action of the uterus*.

The former causes are generally attended by hæmorrhage, but with the latter it is very seldom the case. The placenta is retained, merely because the uterus is deprived of the necessary irritation to cause its efficient contraction, In such instances, the first contractions of the uterus not being supported, the organ becomes, as it were, accustomed to the presence of the placenta, and remains imperfectly contracted about it, without any further effort at expulsion. In this way, the placenta may remain two —four—six hours in the uterus without being expelled. If the rule which we have laid down be observed, and a steady but moderate pressure be maintained upon the fundus of the uterus during its contraction, this will seldom happen; but if the placenta be not separated then, it is better to wait for some time,

and again to excite the uterus to contraction. For this purpose, the fundus should be brought, as nearly as possible, towards the centre of the pelvis, and grasped firmly with both hands; as soon as it becomes hard, strong pressure upon it is generally sufficient to cause the expulsion of the placenta. If this should not be sufficient, do not use any violence; rather let the nurse, under your direction, maintain the fundus in the same position, while you pass the fingers, and, if necessary, the hand, into the vagina, in order to stimulate the uterus to contraction. For this purpose the funis should be held firmly in the left hand, and the fingers of the right hand passed along it within the vagina. Sometimes this alone excites contraction; but if not, all the fingers, in a conical form, may be introduced within it as far as the os uteri. In doing so, you will often find a large portion of the placenta lying at the upper part of the vagina; you may even feel the insertion of the funis; but do not attempt to withdraw it: pass the hand still towards the os uteri, and, by irritating it, the portion of the placenta that lies within the cervix is often detached, so that the whole placenta may be removed. If this be not sufficient, withdrawing the hand along the vagina for a short distance will excite contraction; but if both means fail, the fingers must be introduced in the same manner within the os uteri, to dilate it, when the upper part of the placenta may be grasped, and the whole removed. The assistant should press firmly on the fundus uteri while the hand is being withdrawn. In many instances the placenta is found in the upper part of the vagina alone, and can be very easily removed; but no attempt of this kind should be made until the hand has passed above it, so as to have it completely within grasp. When efforts are made to draw the placenta away by the lower portion, there is always a risk that it may be broken in the attempt, especially if it be caught by the cervix uteri. In one instance which came under our notice, a small portion of the placenta was adherent to the neck of the uterus, and the remainder being dragged away in this manner gave rise to hæmorrhage that terminated fatally.

Another cause of retention of the placenta without hæmor-

rhage, is *irregular contraction of the uterus*. This is excited, as we have stated, by drawing the funis frequently, for the purpose of ascertaining whether the placenta is separated. It may be attached to the lower part of the uterus, which is thus excited to contract. Sometimes, when the order of uterine contraction is not maintained, the circular fibres of the body contract, and not the fundus. To remove this irregularity it is necessary, not only to grasp the fundus firmly, as before mentioned, but to pass the fingers over the posterior wall, as low as the abdominal parietes will admit; when, if the irritation excite the relaxed portion, the order of uterine contraction is instantly restored and the placenta will be immediately expelled. In these cases of retention, it is seldom necessary to wait longer than an hour to have it removed; and if the uterus be carefully attended to during its contraction, and firm pressure afterwards used if necessary, you will very seldom have any occasion to wait so long, or to pass the hand into the uterus to withdraw the placenta.

LECTURE XV.

DIFFICULT LABOUR.

The first exception to the definition which Denman has given of natural labour is that in which labour exceeds twenty-four hours. It then becomes *Difficult Labour*. According to this definition, when the vertex presents, and no accident occurs, time alone would seem to be the criterion which is to determine the class to which labour is to be referred. This, however, is not the case; the definition is only of general, not of universal application; for while, on the one side, there are cases in which labour is so severe, and the obstruction so great, as to render it difficult, nay, even dangerous, before twenty-four hours expire, there are also instances, on the opposite side, in which labour may be prolonged

far beyond the prescribed period, and yet present no difficulty to the practitioner but that of sustaining his patience.

Classes of Difficult Labour. The causes which render labours difficult vary exceedingly. The delay arises sometimes in the first, sometimes in the second stage. In one instance, the constitution of the patient, or the rigidity of the passages, may retard the delivery; in another, disproportion between the head of the child and the pelvis may impede the progress of labour. It is necessary, therefore, to classify these causes; and for this purpose we would include, under the head of *difficult labour*, two subdivisions:—

1. That in which labour is merely prolonged beyond the average period, without being, at any time, unusually severe; it is then called *Tedious Labour*.

2. That in which, without reference to time, there is a powerful struggle carried on by the uterus to overcome some unusual resistance. This may be called by the expressive term *Laborious Labour*.

The causes which produce the former are most frequently met with in the first stage of labour; those that give rise to the latter, generally occur in the second. These divisions embrace a great variety of causes, which may be classed under several heads.

Tedious Labour may depend either on inefficient action of the uterus, or on rigidity of the passages; and as its consideration will form the subject of the present lecture, we place these causes before you in a tabular form, in the order in which we shall consider them.

Inefficient Action of the Uterus from—	*Rigidity of the Passages—*
1. Over-distension of the uterus.	1. Rigid os and cervix uteri.
2. Extreme obliquity of the uterus.	2. Contracted vagina.
3. Gradual escape of the liquor amnii.	3. Rigid perinæum.
4. Hysterical excitement.	
5. Mental despondency.	

Inefficient Uterine Action.—1. *Over-distension of the Uterus.* This cause of delay is not very commonly met with; but, when

it occurs and prolongs labour, the uterus is so immensely distended by the liquor amnii, that, like the bladder in retention of urine, it is for a time paralysed. The accumulation of fluid arises from a diseased condition of the amnion, which is often thickened and marked with broad patches of a white colour, as if lymph had been effused between it and the chorion. This thickening of the membranes and dropsy of the amnion generally accompany each other; but the delay in labour principally depends upon the latter cause.

When the uterus is thus over-distended, the grinding pains, which last only for a moment, return with longer intervals between them, and sometimes they cease altogether; so that, if the cause be unknown, the patient may remain for an indefinite time teased with these inefficient spasms of the uterus, or labour may be quite suspended. Very little attention, however, is sufficient to detect this condition of the membranes. In such cases, the child is generally small; and the evidence, through the abdomen, of its presence in the uterus, is not so manifest. The fœtal heart often cannot be heard; the placental murmur is indistinct, or may be absent; at the same time, the abdomen is greatly distended, and the sense of fluctuation over its surface general. When the vagina is examined, no presentation can be felt; the membranes, tensely distended by the liquor amnii, alone protrude through the os uteri. Such evidences are sufficient to determine the cause of delay; and, as the dilatation of the os uteri has generally made some progress with these tardy and feeble pains before the case can be considered tedious, the liquor amnii may be discharged without much risk of the os uteri becoming irritated; nevertheless, caution is necessary in this simple operation, because, if the liquor amnii be discharged suddenly, the violent gush of the fluid may derange the position of the child, or bring down the funis into the vagina. The safer plan would be to puncture the membranes within the os uteri as high as you can reach, so that the liquor amnii may escape gradually. This may be done with the elastic catheter. When the uterus is thus relieved, the pains increase in strength and frequency, so that labour generally proceeds rapidly to its conclusion.

2. *Extreme Obliquity of the Uterus* is the next cause of delay. This obliquity may be either *lateral* or *anterior*.

When the obliquity is *lateral*, the uterus is generally inclined to the left side of the abdomen in place of taking its more usual direction to the right side: it rests very much upon the iliac fossa, and the pains, which may be strong, have little effect upon the os uteri, although it be quite dilatable; this circumstance will excite a suspicion of the cause, but an examination of the uterus through the abdomen will at once determine it.

Mere change of position is sometimes sufficient to remove this difficulty. Those pains which had been short and irregular, and consequently ineffectual, while the patient lay on her left side, become steady and efficient when the patient changes to the right side. The dilatation of the mouth of the uterus proceeds rapidly to its completion, and the labour, that had been lingering for hours before, is often terminated by a few strong pains. If this mode be not sufficient for the purpose, a broad bandage may be applied round the abdomen, and drawn towards the right side as firmly as the patient can conveniently bear.

Excessive inclination of the uterus *forwards* may arise either from the pelvis being so shaped that the axis of the brim is nearly horizontal, or from weakness of the abdominal parietes; possibly from both combined. In these instances, the uterus is sometimes so completely displaced, that the direction of the fundus is reversed, and the uterus hangs down over the pubes so as to rest upon the thighs. Labour is, of course, impeded; but if the bandage be so applied as to draw the uterus gradually upwards, or even if it be supported by the hand during its contractions, labour will often advance rapidly to a favourable termination.

It is advisable to allow the patient to lie more upon her back than on her side; but, as there is a great difference in the position which different women find most favourable to their pains under these circumstances, we sometimes meet with cases where they lie, not only on their side, but with the body completely across the bed. This difference may depend upon the cause of the obliquity; if it arise from weakness of the parietes of the

abdomen, lying on the back would be the most likely position to correct this deviation; if it depend upon a horizontal aspect of the pelvis, the body would be inclined forwards, to lessen its distance from the axis of the uterus. It would be unsafe, however, to theorise too much on such a subject; and happily it is the less necessary, because nature generally prompts the woman to adopt the position which is the most favourable for her, You should not insist, therefore, too much on any given position, but rather let your patient try different postures, and accommodate yourself to that which she feels to be the easiest.

The mouth of the uterus is often greatly displaced in these cases: it is directed very much towards the promontory of the sacrum; and hence, in order to correct the obliquity, some have advised that the forefinger be passed within the opening, and the os uteri drawn towards the centre of the pelvis. How is it possible to alter the pendulous fundus by such means? But if, in order to correct the position of the fundus, it is also necessary that it be raised by the opposite hand, the introduction of the finger is not required, because then the mouth of the uterus will correct itself. Such means, therefore, should be avoided, because they are calculated to excite irritation.

Some serious mistakes, however, may be made as to the cause of delay, when the os uteri is absent from its usual situation. For instance; when the anterior lip has become so thin as to resemble the membranes, it may be mistaken for them, and this extreme tenuity sometimes takes place when the anterior lip becomes the most dependent part of the uterine tumour. The delay might easily be attributed to rigidity of the membranes, and the supposed membranes—that is, the uterus—accordingly punctured. Another error is, the supposition that the os uteri is either closed by a cicatrix, or is imperforate. A mistake of this kind has led to the sagacious operation of dividing the cervix to make an artificial os uteri: such an instance has been mentioned by Dewees (*Midwifery*, p. 90.) You should, therefore, always make the most careful vaginal examination, and you will seldom fail in finding the os uteri (often not larger than a sixpence) directed upwards towards the promontory of the sacrum.

3. *Gradual Escape of the Liquor Amnii* also gives rise to tediousness. If this take place when the os uteri is slightly dilated—in other words, when the latter is so long exposed to the pressure of the head of the child as to become irritated by it, the result is rigidity of the os uteri; and its consideration falls naturally under that head. But if the os uteri be dilated to any extent, and not easily excited by irritation, this accident may have an opposite effect, and hasten rather than retard delivery.

4. *Hysterical Excitement* is sometimes met with. Hysteria is one of the most frequent affections of the female constitution. When hysterical females become pregnant, and the period of parturition arrives, the practitioner has often to undertake the management of a case far more embarrassing than those in which mechanical impediments obstruct delivery.

As the time of her trial approaches, the patient becomes anxious and excited; she has perpetually before her mind this long-looked-for event; her attention is constantly alive to the most trifling circumstance that has reference to the suffering she has to undergo. Consequently, when at length the moment arrives, her mental excitement is strained to the highest pitch; labour has scarcely commenced when it is suspended by her anxiety, and is again renewed, only to be again interrupted in a similar manner. Proceeding in this irregular course, the first stage of labour may be prolonged considerably beyond the time it would otherwise occupy; and when this is the case, the patient (who from the beginning was not very tolerant of her suffering), being taken as it were by surprise, and never anticipating such delay, becomes still more anxious. She may possibly be alarmed for her safety; and then her mental inquietude bursts through all restraints: she begs urgently to be released from her agony; and if you hesitate to comply with a request to which you dare not accede, she loses all confidence in you; her impatience knows no bounds, every pain is interrupted by the most violent exclamations, and sometimes terminates in a fit of hysterical convulsions.

Such a case, therefore, requires the most careful attention, not only in its medical treatment, but in the circumspection that

is necessary in its management. Conversation should not be permitted within the hearing of the patient; none but her immediate friend and the nurse should be allowed to remain in the room; and while you use every exertion to give her encouragement, and, if possible, to lessen her excitement, you must not commit yourself by hasty promises. With regard to medical treatment, your chief attention should be directed to the state of the bowels. If it be in your power to enter upon a course of treatment before labour has commenced, your chance of success will be greatly increased. In many of these cases, there is great constipation previous to parturition; but in all, the evacuations are of an unhealthy character, dark, viscid, scanty, and offensive. A preliminary course of alteratives, combined with stimulating aperients will correct this condition, and lessen the hysteric influence; but if you are not given the opportunity for such treatment, and are for the first time called upon to take charge of the case when labour has actually commenced, it would be advisable to have an assafœtida enema given before labour has made any progress. Scybala lodge frequently in the rectum and large intestines, causing great irritation, which contributes to impede the action of the uterus. When the bowels are unloaded, chloroform may be administered in moderate doses with great advantage. When it is given sufficiently to relieve the intensity of the pains, the patient is immediately conscious of the difference; she becomes quite tranquil, grateful for the relief afforded her, and labour proceeds more rapidly to its termination. There are no cases, in which the advantage of moderate doses of chloroform in relieving pain without inducing sleep is more remarkable than these hysterical cases. Instances of this description are embarrassing to the practitioner from their tediousness, but seldom terminate unfavourably if they be properly treated. The same remark does not apply to the next cause of delay.

5. *Mental Despondency.* This source of difficulty is but briefly alluded to by the majority of obstetric authors. "Depressing passions of the mind" are enumerated among the causes that retard labour, but are not dwelt upon in proportion to their

importance. Fortunately, extreme cases of this kind are rarely met with; but instances might be quoted in which death was the result of such a cause. Cases are occasionally recorded of *unaccountable sudden death* after labour, which might perhaps be explained in this way, if all the circumstances of the case were understood; at least, the few instances that have fallen under our notice seemed to admit of such an interpretation. In one case, death would undoubtedly have taken place, had not the cause of depression been so obvious.

A poor emaciated woman entered the Dublin Lying-in-Hospital, in January, 1834, to be delivered of her eighth child. "Sharp misery had worn her to the bones"; her pulse was feeble, the action of the uterus weak: notwithstanding this, she was delivered in an hour after admission; no hæmorrhage took place, and the placenta was separated without any difficulty; but her delivery was followed by the most alarming depression, which required the utmost care and attention to prevent her from sinking altogether. Fortunately, strong beef-tea and other nutritious diet had been given to her from the time of admission; so that, with the addition of stimulants and maintaining the temperature of the surface, she gradually recovered. This was a case where poverty and starvation produced their usual effects, and consequently one more under the control of treatment than those melancholy instances, in which some cause operating on the mind alone produces an extreme nervous shock which we cannot relieve, because we cannot "minister unto a mind diseased." An instance of this kind occurred in the same institution the following year.

In January, 1835, a young woman was admitted in labour of her first child. She was evidently above the class of persons usually admitted into that establishment. She seemed rather to shun observation; and there were no symptoms attending labour that required interference. It proceeded to its conclusion without any interruption, and terminated within ten hours from its commencement. The pains were feeble, but they were sufficiently strong for the purpose: the patient herself appeared also weak. She was delivered of a girl; and in about half an hour afterwards,

the placenta was expelled; but the pulse instantly sank, syncope followed, and every means that could be used failed to prevent dissolution, although the discharge from the uterus was not increased, nor was there the least evidence of hæmorrhage, either internally or externally.

An inspection was made twelve hours after death, and no cause could be discovered to explain an event so unlooked-for; her history, however, may do so. She had been one of a respectable family, delicately reared, and educated in the strictest moral principles. She had been seduced, betrayed, and deserted; and, to complete her miseries, had to endure her hour of trial in the reception-ward of the Dublin Lying-in Hospital. We shall only mention another instance of this kind, which will, perhaps, more distinctly illustrate the effect of extreme nervous shock.

In the beginning of the year 1834, a poor woman had walked some distance to the Dublin Lying-in Hospital, and, when near it, was suddenly seized with the pains of labour. She was delivered in the street, and was with much difficulty brought into the house before the placenta separated. It came away, however, without difficulty; and the trifling hæmorrhage that followed was easily arrested. Her alarm was very great, but after some time it subsided: she slept, and nothing further occurred out of the usual course until the following day. On that morning a patient was brought into the same ward to be delivered, who was extremely boisterous: she occupied the next bed to this woman, who lay so quietly that she seemed to pay little attention to the disturbance. In the course of the day, however, she complained of being overcome by her cries. She felt faint, as if she were sinking; she had slight pains in the epigastrium, some sickness of stomach, pulse rather rapid, compressible, and soft. The woman who caused this was fortunately delivered, and thus all further annoyance was removed; but this patient did not recover from the effect that it seemed to produce on her. Stimulants were given to her; the extremities and surface were kept warm; and the most perfect quietness observed in the ward, but all to no purpose. In the evening she was seized with syncope, so alarming as to excite the greatest apprehension for her safety: the extremities became

cold, her motions passed involuntarily, and she died in about three hours. The uterus was perfectly contracted; there was not the slightest appearance of hæmorrhage from the vagina, nor any symptom present to explain the cause of dissolution.

A very careful inspection was made after death. All the viscera of the abdomen were quite healthy; the uterus was firm, and contracted to its usual size. There were some old adhesions in the lungs; the heart was small, and contained very little blood on the right side; the vessels were all sound; and the only alteration in the brain was an increased quantity of serum in the ventricles and at the base. No other explanation therefore was left, but the probable one that she sank in consequence of extreme nervous shock. Her own sudden delivery produced a strong impression on her mind, in the first instance. This was again excited and increased by the violence of the patient alluded to; and hence the effect. It is probable that she would have recovered from the first shock, had it not been renewed by this accident.

These instances will illustrate the influence of the mind on the constitution at this critical period: they are fortunately rare, but those cases where the same cause operates in retarding, and sometimes in suspending, the action of the uterus, are more frequently met with. The sympathy (to use a popular term) that exists between the brain and the uterus is matter of daily observation; the change of feelings and temper that frequently result from pregnancy, the hallucinations that occur after delivery, from the slightest temporary aberration to long-continued mania, all prove the influence of the uterus on the mind. So, on the other hand, a disturbed mind suspends the action of the uterus, just in the same manner as it interferes with the healthy action of the digestive organs. As in the latter class of cases you find the appetite gone, the digestion imperfect, the liver disordered, and the bowels constipated, so, in the former, parturition may be greatly prolonged, and the patient may recover with difficulty from the effect of a labour that otherwise would have been happily concluded within the average period.

The patients differ altogether from the hysterical class. There

is no restless excitement about them; on the contrary, they submit to their suffering with a quiet resignation, which might be called fortitude, only that the feeble pulse and listless expression pronounce it the indifference of despair. The patient meets her trial without hope, with the settled conviction that she will not escape. The sufferings that attend the birth of her offspring are only lighter pangs added to the accumulation of sorrows that have already overwhelmed her; she therefore makes no complaint, no inquiry; but the pains are feeble, the dilatation of the os uteri is consequently slow, and the labour protracted. The uterus is evidently unequal to the required effort.

You have no clue to unravel the intricacy of these symptoms, as you are, of course, never informed of their cause. Nevertheless, the quick and feeble pulse may excite suspicions; the tendency to chill and the coldness of the extremities will increase them; and the constant although passive watchfulness of the patient will confirm your apprehensions.

The moment the nature of the case is perceived, no time can be lost. A treatment is required, the opposite to that generally employed. Stimulants may be given moderately, carefully observing their effect; the temperature of the surface and extremities must be attended to, and the bowels (which are always constipated) relieved by warm and stimulating enemata. Ergot of rye in moderate doses, to excite the specific action of the uterus, is useful.

You may thus succeed in securing a favourable dilatation of the uterus, before the patient becomes exhausted; so that, in the second stage, the uterus may retain sufficient power to complete the delivery in a short time; but if this be not the case, artificial assistance becomes necessary, in order to abbreviate its duration as much as possible. When the child is partly born, you must be careful, also, not to withdraw it too rapidly from the vagina and uterus, because the danger that attends the case is not confined to the effect of tediousness in labour; you have still to guard against the syncope that may follow the complete contraction of the uterus. It should, therefore, be permitted

to expel the remainder of the child very gradually, while an equable pressure is maintained by a broad bandage over the abdomen.

Rigidity of the Passages. This may exist either in the cervix uteri, in the vagina, or in the perinæum. At present we shall confine our attention to rigidity in the cervix uteri.

Rigid Cervix Uteri. We shall first speak of those cases where the rigidity has been induced by some *accidental cause*, and secondly, consider *idiopathic rigidity*.

Accidental Rigidity from Escape of Liquor Amnii. If the os uteri be much exposed to irritation, it is rendered rigid; the lips become swollen, hot, and tender: when these signs present themselves, the cervix is less disposed to yield to the action of the uterus, and becomes rigid. One of the most frequent causes of this kind of rigidity is gradual escape of the liquor amnii, by which the head of the child descends upon and irritates the cervix. If this irritation be long continued, you have to contend, not only against the effect of inflammation, but also against a spasmodic contraction of the fibres of the body of the uterus round the child. When this happens, an additional resistance is offered to the action of the fundus. In the treatment, therefore, promptitude is necessary. If the patient be strong, plethoric, and disposed to make violent straining efforts, a free depletion from the arm will be of much use; it diminishes the tendency to inflammation, and produces a feeling of exhaustion in the patient, which induces her to bear her pains more patiently. In order to ensure such an effect, depletion may be followed by tartarised antimony, in small doses, so as to excite nausea. Women who may have been previously very violent and intolerant of their pains, are soon subdued when the sense of exhaustion that attends sickness is excited. If, on the contrary, your patient be of an opposite temperament, this treatment cannot be employed; local depletion is preferable; a dozen leeches may be easily applied to the cervix uteri; warm emollient enemata may be given, and, if the woman be much fatigued, or if the pains become feeble and irregular, an anodyne is often very beneficial; some sleep is procured, the irritation of

the cervix is diminished, the spasmodic contraction of the fibres disappears, and the pains return with more regularity and strength.

From Compression of the Head against the Pelvis. Another cause that renders the cervix uteri rigid, from a tendency to inflammation, is its accidental compression by the head against the pelvis. Sometimes the mouth of the uterus, partially dilated, is driven down with the head into the pelvic cavity, where it may be tightly wedged between the head and the pelvis. Cases are recorded in which the whole cervix uteri has been completely separated by a circular slough, and expelled with the head. In order to avoid this, it is necessary to use every means to combat inflammation, and to prevent, as far as possible, the effects of extreme pressure. Local depletion, either by leeches or by scarification, may be employed with advantage; and, when the pains cease, the head should be pressed back towards the brim, to relieve the constriction of the cervix uteri. This plan of treatment, with warm emollient enemata, which act as fomentations, will generally succeed; but if the impaction be so great as to render it impracticable, instrumental aid becomes necessary. The consideration of this we must defer to another opportunity.

From Constriction of the Anterior Lip. The cervix and os uteri may suffer only a partial constriction, and thus become inflamed, and retard delivery. The head of the child may rest on the pubic side of the pelvis in such a manner as to compress the anterior lip of the uterus, and prevent its dilatation. A band is thus formed before the head; and, when long pressed upon, becomes swollen, tender, and rigid. The treatment of the cervix when in this state has become a kind of *vexata quæstio* in obstetric practice. Some practitioners of station and experience have advised that the anterior lip of the os uteri be pushed up by the fingers, above the head, in the interval of the pains, and there maintained until the returning contractions of the uterus drive the head below it; while others of equal reputation deem such practice objectionable, and calculated rather to increase than to diminish the difficulty, by exciting more inflammation. We may

mention the late Dr. Hamilton of Edinburgh, as holding the former opinion; Dr. Collins of Dublin, the latter; as a proof how men of very extensive experience often arrive at opposite conclusions on what would seem to be a simple practical point. It is our duty neither to draw you into controversy, nor to give you too dogmatic an opinion on a question so nicely balanced by authority. We must assume, on the evidence of Drs. Hamilton, Burns, and Breen, that this kind of artificial dilatation may be accomplished in some instances with safety and success. Our own experience, however, confirms that of Dr. Collins, and is opposed to this practice: the opportunities we have had of putting it to the test have taught us that success is by no means so easy as it is described to be; that the anterior lip may be pressed back again and again, and yet return to the same situation as before; that it is difficult to get the head to pass the introduced finger; and that these attempts, when unsuccessful, only increase the swelling and inflammation of the soft parts. We have also met with instances in which, after a failure of this kind, the anterior lip was retracted without any assistance, when the contractions of the uterus succeeded in at length altering the direction of the head. It appears to us, therefore, that this kind of manipulation may be employed, and would be serviceable if the fingers were placed against the head of the child, in order to relieve the constriction of the anterior lip, and to direct the head more towards the pelvic cavity. We are still, however, disposed to object to the practice of artificial dilatation of the mouth of the uterus. There are certain cases in which it may succeed—those in which the cervix is thinly expanded in front of the head. In such cases, when the cervix is pressed above the descending head, it sometimes slips up altogether; but if it should not do so, and these attempts be frequently repeated, the thin cervix becomes thick and tender, and will not yield. When the cervix is compressed between the head and the os pubis, and becomes swollen and inflamed, attempts at artificial dilatation only increase the inflammation, and of course the resistance: pressure should be directed against the head, not against the cervix. In some cases this difficulty is produced by malposition of the uterus—

"anterior obliquity." The patient should lie on her back; and the fundus of the uterus should be supported during the pain. By this means, and by pressing the head well back, the cervix may be at once drawn up.

From Hypertrophy of Anterior Lip. The anterior lip is sometimes hypertrophied, and projects so much before the head that it seems to be the cause of difficulty. It is scarcely necessary to say, that time would be very fruitlessly employed in an attempt to push back this hypertrophied portion of the os uteri.

Idiopathic Rigidity. Toughness. That condition of the cervix uteri, to which we have applied the term *toughness* (borrowed from Dr. Hamilton), is often met with. The os uteri forms a thick gristly ring, rather dry, and without tenderness. It yields very slowly to the repeated efforts of the uterus, and hence the stage of dilatation is generally very much prolonged; but, so long as inflammation is not excited, no injury is caused by the time occupied; nay more, these cases often recover more rapidly than where the labour is short, although severe. The treatment is altogether of a negative character; rather to watch attentively the progress of the labour than officiously to attempt to hasten it. Every care should be taken to prevent inflammation from taking place; and vaginal examinations should be made as seldom as possible. The patient should not be suffered to fatigue herself by endeavouring to assist the pains, and by fruitless efforts to shorten her sufferings. The room should be kept perfectly cool; and, as there is generally very great thirst, heating drinks should be strictly forbidden: warm emollient enemata may be given with advantage; and if a stimulus be required to excite the action of the uterus, the addition of common salt in a moderate dose will generally answer the purpose. In such a case as this the first stage may occupy thirty, forty, fifty hours without injury; but if attempts be made to hurry it to a completion, either by mechanical dilatation or by ergot of rye, they will only cause inflammation. The former is a direct, the latter an indirect irritant; because, when the uterus is much excited to contract by the specific action of the medicine, the membranes are

broken prematurely and the head is driven forcibly down upon the undilated os uteri.

The patient may become fatigued and dispirited by the continuance of this stage, and the pains feeble and inefficient. When such is the case, a full dose of opium is often very serviceable; and the nearer the time of natural rest at which it is given, the more likely it is to succeed. A woman who has been fatigued by constant pain during the day, will often sleep the greater part of the night after an anodyne, and awake quite refreshed by her sleep. The dilatation of the os uteri then proceeds more rapidly to a favourable conclusion. Time, in fact, is the only remedy for this condition of the passages.

Cartilaginous Os Uteri. The last kind of rigidity to which we shall have to allude is that in which the os uteri is like cartilage, and will not yield to the most powerful and constant action of the uterus; the membranes are usually broken and the waters discharged early in this stage, and therefore the uterine action is increased to its full extent. Inflammation is the almost certain consequence of the struggle that ensues; you have, therefore, complications of the worst description to contend against. The issue of a case of this kind is the spasmodic and irregular contraction of the uterus about the body of the child, and frequently its death, before the uterus is opened to any extent. It therefore becomes a case for delivery by perforation. But there are some instances in which the dilatation is brought to a successful termination by extreme care in the management of the case. As a preliminary treatment, the frequent use of the warm bath is found to be very beneficial. When labour begins, warm emollient enemata should be given from time to time, and the patient placed at once under the influence of tartarised antimony. General depletion may be employed if the patient be robust; if she be otherwise, local depletion is preferable, and it is indicated as soon as the least tenderness of the os uteri is observed.

If these means fail, it becomes a question whether we should wait for the death of the child, in order to remove it by the crotchet, or incise the unyielding cervix. The former practice involves a sacrifice of life, but generally secures the mother from

the injurious effects which may follow. The latter may be the means of preserving the child; but if the incision lead to a laceration of the uterus, the mother is at once placed in the most imminent danger of her life. The fear of such a consequence, it appears to us, has prevented any attempt from being made thus to cut through this Gordian knot of difficult labour in its first stage; but whether this, like other operations, is only surrounded by chimeras of the imagination, which some bold spirit will dissipate, remains yet to be proved. Incision has been performed without accident; the same may happen again, and we confess, in a case such as we have described to you, we should be more disposed to adopt the shorter course, in the hope of saving the child, than to wait until its death enabled us to remove it. This, however, is but an individual opinion, and needs support.*

LECTURE XVI.

LABORIOUS LABOUR.

The causes of delay in the second stage of labour we have now to consider. Difficulties in this stage are produced either by disproportion between the head and the pelvis, or by some mechanical impediment obstructing the head in a pelvis that otherwise would permit it to pass. In cases of disproportion, the cause may exist either in the head of the child or in the pelvis, or in both combined.

The Fœtal Head as a Cause of Delay. The head of the

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* Since these observations were first written (1845) several cases have been recorded in which the cervix has been incised, the child saved, and no mother lost. *Vide* Mr. Tweddle's case (*Guy's Hospital Reports*, vol. iv. p. 119); Mr. Butler's (*Medical Gazette*, vol. xx. p. 589); Dr. Buckminster's (*American Quarterly Journal*, Oct., 1847); Dr. Pagan's (*Edinburgh Monthly Journal*, Aug., 1854, p. 172).

child may be a cause of difficulty from its *irregular position*. It may be *too large*, or *too much ossified*, or it may be *hydrocephalic*.

Irregular Position. We have already sufficiently dwelt upon the positions of the head (p. 188); very few observations upon them as causes of delay in labour will now be necessary. Some of these positions, as face and face-to-pubes presentations, have been assumed as, rather than proved to be, causes of difficulty. We have shown that the majority of these cases terminate within the ordinary period. Nevertheless, there are some exceptions in which labour is prolonged, and in which danger may arise if a judicious treatment be not adopted.

When the head is arrested with *the face towards the pubes*, you will have no difficulty in detecting the position by the rule we have laid down; neither, when the head ceases to advance, is it hard to correct the position. Sometimes the correction may be made with fingers; but it is preferable to introduce the vectis on the pubic side of the pelvis, to press the head back in the intervals of the pains, and to rotate it gradually towards the sacral side. When we say "gradually," we mean that you should rather trust to frequently repeated efforts to give the head its proper direction, than to make a violent attempt to change the position in the first instance. The adoption of such a course would only end in disappointment, and complicate your difficulties. It is obvious that in these cases the head should not be suffered to remain too long arrested; because it may be impossible then to alter it, and you will be compelled to extract the child with the forceps—an operation which, in such a case, would be one of no little difficulty, and dangerous to the soft parts of the mother, especially to the perinæum. Every effort should be made to rotate the head, if possible, with the forceps, before extracting it.

If the *face-presentation* be in a similar manner arrested, as few vaginal examinations as possible should be made, merely such as are sufficient to determine the arrest; when this is ascertained, the forceps must be used. But it is very improbable that you will meet with a case where such an operation is necessary.

That accidental displacement by which the *antero-posterior measurement of the head is fixed across the cavity of the pelvis* has been already alluded to (p. 195). This is the most easy to correct of any of these deviations; but if the head be left too long arrested, you may not be able to press up the forehead with the fingers; the vectis may therefore be applied for the purpose of altering the direction.

The last irregularity is when *the forehead becomes the presenting part.* In these rare cases, it may be possible to correct the position, if detected sufficiently early; but if the head is forced down low in the cavity of the pelvis it cannot be done, and the forceps must be used to extract the head, which will be found a most difficult operation.

The next cause of difficulty we have stated to be that in which *The Head of the Child is too Large and too much Ossified.* This will require a more attentive consideration, because it appears to us that this increased development of bone occurs most frequently in male children; and through the elaborate researches of Professor Simpson of Edinburgh, we now have statistical proof that—1. "The dangers and difficulties of parturition are *greater to the mother* in male than in female births;" and 2. "The dangers and accidents from parturition and its results are *greater to the child* in male than in female births." Professor Simpson correctly attributes these effects to the greater size of the head at birth in male infants; a fact already noticed by the late Dr. Joseph Clarke, of Dublin. We should be disposed to add, that not only is the size greater, but the ossification of the bones is more advanced, and therefore they are less disposed to yield. The head of the healthy male child is rounder, and the fontanelles are smaller: that of the female is more oblong, and the fontanelles are more distinct. These characters, along with the increased size, contribute to produce greater difficulty in its passage through the pelvis. The head being too much ossified, is therefore a very frequent, and too often a very embarrassing cause of delay in the second stage of labour. When a vaginal examination is made, the posterior fontanelle is not distinctly felt; it seems to be only a central point to which the lambdoid and sagittal sutures converge; the sagittal suture is indistinct, the head presenting a round

firm, equal surface. When the head is so formed, it will generally pass safely through a pelvis of the average proportions, although slowly and with difficulty. It is when the pelvis deviates from the standard, and is diminished in its proportions, that these difficulties increase to a dangerous extent.

As far as we have had the opportunity of judging, this kind of head is very often met with when the pelvis is in a similar condition—too much ossified. We shall have again to bring before your notice the varieties of the pelvis which have been described to you in the commencement of the course; and we shall beg you to attend especially to that variety which possesses many of the characters of the male pelvis, and to take it in connection with the large, round, ossified head of the male child. This is of essential importance when we have to compare it with other varieties in the head and in the pelvis, and to derive from these facts a conclusion as to rules of practice. At present, we shall only direct your attention to the propositions which have been quoted as established by Professor Simpson. The valuable report by Dr. Collins, of the practice of the Dublin Lying-in Hospital, has been the basis of his calculations. We are happy to have it in our power to confirm Prof. Simpson's statements by the results of our own experience in the same hospital. All those cases having been noted in which the duration of labour extended to or exceeded twenty-four hours, the following results were obtained in reference to this question.

There were in the total number of patients delivered (5699), 213 such cases, of which five were twin-births; 126 of these were boys, and only 92 girls, or in the proportion of three to two. Forty-six of the boys died, thirty-five of the girls, being more than one-third of the whole number. About eighty of these 213 cases occurred when that hospital was under the superintendence of Dr. Collins, and are therefore included in 16,654 cases reported by him; the remainder were observed during the two years subsequent to that report. These facts establish that the majority of cases where labour is difficult are those with male children; and, as the greater size of the head is proved to be the cause, the difficulty must be in the second stage, and they belong, therefore, to the class of laborious labours which we are now considering.

Hydrocephalus. The next cause is of a very opposite character. The hydrocephalic head, it is true, is enormously increased in its size, but its ossification is retarded; and it might rather be compared to a bag of fluid than to the solid tumour which the head generally presents. Hence some of these cases are attended with no difficulty; and instances have occurred to me, in which the head, though morbidly enlarged, passed easily through the pelvis; but, on the other hand, some of the very worst cases in obstetric practice have depended upon this cause. As a proof, we place before you the very opposite results of the practice of Dr. Collins and Dr. Lee on this point. Dr. Collins reports six cases in which the child was still-born, from hydrocephalus. In three of these cases labour lasted only one hour; in a fourth only two hours; the fifth was twenty-six hours in labour, not stated to be severe; the sixth was brought into the hospital, after being thirty-two hours in severe labour. In none of these cases did the mother suffer. In contrast to this, Dr. Lee gives five cases:—one twenty hours in labour; one, sixty hours; one, seventy-two hours; the fourth stated as being "very long;" the fifth, "too long" in labour. In three of these cases, the mother died; two of them in consequence of the uterus being ruptured. These last two cases are detailed at length by Dr. Lee in his *Lectures.** Dr. Thomas Keith quotes 74 cases of hydrocephalus recorded, in sixteen of which the uterus was ruptured. (*Simpson's Obstetric Works*, vol. i., p. 654.)

If it were necessary to bring forward additional proofs to convince you of the importance of educating the sense of touch so as to distinguish the different positions of the head, such instances as these would afford abundant evidence. It is obvious that, if the cause of delay were known to be hydrocephalus, no patient should be suffered to remain "very long in labour." The disease is fatal to the child; and if the head be arrested, there is no other operation than to perforate the head with a trochar and

* It is right to state, that these cases, recorded by Dr. Lee in his *Clinical Midwifery* (pp. 54—60), were cases in which Dr. Lee's assistance was required, not those attended by him from the commencement of labour.

discharge the fluid. The trochar should always be used in the first instance; because, when the fluid is thus drawn off, the head may descend through the pelvis and the child be born *living*. We have met with one such instance; and if it be possible to check this disease by tapping and pressure in a child a year or two old, there is no reason why such treatment should not succeed at birth. The practice is self-evident when the cause of difficulty is understood. But when a patient is allowed to remain under such circumstances too long in labour, it can only arise from an imperfect education in the sense of touch, in consequence of which the true condition of the head is unnoticed. Those who are quite satisfied that the head presents, without caring how it is situated, will be liable to those mistakes; but when, by a constant and careful attention, a facility in recognising its different positions is acquired, the remarkable change which hydrocephalus produces will at once be detected. The increased size of the posterior fontanelles, the mobility and separation of the sagittal suture, the great overlapping of the parietal bones during a pain, if the head have entered the pelvic cavity, and the general looseness of these bones, will sufficiently point out the nature of the case and determine the practice.

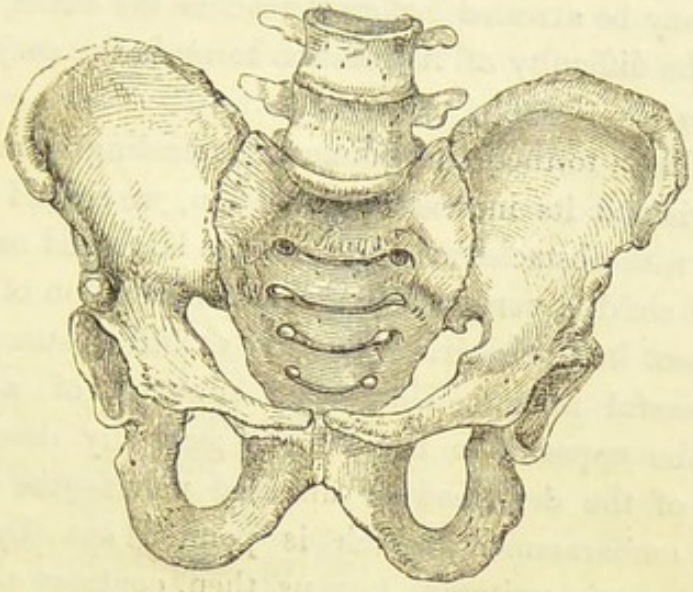
Such are the principal causes of difficulty depending upon the head of the child, in the second stage of labour. The most important of these is certainly that in which the head is too large and too much ossified—the head of the male child. Let us now turn to the

Difficulties presented by the Pelvis. To prevent confusion, we shall assume that the head presents in the first position.

It will not be necessary again to enter upon a detailed description of the varieties in the irregularly formed pelvis; it will be sufficient to recapitulate briefly these leading points of difference that are of practical importance; and with this view we shall consider that form of pelvis which has been described as *resembling the male pelvis*, to compare it with the *pelvis deformed by disease*, and observe the points of contrast between them. The pelvis resembling the male is more osseous than the standard pelvis; the diseased pelvis less so. The former we shall call the

masculine pelvis, and proceed to consider its especial characters.

Fig. 60. *



Masculine Pelvis. Its *weight* is greater than that of the ordinary pelvis, in consequence of the increased deposition of bone; but, what is more important, this deposit occurs in most unfavourable situations. The symphysis pubis is very narrow, and a bony ridge is sometimes formed behind it. The spine of the ischium is longer, and drawn inwards. The ischiatic tuberosities are larger and rougher, from the same cause. There is much less mobility in the sacro-coccygeal articulation; and the sacro-iliac synchondrosis is perfectly unyielding.

Its *shape* is unfavourable to the passage of the head. The brim is rather lessened in its transverse and oblique measurements; but the difficulty which this pelvis presents is not generally at the brim, it is rather at the pelvic cavity that an arrest or impaction takes place. The cavity is much deeper than in the standard pelvis, and becomes narrower towards the outlet. The head often passes down almost to the outlet, and then becomes *impacted*, because the pubic arch is too narrow to

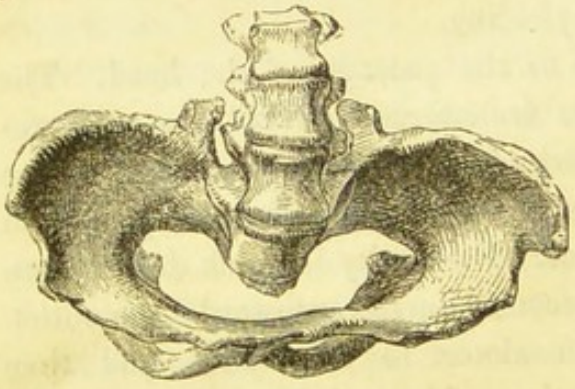
* Fig. 60. Masculine pelvis.

allow the occiput to escape from the cavity; it is therefore driven down still further, and becomes fixed between, or above, the tubera of the ischia. Its advance is also opposed by the resistance of the coccyx, and perhaps by the spines of the ischia. The head may be arrested before it reaches the outlet, in consequence of the difficulty of its rotation towards the conjugate axis of the pelvis.

If, in addition to these impediments depending upon the shape of the pelvis and its increased ossification, we should be obliged to contend with obstacles arising from the large and ossified head of the male child, a very embarrassing combination of difficulties would present itself, requiring the most skilful treatment to bring to a successful issue. They are, however, of a character perfectly the opposite to those more generally described—the difficulties of the deformed or diseased pelvis—the only source of pelvic embarassment which is pointed out by the majority of obstetric writers. Let us, then, contrast the one with the other.

Diseased Pelvis. The *softened pelvis* has *a less deposit of bone* than the standard pelvis. The symphysis pubis is often wide and perfectly smooth; the ischiatic tuberosities small. The articulations are less resisting; and we might add, on the authority of some recorded cases, that the pelvis itself is capable of some degree of expansion. The shape of the diseased pelvis is never uniform. In that which is generally attributed to *rickets*, the brim is *oval*, and, in the extreme deformity, is of an hour-glass shape; the cavity is shallow; the outlet very wide; the coccyx abruptly curved (fig. 61).*

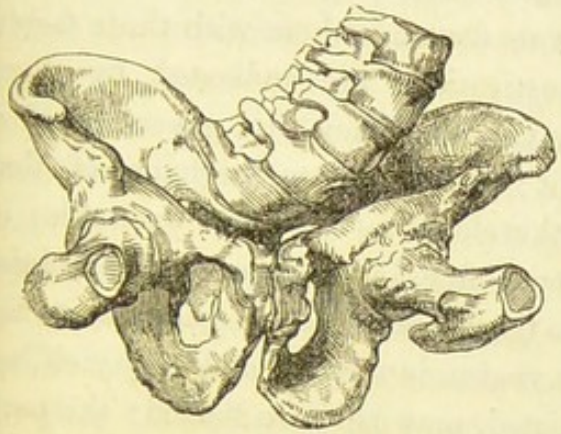
Fig. 61.*



* Fig. 61. Ovate pelvis: case of Elizabeth Sherwood.

The principal difficulty in such a pelvis is at the brim, the antero-posterior measurement being too narrow; but if this be overcome, no other impediment presents itself but the coccyx, which although abruptly curved, is generally sufficiently flexible to oppose but slight resistance to the head of the child. In that deformity which is ascribed to *mollities ossium*, the *cordiform pelvis*, its irregularities impede the passage of the head both in the brim, cavity, and outlet (fig. 62.) If the head pass through the cordiform brim, it is still opposed in the cavity by the planes of the ischium, which are pressed inwards: the pubic arch is also too narrow to allow the head to escape. The coccyx is abruptly curved in the same manner as in the rickety pelvis, from which it differs in the close approximation of the ischiatic tubera. The extreme of such a deformity would render the passage of the child impossible; it is only, therefore, to cases of slighter deviation into this irregularity that our present remarks must apply: we would call attention to those instances alone where the head of the child may pass through the pelvis slowly, or may be drawn through it with difficulty.

Fig. 62.*



Contrast between the Masculine and Diseased Pelves. Assuming that the cavity in both the masculine and the diseased pelves presents the same apparent contraction, the difference in the degree of ossification must cause a corresponding difference in the degree of opposition to the passage of the head. The articulations of the softened pelvis, although not actually moveable (even this is asserted by some), are yet capable of yielding, to a certain extent; the bones themselves may admit of slight expansion, and if we might admit the probability that the head of

* Fig. 62. Cordiform pelvis: case of Elizabeth Thomson.

the child is also less ossified, we shall perceive a strong contrast to the difficulties which the masculine pelvis presents under apparently similar circumstances.

The contrast is not confined to the pelvis alone; but there is a similar difference in the constitutional strength and temperament of the parturient woman.

We have already briefly alluded to the characteristics of those strong, muscular, masculine women with whom the pelvis is unusually ossified, who have often great rigidity of the passages, and with whom we sometimes find that almost undilatable rigidity of the os uteri. Let us contrast them with those feeble habits, whose unhealthy constitutions are indicated by these evidences of disease in the pelvis. They are generally of a leucophlegmatic temperament; the subjects, perhaps, of that cameleon disease, hysteria, therefore nervous and excitable; of fair complexion, soft skin, bones fine, but swollen at the joints; the flesh often flabby, and the tissues relaxed. In such habits the os uteri is seldom rigid; the vagina is smooth, and very yielding, and, if leucorrhœa have existed, may be even flaccid; the perinæum is also quite dilatable. Inflammation is not so readily excited in the passages as in the former case; and the whole difficulty of the case in this second stage is, as it were, centred in the pelvic deformity.

It should be also noticed, as a constitutional difference, that in these feeble habits the uterus does not possess the same energy; it is sooner fatigued, and exhaustion would be more readily induced if its action were greatly prolonged, than in patients with masculine pelves. Thus two cases which present precisely the same apparent amount of resistance to the passage of the head may be perfectly opposed in every other respect; and consequently the same treatment, if applied to both, might be mischievous to either. It is essential to point this out, because rules of practice are too often laid down by authors, as being applicable indifferently to all cases which present the same amount of disproportion; and hence a great deal of useless controversy has sprung up as to those rules, in consequence of the opposite experience of the disputants. For example, if the

question be as to the rule when instrumental aid is called for; the practitioner who meets with the diseased pelvis as his chief cause of difficulty, and, living perhaps in a manufacturing town, or another unhealthy district, finds the majority of his patients to be those we have just described to you, would find that he could not suffer his patient to continue in labour beyond a certain period, without great hazard to her life and to his own reputation. He would also have it in his power to deliver his patient with the forceps successfully where the disproportion was such that, had it been the masculine pelvis, he would do irreparable mishief. It is not surprising, therefore, that his opponent, accustomed to a healthy district, and meeting with cases where the chief difficulty arises from a pelvis of the latter kind, should wonder and protest against such temerity. The judgment of each, as to the rule, may be correct; but the experience upon which it is founded being different, the opinions must of necessity be opposed when they attempt to argue *a particulari ad universale* (as logicians have it), without exercising a just discrimination on those points of difference that have been pointed out.

Modes of Retardation of the Head.—*The Head may not be able to enter the Brim of the Pelvis.* This may happen when the head is hydrocephalic, or when the brim of the pelvis is much deformed. In the former case, the moment it is ascertained, as has been already stated, the head must be perforated. In the latter, it is of importance to determine the degree of disproportion in the brim, in order to decide on the practicability of delivering the child. In the extreme deformity of either the ovate or cordiform brim, when the antero-posterior measurement is, perhaps, only an inch or an inch and a half, it would be impossible to deliver *per vias naturales*;* and, therefore, the Cæsarian section, or what might be called delivery *per vias præternaturales*, becomes a question for consideration. But the deformity may not be extreme, and yet the head may be prevented from entering

* In Elizabeth Sherwood's case, delivery was effected by the crotchet, when the antero-posterior measurement was less than an inch. But this exception is so remarkable as rather to prove the rule.

the brim. It is such cases as these that cause the practitioner the most embarrassment, and which present to him the greatest difficulty as to the course he should pursue.

It is for the purpose of determining the rule in these cases, that our professional mechanicians have contrived an endless variety of *pelvimeters*. The simplest, and, we might add, the most efficient pelvimeter, is the hand of the practitioner. If it be the educated hand of the experienced obstetrician, the evidence is certain; but even the attentive student may acquire much accuracy by observing a few simple rules. In ordinary vaginal examinations, when one finger only is introduced, the superior part of the sacrum is quite out of reach. When the point of the finger, therefore, touches the upper part of the sacrum, it is evidence that the sacrum must be pressed too much forwards; but if it touch the promontory, or just below it, the contraction at the brim must be such as to render it very doubtful if the head can pass. The length of the forefinger is four inches; but from the resistance of the soft parts, as well as of the remaining fingers which are without the vulva, not more than three inches of the forefinger can pass within the pelvis. If, therefore, the distance between the pubic arch (taken below the subpubic ligament and soft parts adjoining) and the promontory of the sacrum be only three inches, that between the superior surface of the symphysis and the same point must be less than three inches. It may, then, be taken as a rule, that if the forefinger touch near the promontory of the sacrum, the head will not pass. In more doubtful cases, there are other modes of examination to confirm these suspicions. In some cases, when the cavity and outlet are very wide, the whole hand may be introduced, and the degree to which the fingers are pressed upon when passed towards the brim of the pelvis will be a guide. In the standard pelvis, the fingers may be slightly separated from each other. In the pelvis which is contracted at the brim, but through which the head might pass (at least to a certain distance), the fingers are pressed close, but not so as to overlap each other. In greater degrees of disproportion, the fingers cannot be passed forwards without overlapping; and the degree to which this takes place will indicate the amount of contraction in the brim of the

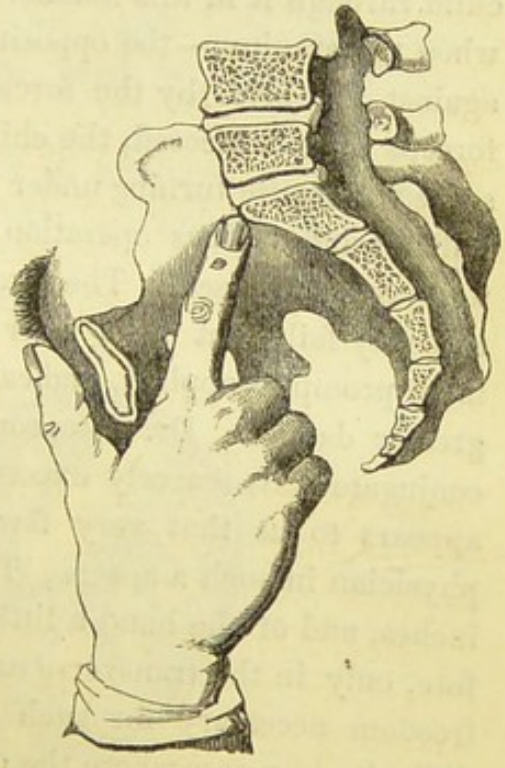
pelvis. In extreme cases, three, two, sometimes even one finger will hardly pass between the sacrum and the os pubis. In other cases, where this cannot be done in consequence of the outlet being also distorted, you have, in this circumstance, additional evidence of the character of the pelvis.

When, as in the ovate pelvis, the outlet is wide, two fingers may be introduced, and one applied to the promontory of the sacrum, the other to the symphysis pubis, a finger of the opposite hand may be placed between them, and then withdrawn. The distance between the introduced fingers, thus prevented from closing, may be measured, which will give the conjugate axis with tolerable accuracy.

Fig. 63.*



Fig. 64.†



The measurement being ascertained, the next question is the *mode of delivery*. If the conjugate axis be only three inches,

* Fig. 63. Measurement of pelvis by fingers. Size normal.
† Fig. 64. Measurement of pelvis by fingers. Sacrum projecting forwards.

the head may be forced within the brim, and become fixed there; but if it should not, we have the choice of three operations—the long forceps, turning, or perforation. The last operation, which destroys the child, must be rejected if either of the others are practicable. Dr. Simpson delivered a child by turning, when the conjugate axis but little exceeded two and a half inches. The question rests, therefore, between turning and the long forceps. By the former operation, the child, when brought down, is made to act against the pelvis like a prolonged wedge—the feet, body, and shoulders succeeding each other in increasing measurements; and when we arrive at the head, the base of the cranium, the narrowest and firmest part, is first brought through, the head still acting like a wedge on the pelvis. If we assume that the ovate pelvis is capable of expansion, drawing the child through it in this manner must be far more efficient than when the cranium—the opposite end of the wedge—is brought against the brim by the forceps. On the other hand, if the forceps should succeed, the child is much more likely to be preserved; because turning under such circumstances is necessarily a difficult and tedious operation, and therefore the funis may be too long compressed. The forceps operation is the more difficult, and may fail; but it is safer for the child. Turning may be more promptly applied, and cannot fail; but the child is in much greater danger. Dr. Simpson succeeded in turning when the conjugate axis scarcely exceeded two-and-a-half inches; but it appears to us that very few could succeed like this eminent physician in such a space. The breadth of the wrist is three inches, and of the hand a little more; the hand can pass, therefore, only in the transverse axis, and cannot be moved with the freedom necessary for such an operation. We met with this difficulty in a case where the conjugate axis was $2\frac{3}{8}$ inches. The child was turned and extracted still-born; but the operation was the most difficult we ever performed. It seems to us, therefore, that turning cannot be performed if the conjugate axis be less than three inches; neither will the forceps succeed, although it may be tried.

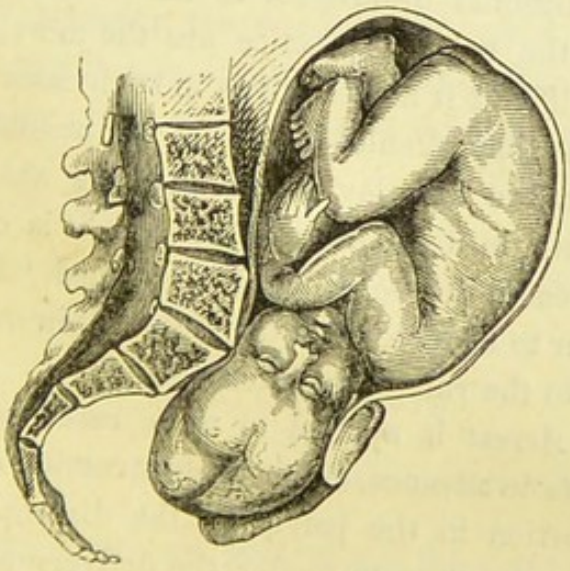
The only operation which remains is perforation and extraction with the crotchet. If the child must be sacrificed, every effort

should be made to save the patient; and therefore a protracted and useless labour should be avoided. When the diminished space is accurately ascertained, and sufficient time given to prove that the head cannot pass, craniotomy must be performed. When the conjugate axis diminishes to an inch and a-half, a limit is placed even on this operation, which we shall consider when speaking of the Cæsarian section.

The Head may become fixed within the Brim. This may occur with any of the irregularities of the pelvis that have been described to you. The degree of disproportion may be just sufficient to allow the head to enter the brim, and no more; but as, in the majority of these deviations, the cause retarding its advance exists in the pelvic cavity, such instances may be most conveniently included under the next division. At present, we would direct attention to one, and only one, variety of the deformed pelvis, where the head is often fixed in the brim.

In the *ovate pelvis* (that which is produced by rickets), the conjugate measurement of the brim is diminished, while the

Fig. 65.*



* Fig. 65. Head fixed in the brim of the pelvis.—(*Smellie.*)

transverse and oblique are increased; the cavity is shallow, the outlet wide. When the head, therefore, has entered the brim, and is there arrested, the conjugate measurement is the only cause of obstruction; but if this difficulty can be overcome, the head will rapidly advance. Such seems to be precisely the case where the long forceps may be applied with the most success. The shape of the brim is very favourable to its application, and if the head can be drawn through the brim safely, no further difficulty remains. When the head is thus fixed in the brim, its long axis corresponds exactly to the transverse measurement. The biparietal space is compressed between the sacrum and the os pubis, hence it would be impossible to feel the ear of the child; the sagittal suture is overlapped; but there is always sufficient space between the head and the sides of the pelvis to introduce the blades of the long forceps.

The Head may pass through the Brim, and remain obstructed in the Cavity. This division embraces the largest number of cases you have to consider, and the most important. It is to this that the observations apply which we have previously made, in reference to the large and ossified head of the male child, the masculine pelvis, the cordiform variety of the deformed pelvis, and the constitutional differences to be noticed in these cases. It is here that the rules of practice are the most contradictory; and however difficult it may be, it is in such cases of the utmost importance that they should be, as far as possible, determined. We shall therefore first lay before you the characters of this obstruction, both in its slighter form, when it is called "*arrest*," and in its increased degree, when it is named "*impaction*," and then endeavour to deduce, from the facts within our reach, a safe conclusion as to the rule of practice.

The term *Arrest* is applied to those cases where, although the head ceases to advance, either the obstruction does not depend upon disproportion in the pelvis, or the disproportion, when it exists, is not so great as to render the delivery of a living child impossible. For instance, when the uterine pains are feeble and inefficient, if the position of the head be unfavourable, or if the arm descend with the head, its progress may be *arrested* without

any irregularity in the pelvis. The term *Impaction* is employed when the head not only ceases to advance, but when there is every evidence that its further progress is beyond the power of the uterus. The use of this term is therefore confined to those cases in which there is great deformity of the pelvis, or to those in which a very large and ossified head is wedged in the deep narrow cavity of the masculine pelvis.

When the head is *arrested* in the pelvic cavity, it may be readily distinguished from the *impacted* head. In cases of arrest, if the head be slightly pushed back, the finger can be passed with facility between the head and the pelvis; the ear may be touched; the parietal bones do not overlap each other strongly; the scalp is only puckered; or, if a tumour be formed on the presenting part, it is diffused, increases slowly, and seldom attains any magnitude. When the head is *impacted*, it cannot be so easily displaced; it is impossible, without force, to pass the finger between it and the symphysis pubis; the ear cannot be felt; and the urethra is compressed. The parietal bones are strongly overlapped; and cause the sensation to the finger that is expressed by the homely simile of "the sow's back"; a tumour grows very rapidly, and to a great size, often completely obscuring the character of the presentation; the vagina is also swollen and congested. If, however, the death of the child take place, the head becomes less in size, softer, crepitant, and œdematous, while the serrated edge of the suture may be felt still more distinctly.

LECTURE XVII.

LABORIOUS LABOUR (*continued*).

In the preceding lecture we pointed out the manner in which the head may be impeded in the pelvic cavity, and explained the terms used to designate the different degrees of disproportion. We shall now bring before you the effects that result therefrom,

the symptoms that indicate danger in labours of this class, and the general treatment required to secure the patient from injury. We shall then endeavour to determine, as far as possible, the circumstances that justify artificial assistance, and the nature of the aid that is called for. In speaking of the second stage of natural labour, we directed attention to the striking change in the action of the uterus when the waters were discharged and the os uteri fully dilated. The action then becomes much more powerful, and the effort to force the child forward is assisted by every muscular aid that can be called into action by the patient. Hence the danger that may arise if the advance of the child be opposed by any unusual resistance from the pelvis. If the head be arrested, but still more if it become impacted, the most serious consequences may follow, if not prevented by a judicious treatment. It is therefore necessary, in all such cases, to watch very closely any alteration in the symptoms that accompany the struggle, in order to foresee the approach of danger, and to act with that promptitude and decision which the circumstances require.

The unfavourable results that follow these labours, and, indeed, the majority of all difficult labours, depend generally upon one of two causes—*inflammation* or *exhaustion*.

Inflammation of the passages may arise, and, if it proceed to any extent, may terminate either in slough of *some part of the vagina* (more especially the vesico-vaginal septum, because most exposed to pressure); or in the slough of the *whole vagina*, if the inflammation assume an erysipelatous character; or perhaps in slough and laceration of the *portion of the vagina connected with the neck of the uterus*. Each of these consequences, although differing in degree, is equally to be avoided. It is therefore important to observe the earliest symptoms of inflammation.

Exhaustion of the Uterus. When the uterus becomes powerless, artificial assistance is absolutely required to deliver the child. The danger, however, does not consist in this necessity, but rather in the cause that led to it. Atony of the uterus is not easily produced; but when it occurs, the shock to the constitution is very great. Sudden death has been the consequence of

it; and the patient is always placed in imminent danger, because of the symptoms of constitutional disturbance which present themselves. Besides this, the uterus having lost to a certain extent its power of contraction, hæmorrhage may be the result; and this increases the exhaustion of the patient, and, consequently, the danger of the case.

Hence, one of the most serious effects that can follow prolonged labour is, that the patient becomes, in the true meaning of the term, exhausted. It is one that should be guarded against by every precaution, and which justifies the most prompt interference, the moment any indication is given of such an unlooked-for alteration in the constitution of the patient. But do not confound exhaustion with mere fatigue. Fatigue is the ordinary effect of long-continued exertion, and, therefore, of long and severe labour; exhaustion, a very rare result of it; nevertheless, the term exhaustion is applied indifferently to express both effects. The patient will tell you that "she is quite *exhausted.*" Her friends will exclaim, "that she will sink from *exhaustion* if not relieved." This language is well understood and appreciated by the intelligent practitioner in cases where there is no exhaustion whatever; but we fear we must add, that it is an appeal very readily listened to by some who are not quite so prudent, and who feel quite as much inconvenience from fatigue as the patient. You must not be betrayed into impatience from such a cause, but rather steadily observe the character of the labour, and be prepared to recognise the earliest symptom of exhaustion the moment it presents itself. Thus you will be able to interfere with promptitude when your assistance is required, and, on the other hand, will not be hurried by these urgent solicitations into an unnecessary, and perhaps an injudicious, attempt to terminate the labour.

When the head of the child moves very slowly, or ceases to advance through the pelvic cavity, the second stage of labour is often greatly lengthened. In such instances, the uterus continues to act for a certain time with the same power as before; but if no effect be produced, its action is suspended in the same manner as in the first stage, only for a shorter time. When the pains

are renewed, they are not so strong as before; the uterus seems, as it were, conscious of the difficulty; the pains are shorter, although very often severe. At this time the woman is disposed to use every effort to force the child forward, and, impatient of the delay, will strain with all her strength: failing in her object, she becomes alarmed and dispirited, and her mental anxiety still further interrupts the action of the uterus. She should therefore be dissuaded from fruitless attempts of this kind, because nothing is so well calculated to excite inflammation, if not to produce exhaustion. It is more necessary to point out this, because the patient is too frequently recommended to adopt this very practice. She is often desired "to bear down with her pains," and "to assist herself" at a time when she can give herself no assistance whatever.

After this comparatively feeble action of the uterus has continued for some time, the pains return in their former strength, especially if the patient have had even momentary sleep. If the difficulty be still insuperable, they may either again cease, or continuing, may produce inflammation of the passages.

Symptoms and Treatment of Inflammation. When inflammation is in the least degree indicated, the pains are very short, extremely severe, and in their intervals the patient still complains of pain and a feeling of soreness. If the uterus be examined through the abdomen, you will observe a very perceptible difference in the sensation it communicates. It feels almost as hard and contracted in the interval as during the pain; the patient cannot bear to have the abdomen touched. Besides this alteration in the character of the pains, we have other symptoms, both local and general, to guide us. Febrile irritation, which had been previously absent, shows itself; the pulse becomes quick, frequent, and not easily compressed; the tongue is dry, and the patient has great thirst; the countenance is anxious, and the features are slightly collapsed; there may be a distinct rigor, but more usually there is but a slight chill. Locally, the vagina becomes hot, tender, and dry from cessation of the mucous secretion; or, if the inflammation increase, a serous discharge may be substituted. When inflammation thus commencing is neglected, and

it extends to the uterus, there are further local changes depending upon the effect produced on the contents of this organ. The membranes undergo decomposition; and then a thick, yellow, oily, and very offensive discharge flows from the vagina. This is increased if, the death of the child having taken place, its tissues undergo a similar change. You should bear in mind, however, that there are cases where the death of the child may have taken place either in the beginning of labour, or before it has commenced. In such instances, putrescency may take place rapidly, and appearances similar to those just mentioned might present themselves without any inflammation having existed; you must not, therefore, confound the dark and fœtid discharges from the vagina, that depend upon such a cause, with those that occur in connexion with inflammation of the vagina and uterus.

When the head remains in the cavity of the pelvis, and the least tendency to inflammation is manifested, the most prompt and decided measures are necessary. In strong and plethoric habits, free general depletion, followed by nauseating doses of tartar emetic, emollient enemata, and local fomentations, will check the advance of inflammatory symptoms, and give time to determine the important question as to the delivery of the child. In those feeble constitutions where you have reason to dread lest exhaustion should ultimately take place, you cannot employ general depletion, nor any means that would reduce the strength of the patient to any extent. It is preferable to deplete locally, to use fomentations, enemata, and, after the bowels are evacuated, to give a *moderate* dose of liquor opii sedativus, combined with some diaphoretic. Inflammation does not so readily arise in these cases, and when it occurs it is more easily arrested; but exhaustion would be much more likely to follow prolonged labour than in those more robust constitutions to which we have alluded. Both cases demand an equal attention; but it must be directed to a different object. We shall therefore briefly detail those premonitory symptoms that indicate the approach of exhaustion.

Symptoms and Treatment of Exhaustion. When the uterus is becoming weak, and its strength is, in the strictest sense of the

term, almost exhausted, the pains become short and inefficient, the intervals between them longer, and sometimes they are quite suspended; but, the nervous system being excited, the patient derives no advantage from such suspension. She does not sleep, but continues watchful, anxious, and restless; the pulse is increased in frequency, is very easily compressed, and its pulsations are disturbed and rendered irregular by the most trifling causes. The countenance of the patient is peculiar. To say that it is collapsed would not convey its exact expression. Watchfulness and anxiety are portrayed on features that equally indicate languor and listlessness. An observable change takes place, but to explain how is not easy. If these monitors be neglected, further symptoms of constitutional disturbance will soon present themselves. Constant watching, increased restlessness, hurried respiration, irregular chills, and slight delirium, all rapidly succeed each other, and hasten to the most unfavourable conclusion. When there is the least reason to apprehend exhaustion, promptitude in delivery is imperative; but before interference is thus called for, much may be done to prevent its necessity. Rest is very important in these cases, because it is an evidence that the over-excited nervous system is tranquillised; therefore, when the pains are becoming weak, or return only at long intervals, a moderate dose of opium is often of great service: if the patient sleep, even for a short time, the uterine action is renewed with much more power. After a temporary rest has been thus produced, if the uterus still continue to act feebly, ergot of rye may be given in an equally cautious manner; carefully attending to its influence on the pulse, and especially on the circulation of the fœtus. If in either case, after giving this medicine, the rate of the pulsations be diminished, you must not persevere in its employment, otherwise the death of the child may be the result.*

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* Ergot of rye should be given with great caution. Its effect has been closely observed by Dr. Beatty, and he is led to the following conclusions:—

"That the administration of ergot to a woman in labour is attended with danger to the child, whenever a time sufficient for the absorption and trans-

It is also necessary to be careful to avoid the use of *secale cornutum*, if the delay in this stage arise from great disproportion between the head and the pelvis. It must be obvious to you, that in a case like this it would be very dangerous to use a means

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mission of its noxious properties elapses before the child is born. The degree of effect produced differs with the time that elapses between the exhibition of the dose and the birth of the child. Hence, the ergot should never be given in any case where there is a likelihood of the labour lasting more than *two hours* after its administration; except when it may be employed to save the mother's life; and secondly, if delivery is delayed to two hours, we should resort to artificial assistance to save the life of the child." —*Dublin Journal.*

Dr. Hardy has since made its effects the subject of his observation, and has drawn up a series of tables to determine—

1. The period after administration that its action commences.
2. Its effects on the maternal pulse (when any), and how soon evident.
3. Its effects upon the fœtal heart (when any), and how soon produced.
4. The state of the uterus and lochial discharge during convalescence, in cases in which it has been exhibited.

1. It appears that, in some cases, ergot of rye acts on the uterus so soon as seven minutes after its exhibition, whilst in others a much longer period of time is required; from about ten to fifteen minutes may be stated as the average. In those cases where the children have been expelled alive, I (Dr. Hardy) have always observed the action of the uterus to commence within twenty-five minutes. On the other hand, when a longer period than this elapses before the uterus takes on action, the use of instruments has been necessary to perfect the delivery, or the children have been dead-born.

2. In nineteen cases there was a marked diminution in the frequency of the mother's pulse, following the administration of ergot. This effect generally began to take place from about fifteen minutes to half-an-hour. In all these instances, when the depression of the pulse occurred, the fœtal heart underwent a similar change. In several cases where the circulation of the patient underwent this depression from the action of the ergot, the effect continued several days.

3. In the majority of cases, a diminution in the fœtal heart's pulsations followed the exhibition of ergot. The period at which this effect begins to be produced, varies from fifteen minutes to half an hour. The most common effect is a diminution in the frequency of the pulsations; this is succeeded after some time by an irregularity in its beats, which irregularity continues, more or less, until the sounds intermit, and at length after a variable period become quite inaudible. In those cases where the number

of exciting the action of the uterus, over which you can have no control. A preparation which exerts a specific influence on the uterus, which often causes the most violent action, and that not returning at intervals, as ordinary pains do, but which excites a *continuous* effort of the uterus to expel the child, is not the safest to employ when there is much resistance opposed to this action. The remedy is useful, however, when cautiously administered, in those cases where the delay chiefly arises from want of power in the uterus, which may be exhausted if not thus artificially stimulated to action.

Delivery of the Child in Protracted Labour. Having given

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of pulsations have been steadily reduced below 110, and *at the same time with intermissions*, the child will rarely if ever be saved, although its delivery should be effected with the greatest possible speed.

4. The volume of the uterus is often found much greater than after ordinary labours. In addition to this enlarged state of the uterus, it has sometimes a firmly contracted feel, which generally continues for several days. In a few instances the lochial was rather pale and scanty, although nothing unfavourable occurred during convalescence to account for this circumstance. With some few exceptions, the women had generally good recoveries. The children that were born alive, all, with one exception, did well. In this case, delivery was effected by the forceps, as the fœtal heart had fallen so low as 100 from the exhibition of the ergot. It died in three hours after delivery.

General Results of Dr. Hardy's Tables.

Cases in which the uterus expelled the child alive	7	
Cases in which the children were born alive by the application of the forceps or vectis (after ergot was given)	7	
		—14
Cases where the uterus expelled the child dead-born (after ergot) .	15	
Cases in which the forceps or vectis were applied (after ergot), but the children dead-born	6	
The children dead (from ergot), delivery effected by the crotchet .	13	
		—34
		48

Dublin Journal, vol. xxvii. p. 224.

From the above summary of cases given by Dr. Hardy, it appears that in forty-eight cases where ergot of rye had been given, thirty-four children were still-born,—nearly three-fourths!

this brief outline of the general treatment necessary in these protracted cases, we shall now enter upon the more difficult question of their management to secure the delivery of the child, assuming that instrumental aid is not rendered imperative by the presence of inflammation or exhaustion. It is hardly necessary to state that there is every variety in the degree of disproportion between the head and the pelvis. In some instances, it is so slight that the child may be safely delivered without any assistance; it will only occupy a longer time in passing through the pelvis. In others, the amount of difficulty may be so much increased as to render it doubtful whether the head can pass without assistance; and it is in these cases that the rules which are given for your guidance are the most contradictory. Again: there may be a still greater disproportion, in which you can have no doubt about the improbability that the head can be expelled by the natural efforts of the uterus, although there is very great doubt, and no little dispute, as to the means by which the head must be extracted. Lastly, in occasional instances the narrowness of the pelvis is such, or the magnitude of its distortion is so great, that the safe delivery of the child is hopeless: the head must be lessened; the child must be destroyed before it can be brought into the world. In extreme cases, even this cannot be done; but recourse must be had to the difficult and dangerous operation of removing the child from the uterus by laying it open, in order to save the mother from the dreadful alternative of dying undelivered.

In those cases of slight deviation from the standard pelvis, where there is every evidence of space sufficient for the head ultimately to pass, if nature be allowed time for the purpose, you would not, of course, interfere with her; although we believe instances might be quoted where *very adroit operators* have, even in such cases, relieved the tedium of a long attendance by a ready application of the forceps. It is sufficient to say that the united testimony of the profession, given in every standard work of midwifery, is opposed to such a practice; and if any accident should arise from this mischievous meddling, the operator is fully responsible for all the consequences that follow from it. But in

those more doubtful cases, in which there seems hardly sufficient space for the head to pass safely through the pelvis, the practice is not so clear, nor is the evidence of the profession so unanimous on the subject. When, in such instances, the head is actually arrested, and so remains for some hours in the same position—a sufficient length of time to satisfy you that the uterus cannot advance it; if the ear can be felt, or the finger be passed easily between the head and the pubes, you may use the forceps to deliver the child, and we think the weight of authority will support your practice. But when the head is not so arrested, but, at the same time, advances so extremely slowly that it seems to be arrested, you have here the discordance of authorities at once confounding you.

In the last generation, we find Burns, Hamilton, and Campbell, advocating prompt interference when the second stage is making such slow progress; while Wm. Hunter, Osborne, and Denman, were opposed to the use of instruments so long as the natural efforts seemed adequate to their object. At the present time, Dr. Collins has laid down the rule "that so long as the head advances *ever so slowly*, the patient's pulse continues good, the abdomen free from pain or pressure, and no obstruction to the removal of urine, interference should not be attempted unless the child be dead."

This principle has been severely attacked; and in the controversy a new and very important question has been raised by Professor Simpson, which if true, would decide in favour of interference in all such cases. He has shewn from statistics that mortality is increased in direct proportion to the length of the labour; that a labour of four hours' duration is more fatal than one of two hours; one of eight hours than one of four; and so on. Hence the inference that protracted labours are dangerous because of the *time* they occupy. We have given this important proposition the reflection it so justly merits; but confess we cannot coincide in the conclusions drawn from it. It seems to prove too much; that not only are the longest labours the most dangerous, but that the shortest are the safest: neither of these propositions has the support of our experience. The dangers of

protracted labour depend upon many causes; and, if the constitution be good, *time alone* is the least injurious. Rapid labours are attended with risks from which those of moderate duration are free. We do not think, therefore, that the shortest labours are the safest, or the longest *in time* the most dangerous. This question must be determined by individual experience; because there are many causes of error very difficult to remove from a statistical calculation, which would lead to a false conclusion. The time which labour occupies involves the question—What causes the delay? If a difficulty exist leading to a fatal result, the death is attributed to the time occupied, not to the obvious cause: so that it may be perfectly true that labours are dangerous in proportion to their protraction, and yet not true that the danger consists in the time occupied. Dr. Simpson has taken Dr. Collins's tables as the basis of his calculation. These were derived from the Dublin Lying-in Hospital exclusively. In that Hospital, women were frequently brought in when labour had made considerable advance. Those delivered in one, two, or four hours, may have been a much longer time in labour before they entered the Hospital. The actual duration of labours under six or eight hours in that Institution was quite uncertain. These statistical results may prove that every hour spent in the Hospital increases the danger to the patient; but this proves nothing with regard to labours of one, two, or four hours' duration; because in such cases there was no certainty as to actual length. The time stated in the report was the duration of labour *while in the Hospital.*

With every wish to avoid controversial questions, that before us is too important to pass over. Professor Simpson's able researches have been quoted as an authority for the most unscrupulous use of instruments. Women in perfectly natural and even easy labours may be delivered by the forceps; and if they be persuaded that it is dangerous to allow the labour to proceed when it can be at once terminated, the argument is a justification for immediate delivery. Thus those whom Dr. Blundell well describes as "obstetric reprobates" go about with the forceps to

deliver the child the moment it comes within reach, and will quote Professor Simpson as their authority for the practice.

This practice is not new; Chamberlen and Roonhuysen followed it when the forceps and vectis were first invented. The mischiefs done by the followers of these men led a succeeding generation to protest strongly against this abuse, some eminent and experienced men, as Osborne, almost excluding the forceps from practice; and thus, ever since, a struggle has been going on between those who consider the art of midwifery to be the quick delivery of the child, and those who believe it to be the art of assisting nature to overcome a difficulty. Those names who stand highest as men of eminence and of the largest experience are perfectly agreed upon the impropriety of unnecessary interference, or, as Blundell describes it, "mischievous meddling."

Professor Simpson's statistics show the proportionate mortality in protracted labours, but do not, could not, state the mortality if the duration of labour were shortened by instrumental interference. It is assumed that the mortality would diminish; but this is not proved. We have endeavoured to determine this question in the only way which seemed to us practicable; by comparing the results where the forceps had been used to conclude labour, and where it had been allowed to proceed in a protracted course to terminate without assistance.

For this purpose, the only reports upon which we can depend are those of the Dublin Lying-in Hospital. In all others we have forceps operations, and the results to mother and child, but we have no knowledge of the effects of merely protracted natural labour.

In this respect, therefore, these reports from their fulness and accuracy are especially valuable. Three reports have now been published, giving the results of different—we might say—opposite practice under precisely the same circumstances.

Reports of	Total Cases.	Natural Labours above 24 hours.					Forceps Cases.					Vectis Cases.				
			Mothers.		Children.			Mothers.		Children.			Mothers.		Childre	
			L.	D.	L.	D.		L.	D.	L.	D.		L.	D.	L.	D
Dr. Collins	16,654	324	299	25	263	61	24	20	4	16	8	3	3	..	3	.
Drs. Hardy and Mc. Clintock	6,634	171	162	9	119	52	24	19	5	11	13	17	17	..	8	
Drs. Johnston and Sinclair	13,748	247	235	12	198	49	200	189	11	171	29	..	..	..	..	.
	37,036	742	696	46	580	162	248	228	20	198	50	20	20	..	11	

The total of these reports give the following results: 742 women having labour protracted beyond twenty-four hours, were delivered without aid; 46 died, being nearly in the proportion of 1 to 16: 162 children were lost, being in the proportion of 1 to 4·6: 248 women were delivered by the forceps, and of these 20 died, or 1 in 12.4: 50 children delivered by forceps were lost, or about 1 in 5.

So far, therefore, as the general results are concerned, the mortality of mothers in protracted labours will bear comparison with that where the forceps were employed. In both instances the maternal mortality is higher than the average, because it was impossible to separate cases of puerperal fever from ordinary labours. Of necessity, therefore, the mortality was increased. In placing, however, the question in the clearest light, the practice of Dr. Collins, who only used the forceps once in 694 cases, may be compared with that of Dr. Shekleton (Johnston and Sinclair's *Report*) who used it once in 68¾ cases. Both were in charge of the same hospital and of similar cases. The deaths of mothers delivered (without the forceps) in protracted labours, were 1 in 16. (Dr. Collins's *Report*). The deaths of mothers delivered with the forceps, were 1 in 18. (Drs. Johnston and Sinclair's *Report*.) If this difference on the one side be compared with that on the opposite (1 in 12·4) from the total results, it may be said to disappear; proving that, in cases of difficult labour, which are of necessity protracted, mere duration does not increase the mortality.

To estimate statistically the results of forceps operations, we shall refer you to Dr. Churchill's valuable work. He has collected the reports of British, French, and German practice, and arrives at the following conclusions:—

"Among British practitioners, we find 594 forceps cases in 147,645 cases of labour, or 1 in 249.

"Among the French we have 339 forceps cases in 47,475 labour-cases, or about 1 in 140.

"And among the Germans, 7074 forceps cases in 755,593 labour-cases, or about 1 in 106½." (Churchill's *Midwifery*, p. 342, 343.)

Observe the increased proportion of these operations in German practice, as compared with French and English; the number of which, however, does not exceed 1 in 100.

The results of these operations are thus stated:—

"If we add together the number of forceps cases where the result to the mother is stated, we shall find, that of those detailed by British practitioners, of 812 forceps cases 38 mothers were lost, or one in $21\frac{1}{2}$.

"Among the French and Germans, in 4042 cases, 142 mothers were lost, or about one in 34.

"Whilst of the children, the British statistics give 142 lost in 694 cases, or about 1 in 5; and foreign statistics, 858 in 5037 cases, or about 1 in $5\frac{3}{4}$." (*Op. cit.* p. 344.)

In the tables of foreign practice, the French returns are very imperfect as to the mortality of the mother, not sufficient to influence Dr. Churchill's calculation. We may therefore consider the proportion (1 in 34) of maternal mortality as being chiefly German. In the German returns, there is, however, one remarkable feature which may explain this result; their frequent—perhaps too frequent—use of the forceps. The following table will shew the proportions in which the forceps was used by the different eminent practitioners of Germany.

Name.	Place.	Total Cases.	Forceps Cases.	Proportion 1 in
Ricker	Nassau	304,150	4,223	72
Riecke	Wurtemburg	219,303	344	637
Klein	Vienna	35,417	730	48·5
Boer	Do.	29,961	119	252 nearly
Schwerer	...	21,804	194	112·5
Jansen	Ghent	13,365	341	39
Moschner & Kursak	Prague	12,329	120	103 nearly
C. von Siebold	Berlin	1,634	212	8 nearly
Kluge	Do.	809	55	15 nearly
Ritgen	Giessen	180	20	9
Carus	Dresden	2,908	184	15·75
Kilian	Prague	2,350	120	19·5 nearly
		644,210	6,662	96·7

Thus, while the proportion for the use of the forceps, according to the above table, is about one in 96 cases, and, according to Dr. Churchill's estimate from a larger number, one in 106½, we find that Kilian employed it in every twentieth case; Carus and Kluge in every fifteenth; Ritgen in every ninth; and E. von Siebold in every eighth case. This remarkable difference can only be explained in one of two ways; either, as Dr. Churchill supposes, "that their hospitals being on so small a scale are reserved for the worst cases met with in exterior practice among the poor," and therefore operations were more frequent; or they adopted the practice of using the forceps in natural labour in order to abbreviate the process. Such a course would greatly diminish the proportionate mortality; because, whatever other injury might be done to the patient by this unnecessary interference, death would not be the consequence. Thus, if we assume that one in 20 was the proportion of deaths in 100 difficult forceps cases of labour, and that 50 cases of natural labour delivered by the forceps were added to these, five deaths in 150 cases would lower the proportion to one in 30 cases. Every experienced practitioner knows that his cases of difficult labour are "few and far between," they do not return upon him in every eighth or tenth case; therefore, if the forceps be used in the proportion of one in ten, it is clear that they must be employed in natural labour. We have endeavoured to prove from the fairest review of statistical evidence we can make, that, in difficult labours, where so much judgment is required, there is no essential difference in the maternal mortality, whether the forceps be used or not. The deaths of children are also alike, one in five cases. "The total result" says Dr. Churchill, "is that in 5,731 cases" (of forceps operations) "998 children were born dead, or about 1 in 5." (*Midwifery*, p. 344.)

We have shewn (p. 275.) that in protracted labours the deaths of children were 162 in 742 cases, or about 1 in 4⅔, an immaterial difference. Hence in such cases the experienced practitioner may exercise his own judgment, uninfluenced by fear of delaying assistance on the one hand or of affording it on the other. In fact, every case of difficult labour requires to be

considered individually, and the treatment must vary with the conditions. If it should happen, as in many of Dr. Collins's cases, that time was necessary in order so to mould the head to the inequalities of the pelvis, that it might pass through, the practitioner need not be under the apprehension that every hour's delay increases the danger, and be led against his will to a mischievous interference. If, on the other hand, the case seem to indicate a chance of saving the child and shortening labour without injury to the mother, he will not hesitate to interfere.

We have endeavoured to shew that the mere protraction of labour is no justification for interference, and we cannot express our objection in stronger language than Naegele uses:—

"If we admit," he says, "that proportionate difficulties according to the constitution of each individual and an effort of strength (requisite in childbirth) are inseparable from the nature of the process, we must conclude that an *abbreviation of the process, though performed by an able hand* before the salutary change on which the preservation of the health depends has taken place in the organisation of the mother, that *a premature and sudden removal of these difficulties*, cannot be a matter of indifference; that such violent interference with the functions of nature must incur the risk of destroying the health, though this should not ensue for some time afterwards."

In order to determine a question of this kind, we must trust rather to experience than to statistics. The constitution of the patient and the causes of delay are important elements to guide our practice. The rule of Dr. Collins "to wait if the head move ever so slowly" was founded on a class of cases in which the constitution was strong, the pelvis probably masculine, and the danger not delay but inflammation. If inflammation did not exist, nor any premonitory symptoms of it, time might effect the moulding of the head to the pelvis much better than the forceps. With such women there was no danger whatever of exhaustion; and therefore Dr. Collins's object was to effect by time what he knew could not be accomplished by instruments—the safe delivery of the patient.

But there are also cases where such a rule will not apply;

cases in which the constitution is weak, the pains perhaps feeble, and there is every evidence of inability to expel the child. In such cases, although the head is moving slowly, delay would indeed be dangerous; exhaustion and suspension of labour would be the result, with all its serious consequences.

The judicious practitioner, dealing with a constitution such as this, will not hesitate to render assistance the moment he can do so; while he will not interfere with the robust patient in active labour, so long as nature seems equal to her duties. The slow advance of the head is viewed in each case in a different light.

We have hitherto spoken of the use of the forceps in a case of difficult labour when the head is in the cavity of the pelvis, but what shall we say of its use in natural labour to abbreviate the process? Is not the clear language of Naegele a sufficient warning? The instrument, even in the ablest hands, cannot always effect the delivery as safely as nature will. Injuries to the neck of the womb, only known long afterwards, when inflammation, ulceration and prolapsus take place; lacerations of the perinæum, a common occurrence from forceps operations; and even vesico-vaginal fistula—all may be caused by the forceps improperly used; and it is used improperly when its necessity is not proved.

With regard to vesico-vaginal fistula, it is difficult to trace this accident in all instances to the use of the forceps. When a forceps operation is described to us, we are seldom told that any mischief is the consequence. The splendour of success is very dazzling; and, while we admire the operation, we are too often left in the dark as to its effects. Nevertheless, we have been able to trace this accident clearly to the use of the forceps in several instances, while, on the other hand, *Dr. Collins records only one case of vesico-vaginal fistula in the whole of his report of* 16,654 *cases*, and that was a *case of perforation;* consequently this accident never occurred in those protracted cases which were delivered naturally. The principal cause of difficulty in Dr. Collins's cases was the large head of the male child forcing its way through a very osseous pelvis: the pressure on the soft parts must be very great, and, if fistula could be produced by great protraction of labour in cases that ultimately were delivered without assist-

ance, it must have been an accident of frequent occurrence in these cases, the soft parts being so much compressed: but such did not happen, and therefore they afford a very favourable contrast to cases delivered by the forceps in nearly similar circumstances.

If we have placed this subject before you with sufficient clearness, it leads us to the following conclusions:—

That when the head is slowly passing through the cavity of the pelvis, interference with the forceps is not called for because of the *time* occupied, but rather because of the *special conditions* of the case.

That the use of this instrument is only justifiable when some clearly proved necessity arises; that the time occupied in a labour is *seipso* no justification; and that therefore the delivery of patients by the forceps merely to abbreviate a slow but natural labour is highly improper.

Lastly, that such uncalled for interference renders the practitioner responsible for all the consequences which ensue; and therefore, whether it be inflammation in the pelvic cavity leading to permanent lameness, inflammation and ulceration of the neck of the womb, laceration of the perinæum, or vesico-vaginal fistula, all will be attributed, justly or not, to the uncalled-for use of the forceps.

LECTURE XVIII.

LABORIOUS LABOUR (*continued*).

Management of Cases of Impaction. The management of cases where the head of the child becomes impacted has been, I regret to say, almost as much a question for controversy as that which we have just discussed. It is admitted that the child must be delivered by the resources of art; but how these resources are to be applied is the matter in dispute. Some consider that

even in these cases the forceps, skilfully employed, may effect the object in view; the woman may be thus delivered, and possibly the child preserved. Others dread such application of the instrument, because of the injury that may be done to the passages; and consequently they esteem the probable danger to the mother to be a risk too great to encounter for the very slight chance of saving the child. Hence the question lies between perforation of the head of the child and its forcible extraction by the forceps.

It would be most desirable to determine the rule of practice in these very difficult cases, by an application of the same principle that was proposed in the last lecture. If we could compare such cases as have to be delivered by the forceps when the head was impacted, with those in which recourse was had to perforation—if we could contrast the results—we might be able to arrive at a conclusion that would satisfactorily resolve our doubts upon the subject; but, unfortunately, that is impossible. We have no statistical knowledge of the effect of the forceps in these special cases; and the mortality that is reported under the head of perforation seems to be disproportionately increased by the circumstances under which the operation has been generally performed.

From the earliest period, the profession have been accustomed to look upon craniotomy with dread—we might almost say, with horror. A natural reluctance to destroy human life—no matter under what necessity—has been greatly increased in some countries by religious prejudices; and the anathema of the doctors of the Sorbonne still exerts an influence that paralyses the judgment of the practitioner. Hence we read of cases allowed to remain several days in labour, until not only the death, but the putrefaction, of the child, gave evidence that the perforator might be employed without any stings of conscience. The result of such practice was, as might be supposed, inflammation of the passages, advanced to such an extent that the mother was sacrificed to this procrastination; and hence in the tables of mortality, we find that *one mother in every five*, and sometimes *one in every four*, died after the operation. We cannot, therefore, determine the rule of

practice by statistical returns. We must only hope to do so by a fair examination of the question itself, by collecting the general experience of the profession, and by submitting to you the ground upon which we have formed the opinion which would govern us as to the course to pursue. We do not wish you to adopt this opinion unless you are satisfied of its correctness; we but ask you to examine the subject dispassionately, and to discard from your minds the damnatory language that too frequently is employed by some obstetric authors. When you find an operation spoken of as "murderous," you are not disposed to become the murderers; you doubt and hesitate, and perhaps ultimately commit a *double homicide*. An appeal to harsh expressions is generally esteemed an evidence of weakness in argument; therefore, when you find these hard words, you can appreciate their value, and pass them by for more conclusive reasoning.

The Forceps as an Instrument of Compression. In order to compare the forceps and perforator in the case supposed, you must view the forceps as something more than a substitute for power of the uterus. In order to extract the head, it must also lessen its dimensions; it must be employed for *compression* as well as for *extraction*. When we come to examine the different instruments used, you will find, in the varieties of the forceps, that some are shaped especially for this purpose, which is sedulously avoided in the construction of others—a sufficient proof of want of unanimity on this important subject. Let us, then, examine the forceps as an instrument for compressing the head of the child, so as to adapt it to the diminished space in the pelvis.

We have already evidence before us to prove that the power of the forceps for this purpose is extremely limited. The experiments of Baudelocque are referred to in almost every popular work on midwifery; and, notwithstanding the critical objections raised against them, they are sufficiently important to be briefly stated to you. Being desirous to determine the extent to which the forceps could compress the head, Baudelocque performed nine experiments on the heads of still-born children with Levret's

forceps, an instrument of the strongest kind, and especially adapted for compression. The utmost force was exerted to reduce the head, a force so great as to bend one forceps, although highly tempered; the head was not lessened more than two lines, unless where the bones were unusually soft and loose, and then only to four lines. These experiments satisfied Baudelocque that the diminution could not be, in any case, so much as accoucheurs had stated, and that the degree of reduction should never be measured by the distance between the handles, when pressed together, nor by the amount of force employed to approximate them.*

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* 1627. Ces expériences ont été répétées de suite sur neuf enfans morts à l'instant de leur naissance, ou peu d'heures après, qui étoient d'une grosseur différente, quoique tous parfaitement à terme. Pour les rendre plus concluantes, nous fîmes en sorte de restituer à la tête de ces enfans, en la plongeant dans l'eau chaude et en la pétrissant un peu avec les mains, la souplesse que présente au toucher celle des enfans vivans, et nous nous servîmes du forceps allongé dont il est parlé au § 1614. Nous nous en procurâmes trois semblables, *de la meilleure construction et de la meilleure trempe*. Nous applicâmes cet instrument d'abord selon l'épaisseur transversale de la tête, comme nous le recommandons ailleurs; et ensuite suivant la longueur du crâne, c'est-à-dire une branche sur le milieu du front en descendant de la fontanelle à la racine du nez et l'autre sur l'occiput, pour connaître la reduction qu'on pouvoit opérer dans ces deux directions, et ce que la tête acquéroit dans un sens, en perdant selon l'autre. Quelque soit le degré d'ecartement que laissèrent entre elles les branches du forceps à l'extrémité qui se termine en crochet, toutes les fois qu'elles furent placées sur les côtés de la tête nous les rapprochâmes exactement et nous les fixâmes dans cet état de contact au moyen d'un ruban, pour que la reduction de la tête ne variât point pendant que nous mesurerions de nouveau ces dimensions, et que nous les comparerions à celle qu'elle avoit avant l'expérience. (*Baudelocque*, tom. ii. p. 17.)

1635. On peut conclure d'après ces expériences. 1°. Que la réduction qu'éprouve la tête de l'enfant entre les serres du forceps est différente à quelques égards, selon que les os du crâne présentent *plus ou moins de solidité au terme de la naissance* et que les sutures, ainsi que les fontanelles, sont plus ou moins serrées. 2°. Que cette réduction ne sauroit être en aucun cas aussi grande que des accoucheurs l'ont annoncée, et qu'elle ira *difficilement et bien rarement, au-de-là de quatre à cinq lignes*, lorsque l'instrument agira sur les côtés de la tête. 3°. Qu'on ne doit jamais évaluer son étendue

In these experiments, more force was used than you could venture to exert if the child were living, and yet the space gained was scarcely sufficient to admit the blades of the instrument to be introduced within the pelvis. They seem to me, therefore, conclusive as to the limited power of the forceps when used as a compressing instrument.

It has been objected to Baudelocque's experiments, that the head of the dead child is more incompressible than that of the living one; and therefore that the latter may yield to the forceps, although the former will not. We confess we cannot perceive the force of this objection. The head has been already exposed to the powerful pressure of the pelvis, and is impacted because it cannot yield further—it becomes incompressible. Neither will it yield to any force which may be applied by the forceps; but, in making the attempt, the soft parts of the mother are of necessity contused; the cranial bones are pressed in, perhaps broken, and cerebral congestion is increased. It is impossible to grasp the forceps for the purpose of moving the impacted head, without applying to it a

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d'après l'écartement des branches de l'instrument, à l'extrémité opposée à celle des serres, et le degré de rapprochement qu'on leur fait éprouver avant d'extraire la tête, ni d'après les forces qu'on emploie pour les rapprocher ainsi. 4°. Enfin, que les diamêtres qui croisent celui suivant lequel on comprime la tête, loin de s'augmenter dans les mêmes proportions que celui-ci diminue, ne s'augmentent pas même pour l'ordinaire d'un quart de ligne; et en deviennent quelquefois plus petits (*Op. Cit.*, pp. 20, 21.)

The following are the results of eight experiments, briefly stated:—

No.	Reduction in Biparietal Measurement.	
1	3 lines	At this degree of reduction, the suture was torn, and the brain escaped.
2	2 lines	Instrument bent.
3	2 lines	
4	4 lines	Bones very soft, sutures and fontanelles loose.
5	4 lines	Equally soft.
6	4½ lines	The same.
7	3 lines	
8	2 lines	The ninth experiment is not stated by Baudelocque.

sudden and powerful force; and if this force be maintained, such powerful, constant, and at the same time unequal pressure, acting on the head of the child, is much more hazardous than even the compression of the contracted pelvis, which is known to be a frequent cause of the child's death.

The possibility, therefore, of reducing by the forceps the impacted head to such a degree as will enable you to draw it safely through the pelvis, seems to me extremely doubtful. If it were the large head of the male child, advanced in its ossification, and wedged in the deep narrow cavity of the masculine pelvis, we would say, it is impossible. There is one case, however, in which the forceps may be successfully used in the same apparent amount of impaction; that is, in the diseased pelvis. A slight deformity of the cordiform pelvis, by which the planes of the ischia are pressed in and contract the cavity, will cause impaction, but the pelvis is capable of expansion; and, as the cavity is irregular, the forceps may be so applied as to avoid much pressure on the soft parts. The instrument may be therefore used, and the difficulty overcome by steady traction. But this is different from the case we have been considering.

Risk to the Mother. We have pointed out the effect on the child. Let me now direct your attention from the child to the mother; and admitting it is possible, and only possible, to save the former, let us inquire into the risk to which the latter is exposed, in the attempt to accomplish this object. The very nature of the case implies an unusual degree of pressure on the soft parts between the head and the pelvis; congestion must be the result; and if inflammation have not already taken place, the passages are in such a state that inflammation could be most easily excited. The blades of the best contrived forceps cannot be applied to the head when it is tightly impacted in the pelvis, without bruising the soft parts to a certain extent. The contusion becomes a centre around which inflammation takes place: this may increase to any extent, and terminate either in a local slough of the compressed part, or in a general gangrene of the vagina, if the inflammation assume an erysipelatous type. In the former case, the separation of the slough may produce a vesico-vaginal

fistula. In the latter, death may be the result. You will admit that such consequences are of too grave a nature to hazard for the *slight chance* of saving the child; and therefore, when you are placed in the unpleasant alternative, either to save the child at the risk of the mother's life, or to sacrifice the child in order to preserve her, you must adopt the maxim which governs British midwifery, and consider the safety of the mother to be your first object. But you will seldom be placed in such a dilemma, if you observe closely a case of this description. If you be satisfied that the forceps cannot be safely introduced; if you think that you cannot compress the head sufficiently to extract it without exposing your patient to a tremendous hazard; it does not follow that you must destroy the child in order to deliver her. In the great majority of such cases, nature provides against the difficulty of the case by doing so herself. When the head is thus wedged, the liquor amnii discharged, and the uterus strongly contracted about the body of the child, it is seldom saved from the effect of this extreme pressure; its death is the result; and if the case be left altogether to itself, the child becomes putrid, the bones of the head looser and more compressible, and thus it is possible that it may be expelled by the uterus. Formerly, it was customary to wait for "these signs of the death of the child" before perforating; but as they are those of putrescency, the patient was exposed to all the consequences that would follow decomposition of its tissues in the uterus, and hence the death of the mother was too often the result. But now we have it in our power to ascertain its death by another means, which is available long before putrescency takes place.

Death of the Child to be ascertained by Auscultation. The stethoscope has been found to be a valuable aid to the obstetrician; it sometimes enables him to determine the existence of pregnancy when all other means fail; but we know of no case where it is of more important service than in that which is before us, nor is there any in which its evidence is more certain. In pregnancy, when the child is small, the liquor amnii abundant, or the muscles of the abdomen strong, the fœtal heart may not be heard; but in parturition, when the liquor amnii is discharged,

the child full grown, and perhaps large, and the muscles of the abdomen stretched to their fullest extent, its pulsations are perfectly audible; and if once heard, there can be no change in the situation of the sound, because the child is fixed in its position. A close attention, therefore, to the fœtal pulsations, is necessary in such a case; and when they rapidly increase in frequency, then intermit, again return more feebly, and ultimately cease, you can have no doubt that the death of the child has taken place. To prove to you the value of the evidence in this way obtained, we shall quote the very important experience of Dr. Collins as to these kinds of labours. He says—"I have no difficulty in stating, and *that after the most anxious and minute attention to this point*, that where the patient has been properly treated from the commencement of her labour, where strict attention has been paid to keep her cool and her mind easy, where stimulants of all kinds have been prohibited, and the necessary attention paid to the state of her bowels and bladder, under such management, *the death of the child takes place, in laborious and difficult labour, before the symptoms become so alarming as to cause any experienced physician to lessen the head.* This is a fact I have ascertained beyond all doubt by the stethoscope, the use of which has exhibited to me the great errors I committed before I was acquainted with its application to midwifery —viz., *in delaying delivery often, I have no doubt, so as to render the result precarious in the extreme, and in some cases even fatal.*" (*Practical Treatise*, p. 16.) This observation of Dr. Collins would apply to many cases of perforation that are recorded, and which have been followed by such frightful consequences that it is not surprising that they should excite the disgust of the profession. They were cases where the operation was useless, because performed too late. By means of the stethoscope it is in your power to prevent this, and to deliver the child in sufficient time to save the mother from injury. No one is justified in destroying a living child, unless there is clear evidence, from the symptoms, that the mother is in danger. According to the old rule of practice, therefore, you were placed in the dilemma, either to wait for such symptoms, or for the signs of putrefaction

in the child—alternatives equally dangerous to her; but if the death of the child can be known the moment it takes place, and if it be true that its death precedes those dangerous symptoms, it is obvious that its removal by the crochet is no longer objectionable, and perforation is deprived of all its horrors.

It has been objected that the stethoscope is quite unnecessary in these cases; because, if the evidence be clear that the child cannot pass, the sooner it is removed the better; *but the evidence is not sufficiently clear to destroy a living child.* In some of these cases with every appearance of impaction, the head has been so moulded that the child has passed after all. To assert from a vaginal examination that the child certainly cannot be delivered, may be only a bold assumption, and to destroy a child on such an authority would be a grievous mistake.

So far as the safety of the mother and the preservation of the passages from injury are concerned, there is no comparison between perforation and the forceps. In this respect perforation is a far safer operation, if ordinary caution be exercised; the objection—the sole objection that condemns it, is the fact that the child must be destroyed, either by the uterus, or by the instrument. We freely admit the cogency of the argument; but when it is weighed against the still greater objection, that in the attempt to save the child, the soft parts of the mother may be injured to a most dangerous extent, while the preservation of the child is extremely doubtful; when we find, in the imperfect histories of these operations, such as they are given to us, that the child is very generally lost, or, if there be an exception in which the child is with difficulty saved, the case is recorded with that triumphant acclamation that proves the success to be unexpected; when the risk to the mother is so great, and the prospective advantage so doubtful, you will admit that the balance is in favour of an operation by which, if properly performed, and with sufficient promptitude, the safety of the mother is at least secured.

Objections to the Forceps in Impaction. We are not generally favoured with a faithful history of cases that illustrate the mischievous effects produced by the forceps. On the contrary, while

the *post partum* accidents of a skilful operation are deeply concealed in the shadows of the back ground of the picture, the surprising, the almost miraculous, power of the instrument is put prominently forward, with all the vividness of a most glowing and high-coloured description. Thus the truth is concealed from you, and so would remain, until exposed by your own dear-bought experience; except that you find scattered through the works of men whose skill is acknowledged, ominous hints and anxious warnings against the improper application of these instruments. Many evidences might be quoted to this effect: we shall direct your attention to a few of them. Your former respected professor, Dr. Davis, paid a great deal of attention to the subject of instrumental labours, and was disposed to advocate a much bolder use of the forceps than what we should recommend; nevertheless, he candidly admits, that "of all the instruments used in the practice of midwifery, those of the present class [the forceps] are unquestionably *the most dangerous to the mother*, inasmuch as, in all cases where the forceps are used, the maternal tissues are more or less liable to contusion. All the fangs and framework of the instrument are made of tempered steel; and, let them be ever so well covered and defended, they will still retain a great degree of hardness, calculated to bruise and to fret the soft and living texture which might be interposed between their covered surfaces and the solid walls of the pelvis." (*Obstetric Medicine*, p. 786, 8vo. edition.)

The same impression of mischief leads Dr. F. Ramsbotham to warn the practitioner that "cautiously and tenderly must this iron instrument be used! We must recollect that no sensation can be imparted to the operator's hand of any injury that may be done to the woman; and we must remember that one injudicious thrust, one forcible attempt at introduction, one violent effort at extraction, may bruise, may lacerate, may destroy!" (*Obstetric Medicine and Surgery*, p. 299). Dr. Blundell addresses his pupils thus:—"When, however, you lay your hand upon the tractor or forceps, remember that the accoucheur who is meddlesome may be guilty of occasioning laceration of the perinæum, rupture of the vagina, compression and death of the

child, inflammation of the abdomen of the mother, and many other fatal consequences, *which I myself have had occasion to see*—a list of offences surely sufficient to alarm the prudent." (*Blundell*, by Castle, p. 526.)

But let us come to more direct evidence. Riecke, in his report of the practice of the kingdom of Würtemburg, gives the results of a very large number of cases, and amongst them those in which the attempt was made unsuccessfully to remove the impacted head by the forceps. He observes—"Almost always, perforation was preceded by attempts to apply the forceps, and to the great injury of the mothers, because perforations, not preceded by such attempts, presented much more favourable results. . . . . The trials at extraction with the forceps—which many accoucheurs continue, to the extinction of the infant's life (although foreseeing the necessity for perforation)—exhaust the mother to that degree, that she necessarily sinks under the effect of these violent efforts."* In allusion to similar

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* Riecke, in his report, gives 84 cases of perforation, in 31 of which the mother died, being in a proportion rather more than one in three. He explains it thus:—

"Presque toujours la perforation du crâne avait été précédée de tentatives pour appliquer le forceps, et cela au détriment des mères: car les perforations non précédées de ces tentatives offrent des resultats *beaucoup plus favorables que les autres*. La répugnance des accoucheurs à pratiquer la perforation du crâne lorsque l'enfant est encore en vie est d'une influence très fâcheuse pour les mères. . . . . Les tentatives d'extraction avec le forceps que beaucoup d'accoucheurs continuent *jusqu'à l'extinction de la vie d'enfant tout en prévoyant la nécessité de la perforation du crâne épuisent les mères au point qu'elles succombent presque nécessairement à la suite de ces efforts violens*. Les suites ne sont pas moins fâcheuses lorsque l'accoucheur se décide à attendre patiemment que l'enfant soit mort.[1] La perforation du crâne exécutée avec les précautions convenables n'est pas en elle même une opération bien dangereuse. Parmi les femmes soumises à cette operation il s'en est trouvé une qui l'a subie dans onze accouchemens consécutifs et jamais elle n'en a éprouvé de suites fâcheuses."—*Archives Médicales*, tom. xxii. p. 375.

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[1] The means of determining the death of the child by the stethoscope is not alluded to by Riecke.

inquiries, Dr. Collins remarks:—"It is from being thoroughly convinced of these facts by long and extensive observation, that I consider the forceps quite inapplicable when the head becomes fixed in the pelvis, and the ear cannot be reached by the finger except by violence, in consequence of disproportion existing between the head and the pelvis. . . . . The results I have witnessed from such practice [delivery by the forceps] were most distressing: in some, the neck of the bladder or urethra either lacerated, or the injury by pressure from the forceps so great as to produce sloughing and consequent incontinence of urine; in others, the recto-vaginal septum destroyed, either of which renders the sufferer miserable for life; and in two cases, where the mouth of the womb was imperfectly dilated, so much injury inflicted on this part as to terminate in death." (*Practical Treatise*, p. 12—13). Dr. R. Lee, in his *Lectures*, quotes the paragraph at full length from which these passages are extracted, and adds —"The accuracy of these remarks is fully confirmed by all the forceps cases which have come under my observation, which exceed sixty in number." (*Lectures*, p. 305).

It would occupy too much time to accumulate further testimony.* We trust sufficient has been placed before you to authorise the conclusions at which we have arrived, and which are now submitted to you; viz., that when the head is impacted in the pelvic cavity, it cannot, unless in the exceptions we have stated, be delivered by the forceps without such injury to the passages as might endanger the mother's life; that the probability of preserving the child's life is not sufficiently certain to justify an attempt which might be so hazardous; that in the great majority of these cases the death of the child takes place

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* "I wish that my present subject permitted me also to state what I have found on dissecting the parts after the use of the crochet, and, *in particular, where the forceps had been used,* as I must presume, in a case improper for them. The injury which the seemingly harmless instrument—the forceps, is capable of doing, might then be proved, and a wholesome admonition given to young surgeons."—Sir Charles Bell on the Muscularity of the Uterus; *Medico-Chirurgical Transactions*, vol. iv. p. 339.

naturally, and it may be removed before symptoms dangerous to the mother present themselves; and lastly, that if it should happen that the reverse occurs, and danger to the mother—whether from exhaustion or from extending inflammation—is indicated before the death of the child, then perforation is called for, rather than to render the risk to the mother a certainty, by the dangers that result from a forcible extraction by the forceps.

We have been obliged to dwell at some length on these disputed questions connected with the practice of midwifery, when the head is fixed in the cavity of the pelvis; we shall therefore only allude very briefly to the last stage of delay.

Retardation of the Head at the Outlet. When the head is in this position, it may arise from the perinæum being rigid, or from the pubic arch being too narrow, so that the head cannot pass out between the ischio-pubic rami. In either case, there is a long-continued pressure on the perinæum, which must excite inflammation, and increase its rigidity, if the delivery of the head be not assisted. The strictest attention is necessary to subdue any tendency to inflammation in the perinæum; fomentations must be sedulously employed, and, if necessary, depletion by leeches. By this means a rigid perinæum will in many instances gradually yield to the head, and allow it to pass; but sometimes the vectis may be passed on the pubic side of the head, to assist its advance. Great caution is required not to bring the head down too suddenly on the perinæum, which must also be protected by the counter-pressure of the hand. Where the difficulty arises from narrowness of the pubic arch, the forceps is preferable, both because you have more power to overcome the resistance of the ischiatic tubera, and there is less danger of the pubic blade injuring the adjacent soft parts than if the vectis were employed, and much force used in the extraction.

Accidental Obstructions are occasionally causes of difficulty in the second stage of labour; and, when such are presented to your notice, they always demand the most serious attention; first, because the majority of them depend upon some organic disease, the existence of which renders labour, if at all severe,

extremely dangerous to the patient; secondly, because the nature of the obstruction is often very obscure; and if a tumour impede the progress of the head, it may be doubtful whether it is ovarian, polypoid, or malignant. The extent of its attachments, and the possibility of removing it, may also be a difficulty. You have many reasons, therefore, for extreme caution and a very guarded prognosis under such circumstances.

Accidental obstructions may be produced by *Bands* or *Adhesions*, the result of previous inflammation; or by *Tumours*.

Bands are sometimes formed across the vagina, retarding the advance of the head. A *stricture* may be found there just as in the urethra. The *walls of the vagina* have been sometimes *united* for a certain distance. In all such cases there is a certain amount of danger, because the extent of the injury done is not always confined to the part which obstructs the head. The results of previous inflammation may have left the vagina very weak, thinned, and badly calculated to resist any extreme pressure. Thus it may be easily lacerated, if labour be suffered to continue for any length of time.

A band may be easily divided by a guarded bistoury, and the obstruction removed; but a stricture requires more caution, lest any thinned portion of the vagina above the stricture should give way. It would be unsafe, therefore, to trust to the action of the uterus alone to overcome the difficulty; it will be necessary to apply the forceps, if possible, and if incisions are made cautiously in the strictured portion, it will yield. This, however, is not always necessary, because sometimes the stricture will give away without any incisions. A lady had been confined of her first child in the country; the labour was severe and protracted, the child was still-born, and she made a tardy recovery. It was afterwards discovered that the vagina was closed, and she was obliged to place herself in care of the late Dr. Lever, who, with his usual skill, opened the passage, sufficiently at least for intercourse. She became again pregnant, and fearing a similar labour, came at once to London for her confinement. She requested Dr. Lee's assistance, who found it necessary to deliver the child by perforation. She became again pregnant; and being very anxious

to have a living child if possible, and also to be placed under the influence of chloroform, if any operation were necessary, she applied to me. An examination was made when labour commenced; a band with a crescentic margin projected from the sacral side of the vagina, narrowing the passage to about the size of a shilling. The pains were active, dilatation soon took place, and the head descended to the stricture. Here it was, of course, arrested; but, as the stricture yielded to the action of the uterus, the forceps was applied, and after several powerful efforts, acting with the pains, which were strong, the head was brought through, and a large living child delivered.

It is possible, therefore, to overcome a stricture of this kind without incisions, but the forceps should always be applied to regulate and assist the pains.

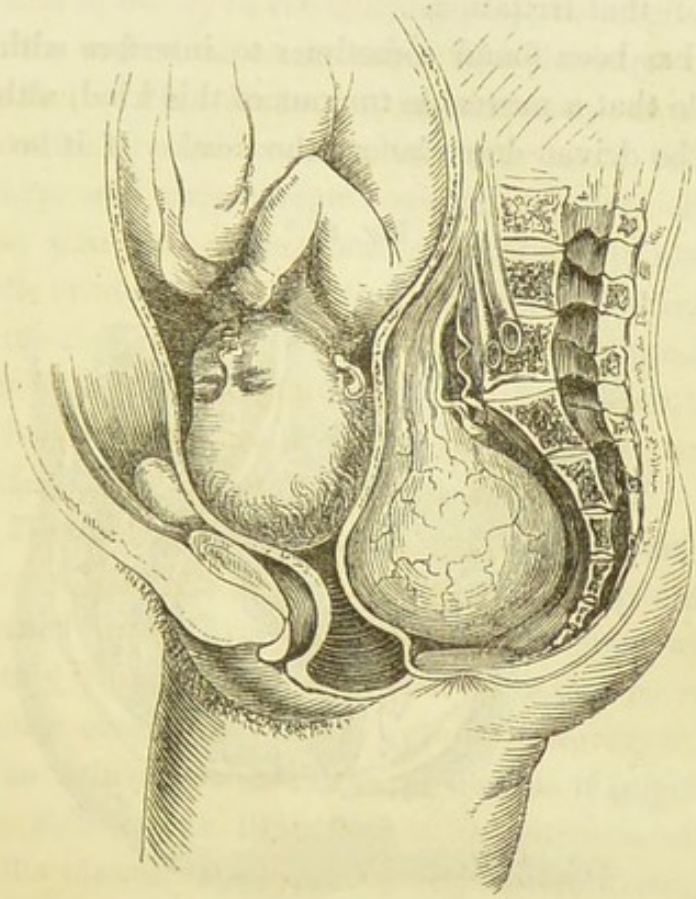
When the walls of the vagina cohere, the case becomes very embarrassing, because they must be separated; and yet there is a danger that the vagina may be cut through, if great caution be not exercised. You have also the additional difficulty, that it is almost impossible to ascertain the condition of the vagina behind the portion that is united. Some risk must therefore be encountered. It is better to allow the labour to proceed sufficiently far to determine the extent to which the head may separate the parts adherent, employing every necessary means to counteract any inflammation that may arise. The head may overcome the resistance to a certain extent, so as to render the division of the remaining portion much safer and more easy; but if this cannot be accomplished, the walls of the vagina must be dilated, so as to expose perfectly the adhesion, which it is necessary to divide by cautious and frequently repeated incisions with the knife.

Tumours obstructing delivery are generally to a certain extent moveable, and may be soft and fluctuating, or firm and elastic. Sometimes the sacrum is the seat of osteo-sarcoma, forming a hard and perfectly unyielding tumour.

Ovarian Tumours sometimes descend into the pelvic cavity, and obstruct the head of the child. If the tumour consist of several cysts, the smallest may pass down between the vagina

and rectum; cases are also recorded where very large tumours are found in the same situation. One of these cases is given by Dr. Merriman, along with a very accurate drawing of the tumour. Their contents vary so very much in their consistence and den-

Fig. 66.*



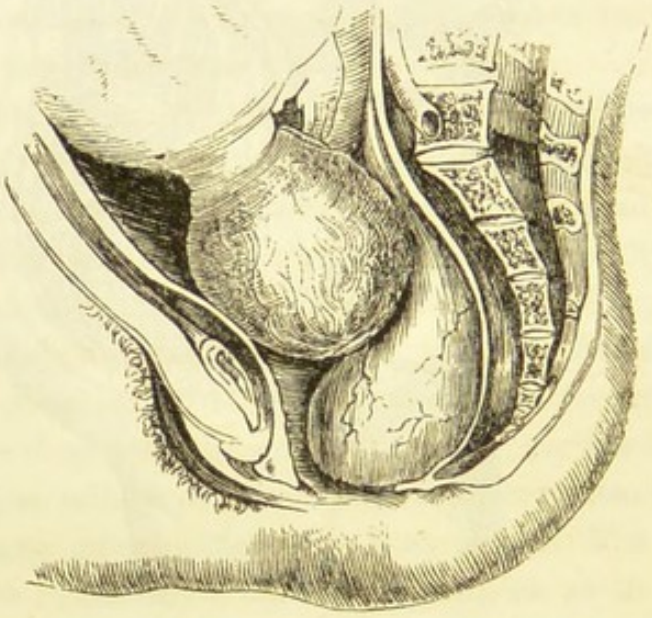
sity, that they are not always easily recognised; but if there be any sense of fluctuation, or even if the tumour be very elastic, the probability is, that it is an ovarian cyst, containing fluid more or less deeply seated. This may be readily ascertained by the grooved exploring needle; and, if fluid escape, the cyst may be more freely opened. In these cases there is always danger lest the pressure in the vagina should cause the cyst to burst into the abdomen. The sooner, therefore, an opening is

* Fig. 66. Ovarian tumour.—Merriman.

made, the better. The danger of these cases does not generally arise from the delivery being obstructed, but from the effect which labour produces on the disease; the tumour is necessarily exposed to a great deal of irritation, and may burst; the patient is weakened, if not exhausted, by the struggle which takes place; and, when labour is concluded, she is quite unequal to combat the effects of that irritation.

Polypus has been found sometimes to interfere with delivery. It is possible that a moveable tumour of this kind, although very large, may be driven down before the head. If it be small, and

Fig. 67.*



detected early in labour, it might also be in your power to prevent the tumour from descending. It may be pressed back when the pain ceases, and so retained until the head passes beyond it. But if neither can be accomplished, if the tumour remain an impassable barrier, it should be removed, not by ligature, but by excision; the polypus should be drawn down as much as possible by a forceps proper for the purpose, a temporary ligature applied, and the stem cut through.

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* Fig. 67. Polypus obstructing delivery. Ramsbotham.

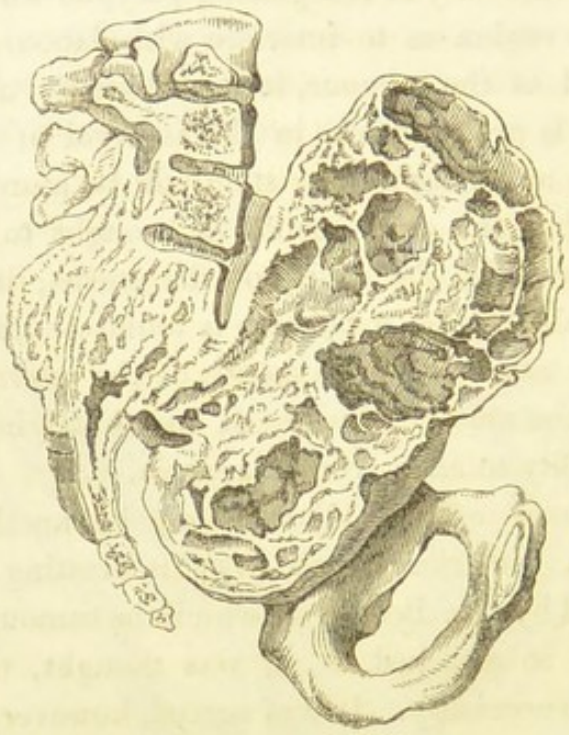
We shall not here enter into a discussion of the comparative merits of the treatment of polypus by ligature and by excision; this must be reserved for another opportunity. But, in reference to the present case, we should only observe that the risk of dangerous hæmorrhage after excision is not so great as to justify the adoption of the only alternative—destroying the child. You will have little difficulty in recognising polypus when it descends so low into the vagina as to interfere with labour. Beside the firm, fleshy feel of the tumour, it is extremely moveable; and when the head is pressed back in the interval of the pains, its pyriform shape and long narrow stem will be more obvious. It is not likely that the ovum could be brought to maturity if a large polypus occupied the cavity of the uterus; it is, therefore, fair to assume that, when a polypus is found to impede parturition, it must be attached to the mouth of the uterus, and therefore it can be the more easily traced to its origin, so that you have every facility to assist your diagnosis.

Fibrous Tumour of the Uterus may be another cause of obstruction. A remarkable and very interesting case of this kind is recorded by Dr. Beatty, in which the tumour was so large and apparently so attached, as, it was thought, to render the Cæsarian section necessary. It was agreed, however, to wait, and to observe the action of the uterus, as long as it might be done with safety. After some time, and to the surprise of those in attendance, the tumour appeared to retreat from its situation, while the child began to occupy its place, and to present its foot: this was seized, and the delivery with great difficulty completed. The child was still-born, but the mother recovered. (*Dublin Medical Journal*, vol. xvii. p. 411.)

Osteo-sarcoma sometimes grows from the sacrum. The bony tumour may be so large as to render delivery *per vias naturales* impossible, and therefore recourse must be had to the Cæsarian section. But it may be small enough to prevent this necessity, although it may be difficult to save the child. A case of this kind came under my own observation, where a tumour of about the size of an orange was connected to the middle of the sacrum; it was perfectly immovable, and of bony hardness; the head of

the child could not pass it, nor was there the least hope that it could be drawn by the forceps through the narrow space left in the pelvic cavity; the head was therefore perforated, and the child removed: the mother perfectly recovered.

Fig. 68.*



Other Rare Varieties of Tumour. Beside these more usual causes of obstruction to delivery, Dr. Drew detailed, many years ago, two very remarkable cases of tumours in the pelvis. The first patient, who was not pregnant, died in consequence of it. An examination was made after death; there seemed to grow from the left sacro-sciatic ligament a tumour, which "was perfectly round, about sixteen inches in circumference, of a fat, gristly substance, without an appearance of circulation in it." The root seemed to be its principal attachment, because when that was cut through it came away quite easily. The result of this inspection satisfied Dr. Drew of the practicability of removing it by operation; and, although a rare variety of tumour, it so happened

* Fig. 68.—Osteo-sarcoma.

that very soon afterwards (as is often the case) a similar tumour came under his notice when the patient was in labour.

Dr. Drew states, "it was exactly the same. The tumour grew out of the right side, and occupied the whole cavity of the pelvis so completely as to admit of passing only one finger between it and the pubes, by which I could scarcely reach the head of the child." Dr. Drew proposed to remove it, which was assented to. An incision was made through the perinæum, at the right side; the tumour was exposed, the finger passed before and behind its root, which was easily divided with a knife, and brought away. The wound being dressed; labour proceeded; and in six hours the head, being within reach of the forceps, was delivered safely. The patient recovered rapidly. (*Edinburgh Medical and Surgical Journal*, 1805, vol. i. p. 20.)

These rare cases may present themselves. If such should happen, you have sufficient encouragement not to despair altogether of giving relief.

LECTURE XIX.

OBSTETRIC OPERATIONS.

The instruments employed in operative midwifery may be arranged into three classes. 1. Those calculated to preserve the lives both of mother and child, as the *Vectis*, the *Forceps*. The *Fillet* was formerly used for the same purpose, but is now discarded from practice. 2. When the preservation of both lives is impossible, those intended to preserve the life of the mother by sacrificing the child. These include the *Perforator* and *Crotchet*, the *Craniotomy Forceps*, the *Osteotomist*, the *Cephalotribe*. 3. When the delivery of the child cannot be effected even by such means, and the safety of the mother is more than doubtful, there still remains the operation of opening the uterus through the

abdomen, and thus removing the child, with some chance, at least that it may survive.

The rules, therefore, which govern the application of instruments, are founded upon these three principles:—1st, *to preserve the lives of the mother and the child;* if this be doubtful, 2nd, *to preserve the life of the mother without reference to the child;* and when this cannot be done, or, at least, seems so from the circumstances, 3rd, *to save the child if possible.*

Operations to save the Mother and Child.—The *Vectis* and *Forceps* are used for this purpose.

Vectis. The vectis consists of a single blade, shaped like a blade of the forceps, only more abruptly curved; and, when used in the manner we have recommended, it is intended to act as an extractor, to assist the feeble action of the uterus, to correct malpositions of the head, or to overcome any unusual resistance of the perinæum. It is not, therefore, an instrument of much power; and its use is limited to the removal of slight impediments to the passage of the head. The advocates for this instrument do not, however, confine themselves to such a restricted application. They employ it as a substitute for the forceps, and even claim for it a superiority over the long forceps, in those cases in which the head is arrested in the brim of the pelvis. We must dissent from such a view of the utility of the vectis: in order to give to it the same power which the forceps acquires by the counter-pressure of the blades, an amount of force must be employed which might be very dangerous to the patient. Imagine the head fixed in the brim of the pelvis, the vectis applied to the occiput, the practitioner using all his strength to extract, and at the same time to keep the vectis in its position, and the instrument from slipping from its situation into the vagina; by supposing such a case, you can readily understand our objection. Nevertheless, as the operation of delivery by the vectis at the brim of the pelvis has received the support of Dr. Blundell, who recommends the instrument improved by Mr. Gaitskill, and his mode of using it, we shall briefly quote Mr. Gaitskill's rules for applying it in such cases.

After giving directions as to placing the patient, etc., he proceeds: "The preliminaries being settled, the next thing is, the safe introduction of the instrument. To do this with facility and safety, the accoucheur should kneel on a pillow by the side of the bed, and introduce all the fingers into the vagina as far as the brim of the pelvis, at the side of the sacral promontory (either right or left, according to the situation of the occiput); as he passes up the instrument, the fingers should be gradually withdrawn. The instrument is to be pressed up into the cavity of the uterus, being careful that it is in the inside and not on the outside, gliding it over the parietal bone till the screw part of the handle presses on the fourchette of the os externum. This attained, the handle should now be held firmly in the right hand, while the index and middle fingers of the left, fixed about two inches from the screw part within the vagina, become a fulcrum. On this fulcrum, or point of support, the instrument is made to move from the sacro-iliac symphysis towards the hollow of the ilium, by the action of the right hand on the handle. In this way it describes the section of a circle, and glides on the occiput. Should the occiput point to the right ilium, the left hand must be employed; if to the left ilium, the right hand must be used. When a labour pain takes place, the accoucheur should gently aid it by drawing down in the line of the axis of the pelvis—*i. e.*, an imaginary line, directed from the umbilicus through the centre of the axis of the pelvis. In this way the occiput is depressed, while the chin approaches the child's breast, and its head is reduced to the smallest compass, and is thus enabled to pass through the cavity of the pelvis. As soon as the occiput is brought so low as to press on the perinæum, the instrument should be withdrawn, and re-introduced with the usual precautions. The object now in view is, to place the instrument over the face of the child. To effect this, the hand must be passed up, as at first directed, to the right or left sacro-iliac symphysis, according to the situation of the face. When the instrument gets above the brim of the pelvis, a finger or two must be inserted by the side of the instrument, and pressed on till it (the instrument) passes over the forehead

on to the face, so as to embrace the chin. An imaginary line drawn through the centre of the child's mouth, ear, and occiput, is the present situation of the instrument, and quite the reverse of what it was before. The practitioner has now nothing to do but to draw down during the time of pain, increasing the power according to the degree of resistance." (*London Medical Repository*, 1823, *p.* 378—381).

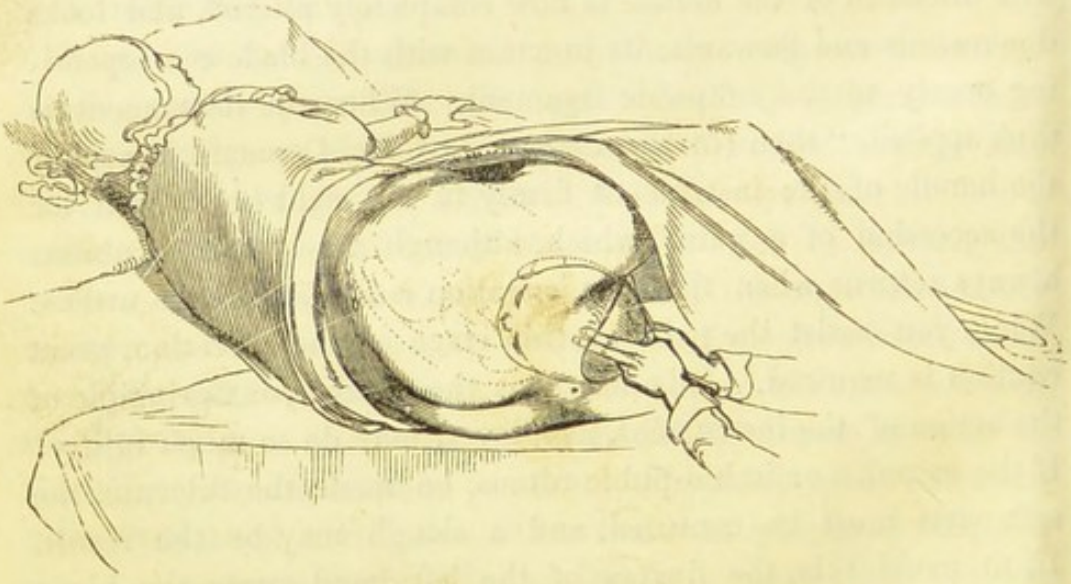
Such is the mode in which Mr. Gaitskill applied it when the head was high up within the cavity, or in the brim of the pelvis; but we confess our fears to recommend to you such a manner of employing the vectis. The cases in which it may be used with most advantage, are those in which the head is arrested at the outlet, in consequence of the uterus being unable to overcome the resistance of the perinæum. So long as the pains continue with any regularity and strength, you should not interfere, except for the purpose of preventing inflammation ; bnt when the pains become feeble, suspended, or return at long and irregular intervals, then the vectis may be applied with even more advantage than the forceps, because there is less risk of injuring the perinæum. We shall proceed to describe to you the manner of performing such an operation.

You must first observe the preliminary measures necessary in all obstetric operations. The urine should be withdrawn from the bladder by an elastic gum catheter, of rather a large size (No. 10), and without a stilette. It is always safer to use a catheter of this kind, because there is less risk of injuring the urethra, if it should be compressed, than if the unyielding silver catheter were employed. An enema should also be administered, to relieve the large intestines: and when these points are secured, the patient, lying on her left side, should be drawn as near to the edge of the bedstead as possible. The pelvis must be raised more than usual, and if the patient has been lying on a bed, and not on a mattress, it would be advisable to place a hair cushion under the hips. Adopting Mr. Gaitskill's position, you may kneel with one knee on a pillow, and in the interval of the pains, introduce the first two fingers of the right hand between the head and the symphysis pubis: passing them on either side of

the symphysis, the tip of the ear will be felt without difficulty, and the finger must remain applied to it while the vectis is being introduced: the instrument should be held about the middle, between the two forefingers and thumb of the left hand, and the handle directed obliquely downwards and backwards towards the coccyx, in order that the blade may lie flat upon the head when the instrument is passing between it and the fingers of the right hand. This is difficult to do when the vectis is very abruptly curved, and therefore the curvature of the blade makes a very essential difference in the value of the instrument. If too much curved, it cannot easily be applied; if too gradually curved, like the forceps, it will slip from its position if any force be used in extraction. You must, therefore, attend to this point particularly, in the selection of the instrument you use. When the blade is so applied, press it gently forwards with a slightly oscillating motion, until the edge reaches the ear, which is now placed exactly between the finger and vectis. The handle must, therefore, be depressed still more, in order that the edge may pass over the ear; when this is safely accomplished, the finger may be withdrawn, and the vectis passed forwards to its proper position. The direction of the handle is now completely altered, and looks downwards and forwards, its junction with the blade corresponding nearly to the subpubic ligament. When the instrument is thus applied, "then (in the language of Dr. Denman), grasping the handle of the instrument firmly in the right hand, wait for the accession of a pain," which, although absent before, almost always returns when this new irritation is applied to the uterus. While you assist the pain at this stage of the operation, great caution is required. It is here that the mischievous principle of the action of the instrument, as a lever, may do so much injury. If the os pubis or ischio-pubic ramus be made the fulcrum, the soft parts must be contused, and a slough may be the result. If, to avoid this, the fingers of the left hand press the blade strongly against the head, and thus guard the soft parts from pressure, making, as it is said, a fulcrum of the fingers, the lever is only altered from one of the first order to one of the second. In the first, the os pubis is the fulcrum; in the second,

the head and face of the child. Serious injury may be done in either case. You should, therefore, carefully avoid using the vectis as a lever; and in order to do this the more certainly, it is better to pass two fingers of the left hand between the head and the perinæum, and to grasp the shank of the instrument with the remaining fingers; counter-pressure is thus made as with the forceps, and the vectis may be used solely as a tractor. Again, in the language of Denman, we would say, "When the pain ceases, let the instrument rest, and on its return repeat the same kind of action, alternately resting and acting, in imitation of the manner of the pains." This cautious proceeding being followed, the head will soon advance and press strongly on the perinæum. The introduced fingers may then be withdrawn, and the vectis maintained in its position, rather for the purpose of acting with it, if the pains should again become feeble, than to extract the head by its means, if the uterus be sufficient to expel it; thus the perinæum will be better secured from injury.

Fig 69.*



* Fig. 69. Extraction with vectis. (In these sketches the perinæum, etc., is exposed, to shew the position of the head, which is faintly outlined.)

When *the vectis is used to correct malpositions of the head,* it is better not to use one too much curved. One blade of the forceps will often answer in these cases; the head is higher in the pelvic cavity, and does not generally press on the perinæum; too great a curvature would interfere with the introduction of the instrument; while, on the other hand, there is seldom occasion to use it as an extractor, because, when once the correction is made, the head will readily descend without assistance.

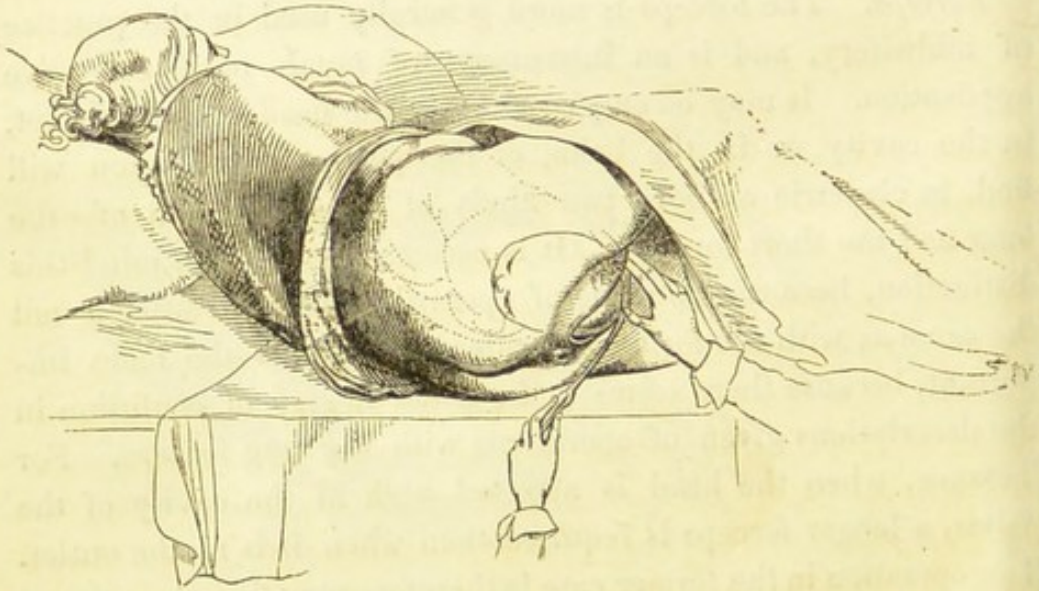
Independently of its limited power, the vectis is liable to some disadvantages which should be guarded against. It is necessary to grasp the instrument very firmly, and to exert your strength to keep it in its place. Sometimes the vectis will not retain the head so securely that the instrument may not slip; and, though it is easily replaced, still a good deal of force is necessary to keep it in its position. If, in such a case, the handle be smooth and round, there is also a risk that it may turn in the hand without your knowledge, and therefore do mischief. The handle should always be made rough, and with one side, at least, flat.

Forceps. The forceps is more generally used in the practice of midwifery, and is an instrument of much more extensive application. It may be employed when the head is at the outlet, in the cavity, or in the brim, of the pelvis. Hence you will find, in obstetric authors, two kinds of forceps spoken of—the long and the short forceps. It is necessary to bear in mind this distinction, because the mode of operating with the latter is not the same as with the former instrument. This is the more important, because there seems to be some degree of confusion in the descriptions given of operations with the long forceps. For instance, when the head is arrested high in the cavity of the pelvis, a longer forceps is required than when it is at the outlet. The operation in the former case is therefore sometimes mentioned as a delivery by the long forceps. In speaking of operations with the long forceps, we would be understood to mean, not only a different kind of instrument, but a different mode of applying it from that adopted when the short forceps is used. In order to avoid this confusion, we shall describe the operations required in

three different cases: first, *when the head is resting on the perinæum*, the operation with the short forceps; secondly, *when it is arrested in the pelvic cavity*, which might be considered an intermediate operation; and lastly, the operation with the long forceps, *when the head is fixed in the brim of the pelvis.*

The Operation, when the Head is resting on the Perinæum, may be undertaken in cases similar to those in which the vectis is employed, and is preferable, if there be any diminution in the transverse measurement of the outlet. The preliminary steps of this operation are the same as for the vectis; but it must be remembered, that the temperature of these, as well as of all obstetric instruments, should be raised to that of the vagina, and they should be greased before being introduced into the passages. These previous arrangements having been made, the pubic blade of the forceps, with the lock looking upwards, must be passed over the head in a similar manner to the vectis; and when it is so placed, the handle may be raised towards the pubis, and there main-

Fig. 70.*

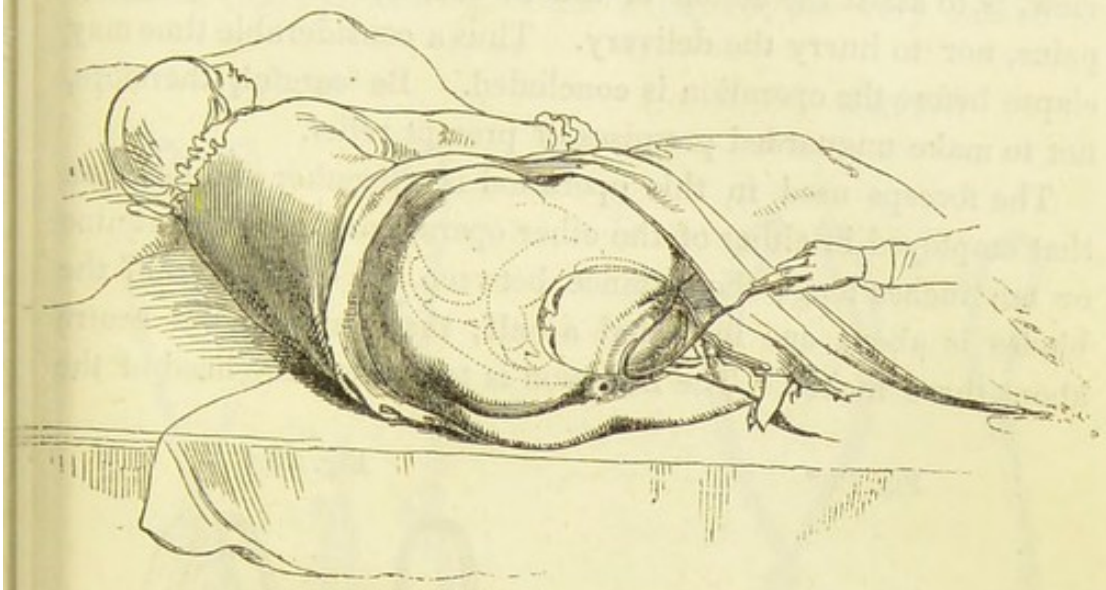


tained by an assistant *in its exact position.* The handle should not be moved to the right or to the left side, because it is of great

* Fig. 70. Passing of the pubic blade.

importance to observe the precise direction of the pubic blade while the sacral blade is being introduced. Taking, then, the lock of the former as your guide, as soon as the pain ceases, pass two fingers of the left hand between the head and the perinæum, and, holding the sacral blade lightly by the handle with the right hand, endeavour to guide it so along the introduced fingers that the edge of the sacral may pass along the lock of the pubic

Fig. 71.*



blade. As the sacral blade passes forwards, and the locks approach each other, the handle of the pubic blade should be taken in the left hand, and drawn slowly towards the perinæum. In this manner the locks will glide together, and the instrument be applied without much difficulty.

When this is done, and the pains return, the handle of the forceps should be held firmly, and, the perinæum being supported at the same time by an assistant, traction should be made—at first very moderately, carefully observing the action of the uterus; and, as you perceive that the pains are inefficient, the force may be increased. With each effort the handle may be drawn, first with a slightly waving motion to each side, and then upwards,

* Fig. 71. Introduction of sacral blade.

towards the pubis, in order that the head may pass in the axis of the vagina. When the head advances, and you are satisfied that the difficulty is overcome, it is better to leave the rest to the uterus so long as it acts, because there is less risk of injury to the perinæum. When the perinæum is tightly stretched over the blade of the forceps, as this passes out with the head of the child, it is very easily lacerated. The time that the operation occupies is of no importance. The object you should have in view, is to assist the action of the uterus, not to anticipate the pains, nor to hurry the delivery. Thus a considerable time may elapse before the operation is concluded. Be careful, therefore, not to make unguarded promises of prompt relief.

The forceps used in this operation is altogether shorter than that employed in either of the other operations. It is about nine or ten inches long; the distance between the extremities of the blades is about one inch and a-half; that between the centre about three inches. The intention is to prevent the head of the

Fig. 72.*

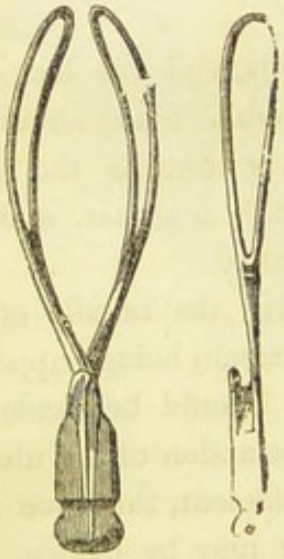
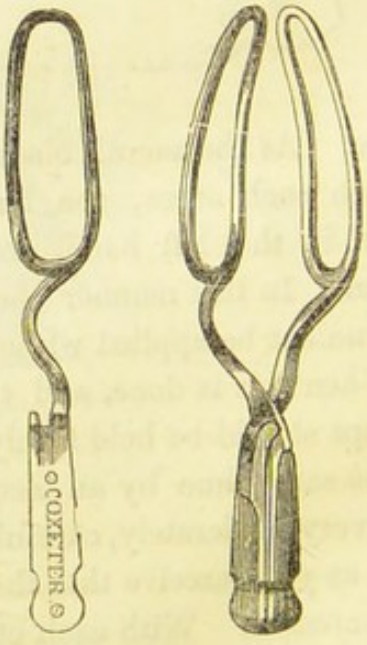


Fig. 73.†



* Fig. 72. Denman's short forceps. From *fac simile* of one in possession of the Dublin Lying-in Hospital.

† Fig. 73. Conquest's short forceps. Fenestræ wide; shanks twisted.

child from being much compressed in the effort to extract it. There is some difference, however, in the construction of these instruments, which will be understood by the examples placed before you. The short forceps of Dr. Denman (fig. 72) had the extremities of the blades closer, but the handles were very short, with the same object, that of preventing much compression. The short forceps of Dr. Conquest (fig. 73) has the fenestræ wide, in order that the parietal prominences may pass through them. Dr. Aitken's (fig. 74) and Dr. Collins's (fig. 75) are very similar in

Fig. 74.*

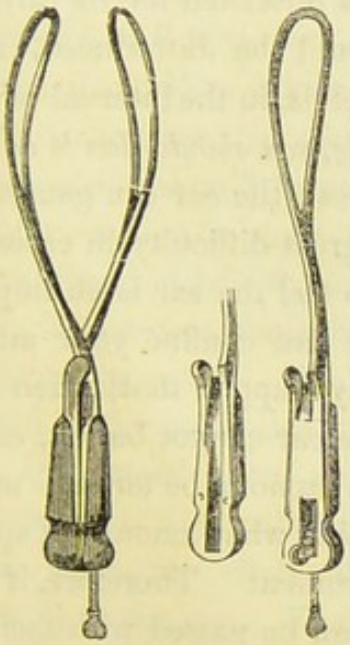
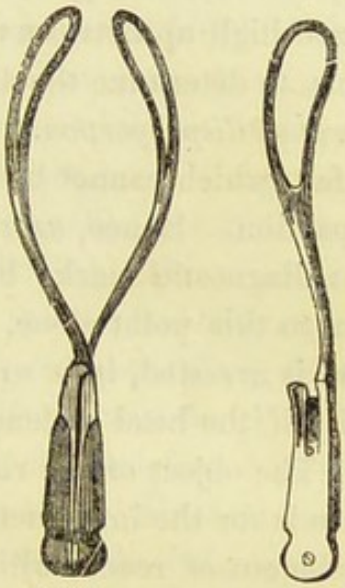


Fig. 75.†



shape, and correspond with the description we have just given; only that Dr. Aitken's has a small moveable roller between the handles, to prevent compression.

The Operation, when the Head is arrested in the Pelvic Cavity, is one which requires a much more attentive consideration, because it is here that the difference in the practice of the most expe-

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* Fig. 74. Aitken's forceps. A small roller is fixed in one handle, which is moved by a screw, and is so adapted as to keep the handles separated when the instrument is grasped.

† Fig. 75. Collins's forceps. Blades straight.

rienced accoucheurs is so remarkable. We have already submitted to you our reasons for the rules proposed for your adoption. They are, 1st, Not to interfere, nor to apply the forceps, *if the head be slowly advancing*, unless in cases where the pains are feeble, from a weak constitution; 2nd. Not to apply the forceps *when the head is impacted*, unless in the diseased pelvis. The view of the operation which we wished you to take would confine it to cases of arrest. It is of importance, therefore, to make a very careful examination *per vaginam*, before the delivery is determined upon. *First, you must ascertain that the head is arrested.* Sometimes it ceases to advance, while the tumour on the presenting part increases, so as to be mistaken for its further descent. Both fingers, therefore, should be introduced, and passed high up between the head and pelvis, in the interval of the pains, to determine the arrest. *Secondly, you should decide on the degree of disproportion.* In cases of arrest, the ear can generally be felt, which cannot be done without great difficulty in cases of impaction. Hence, *as a general rule*, to feel the ear is an important diagnostic mark; but you should not confine your attention to this point alone, because it may happen that, when the head is arrested, it is so placed that the ear cannot be felt, especially if the head be lengthened, and a tumour be formed upon it. The object of the rule is to determine what amount of space there is for the introduction of the instrument. Therefore, if the ear be out of reach, while the fingers can be passed with facility between the head and the pelvis—if the catheter can be passed easily—if you can press the head back without difficulty—and if the vagina be not swollen from the extreme pressure—then the forceps may be applied. *Thirdly, you must decide upon the time of its application.* It appears to me that *four hours* would be quite sufficient to allow the head to remain in the same position, to authorise your interference. But if there be the least indication of pain, swelling, or heat in the passages, you should not delay one moment from the time that these symptoms present themselves, when you are satisfied that the forceps may be applied. Promptitude is the secret of success, and in nothing is it more evident than in the case we are supposing. It is possible that the

pains may be strong and frequent; and it is generally a safe recommendation not to interfere as long as the uterus seems to have sufficient power, but rather to wait until the pains become feeble, or the action of the uterus is suspended. Nevertheless, in the case before us, you cannot act upon such a rule. If the head be arrested—if the pains be strong but inefficient—if inflammation set in—to hesitate to deliver must be considered the most mischievous vacillation. Every hour spent in these useless efforts of the uterus only increases your difficulty, only renders the operation more hazardous, and diminishes your chance of success; because the application of the forceps to parts already inflamed must contuse them to a certain extent, and if so, the contusion will terminate in slough.

When you have determined on the necessity for delivery by the forceps, and on the time for operating, the same preliminary arrangement should be made as in the former instance, using still greater caution in your antiphlogistic measures. If the vagina be swollen and hot, the urine retained, the pulse quick, depletion some time before operating would be advisable; the urine being of course removed. If the ear be felt, the pubic blade may be passed in the same manner as in the preceding operation; but if not, the presentation must be carefully examined. You can usually trace the lambdoid suture passing upwards from the posterior fontanelle: direct the pubic blade along this, and it will guide it to the ear. You may also take the rule with regard to the pelvis, laid down by Dr. Rigby, and introduce the first blade behind the trochanter, still bearing in mind its relation to the lambdoid suture, thus the first step of the operation can be generally taken successfully. The passage of the sacral blade is rather more difficult. It may be introduced in the same manner as in the former instance, but its advance is frequently checked as it approaches the brim of the pelvis. If such should happen, be very careful not to use force in pressing it forwards. It is better to act with the pubic blade, for a short time, as a vectis; and, if the head advance, even slightly, the opposite blade will frequently glide into its place.

When the forceps is applied, it is well to dislodge the head

from its situation in the first instance; because it constantly happens that in these cases of arrest some accidental displacement of the head is the cause of difficulty, which the uterus cannot alter.

Fig. 76.*

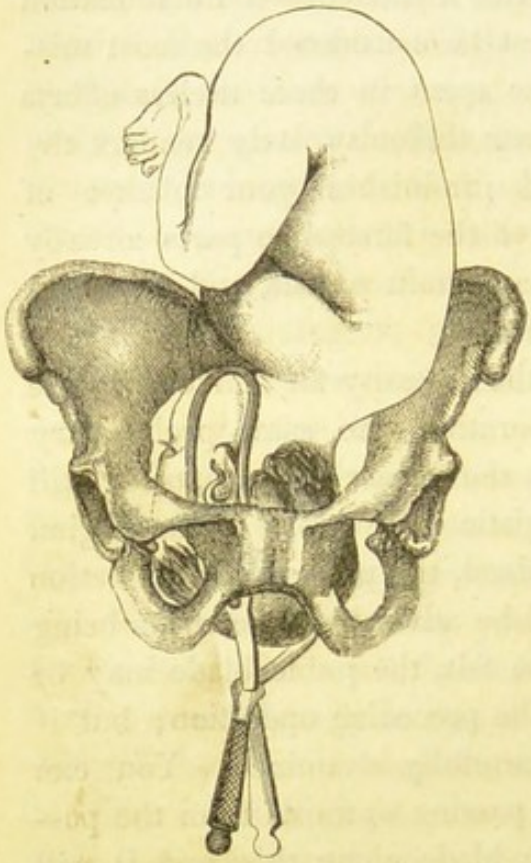
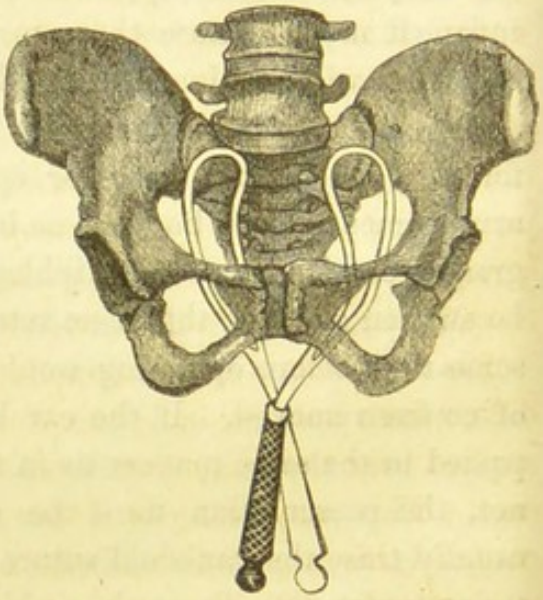


Fig. 77.†



but when the head is relieved, it will glide into the correct position, and may be delivered without difficulty. If, however, you find that with the following pain the head is still arrested, the forceps must be seized firmly, and, in order to secure your hold, a coarse napkin may be placed loosely round the handles. A steady and powerful traction should be maintained as long as the pain continues; and when it ceases, the grasp of the instrument must be at once released, and remain so until the succeeding pain, when the same steady traction may be renewed. Thus you will

* Fig. 76. Head in first position, shewing the application of forceps over the ear on the pubic side of pelvis.

† Fig. 77. Relative position of forceps and pelvis.

generally succeed in bringing the head through the opposing part of the pelvis; and, as it advances more easily and approaches the perinæum, again recollect to leave it as much as possible to the efforts of the uterus. While the head is thus drawn through the pelvic cavity, you should bear in mind the direction in which it must pass; that when the forceps is in the axis of the pelvic cavity, the shank of the handles would lie between the ischiatic tubera, but when the head is in the hollow of the sacrum, the handles would then be directed forwards towards the pubes. You should therefore first draw, with a waving motion, directly towards you, and as the head advances, direct the handles forwards. It is necessary also to observe the rotation of the head, in its lateral direction, from the oblique towards the antero-posterior measurement of the pelvis. At the same time, it is advisable rather to follow than to guide the direction of the head in its progress; because, as it descends, it will *naturally* change its position, which might be prevented by the operator's awkwardness in holding the forceps, and attempting too hastily to turn it.

The Operation when the Head is Fixed in the Brim of the Pelvis differs from both of the preceding operations. The blades are applied over the occiput and face of the child, and not over the ears. This may easily be done in the case to which we have confined this application of the forceps; but it would appear to us extremely difficult and dangerous to do so in other deformities of the brim of the pelvis. Two fingers, and as much as possible of the right hand, should be passed behind the trochanter, towards the centre of the ilium, on the superior side of the pelvis; and, if the anterior fontanelle be felt distinctly, the longer blade of the forceps (if they be unequal) should be passed over the fontanelle to the face of the child; the shorter blade may then be passed in the opposite direction over the occiput, guided by the lock of the introduced blade. When properly applied, the handles look downwards and backwards towards the perinæum, and in the axis of the brim; traction must be made in this direction, and, when the pain commences, the handles of the instrument should be held, as in the former case, firmly, and the force gradually increased, according to the resistance. Two or three steady trials

will generally succeed in extricating the head from the brim, when it will rapidly advance without assistance; the forceps might be removed, but it is safer not to do so lest any impediment might delay its further progress.

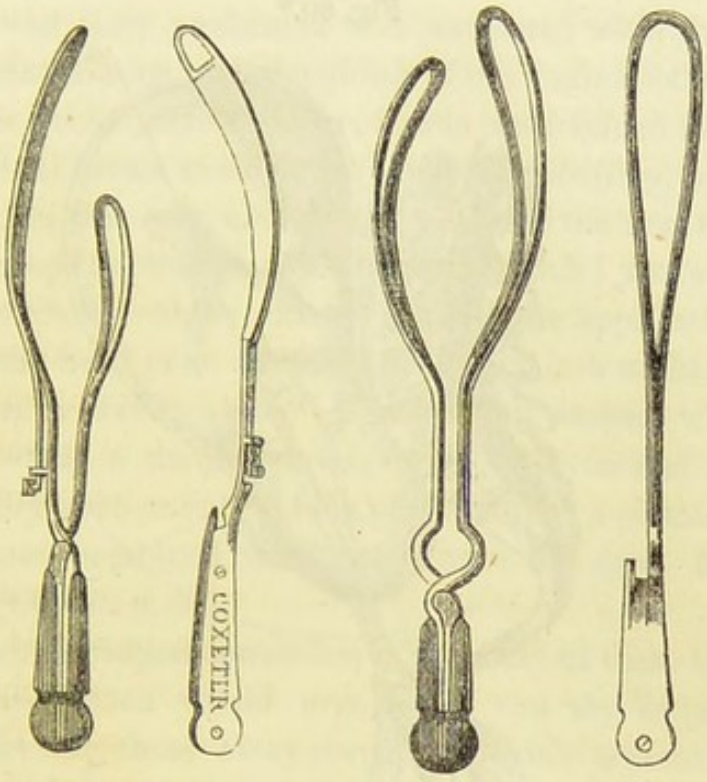
It is necessary to remember the change in the direction of the head when it is passing into the hollow of the sacrum. The blades of the forceps may also be changed, so as to direct them over the ears of the child. Great caution is required in extracting the head from the brim of the pelvis, because it is impossible to use any force without compressing the handles strongly together. There is, therefore, danger lest the face of the child be bruised, or, what is quite as likely, the frontal bone bent in. In some cases, the edge of the blade of the forceps has been buried in the frontal bone, even when the instrument was intended to pass over both ears. Such a fatal accident would be much more likely to occur in this operation, if sufficient care were not taken to avoid it.

If the *posterior fontanelle* be felt on the superior side of the pelvis, the longer or facial blade of the forceps should be passed along the opposite side to the ilium, and then the occipital blade behind the trochanter, as in the former operation. The head of the child always lies in the transverse measurement of the brim, with the occipito-frontal axis corresponding to it. There are only two positions, one with the face to the superior, and the second with the face to the inferior side of the pelvis. The operation in the second case is, therefore, just the reverse of that in the first position.

In the construction of instruments, some forceps are made especially for this operation. It is considered objectionable (and we think rightly so) to operate with a forceps that has the blades of equal lengths, because, when the instrument is applied, the occipital blade will prevent the facial from passing sufficiently far over the face; its extremity may only reach the nasal bones, or be applied over the frontal sinuses, and therefore the bone may be crushed by the force employed in extraction. To avoid this, Dr. Davis contrived a forceps with unequal blades, in such a manner that the curvature of the longer blade could be

diminished or increased if necessary (fig. 78). More lately, Dr. Radford of Manchester (who has had extensive experience in these cases of deformed pelvis), has invented a forceps with un-

Fig. 78.* Fig. 79.†



equal blades for the same purpose (fig. 79). The majority of practitioners however, employ only one kind of forceps for these last two operations, which they call the *long forceps*.

Before you undertake this operation, the utmost care should be taken in making a vaginal examination, lest you mistake the kind of deformity that prevents the head from descending. We cannot give you a stronger illustration of this, than by quoting the first case of instrumental delivery reported by Dr. R. Lee. "On the 28th June, 1823, I was present at the delivery of a woman aged thirty, who had been in labour nearly three days and nights, under the care of a midwife. It was the first

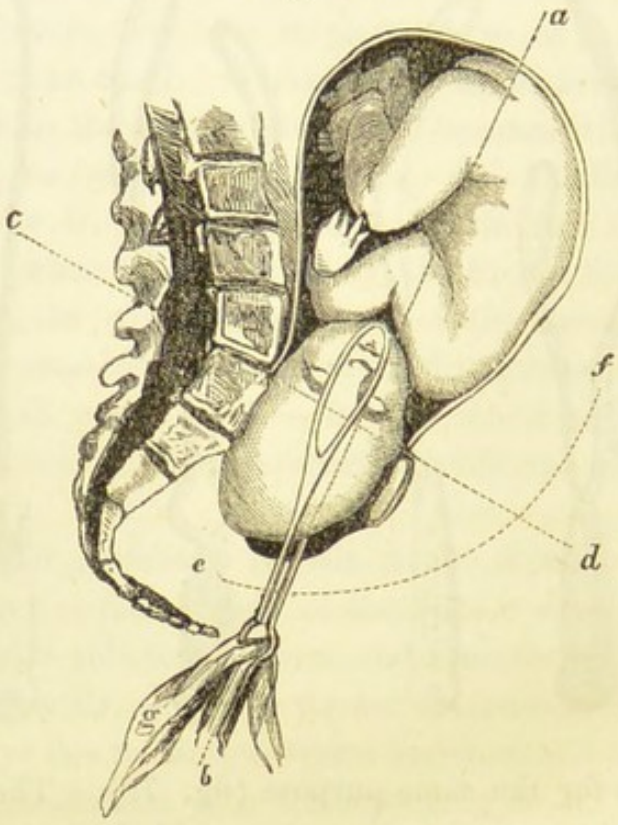
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* Fig. 78. Davis's forceps, with unequal blades.

† Fig. 79. Radford's forceps, with unequal blades. Handles short. Shank forms a ring.

child. The orifice of the uterus was not fully dilated, and it was very rigid; the vagina was swollen and tender; the abdomen tense, and painful on pressure. Tongue loaded, urgent thirst, countenance flushed, pulse rapid and feeble. The labour-pains for ten

Fig. 80.*



or twelve hours had been gradually becoming more feeble and irregular. The head of the child was strongly compressed and much swollen, and the greater part was above the brim of the pelvis. *An ear could not be felt*, and the hollow of the sacrum was empty. It was determined, by the practitioner who had charge of the case, to attempt to deliver with the long forceps; and he observed, before proceeding to introduce the blades, that it was a case in which the superiority of the long over the short forceps would be observed in a striking manner, and that in less than a quarter of an hour the delivery would be safely and easily completed, and the life of the child preserved. The blades of the

* Fig. 80. Application of Dr. Radford's forceps when the head is fixed in the brim.

forceps were, however, introduced with great difficulty, and still greater was experienced in getting them to lock. Strong traction was then made for several minutes, and the blades slipped off the head. *This happened several times;* but the attempt to deliver was not abandoned till the operator was exhausted with fatigue. The head was then perforated and extracted with the crochet. Violent inflammation and sloughing of the vagina followed; and, about three weeks after delivery, it was ascertained that a large vesico-vaginal fistula existed." (*Clinical Midwifery*, pp. 6, 7.)

Dr. Lee, on this case, observes, "This was the first time I ever saw the forceps applied in actual practice; and I was struck with the vast difference which exists between the application of the forceps to the head of an artificial fœtus put into a phantom, and the head of a living child. I was led to suspect what I now witnessed—that a dangerous degree of boldness and hardihood might readily be acquired by long practice upon a phantom, where this was not combined with attendance on cases of difficult labour." (*Op. cit.* p. 7.)

We feel the strongest conviction of the truth of these sentiments; and for this reason would urge upon you the importance of closely observing those every-day cases which present to you no difficulties. It is only by educating your sense of touch so as to perceive the relations between the head and the pelvis, that you can detect any deviation from their ordinary proportions, or can estimate accurately the amount of disproportion that exists. It is by the same tact that you know with certainty the manner in which the forceps is applied, or can judge of the propriety of its application. It is only by such previous education you that can hope to perform any instrumental delivery with success; and, therefore, the study of the presentations in these ordinary, but too often neglected, cases of natural labour, is a far safer mode of acquiring skill in the application of the forceps, than practising on those clumsy imitations of Nature that are commonly employed, under the fanciful names of "phantom," "mannikin," "dolly," etc.

A very few observations only are required on those cases where the *position of the head in the pelvic cavity is altered.*

When the Face is towards the Pubes, the ear can still be felt, and therefore the forceps may be applied in the manner already described. In this case, it is still more necessary to dislodge the head, and to endeavour to rotate it into the correct position. If this cannot be done, the perinæum must be very carefully guarded from injury as the head is descending, because the pressure upon it is so great.

When the Face presents, a very careful and cautious examination should be made; it is probable that the face is already much swollen from previous pressure, and is therefore the more easily irritated. It is essential to know whether the chin or the frontal bone lies on the pubic side of the pelvis. If the fingers be passed along the plane of the ischium on the left side, the suture of the forehead may be felt, perhaps the anterior fontanelle; if not, as they are withdrawn along the face, the irregular surface of the orbits and nose is felt, but not the mouth. This will prove that the forehead is anterior; because, if the mouth be touched near the plane of the ischium, the chin must be on the same side. It is necessary to determine the position of the face, because of the rotation necessary when the forehead lies forwards. The forceps may be applied, one blade along the plane of the right ischium, the opposite in the usual manner along the lock of the first blade. When they are locked, the face may be pushed back slightly; and, when it is pressed forwards by the pain, the rotation may be made, so that the chin will glide forward on the right side from the sacral to the pubic side of the pelvis. The forceps is seldom required when the chin is anterior; but, if it be, the rotation is more easily effected.

The Os Uteri should be dilated. In our description of these different operations, no allusion has been made to the os uteri. Its full dilatation is admitted by all practical writers to be essential to any such operation. The rule has, however, been recently controverted, and the introduction of the forceps before the dilatation of the os uteri advocated. It has been argued that, because the hand may be introduced to turn the child before the dilatation of the uterus is completed, so may the forceps. It is necessary for us to point out to you the reasons for not doing

so. There is no analogy whatever between the gradual dilatation of the os uteri with the fingers and hand to turn the child, and the effort to force open the os uteri by the power of the forceps. The effect on the cervix and os uteri, when, the waters being discharged, the head of the child is brought down upon them, is well known; we have endeavoured to point out how and why the os uteri may then become rigid. If the forceps be applied to the head, and it be forcibly brought against the cervix, the latter will not yield; the irritation will increase the resistance, and the operation will fail, after having excited that inflammation which we were so anxious to avoid. In cases where the cervix is perfectly yielding and dilatable, and which merely require time to effect the full dilatation, the forceps may be applied, and perhaps force open the os uteri without injury; the reverse, however, might happen, and no conscientious practitioner would feel justified in placing his patient in the slightest risk for so unnecessary an operation. Make it a rule, therefore, never to apply the forceps until the dilatation of the os uteri is completed.

We may conclude this subject in the words of Denman:— "Before the completion of the first stage of labour—that is, before the os uteri is completely dilated, and the membranes broken — the use of the forceps *can never come into contemplation*, because the difficulties before occurring may depend upon causes which do not require their use, or, if required, they could not be applied with safety or propriety before those changes were made."

LECTURE XX.

OBSTETRIC OPERATIONS (*continued.*)

OPERATIONS TO SAVE THE MOTHER ONLY.—Having described those operations which are calculated to preserve the lives of the mother and the child, we must now turn our attention to those which are intended to save the mother only.

Perforation. When the head is so impacted in the pelvic cavity that it would be too hazardous to her safety to attempt delivery by the forceps, the alternative that remains is to perforate the head, to remove as much of the brain as possible, and to extract the child by means of the crotchet or craniotomy-forceps. So serious an operation requires the most mature consideration, especially if the child be alive; but should the death of the child take place before symptoms of danger to your patient present themselves, the operation may be undertaken without hesitation, because it is one much less calculated to injure the soft parts of the mother than that with the forceps, and it is more easily performed.

If, then, there be the least suspicion that the case may terminate in perforation, you cannot be too watchful in observing the symptoms. Your attention should be directed to two objects; first, to control, as far as possible, the inflammation which may arise; and, secondly, to observe carefully the pulsations of the fœtal heart. When you have heard them distinctly, have observed the variations in their character, and find that they have ceased, the operation may then be performed. The greatest difficulty connected with this operation is *the time* for performing it. This is especially the case when the child is alive, and symptoms of inflammation are progressively advancing to a dangerous point. Fortunately such cases are rare; but when they do occur, the practitioner is placed in a dilemma. He either destroys the child—an expedient which he must have a natural repugnance to adopt; or, if he attempt to deliver by instruments not destructive to it, he runs the risk of exposing the mother to the most serious dangers, without any certainty that he will succeed even in delivering the child, much less in saving its life. It is well, therefore, to consider the progress of such a case.

The head being tightly jammed in the pelvic cavity, a tumour is very rapidly formed on the presenting part. The vagina is hot, swollen, painful, at first dry, but afterwards moistened with an acrid serous discharge. The urethra is compressed, and the urine retained. The uterus is contracted about the child in the intervals of the pains. If the fœtal heart should cease, the child may be

removed, and these symptoms subdued without injury to the passages; but if the child be alive, there is still a hope, although certainly a distant one, that it may advance when the head is sufficiently compressed by the pelvis, and the swelling of the passages is diminished by the antiphlogistic measures adopted. We are not authorised, therefore, to open the head, until there is some evidence of danger to our patient. It is here, then, that your difficulties begin. To pursue these symptoms: the inflammation, which had commenced in the vagina, extends to the uterus, and engages the constitution in an irritative fever. The surface of the uterus felt through the abdomen is not only hard, but very tender; the patient will not bear to have it touched. When the pains return, her agony is extreme, but in the intervals she has no respite from suffering; she still complains of pain and soreness; the expression of her voice is altogether altered; the deep groan of the bearing pain is exchanged for a constant whine; a yellow, oily, offensive discharge flows from the vagina. The pulse is febrile; the tongue furred; the countenance pallid and anxious; respiration laboured, and the stomach highly irritable. She constantly seeks for cold drinks, which are rejected as soon as taken. The symptoms of exhaustion soon follow. The discharges from the stomach are like coffee-grounds. The patient becomes extremely restless, tossing about the bed, and calling for air. Sudden chills on the surface alternate with clammy perspirations; the temperature of the vagina diminishes; and the fæces are discharged involuntarily. Blowing, in the act of respiration; coldness of the vagina and extremities; and the gradual cessation of the pains, immediately precede the death of the patient. Such are the train of symptoms, which succeed each other more or less rapidly, once inflammation commences. Whenever, therefore, these symptoms first shew themselves, and will not yield to treatment, you cannot temporise; the child must be removed, even though it be necessary to destroy it.

Manner of performing Perforation when the Head is fixed in the Brim or in the Cavity. The position of the patient is the same as in the forceps operation. The preliminary measures to be adopted are similar, but much more attention is required,

because it is so necessary to combat inflammation. We must assume, therefore, that the rectum is empty, and that the urine has been previously withdrawn from the bladder. It would be right, however, to examine the bladder carefully above the pubes before operating; sometimes the neck and fundus of the bladder are so compressed between the head and the os pubis, that if a short catheter be used, the urine is removed from the lower segment only, while the principal portion remains above. When this is the case, the head should be pressed back as much as possible, and a long gum-elastic catheter, of the size that will pass the urethra, introduced; great care should be taken not to use force in its passage, lest the instrument perforate the canal.

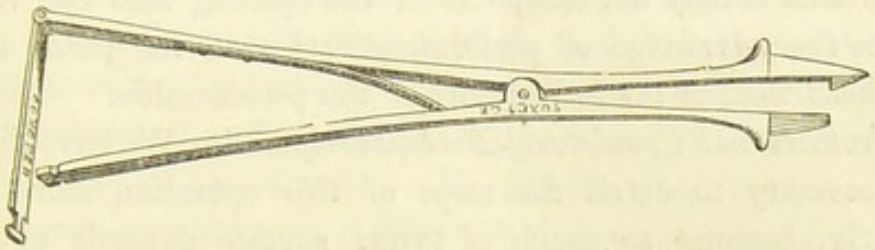
These essential points having been secured, two fingers of the right hand should be passed to the most depending part of the tumour that presents. The whole surface of the presentation should be carefully examined, in order to determine the degree of dilatation in the os uteri. If it be not fully dilated, you should observe its exact relation to the tumour,* and the distance of the edge of the os uteri from its centre; and if the os uteri be very thin and closely embrace the tumour, you should accurately define its margin, lest the degree of dilatation should escape your notice. Having thus made a very cautious examination, let the forefinger of the right hand remain applied to the centre of the presenting part, but rather to the pubic side, and with the left hand introduce the perforator, having the point (which is slightly curved) resting upon, and guarded by, the forefinger. When both fingers meet, the right hand may be withdrawn from the vagina, and the perforator forced through the tumour and bone, at the part where the forefinger had been applied. The stops arrest its further progress. The handles should then be separated, in order to break open the cranium; but care is re-

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* This tumour, formed on the head by the pressure of the cervix of the uterus, is different from that which afterwards takes place when the head is in the cavity of the pelvis.

quired in doing so. The first two fingers of the left hand should rest on the stops of the instrument, to prevent the perforator from slipping from the opening when the handles are raised, and to save the vagina from injury. With the common perforator, one handle is generally held by the operator, while the opposite is raised by an assistant; but if Naegele's perforator be used, an

Fig. 81.*



assistant is not required for this purpose. When the bone is sufficiently broken in one direction, the handles may be changed to the opposite, and a crucial opening made. The perforator should be passed into the cranium, and the brain completely broken up. It may then be removed, but it would be advisable to have the forefinger of the right hand still within the opening; because it frequently happens that, when the pressure of the head is very great, the bones so overlap each other that the opening is again closed, which makes it difficult to introduce the crotchet. This latter step of the operation is often very troublesome, especially if the crotchet be properly curved, because the point of the instrument is so directed that it is difficult to introduce it. In order to do so, the handle should be directed backwards towards the coccyx, when, with a little careful management, it may be passed through, and the remainder of the brain removed. As soon as this is accomplished, the handle of the crotchet should be held firmly in the right hand, while two or three fingers of the left are applied to the bone externally, partly for the purpose of protecting the vagina, if the crotchet should

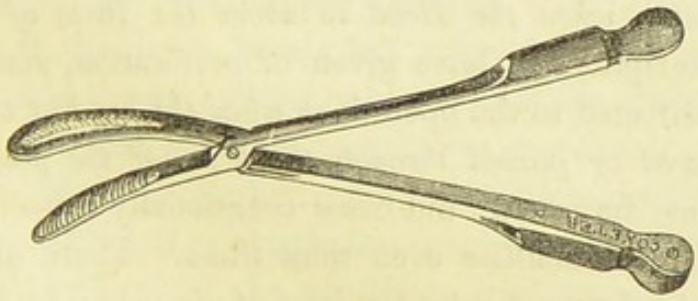
* Fig. 81. Naegele's Perforator.

perforate, but chiefly to prevent it from breaking through the bone. Some caution also is required in extraction. The force should be so applied that the bone may be held tightly between the flat part of the point and the fingers, without directing it much on the point itself. In this manner you may proceed, never using more force in extracting than is actually required. As the point of the crotchet frequently slips from its place, it is an advantage to have as much of the bone below it as possible, in order that it may not escape from the opening into the vagina; hence the advantage of perforating rather on the pubic side of the head than at the lowest part of the presentation.

Crotchet and Craniotomy-Forceps compared. We have thought it necessary to detail the steps of this operation more particularly, because so much of your success depends upon the manner in which it is performed, and especially as respecting it there seems to be much misconception. This is evident in the construction of these instruments, some crotchets having the shaft as straight as the handle, with the point sharp and spear-shaped. No doubt a crotchet of this kind could be fixed within the cranium without any difficulty, neither would there be the least danger that it would slip from its position; but, as soon as the extracting force is applied, being directed completely on the point, there is great risk that it would break through the bone. When the crotchet is properly curved, this is altogether avoided, because, while the point is sufficiently fixed in the cranium to retain its hold, the principal force is employed in compressing the bone against the fingers. These disadvantages induced the late Mr. Holmes and Dr. D. Davis to propose the craniotomy-forceps as a substitute—the revival of an instrument described in the early history of midwifery as the forceps. The craniotomy-forceps is formed of two blades or shafts, one of which has at the extremity a number of teeth, the other a corresponding number of openings; so that, when the blades are applied together, the teeth rest in these openings as in sockets. Sometimes the shafts are separate, and may be united, like the forceps, by a lock; others are joined together by a hinge-joint. The handles are strong, and the extremity of the blade is smooth and rounded.

When the craniotomy-forceps is used, the blade which is dentated is introduced within the cranium, while the opposite blade is passed outside; when they are closed, the teeth perforate the bone, and are received by the openings mentioned, and thus the cranium may be grasped firmly by the instrument. Extraction may then be made without difficulty, provided the bone does not give way. The craniotomy-forceps may be very easily introduced and applied to the head of the child; the teeth are guarded by the construction of the instrument; and there are no other sharp points to tear the vagina when applied, neither is there the same management required in extracting as there is with the crotchet. Its advantages, therefore, seem to be such as to make it supersede the use of the crotchet. Nevertheless, some of the most experienced practitioners dislike the instrument, because it is liable to one great objection from which the crotchet is free. The bone is so crushed by the craniotomy-forceps, that, when extraction is made, just so much of the bone is torn away as was broken, and the head is left behind. This is especially the case when the child has been dead for some time, and putrescency has commenced. Thus the presenting part of the head may be torn up into fragments, without being disturbed from its position. If the instrument fail in its purpose, there is great diffi-

Fig. 82.*



culty in applying the crotchet afterwards, and there is some danger lest the spicula of bone broken by the forceps should tear the passages: a lacerated wound of this kind may give rise to

* Fig. 82. Craniotomy-forceps.

very serious inflammation, and therefore increase the hazard of the operation. To obviate this objection, some forceps are made without teeth, having only a strongly serrated edge in the blades, by which the bone is grasped, and prevented from slipping. There is less risk of breaking through the bone with an instrument of this kind, and it is, therefore, less objectionable; but still there is more danger of separating the parietal bone at the sutures than with the crotchet, if the resistance be great.

These observations on the comparative merits of the crotchet and craniotomy-forceps give you the result of our own experience in the use of these instruments. The objections stated have also occurred to other practitioners, in whose judgment we have the highest confidence, and therefore we feel the more certainty in their truth. Nevertheless, we should not wish you to infer that the craniotomy-forceps is either an useless instrument, or one that should be altogether discarded from practice. On the contrary, in many cases, and especially in those where the head is much ossified, it may be employed with great advantage, if caution be used, and the instrument be properly selected. You should only conclude, from what has been said, that either instrument may be employed usefully in cases especially fitted for its application; but that, in the majority of instances in which difficulties of this kind require the aid of instrumental assistance, it is safer to employ the crotchet.

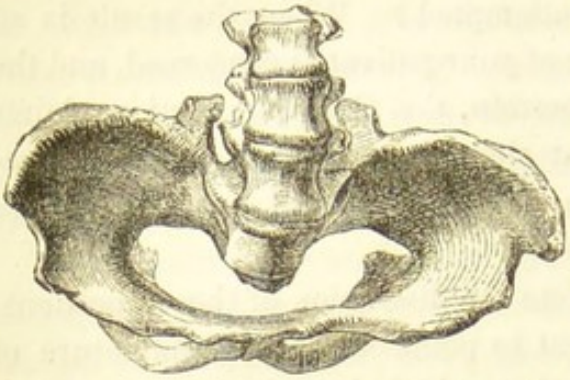
Perforation when the Head is above the Brim of the Pelvis. In the description we have given of perforation, your attention has been directed to the operations *when the head of the child has either entered or passed through the brim of the pelvis*, and has then become impacted; but cases occasionally arise that present much greater difficulties even than these. There are instances *where the head cannot enter the brim of the pelvis*, in consequence of its extreme deformity; and in determining the mode of delivery, we are again involved in a cloud of controversial opinions, through which it is difficult to find out the true course to pursue. The object of one of these questions is to determine the limit of perforation; or, in other words, to decide what is the least possible space in the pelvis through which a child may be extracted by

the crotchet. Secondly, when, in cases of extreme disproportion, this seems hardly to be accomplished, and, at the same time, the attempt is extremely hazardous to the mother, the question arises, whether it should be at all attempted? When the result is so doubtful, so far as the safety of your patient is concerned, and the destruction of the child is certain, the Cæsarian section claims for itself the advantage that there is at least a chance of preserving the child, while the risk to the parent could hardly be greater.

We shall presently enter into the discussion of these questions. At present, it will be sufficient to point out to you the nature of them, and the different operations which have been suggested to meet the difficulty. The first question sprang up in the discussion of a very remarkable case that occurred in the practice of Dr. Osborne—the case of Elizabeth Sherwood. Dr. Osborne states, that "she was so deformed both in her spine and lower extremities, as never to be able to stand erect for one minute without the assistance of a crutch under each arm." At the age of twenty-seven years, however, she became with child, and was admitted a patient into Store Street Hospital. A vaginal examination was made, and "immediately upon the introduction of the finger, I" [Dr. Osborne] "perceived a tumour, equal in size, and not very unlike in feel, to a child's head. However, it was instantly discovered that this tumour was formed by the basis of the os sacrum, and last lumbar vertebra, which, projecting into the cavity at the brim, barely left room for one finger to pass between it and the symphysis pubis, so that the space from bone to bone at that part *could not exceed three quarters of an inch.* On the left side of the projection, quite to the ilium, which was about two inches and a half in length, the space was certainly not wider, and, indeed, by some of the gentlemen who examined her afterwards, it was thought to be rather narrower. On the right side, the aperture was somewhat more than two inches in length from the protuberance to the ilium, and, as it admitted the points of three fingers (lying over each other) in the widest part, it might, at the utmost, be about an inch and three quarters from the hind to the fore part, but it became gradually narrower, both towards

the ilium and towards the projection." (Osborne's *Essays*, p. 242.) Such was the pelvis through which Dr. Osborne determined, after consultation with Drs. W. Hunter, Denman, Bromfield, Walker, and Watson, to extract the child with the crotchet. "It was my duty" (he proceeds) "to perform the operation, which I began about eleven o'clock that night: after placing her in the usual manner, close to the edge of the bed, on her left side, as the situation most commodious both for the patient and myself. Even the first part of the operation, which in general is sufficiently easy, was attended with considerable difficulty and some danger. The os uteri was but little dilated, and was awkwardly situated in the centre and most contracted part of the brim of the pelvis. The child's head lay loose above the brim, and scarcely within reach of the finger, nor was there any suture directly opposite to the os uteri. Having desired an assistant to compress the abdomen with sufficient force . . . I introduced them (the perforating scissors) with the utmost caution through the os uteri, and, after repeated trials, at length succeeded in fixing the point into the sagittal suture near the posterior fontanelle. I very soon, and with great facility, penetrated into the cavity of the head, destroyed the texture of the cerebrum, with a common spoon extracted a considerable quantity, and, breaking down the parietal bones, made an opening sufficient for the free discharge of what remained. In this state we left her" for thirty-six hours, when, "upon examination, a small portion of the head was found squeezed into the pelvis; indeed, there were some little detached bits of the parietal bones lying loose in the vagina. . . . Our intention, by delaying the extraction of the child six-and-thirty hours after opening the head, was, in

* Fig. 83.



* Fig. 83. Ovate pelvis: case of Elizabeth Sherwood.

the first instance, to allow the uterus opportunity, by its continued contractions, to force the head as low and as much within reach of the crotchet as the nature of the case admitted, and afterwards to induce as great a degree of putrefaction as possible in the child's body, by which means it would become soft and compressible, and afford the least possible resistance in its extraction . . . I immediately determined to begin to make an attempt to extract the child. *I call it an attempt, for I was far from being satisfied in my own mind of the practicability.* . . The os uteri being situated as before described, in the most contracted part of the brim of the pelvis, where the space was incapable of permitting the introduction of the curved point of the crotchet, without great difficulty and danger, my first endeavours were bent to draw the os uteri with my finger into the widest part of the brim of the pelvis, and to dilate it as much as possible. Both the removal of the os uteri, and such dilatation of it as the bones admitted, were effected without much trouble. I then introduced the crotchet through the perforation into the head, and by repeated efforts, made in the slowest and most cautious manner, destroyed almost the whole of the parietal and frontal bones, or the whole upper or presenting part of the head: and as the bones became loose and detached, they were extracted with a pair of small forceps, to prevent, as much as possible, laceration of the vagina in their passage through it. The great bulk of the head formed by the base of the skull, still, however, remained above the brim of the pelvis; and from the manner in which it lay, it was impospossible to enter without either diminishing the volume, or changing the position: the former was the most obvious method, for it was a continuation of the same process, and, I trusted, would be equally easy in execution. I was, however, egregiously mistaken and disappointed, being repeatedly foiled in every endeavour to break the solid bones which form the basis of the cranium, the instrument at first invariably slipping as often and as soon as it was fixed, or at least before I could exert sufficient force to break the bone. At last, however, by changing the position of the instrument, and applying the convex side to the pubis, I fixed the point, I believe, into the great foramen, and by that means became master

of the most powerful purchase that the nature of the case admitted. Of this I availed myself to the utmost extent, slowly, gradually, but steadily increasing my force till it arrived to that degree of violence which nothing could justify but the extreme necessity of the case, and the absolute inability, in repeated trials, of succeeding by gentler means. But even this force was to no purpose, for I could not perceive that I had made any impression on that solid bone, or that it had been the least advanced by all my exertions. I became fearful of renewing the same force in the same way, and therefore abandoned altogether the first idea of breaking the basis of the cranium, and determined to try the second by endeavouring to change the position. . . . I therefore again introduced the crotchet in the same manner, and, fixing it in the great foramen, got possession of my former purchase; then, introducing two fingers of the left hand, I endeavoured with them to raise one side of the fore part of the head, and turn it a little edgeways. Immediately and easily succeeding in this attempt, the two great objects were at once accomplished, for the position was changed, and the volume diminished. Continuing my exertions with the crotchet, I soon perceived the head advance, and, examining again, found a considerable portion of it had been brought into the pelvis. Every difficulty was now removed, and by a perseverance in the same means for a short time, the remaining part of the head was brought down, and out of the os externum." (*Op. cit.* pp. 247—55.)

We have detailed this case to you more at length, because it accurately describes an operation with the crotchet, different from what we have described—one by which the vault of the cranium is quite broken up and removed, and the base of the skull is drawn obliquely through the contracted brim of the pelvis, the crotchet being fixed in the foramen magnum. It is also remarkable—we might say singular—in the fact, that a child could by any means be drawn through a pelvis so extremely distorted as to have the antero-posterior measurement reduced to three-quarters of an inch; and perhaps the most astonishing fact connected with the case was, that the woman recovered without a bad symptom, and sat up in seven days after the operation. It is not sur-

prising, therefore, that a warm controversy should have arisen; the advocates of the Cæsarian section condemning the attempt, and protesting against such a case being made a precedent for future crotchet operations; while the supporters of craniotomy claimed the case as a valuable proof of the superiority of perforation to hysterotomy, which latter was generally fatal to the parturient woman.

Other Instruments for Perforation. Dr. D. Davis contrived instruments to meet the difficulty of these cases. One was the *osteotomist*, a strong bone-forceps, intended to cut completely away the bones which form the vault, so as to leave the base of the cranium. Dr. Davis stated that this also may be broken and removed by the instrument, so as to prevent the necessity for that violent exertion to which Dr. Osborne was obliged to have recourse in drawing the cranium through the brim of the pelvis.*

Fig. 84.†

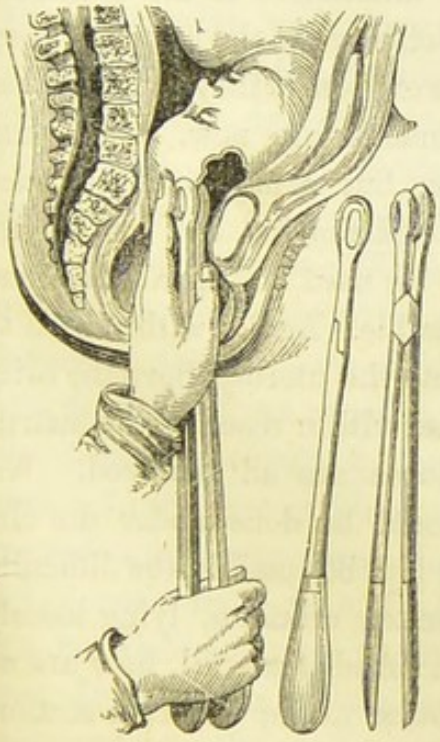
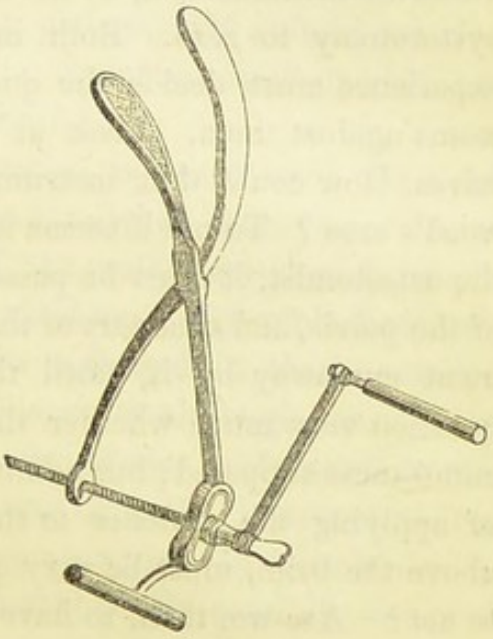


Fig. 85.‡



* Dr. Campbell has invented an instrument—the *kephalepsalis*—for a similar purpose to Dr. Davis's *osteotomist*.

† Fig. 84. Dr. Davis's osteotomist.

‡ Fig. 85. Baudelocque's cephalotribe.

M. Baudelocque, jun., also invented an instrument to break up the head, not by cutting it away, but by crushing it together. The *cephalotribe* consists of two very strong blades, rough on the inside, and having handles through which a screw passes. The handles are brought forcibly together by turning the screw, and the blades, by the same power, crush the bones that lie between them (fig. 85.)

Both these operations are intended to supersede the Cæsarian section, and both are liable to the same objection—viz., the extreme difficulty of using them in those cases where they are chiefly required, as well as the danger to which the passages would be exposed in such an operation, especially with the cephalotribe. In moderate distortions, where the crotchet or craniotomy-forceps may be used, the osteotomist and cephalotribe are unnecessary, because they possess no advantages which would lead us to employ them in preference to the former instruments. But when the distortion is extreme, and the alternative is the Cæsarian section, from the impossibility of delivery by the crotchet, they would be invaluable, if, as Dr. Davis expected, they could reduce hysterotomy to zero. Both instruments are new, and future experience must decide the question, but *primâ facie* evidence seems against them. Look at the cephalotribe, and ask yourselves, How could that instrument be used in Elizabeth Sherwood's case? To me it seems impossible. Again, with regard to the osteotomist, it must be passed into the uterus, above the brim of the pelvis, and that part of the head within reach of the instrument cut away by it, until the bones are all removed. We question very much whether this could be done under the circumstances supposed; but admitting it to be possible, the difficulty of applying the crotchet to the broken cranium, lying loosely above the brim, must be very great. And if we fail, how are we to act? Are we, then, to have recourse to the Cæsarian section, for the purpose of delivering a mutilated child from the uterus? It is true, we are assuming a maladroit performance of the operation, which might arise from want of skill. It is right, however, to do so, and to consider the alternative in cases of failure, if we would properly appreciate the value of the improvement. This

objection will, perhaps, appear with more force, from the caution used by Dr. Osborne to avoid such a difficulty in his operation. He first perforated the head, and then allowed his patient to remain thirty-six hours in strong labour, in order that some part of the head (then a putrid mass) might be driven into the brim of the pelvis. He preferred leaving the patient so long in labour, under such unfavourable circumstances, rather than operate while the head was yet above the brim of the pelvis. For these reasons we very much doubt whether the sanguine expectations of Dr. Davis will ever be realised.

Operations to save the Child.—Long before the instruments which have been just described were invented, an operation was proposed, to supersede the Cæsarian section, which at first was attended with some success, received the approval and honours of the Academy of Medicine, Paris, excited the warmest enthusiasm in its favour, and has now become only a part of obstetric history. Sigault and Le Roy proposed *to divide the symphysis pubis*, and thus to force open the contracted brim. It is sufficient to say, that this operation failed in its object, and proved to be so dangerous to the patient, that it has been discarded from practice; we shall not, therefore, dwell upon it, but proceed to the Cæsarian section itself.

Cæsarian Section.—This operation is based upon the third principle we have stated to you—viz., when from the circumstances of the case, the safety of the mother seems to be more than doubtful, if not hopeless, the child must, if possible, be saved. The *Cæsarian section* is therefore indicated in these extreme cases. In the case of Elizabeth Sherwood, although the crotchet succeeded, its success was the wonder of the professional world, and of none more than Dr. Osborne himself. It cannot, therefore, be taken as a rule to guide your practice. In order to decide upon the Cæsarian section, you should weigh carefully the probable result to the mother if the operation be not performed; and if it appear to you that perforation is impracticable, or so difficult to perform that the danger seems to be nearly as great to the patient as that of opening the uterus, you are then authorised to undertake this operation; because, if there be a probability that

foration will not ensure safety to the mother, you are certainly bound to consider the child, and give it a reasonable chance for its life.

In so difficult a question, and one that has been so warmly contested, facts are better than arguments. Some years ago we were requested by Mr. Codd of Rickmansworth to see a case of difficult labour, arising from distortion of the pelvis. The woman was not more than four feet three inches in height, twenty-three years of age, and born of diminutive parents. She was taken in labour, March 8, 1847 ; the water broke in six hours, and the pains ceased after twelve hours; they then returned, and continued for forty-eight hours, before we saw her. She was in active labour, her spirits good, and her pulse tranquil. Two fingers were easily introduced into the pelvic cavity; they at once came into contact with the sacrum, projecting so strongly forward that it had been mistaken for the head of the child; the conjugate measurement was ascertained to be *an inch and a half*. Had this patient been in London, the Cæsarian section would have been performed; but in Rickmansworth, in a confined apartment, with every disadvantage that poverty could present, it was out of the question. The attempt must be made to drag the mutilated child through a space that an apple would not pass. The head was perforated, and the crotchet with great difficulty applied; three hours were occupied without causing the least advance of the head, although the cranium was very much broken up. Further efforts were discontinued that night, and resumed the following morning. It was still more difficult to apply the crotchet, and several varieties of craniotomy-forceps were tried, but found unmanageable in so confined a space. The crotchet was resumed, and we succeeded in forcing it through the orbital plate of the frontal bone; a firm hold was thus obtained. Extractive force was gradually increased to the very utmost, but without success. At length the bone separated at the frontal suture, and came away. Two hours were thus spent to no purpose; the woman was exhausted, so a full anodyne was given, and she was left for a few hours. On our return, we found the fragments of the cranium pressed further into the brim, so that

we were able to get the crotchet hooked on the neck, and thus delivered the head; the shoulders were extracted with great difficulty, and the child removed. This woman sank in about a week afterwards. The *post mortem* examination gave no satisfactory explanation of the cause of death; there was no trace of peritonitis; her death can only be attributed to exhaustion. The pelvis was exactly one and a half inch in the conjugate axis, and four and a half inches in the transverse measurement.

This case may be contrasted with one reported by Mr. James Hawkins of Newport, in which the Cæsarian section was performed. Mr. Hawkins's patient was nearly of the same age and height, four feet one inch; the pelvis was ascertained to be *an inch and three quarters* in the conjugate axis. Labour commenced Feb. 17, 1858; and on the 19th, it was agreed by Messrs. Brewer, Woollett and Hawkins, that the Cæsarian section was the most feasible, and the only operation by which the life of the child could be preserved, and under the circumstances the most favourable to ensure the life of the mother. The operation was performed; the child was saved; the mother recovered; and both mother and child—"a fine little baby"—were frequently to be seen by Mr. Hawkins afterwards (*Med. Times and Gazette*, vol. xxxvii. pp. 488, 489.)

Thus in these cases, as nearly similar as possible, craniotomy, a most difficult and wearisome operation, scarcely succeeded in dragging a mutilated child through the narrow pelvis, and without saving the parent. The Cæsarian section accomplished both. A most interesting case is related in the *American Journal of Medical Sciences* (vol. xvi. p. 20) in which Dr. Meigs performed craniotomy, and had to contend with even greater difficulties than in the preceding case. Using his utmost skill and most powerful efforts, and returning at intervals, he failed to remove the head until thirty-three hours after it was opened. This woman fortunately recovered, and, becoming again pregnant, was delivered twice by the Cæsarian section. Mr. Gibson of Philadelphia performed the operation in 1834 and 1837, and in both instances with success, the mother and children being saved. The conjugate measurement of the pelvis was *under two inches.*

Such facts as these are sufficient to negative the statement that the Cæsarian section is of necessity an operation fatal to the mother, and to prove that the risk of craniotomy is quite as great in such cases. They establish, it appears to us, the rule that, in the ovate deformity of the pelvis, if the conjugate axis be *less than two inches*, craniotomy should not be attempted, but an effort made by the Cæsarian section to save the child.

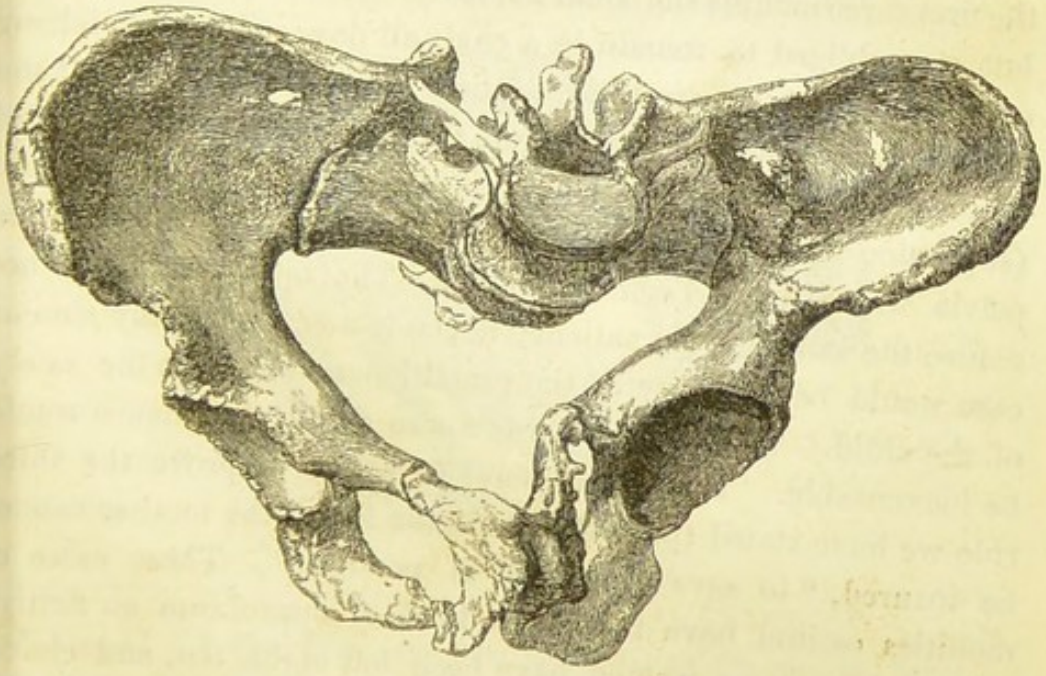
The *cordiform pelvis*, if caused by *rickets*, is generally only slightly deformed, just sufficiently to arrest or impact the head, which in either case may be delivered by the forceps; but when it is the result of *mollities ossium*, the deformity is extreme, and is caused by a disease which runs a much more rapid and destructive course. The history of a case will best explain its characters. Dr. Fraser, of Harrington Square, once sent for us (July 11, 1858) to see a patient of his in severe labour. She had been married sixteen years, and had given birth to seven children, all born at the full time, without any unusual difficulty. Three or four months previously to the birth of her last child (May 26, 1856) she complained of constant weariness, and dull aching pain in the lower part of the back and down the thighs, increased on walking. She continued to go about, however, up to within an hour or two of her confinement, which was quite natural, and terminated in less than two hours.

In Oct. 1857, she became again pregnant; after which the pain and difficulty in walking, which she previously felt, returned with increased force, so that ultimately (January 1, 1858) she was not able to leave her home. Dr. Fraser saw her in April sitting at her work-table, where she remained all day until she was moved to her bedroom. Her labour commenced July 10, 1858; but, contrary to the usual course, no advance whatever was made for twelve hours. Dr. Fraser, on making an examination, found the pelvis contracted; and, as the pains were then feeble, he gave an anodyne in the hope that they might become stronger after his patient had rest. On July 11, there being no alteration, our aid was requested. We found it impossible to get two fingers between the pubic rami; but, using the left hand and pressing strongly against the coccyx, we were able, by bending them so as to

avoid the projecting promontory of the sacrum to introduce two fingers within the brim of the pelvis. On passing the finger round the brim, the space seemed to be hardly larger than a florin. The nature of the difficulty being thus revealed, no other operation than the Cæsarian seemed practicable, and for this purpose she was taken into University College Hospital. The operation was very skilfully performed by Mr. Quain, and a dead child removed. In the first two days after the operation the symptoms were favourable; but on the 13th she complained of sickness and pain in her bowels, vomiting set in, followed by extreme restlessness, and she sank the following day.

In the *post mortem* examination the pelvis was found to be brittle throughout; all the articulations were loose, and the pubic and ischiatic portions of the coxal bones moved on each other. Both iliac bones were much distorted and carious, portions being as thin as paper, and some parts perforated. The horizontal rami of the pubic bones were parallel; the pectineal eminence on the

Fig. 86.*



* Fig. 86. Pelvis distorted by mollities ossium.

left side almost touching the promontory of the sacrum. The space measured was half-an-inch, but the bones were easily pressed together, and very likely were so when the patient was lying on her left side. The descending rami of the pubic bones were closed in and carious; the acetabula were eaten through, and the brittleness of the bones such that it was impossible to take a cast in plaster of Paris.

The transverse measurement was 3·4 inches; between the promontory and pectineal eminence on the right side, 2·2 inches; on the left side 0·7 inch. The horizontal rami of the pubic bones were parallel, distant from each other 0·8 inch : the descending rami were 1·1 inch apart. The space between the ischiatic tubera was 2·5 inches.

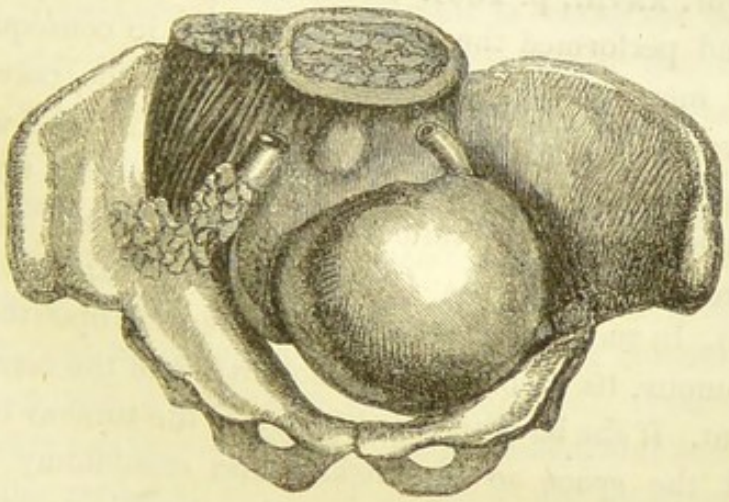
This case is interesting, both as an example of the disease mollities ossium, and as it bears on the question before us. Some of the symptoms of the disease shewed themselves in the previous pregnancy; but no effect was produced on the pelvis. The patient was delivered in two hours of a full-grown child. In her last pregnancy, such was the rapidity of its progress that at the end of the first three months she could not leave the house, could not move, but was obliged to remain in a chair all day; and, when labour set in, the pelvis was in the condition we have described. If the attempt had been made to perforate the head and remove the child by the crotchet or any of the instruments proposed for the purpose (supposing this possible, which is very doubtful), the bones of the pelvis would have been separated. The operation could not secure the safety of the patient: hence it was, and in any similar case would be, the duty of the practitioner to attempt the safety of the child. To sacrifice its life for so doubtful a chance would be inexcusable. This case therefore seems to prove the third rule we have stated (p. 300), when the life of the mother cannot be insured, "to save the child if possible." These cases of mollities ossium have become a kind of opprobium on British Midwifery. Some women have been left eight, ten, and eleven days in labour, to die undelivered (Hamilton's *Outlines of Midwifery*, 4th. Ed. Hull's *Defence*, p. 221, 222). Craniotomy has been tried with others; a mutilated child has been dragged with

immense difficulty through the pelvis, but the woman has died of ruptured uterus (Lee's *Clin. Med.* pp. 74, 78). And lastly, the Cæsarian section has been performed too late: the woman has been left amid doubts and hesitations until she was dying—and *then* the attempt has been made to save the child.

If we be agreed as to the propriety of the Cæsarian section in such cases, every means should be used to secure the life of the mother, if possible. Her constitution is diseased and easily exhausted; she should therefore not be exposed to protracted and useless suffering; means should be used to counteract the destructive effects of the disease itself, and her strength as far as possible maintained. The operation may be performed under chloroform, and the exhausting effects of pain removed. For proof that it is possible by skilful management to save the mother, we need only refer to the cases of Mr. Knowles (1827), Mr. Greaves (1833), Mr. Goodman (1843), Dr. Radford (1849), Mr. Thornton (1856). (See *Appendix*).

Tumours and other Morbid Growths sometimes so occupy the

Fig. 87. *



* Fig. 87. Dr. Shekleton says "On examination, the tumour, large and unyielding, was found to occupy the whole cavity of the pelvis, with the exception of the space immediately behind the pubis, which barely admitted the passage of one finger between it and the tumour." (*Dublin Quarterly Journal*, vol. x. p. 287).

cavity of the pelvis as to obstruct completely the passage of the head. We have already alluded (p. 297), to the instance recorded by Dr. Beatty, in which a large fibrous tumour fortunately was pushed out of the pelvis by the descending child; but such cases are rare exceptions. Dr. Shekleton reports a case which occurred in the Dublin Lying-in Hospital, where a tumour so occupied the pelvis, that an anxious consultation was held whether the Cæsarian section should be performed. It was decided unfortunately against it; and Dr. Shekleton had to make the attempt to extract the child piecemeal "through a space which scarcely admitted the passage of the finger." (Fig. 87.) After immense difficulties which Dr. Shekleton most graphically describes, he succeeded in the delivery—but the patient died in ten minutes afterwards of ruptured uterus.

This case may be contrasted with one related by Dr. Waller of St. Thomas's, in which the Cæsarian section was performed (Feb. 7, 1853), in consequence of a pedunculated fibrous tumour which completely occupied the pelvis. The child was saved, but the woman sank after forty-eight hours, apparently from exhaustion. She had bronchitis previously to the operation (*Medical Times and Gazette*, vol. xxvii., p. 266). Dr. Oldham reports a case in which Mr. Poland performed the Cæsarian section in consequence of a scirrhous mass having completely occupied the pelvic cavity. (*Lancet*, vol. ii. 1851, p. 226). Both mother and child were saved. Mr. Edmunds relates a case in which the cervix uteri seemed to be converted into an immense cancerous mass; mother and child were here also saved. (*Med. Times and Gazette*, vol. i. 1860, pp. 9, 10). In such cases as these, much depends upon the character of the tumour, its mobility or immobility, and the constitution of the patient. If she be otherwise healthy, if the tumour be immoveable and the space so diminished that craniotomy becomes a difficult and dangerous operation, the Cæsarian section should be at once adopted; and if it be performed promptly, there is every probability that, as in Mr. Poland's and Mr. Edmunds's cases, both lives will be saved.

We therefore think this operation justifiable—

1. In the *ovate deformity* of the pelvis, when the conjugate axis is less than two inches.

2. In the *cordiform distortion* from *mollities ossium*, when the distortion is extreme, and craniotomy is either impracticable or so difficult that the safety of the mother cannot be secured.

3. When *tumours* are immoveable, and so occupy the pelvic cavity as to leave a space of only two inches between the tumour and the pelvis.

Statistics have been conveniently employed in this as in other instances to furnish arguments against the operation. The statistical results of craniotomy have been contrasted with those of the Cæsarian section, to prove the much greater mortality to the mother in the latter operation. The mortality from the Cæsarian section it is said, is 86 per cent. while that from craniotomy is 20 per cent.; or, in other words, while by the latter operation only one in five is lost, by the former only one in five is saved. No comparison of this kind can be fairly made between these operations; because on the one side the danger to the mother from gastrotomy is uniform, always present, while that from craniotomy varies precisely as the degree of disproportion for which the operation is performed. No operation is easier to perform, or safer for the mother than craniotomy, when the contraction of the pelvis is not great; but if the disproportion be extreme, none is so difficult and dangerous. It is only in the latter class of cases that the Cæsarian section and craniotomy can be justly compared; but both classes are included in statistical tables, and therefore the conclusion derived from them is false. Too much caution cannot be used in drawing conclusions from statistics, as will be obvious in this question from the tables placed before you (see *Appendix*.) In the continental and American practice, the maternal mortality is about one in three. In the British, it is more than four in five. Very little confidence can be placed in any conclusions derived from these figures; it is better to seek to determine this very difficult question by comparing case with case. A comparison of the facts and results of the separate histories will lead us much nearer the truth than any statistics. An eminent statesman once said "Nothing so bad as false facts—except false figures."

Operation. Previously to operating, the rectum and bladder must be carefully emptied; the position of the placenta must be ascertained with the stethoscope, and the exact direction of the uterus observed. If it project forwards nearly in the middle line of the body, and the placenta be in its usual position at the back of the uterus, an incision may be made through the linea alba for about seven inches, commencing about the umbilicus and terminating about two inches above the pubes; the uterus is thus exposed, and the peritoneum along with it. An assistant should press with both hands firmly on the uterus at each side of the wound, while the uterus is being divided. This must be done by cautious incisions, in the direction of the internal wound, until the membranes are seen. These should be raised, and a small opening made in them to allow the liquor amnii to escape externally; the whole fluid may be removed by successive applications of sponges to the opening. The membranes should then be divided on a director the whole length of the wound; and, while this is being done, a second assistant should be prepared to grasp and remove the child, while the first maintains pressure on the contracting uterus, to prevent, as much as possible, protrusion of the intestines or exposure of the peritoneum. The placenta then may be easily removed, the intestines replaced (they always protrude), and the wound united by several sutures; water-dressing and a broad bandage may be applied over the whole.

Lauvergat advised us to puncture the membranes previously to the operation, and this plan has certainly many advantages. The placenta can be heard much more distinctly; the size of the uterus is reduced, and the calibre of its vessels diminished; the amount of hæmorrhage may thus be lessened, and the external wound need not be so large. The peritoneum, also, is less likely to be exposed when the uterus contracts after the child is removed.

The dangers you have to apprehend from this operation are:—

1. The shock to the constitution, under which the patient may sink;

2. The hæmorrhage which may result from the operation; and

3. The inflammation of the peritoneum, in consequence of the sac being opened.

The subsequent treatment we shall consider, under these different heads, in another part of the course.

THE INDUCTION OF PREMATURE LABOUR, OR ABORTION, is intended to supersede these dreadful operations.

The *Induction of Premature Labour* applies to cases in which, the child having been in previous labours destroyed by craniotomy, it seems possible to save it by inducing labour at the seventh month. If, for instance, the conjugate measurement of the pelvis be three inches, the safety of the child is extremely doubtful at the ninth month, and the labour is too often terminated by perforation; but if labour be brought on at the seventh month, when the child is smaller, there is a reasonable chance that it may be extracted living. Hence the induction of premature labour applies to cases where the child might be saved.

Induction of Abortion is applicable to those cases only in which the contraction of the pelvis is so great, that the Cæsarian section would be necessary if the woman arrived at the full term of gestation. A moral prejudice, in consequence of its shameful abuse, has long existed against this operation; and hence it is only lately that it has received the serious attention of the profession. Its value and importance is now admitted in those difficult and unmanageable cases; and the only question remaining is, How often should it be performed on the same patient? Dr. Radford most justly protests against sacrificing infant life in such cases, not once but several times. When the woman is aware of her condition, is cautioned against intercourse, and, still giving way to a sensual passion, seeks relief by abortion, the crime is not very different from that of the once respectable but unfortunate victim of seduction, and is perhaps less excusable. The latter seeks thus to hide her shame. The former has no shame to hide.

The *Mode of Exciting the Action of the Uterus* varies. Some methods are directed to the uterus alone; as for instance, *ergot of rye*, as proposed by Dr. Ramsbotham. This is given in large and frequently repeated doses, until the action of the uterus is established. In the cases where we have tried this means, we were not equally successful with Dr. Ramsbotham; besides, even from

his reports, the child's safety seems not to be well secured. The destructive effect of ergot of rye on the child, when largely given, is now an established fact. The *introduction of sponge-tents within the os uteri*, as proposed by Brünninghausen and Kluge, is more successful. When the tents are introduced, they are retained in their position by a plug in the vagina. Tents gradually increasing in size may be introduced from time to time; and, as the os uteri expands, the action of the uterus is excited. The use of the sponge and ergot of rye have been combined with great advantage; the action is sooner induced, and less ergot is required.

Some modes are based on the principle that, if the connection between the uterus and ovum be disturbed or broken, the ovum becomes, as it were, a foreign body, and is expelled.

Puncturing the membranes was the earliest practice adopted on this principle. It applies especially to the induction of premature labour at the seventh month, and in such cases is very efficient and seldom fails in its effect. For this purpose an instrument, like a catheter, contains a pointed stilette. It is passed within the os uteri as far as the presenting part, and the stilette is then pressed cautiously forward. The action of the uterus commences some hours after the waters are discharged. This method is not so applicable to the induction of abortion, which formerly was never thought of, because the passage of the stilette within the uterus is more difficult and attended with greater risk.

Separating the membranes from the uterus is also successfully practised. The sound may be passed within the uterus, and moved cautiously round, detaching the membranes a few inches from the os uteri; the membranes may be ruptured, but this accident only renders the effect more certain. Professor Braun, of Vienna, introduces a catgut bougie high up within the uterus, and leaves it there until the action of the uterus is excited and the waters escape. (*Med. Times & Gazette*, June 11, 1859, p. 606.)

A far more efficient means for accomplishing this purpose is that proposed by M. Kiwisch, of Prague. He places warm water about ten feet high, and from the vessel containing it a long

tube descends, the pipe of which is passed within the vagina; the full stream of water is then allowed to play on the os uteri, by which the action of the uterus is excited. A simpler and more efficient means of carrying out this practice is—

The injection of warm water within the uterus by means of a syringe. It is necessary that the stream be continuous, and therefore Kennedy's or Higginson's syringe must be used. When the pipe is inserted within the cervix, any quantity of water may be easily forced up; and, if the pipe be kept in its place, the water will not return until the uterus is very fully distended. When the pipe is withdrawn, the water is expelled with force, and sometimes the expulsive action returns soon, and continues until the ovum is expelled. More usually it is necessary to repeat the operation two or three times to produce the effect, and in some instances the alternation of cold and warm water has been tried to excite the tardy uterus. This method detaches the ovum far more efficiently from the uterus than any separation which a sound or a catheter can effect, and, by distending the walls of the uterus, excites its action. The objection which naturally suggests itself to this method is the risk of hæmorrhage. We have tried it with perfect success in inducing premature labour without the least hæmorrhage, but it would be very difficult for abortion to take place without hæmorrhage; we must only therefore guard against its effect on the patient, and as far as possible control it. Tincture of opium with the liquor secalis in wine may be given to the patient, and the vagina plugged moderately after the water has been expelled.

LECTURE XXI.

OBSTETRIC INSTRUMENTS.

From the details of those instrumental deliveries, we would now draw attention to the instruments themselves, in order to point out the alterations and improvements which have been made in them. First, we shall speak of the—

Vectis and Forceps.—Previously to the introduction of either of these instruments, the state of midwifery was such, that it was sufficient that a labour was difficult, to assume the death of the child. No other operation was known or practised than perforation; and when a midwife (the accoucheur of that day) called for assistance, it was generally because the patient was in danger of her life. The medical man who undertook the operation of delivering the child, did so under the most unfavourable circumstances: the child must be destroyed, and perhaps the parent was not saved by the operation. It is not surprising, therefore, that the obstetrician (or man-midwife, as he was called) should have held a very humble rank amongst his professional brethren; like the plague, destruction seemed to follow in his path; and, consequently, he was an object rather to be shunned than sought after. Operative midwifery was in this condition, when, in the seventeenth century, two practitioners, one in Holland, the other in this country, contrived instruments by which delivery could be accomplished, and the child's life, at the same time, preserved. One of those inventors was Roonhuysen, a Dutch practitioner, who invented the vectis; the other, Dr. Paul Chamberlen, the inventor of the forceps. The introduction of steam did not produce a greater revolution in the commercial world, than did these instruments in obstetric practice. Deliveries were effected safely that before would have been despaired of; and, not unlike our illustration, with a great economy of time. The reputation of both men soon rose to the highest pitch; but, I regret to add, they did not elevate their profession to the same degree. Governed by mercenary motives, the invention was kept secret by both, and all the aid that mystery could give was employed to magnify its importance. It served the intended purpose: the practice of both increased to the fullest extent, and consequently the number of patients delivered by these instruments was considerable. De Bruyn, one of Roonhuysen's pupils, admits having delivered eight hundred women with the vectis; and from this you may form an estimate of the general number of operations. In fact, the practice of midwifery assumed a new character; formerly, parturition was left to the efforts of nature, and

very often far beyond what prudence would dictate. If she failed, and the patient were in danger of sinking under the inefficient efforts of the uterus, the child was dragged away by hooks and crotchets, in whatever way the practitioner could best accomplish it. Now, the principle was changed; art pushed nature aside; delivery became a question of mechanical skill; and, in these times, the principal merit of Roonhuysen and Chamberlen was, that by their invention they could not only deliver a woman where the natural efforts failed to do so, but also they could effect the delivery in a much shorter time than nature could generally accomplish, even where assistance was not so obviously required. Dr. Hugh Chamberlen boasted, that "by the manual operation" (the forceps) "a labour may be despatched (in the least difficulty) with fewer pains and sooner"—than nature could—"to the great advantage, and without danger, both of woman and child" (Churchill's *Midwifery*, 4th ed., p. 334). These secret means of delivering women were sold from one to another, like patent medicines, until at length the secret made its way into the profession.

Vectis. We have stated that Roonhuysen invented the vectis, the use of which he taught to his son Roger, to Ruysch, and to Böckelman. They instructed De Bruyn; and at length, after the secret had passed through three generations, two Dutch practitioners, Jacob de Visscher, and Hugo Van de Poll, influenced by the true spirit of science and philanthropy, purchased the secret from De Bruyn's daughter for 5000 livres, and at once made it known to the world. "Roonhuysen's lever consisted of a flat piece of iron bent into a slight curve at both ends, and he generally employed it covered with soft leather."

Fig. 88.*



* Fig. 88. Roonhuysen's vectis.

This simple contrivance was soon improved upon on the continent by Titsing, Morand, and Herbiniaux. Dr. Denman states, "that when the vectis was first known in this country [England], that described by Heister was preferred to those recommended by the surgeons of Amsterdam. The vectis used by Dr. Cole was like one blade of the forceps, somewhat lengthened and enlarged. That of Dr. Griffith was of the same kind, with a hinge between the handle and the blade; and that of Dr. Wathen was not unlike Palfyn's, but with a flat handle, and a hook at the extremity of the handle, which prevented its slipping through the hand, and might be occasionally used as a crotchet. Many other changes have been made in the construction of the instrument, but the vectis now generally used is of the following dimensions:—The whole length of the instrument before it is curved is 12½ inches; the length of the blade before it is curved, 7½ inches; the length of the blade when curved, 6½ inches; the widest part of the blade is 1¾ inch. The weight of the vectis is 6½ ounces. The handle is fixed in wood" (Denman's *Introduction*, p. 286). Dr. Bland, who was, equally with Denman, an advocate for the vectis, used an instrument much straighter, and one which could not be employed otherwise than as a lever. Dr. Bland's vectis had the advantage of facility in the introduction; Denman's of security in its purchase on the head. Dr. Aitken, of Edinburgh, wished to combine both advantages, and invented what he called the living lever, from its motion resembling that of the finger. A screw was fixed in the handle, by turning which, the blade might be curved to any extent. This instrument soon fell out of use; the mechanism was not sufficiently strong to keep the blade curved when any force was employed in extraction. Lowder's vectis is made with a hinge-joint between the blade and the handle; it can thus be carried very conveniently—unfortunately too conveniently—in the pocket; there is, therefore, a great temptation to misapply the instrument. It had been in very general use when Mr. Gaitskill introduced an improved vectis. He says: "The vectis should be thirteen inches long; one-half to form the handle, the other the curve. The handle should be made of hard wood, rendered rough, for the purpose of obtaining

a firmer hold, and made to screw on and off. When the instrument is made with a hinge-handle it is very difficult to introduce, therefore this construction of the instrument should never be adopted." (*London Medical Repository*, pp. 823, 80, 81).

Fig. 89.*



Fig. 90.†



In the variety of these instruments you will observe a striking difference in their curvature. Some are nearly straight, like Roonhuysen and Bland's; others, like Lowder's, are very much curved. The principle of the former is the lever; of the latter, the tractor. The mode in which Gaitskill applied the vectis has been already explained; and the instrument, in its construction, is adapted to his manner of using it; but it cannot be so conveniently employed in the way we have recommended. The curve of the blade is too abrupt, and the blade itself rather too wide, to introduce conveniently on the pubic side of the pelvis. If the curvature were less and the blade narrower, it would be more suitable for the purpose indicated.

The *Forceps* was invented by Dr. Paul Chamberlen, somewhere about the year 1650 (the exact date is uncertain); it was kept a secret from all, except his sons Peter and Hugh, for more than sixty years; and at length, in the year 1716, its principle trans-

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* Fig. 89. Lowder's vectis, with hinge handle.

† Fig. 90. Gaitskill's vectis (handle screwed on).

pired through some channels that have not been correctly ascertained.

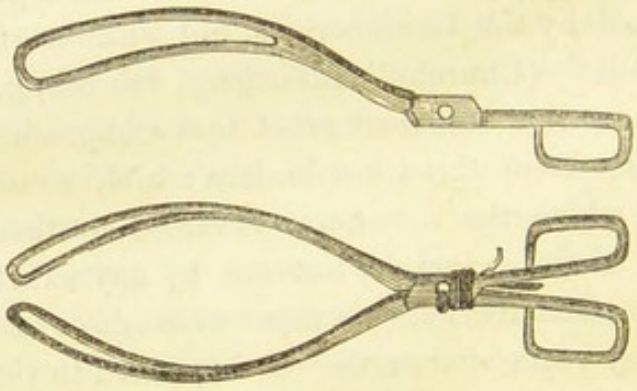
We have already stated the boast of Dr. Hugh Chamberlen, that "by God's blessing and their own industry, his father, brother, and himself, had attained to, and long practised, a way to deliver a woman in this case, without any prejudice to them and their infants." Their success had led Dr. Hugh Chamberlen to calculate rather too confidently on the powers of the instrument; he seemed to think it omnipotent. In the year 1670, he went to Paris for the purpose of selling his secret, and, it is said, offered it for 10,000 crowns to the first physician of Louis XIV. It was necessary, however, to determine its value; and a case of deformed pelvis soon afterwards presented itself to Mauriceau. The woman had been altogether eight days in labour; on the fifth day the os uteri was fully dilated, but the narrowness of the pelvis was such, that the head could not advance. Mauriceau was again sent for at the end of three days more, and "declared to all the assistants that the delivery could not be effected; of which" (says Mauriceau) "they being fully persuaded, urged me to draw the child from the belly by the Cæsarian operation, which I would not undertake, knowing well that it is always very certainly mortal to the mother. *But after I had left the woman, without being able to afford her relief,* there arrived, unexpectedly, an English physician named Chamberlen, who was then in Paris, and who, from father to son, practised midwifery in London, where he has since acquired the highest reputation in this art. This physician, seeing the woman in the condition I have described, expressed his astonishment that I, whom he pronounced and affirmed to be the most dexterous accoucheur in Paris, could not deliver her, and promised that he would do so in less than half a quarter of an hour, *whatever difficulty he might encounter.* He accordingly went to work, and laboured upwards of three hours, without stopping to take breath; and then, being thoroughly exhausted, and seeing the poor woman almost dead, he was compelled to abandon the case, and avow the delivery could not be effected, as I had declared. The woman died, undelivered, twenty-four hours after; and I found, on opening the body, which I did

by performing the Cæsarian operation after death, that the whole uterus was torn and pierced in several places by the instruments which this physician had employed blindly without the guidance of his hand, which, being one-half larger than mine, could not be introduced." (Mauriceau, vol. ii., pp. 23, 24; Lee's *Lectures*, p. 291.) Chamberlen left Paris in disgust; or, as Mauriceau says, "he returned to England in a few days, seeing clearly that there were men in Paris more skilful in the art of midwifery than he." The case proves the indiscriminate use which Chamberlen made of the forceps. His secret was not sold, like Roonhuysen's, so that the instruments invented by him remained unknown for a very long time.

Dr. Churchill states, "About this time (1716), or soon after, the secret appears to have been communicated to one or two, for Dr. R. W. Johnson, when speaking of the forceps, says; 'Besides these, I have a pair of forceps which did belong to the late Mr. Drinkwater (late surgeon and man-midwife at Brentford), who began practice in 1668, and died in 1728. The size and form of this pair agree with those of Chapman and Giffard, save only that the hooks of the handles are turned outwards.' And Mr. Chapman, in 1733, published a description and a plate of the instrument used by the Chamberlens, but without stating whence he procured it." (Churchill's *Midwifery*, 4th Ed., p. 335). (Fig. 991.) We have now sufficient proof that Chapman's forceps was quite different from the Chamberlens'; and, consequently, the only way in which the secret was revealed to them was by an explanation of the principle, but not by any exhibition of the instrument. Chamberlen's forceps were discovered by mere accident many years afterwards. It happened in this manner, as described by Mr. Cansardine. The estate of Woodham Mortimer Hall, near Malden, was purchased by Dr. Peter Chamberlen, some time previously to 1683, and continued in his family till about 1715, when it was sold by Hope Chamberlen to William Alexander, wine merchant. In the year 1818 (more than a century afterwards), in an old chest, found in one of the chambers of this house, certain obstetric instruments were discovered, along with old coins, trinkets, gloves, fans, spectacles, etc. Mr. Cansar-

dine's description of these instruments is as follows:—"First we have a simple vectis with an open fenestrum; then we have the idea of uniting two of these instruments by a joint, which makes each blade seem as a fulcrum to the other, instead of making a fulcrum of the soft parts of the mother; and which also unites a power of drawing the head forward. The idea is, at first, by a pivot, which, being riveted, makes the instrument totally incapable of application. Then he goes to work again, and having made a notch in each vectis for a joint, he fixes a pivot in one only, which, projecting, is to be received into a corresponding hole in the other blade, after they have been applied separately. It may be observed, that although there is a worm in the projecting part of the pivot, yet there is no corresponding female screw in the hole to receive it. Every practical accoucheur will know that it is not easy, nor always possible, to lock the joint of the forceps with such accuracy as to bring this pivot and hole into opposite contact. This Chamberlen soon discovered, and next produced a more light and manageable instrument, which,

Fig. 91.*



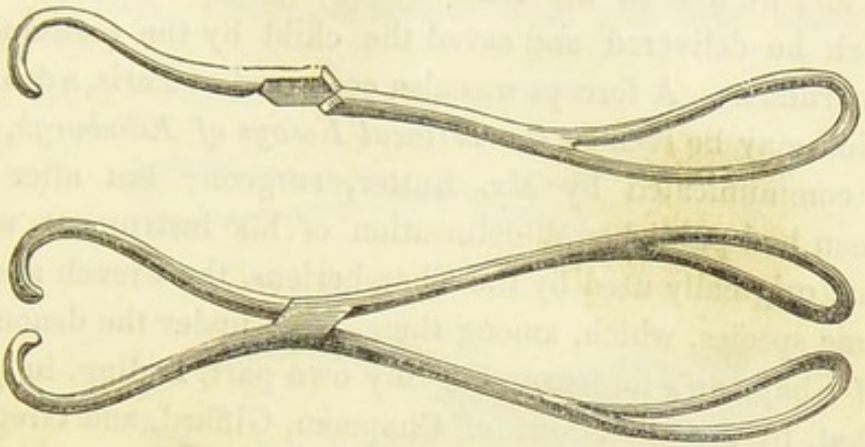
instead of uniting by a pivot, he passes a tape through the two holes, and winds it round the joint, which method combines sufficient accuracy of contact, security, and mobility." (*Med.-Chir. Trans.* vol. ix. p. 183.)

The instruments here described were altogether different from

* Fig. 91. The most approved of four instruments made by Chamberlen, copied from the original.

those afterwards brought forward by Chapman and Gifford, about the year 1730. Chapman was the second practitioner who gave lectures on midwifery in London. In them, he explained the new instrument, and the mode of its application. The forceps he employed resembled in the shape of the blades those at present in use; the handles were of steel and hooked at the extremity,

Fig. 92.*



the blunt hooks being turned inwards. The blades were united by a kind of mortice-lock, just like the blades of a pair of scissors. Giffard's were similar. Soon after Chapman published his account of the forceps, the inventive genius of the profession was busily employed in making improvements in it. Some of these, as Burton's, did not deserve the name, being rather more clumsy even than the original instrument. Others were only alterations, without the introduction of any new principle. But in 1752, Smellie's work appeared; and to him we are indebted for the forceps that is the basis of all the modern instruments. The practice before his time is best described in his own words:— "The common way of using them [the forceps] formerly, was by introducing each blade at random, taking hold of the head any how, pulling it straight along, and delivering with downright force and violence, by which means both the *os internum* and the *os externum* were often torn, and the child's head much bruised. On account of these bad consequences, *they had been altogether disused*

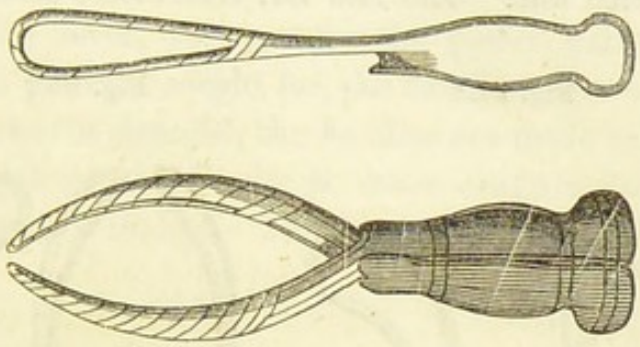
* Fig. 92. Chapman's forceps; from which Gregoire's and the French forceps seem to be derived.

by many practitioners, some of whom endeavoured, in lieu of them, to introduce *divers kinds of fillets* over the child's head, but none of them can be so easily used or have so many advantages as the forceps, when rightly applied and conducted according to the directions that shall be laid down in the next section.

"Mr. Chapman, as mentioned in the introduction, was the first author who described the forceps, with the method of using them; and we find in the observations of Giffard, several cases in which he delivered and saved the child by the assistance of this instrument. A forceps was also contrived at Paris, a drawing of which may be seen in the *Medical Essays of Edinburgh*, in a paper communicated by Mr. Butter, surgeon; but after Mr. Chapman had published a delineation of his instrument, which was that originally used by the Chamberlens, the French adopted the same species, which, among them, went under the denomination of Chapman's forceps. For my own part, finding, in practice, that, by the directions of Chapman, Giffard, and Gregoire, at Paris, I frequently could not move the head along without contusing it, and tearing the parts of the woman (for they direct us to introduce the blades of the forceps where they will easiest pass, and, taking hold of the head in any part of it, to extract, with more or less force, according to the resistance), I began to consider the whole in a mechanical view, and reduce the extraction of the child to the rules of moving bodies in different directions. In consequence of this plan, I more accurately surveyed the dimensions and form of the pelvis, together with the child's head, and the manner in which it passed along in natural labours; and, from the knowledge of these things, I not only delivered with greater ease and safety than before, but also had the satisfaction to find, in teaching, that I could convey a more distinct idea of the art in this mechanical light than in any other, and particularly give more sure and solid directions for applying the forceps, even to the conviction of many old practitioners, when they reflected on the uncertainty attending the old method of application. From this knowledge, too, joined with the experience and hints which have occurred and been communicated to me in the course of teaching and practice, I have been led to

alter the form and dimensions of the forceps, so as to avoid the inconveniences that attend the use of the former kinds." Smellie introduced two very obvious improvements in the forceps, which have since been retained, and may be considered the essential attributes of the British forceps. (Smellie's *Midwifery*, vol. i., p. 250—252). He first proposed the present mode of locking the forceps,* and also had the handles made of wood in place of iron (fig. 93). These alterations have not been followed in

Fig. 93.†



France. The forceps of Gregoire differed from Chapman's only in the iron handles; Gregoire's had their hooked extremities turned outwards; the method of locking was the same: these are still retained in Levret's forceps, which has been for many years in general use in France. So that Gregoire's forceps may be considered the parent of the French—Smellie's of the British forceps.

From the date of Smellie's forceps to the present day, these leading characters have, with a few exceptions, been continued in the construction of the British instruments, but they are almost the only points in which they agree. The varieties in other respects are almost endless: no two instruments are alike; and the zeal with which new changes are proposed and defended, the superiority which each inventor claims for his favourite instrument, and the constant introduction of some slight alteration, just

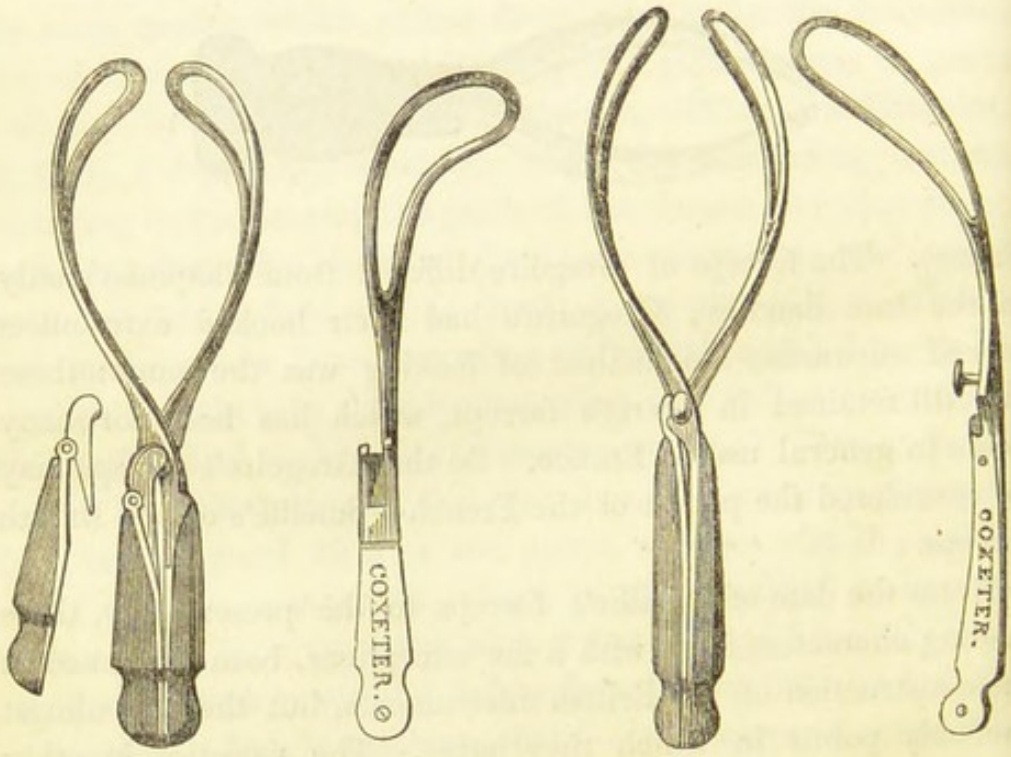
* Dr. Rigby attributes the introduction of the lock to Chapman.

† Fig. 93. Smellie's forceps covered with leather.

sufficient to establish the parentage of the new forceps—this desire for novelty would lead us to suppose that a new forceps was an essential introduction to practice. It would be only a tedious continuation of the history of this instrument, to mention in detail all the different forceps proposed or employed with the names of the inventors; it is more desirable to point the varieties suggested in the different parts of the instrument, and the objects which they are intended to accomplish.

The *Length of the Forceps* is generally about 11 inches, 4½ for the handles, 6½ for the blades. Those intended for the high operation exceed this. The late Dr. Hamilton's forceps (fig. 94)

Fig. 94.* Fig. 95.†



was 13½ inches in length; Brünninghausen's, introduced by Dr. Rigby, 13 inches (fig. 95); Dr. Radford's long forceps, 13¼ inches

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* Fig. 94. Hamilton's forceps. Blades strongly curved backwards. One handle moveable on the blade.

† Fig. 95. Brünninghausen's forceps, used by Dr. Rigby.

(fig. 79, p. 315). Those which are less than 11 or 12 inches are only intended to be used when the head is resting on the perinæum. This length is generally preferred by practitioners who object to use this instrument for the purpose of shortening a labour which may be much prolonged. Aitken's short forceps (fig. 74, p. 309), Dr. Collins's (fig. 75, p. 309), and Denman's (fig. 72, p. 308), are about ten inches in length.

The *Length of the Handles* is very different, even in forceps which are made for a similar purpose; for instance, the handles of the long forceps used by Dr. Rigby are fully 6 inches; of Dr. Radford's only 3 inches. It is obvious that, the greater the length of the lever, the greater the power gained; therefore, where much power is sought for, the handles must be long; when too great power is dreaded, the handles are made very short.

The *Length of the Blades* is more uniform, being generally between 6 and 7 inches. The blades of Denman's forceps are

Fig. 96.*

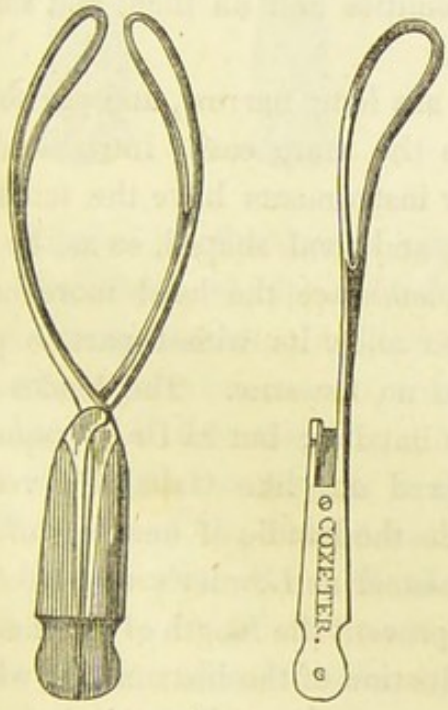
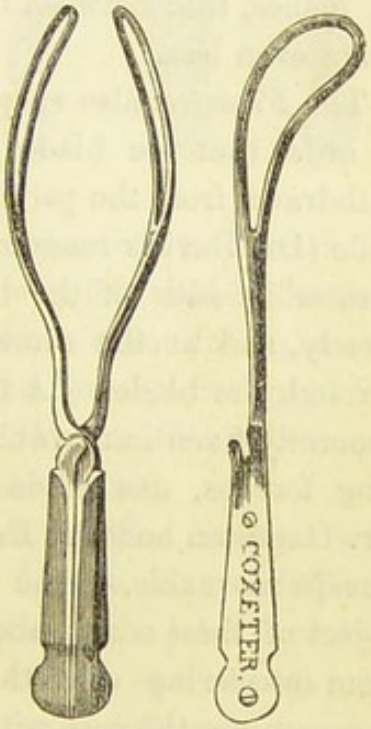


Fig. 97.†



* Fig. 96. Haighton's forceps. Blades very light and slightly curved backwards. Handles long.

† Fig. 97. Dr. Ramsbotham's forceps, with shank and second curve.

about 6½ inches, of Haighton's long forceps, 8 inches in length (fig. 96). Some instruments have a shank between the handle and the blades, so that the lock may be quite external to the vulva, and the soft parts saved from injury in locking the blades. The blades, however, differ extremely in their shape: some are straight, having only a single curve outwards from the lock; others, especially the long forceps, have a second curve backwards, to correspond with the axis of the brim of the pelvis. The latter was first suggested by Smellie and Pugh, and has been adopted by Drs. R. W. Johnson, Osborne, Haighton, Hamilton, Rigby, Ramsbotham (fig. 97), and others. The degree of the lateral curvature is very important. Some are made to embrace the head without compressing it; when such is the intention, the distance between the centre of the blades, where they are most apart, is about three inches, the distance between the extremities of the blades 1½ to 2½ inches, or what is just sufficient to prevent them from slipping off the head. When compression is intended, the greatest distance between the blades is about 2½ inches, that between the extremities half an inch, and sometimes even less.

The *Fenestræ* also vary: some are long, narrow, and pyriform, in order that the blades may be the more easily introduced or withdrawn from the pelvis; other instruments have the fenestræ wide (Dr. Davis's remarkably so) and oval shaped, so as, by the greater breadth of the blade, to embrace the head more completely, and at the same time to allow its widest part to pass through the blades. A few have no fenestræ. The blades are generally fixed immovably in the handles; but in Dr. Conquest's long forceps, one blade is screwed on, like Gaitskill's vectis. Dr. Hamilton and Dr. Davis made the handle of one part of the forceps moveable, in the same manner as Lowder's vectis. The object of these contrivances is to prevent the length of the handle from interfering with the introduction of the instrument, which is sometimes the case with the long forceps, unless the patient is placed very much over the side of the bed. The exceptions to the manner of locking the blades are met with in the forceps recommended by Dr. Rigby; in which one blade has a fixed

ivot, the other a notch which fits into it. The late Dr. Beatty of Dublin contrived a forceps with a transverse opening in the shank of one blade, through which the other passed (fig. 98).

Fig. 98.*

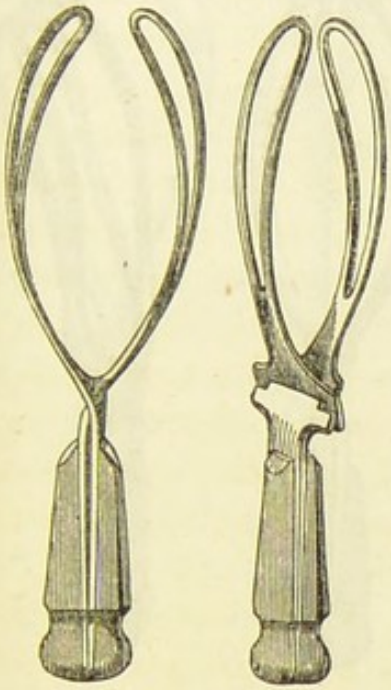
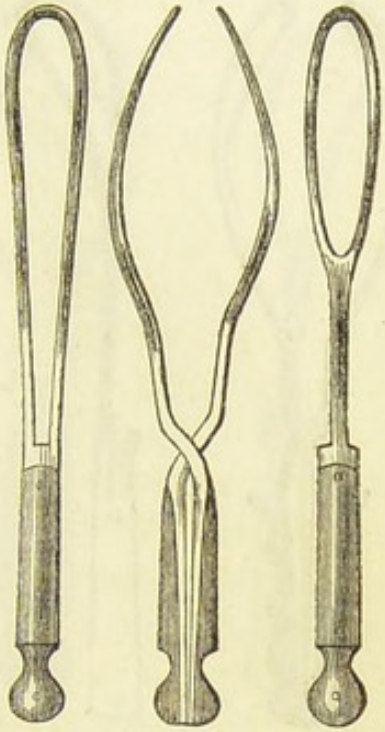


Fig. 99.†



Dr. Ziegler of Edinburgh has proposed another modification of the instrument, which we are informed is much used in Scotland. The fenestra of one blade is carried down to its handle, and in introducing the instrument, this elongated fenestra is slipped over the handle of the other single blade of which is first introduced, and thus serves as a guide to the second (fig. 99).

The form of the forceps has also been modified in other ways by obstetricians. Dr. J. Y. Simpson's forceps is provided with a knee above the joint to prevent unlocking; the joint is so loose as to allow a considerable degree of lateral motion; and the handle is formed so as to be used as a tractor rather than a com-

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* Fig. 98. Dr. Beatty's forceps. † Fig. 99. Dr. Ziegler's forceps.

pressor (fig. 100). Fig. 101 represents a modification of Ziegler's forceps, copied from a pair supposed to be Dr. Ziegler's, but of which the inventor is unknown. In Dr. Churchill's forceps (fig. 102) the blades are straight, and the fenestræ short; the

Fig. 100.*

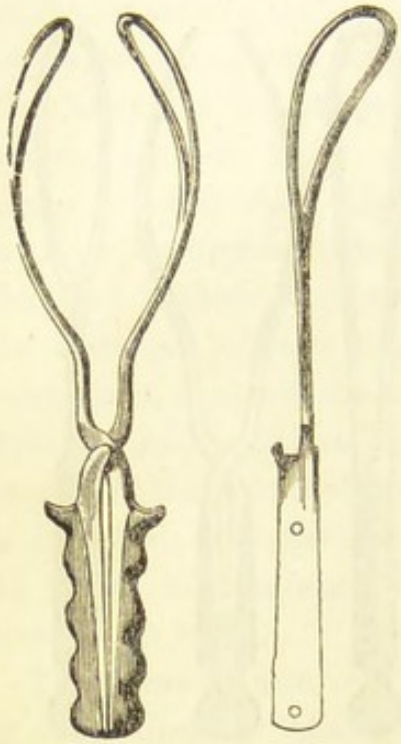
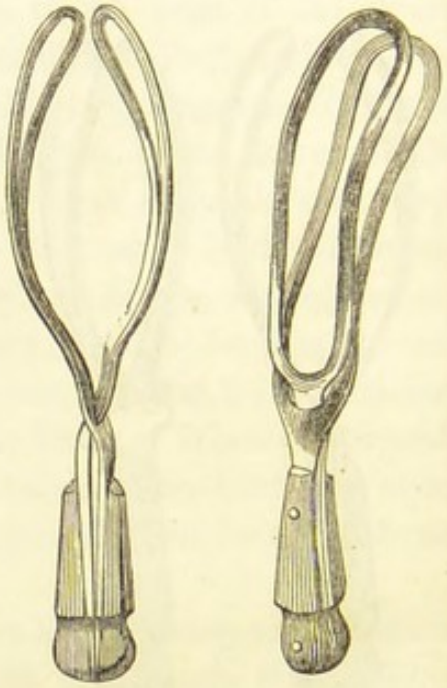


Fig. 101.†



greatest distance between the blades is near the extremity. In Hopkins's forceps (fig. 103), the blades have wide fenestræ, and a second curve; the shank forms a ring; and the handles are long.

These are the principal varieties introduced in the construction of the instrument. We have endeavoured to explain the objects intended by them. Among so many, each differing from the other, and all used by accoucheurs of acknowledged skill, it is no easy matter to determine which forceps is the best. In making a selection, therefore, of any, we must not be understood as wishing to depreciate the value of those we reject. In the con-

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* Fig. 100. Simpson's forceps.

† Fig. 101. Modification of Ziegler's forceps.

struction of these instruments, two different principles seem to have been followed. Some have wished to render the mechanism of the forceps as perfect as possible; others have sought simplicity in its construction. The former have contrived instruments of great power, but which are not very easily applied. The latter have succeeded in the facility with which their forceps may be applied, although with some of them the power is extremely limited. Your late respected professor, Dr. Davis, contrived a forceps (fig. 104) which may be taken as an example of the former. In its mechanism it is perfect. It is exactly fitted to the head of the child, so as to lie close without bruising it; the fenestræ are made very wide, in order that the parietal protuberances may pass through them; and the blades are curved very much backwards, in order to correspond with the axis of the brim. If it be applied to the head of the still-born child, the

Fig. 102.*

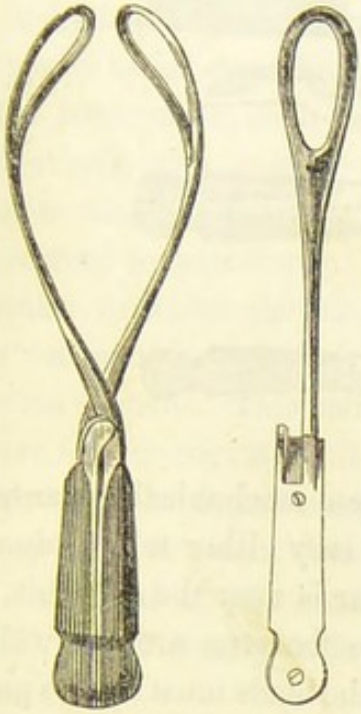
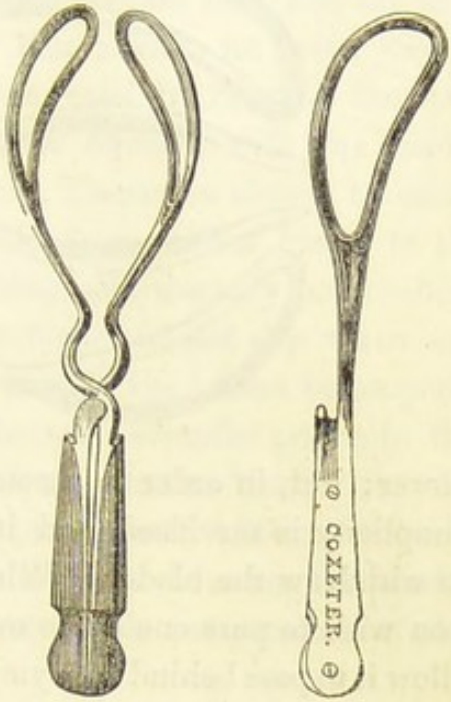


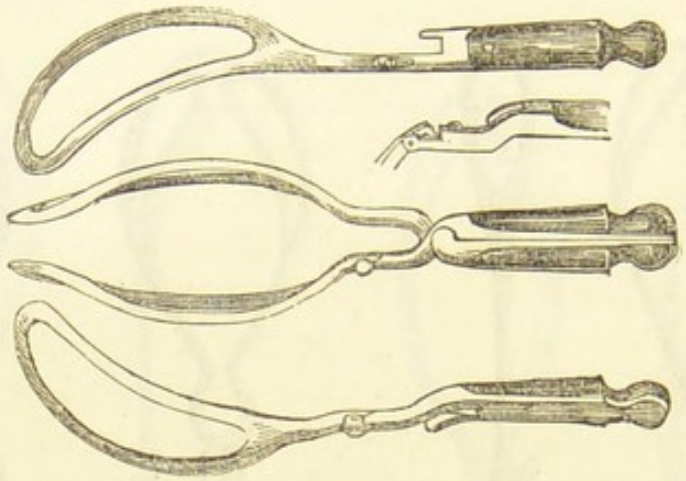
Fig. 103.†



* Fig. 102. Churchill's forceps. † Fig. 103. Hopkins's forceps.

perfect manner in which the head is embraced is quite obvious; therefore, when it is accurately passed over the head of a living infant arrested in the pelvis, there cannot be a greater extracting

Fig. 104.*



power; but, in order to accomplish these mechanical advantages, simplicity is sacrificed, and it is not easy either to introduce or to withdraw the blades. When the ear is near the os pubis, and you wish to pass one blade over it, the fenestræ are too wide to allow it to pass behind the symphysis; the blade must first be passed along the plane of the ischium, and then brought gradually round to the ear at the pubes; which is certainly inconvenient, and to the young practitioner may be embarrassing. Again, the second curve from before backwards, although receiving the support of many very experienced operators, seems to us to be liable to a similar objection. You may, in your hurry, introduce the wrong blade first; or if you avoid (and of course you will be careful to avoid) this mistake, the curved blade passing in a direction different from the handle, you cannot be so certain that it is correctly applied; on the other hand, the advantage claimed for the curve seems to us one founded much more on theory than practice. These objections apply only to the instrument in the hands of the inexperienced accoucheur; but when, by patient attention, you have acquired that practical tact which is so

* Fig. 104. Dr. Davis's forceps.

necessary in this branch of your profession, and which experience will ultimately give you, you will also acquire with it that facility in the application of the forceps, which will render it a mattter of indifference which you select, provided the instrument is at all properly constructed.

But, in commencing your career, we must advise you to avoid all complications in instruments—the simpler they are, the safer they will be in your hands. For this reason, we prefer forceps of the latter class, such as have been used by Smellie, Denman, and others, who employ the straight forceps, with the blades narrow, and the fenestræ pyriform. These can always be easily introduced or withdrawn; the handle is a perfect guide to the direction in which the blade is passing, and the only point which it is necessary to secure is, that the blades do not slip when extraction is made. This cannot take place if the blades be properly curved: their curvature is one of the most essential points in the construction of these forceps. Their extremities should be sufficiently close to retain their position on the head without bruising the face; and at the same time, the space between the blades should be sufficiently wide to prevent much compression of the cranium.

Experience can alone decide between the merits of similar instruments on a point of this kind; and having used several of these forceps, that which we have found to be the best, and one which we are disposed to recommend to you, is one used by Dr. Beatty, Professor of Midwifery to the College of Surgeons in Ireland, and described by him in the *Dublin Journal*, vol. xxi. The whole length of the forceps is 12½ inches; the distance between the extreme points of the blades 1⅛ inch; the greatest distance between the blades is three inches; the breadth of the blade 1⅜ inch*. (Fig. 105). This instrument is well calculated for that

* These measurements are those given by Dr. Beatty, in the *Dublin Journal*, but the instrument which is in our possession, and which we have found so useful, varies a little from this. The entire length is eleven inches and a half; the handle, four inches and a half, blade seven; greatest breadth between blades, three inches; between extreme points, one inch

operation which we have described as being intermediate between the operations with the long and short forceps—viz., when the head is in the cavity of the pelvis, without touching the perinæum.

Fig. 105.*

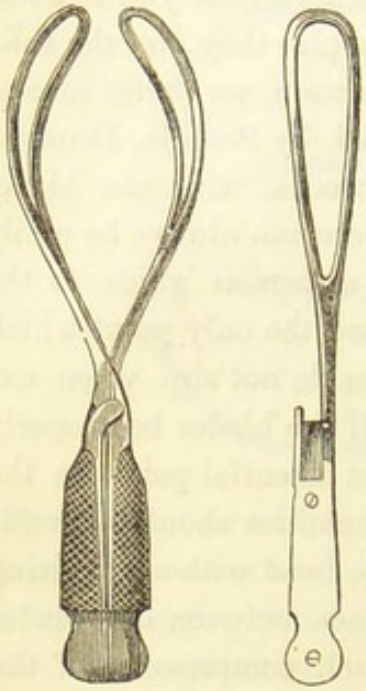
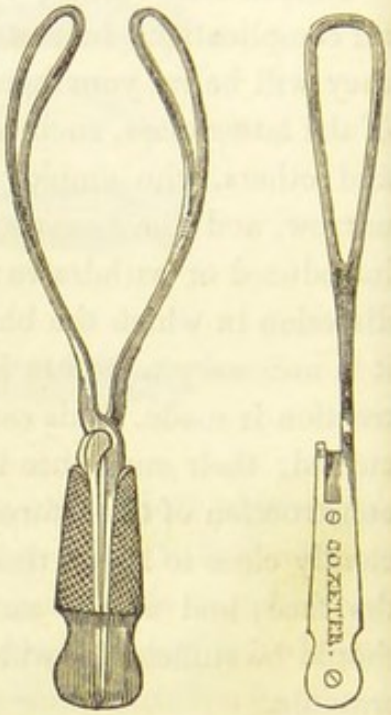


Fig. 106.†



When the head is resting on the perinæum, a shorter forceps would be more convenient — for instance, that of Dr. Collins, which is about ten inches in length (fig. 75). But when the head is fixed in the brim of the pelvis, the forceps of Dr. Radford, having unequal blades, appears to be the most suitable (fig. 79). In giving you this account of an instrument of so much importance as the forceps, we wish to avoid leading you into what seems to us a great error—viz., a belief

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and an eighth. In this instrument we have added a shank to the blades about one inch in length, when it is necessary to introduce them high within the pelvic cavity. It is right to state, that the length is taken in a direct line from the extremity of the handle to the extremity of the *curved* blade.

* Fig. 105. Beatty's forceps. † Fig. 106. Beatty's forceps modified.

that by mechanical skill in the construction of the instrument, a great deal more can be accomplished by it than what is really the case. Hence every practitioner has his favourite forceps, and no little boast is sometimes made of the deliveries accomplished by it. But we would beg of you to remember that Smellie and Denman, with their simpler forceps, had as much success as Hamilton and Davis with their more ingenious instruments, and *that the success of an operation depends much more on the hands that use the forceps than on the instrument itself.*

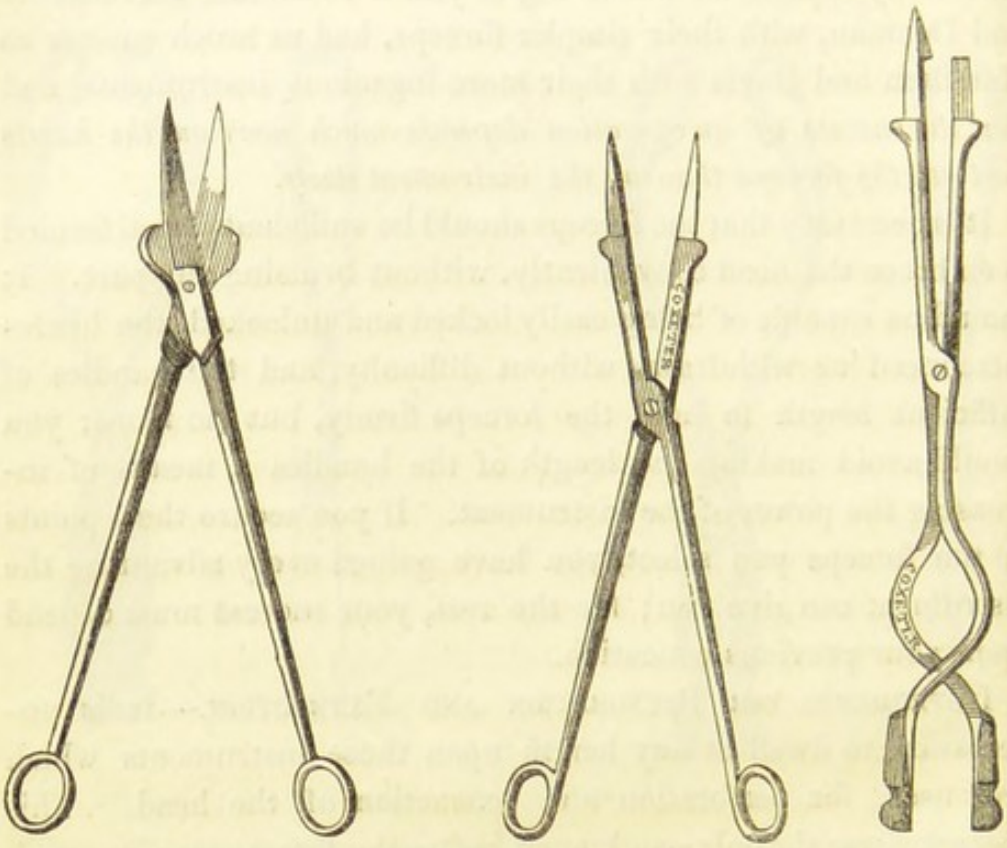
It is necessary that the forceps should be sufficiently well formed to embrace the head conveniently, without bruising any part. It should be capable of being easily locked and unlocked, the blades introduced or withdrawn without difficulty, and the handles of sufficient length to hold the forceps firmly, but no more; you should avoid making the length of the handles a means of increasing the power of the instrument. If you secure these points in the forceps you select, you have gained every advantage the instrument can give you; for the rest, your success must depend upon your previous education.

Instruments for Perforation and Extraction.—It is unnecessary to dwell at any length upon those instruments which are used for perforation and extraction of the head. This operation was the only one known before the forceps was invented, and at first was never attempted until the child was dead; it was then drawn away by "hooks and crotchets." If the head were too large it was opened by some pointed instrument (Raynald used a penknife), and the hook placed inside. In course of time these instruments were brought to a more definite form, and reduced to the present instruments employed.

Perforator. The first attempt at a perforator was made by Sir Fielding Ould, who invented an instrument which he called "*terebra occulta.*" The point was rounded, had a cutting edge, and was concealed within a sheath, to prevent it injuring the passages. In 1752, Smellie proposed scissors with a short edge on the outside, terminating in a blunt stop (fig. 107). By this means, he intended not only to perforate the bone, but also to cut away the broken fragments. Denman modified this instrument

to its present shape. He retained the external cutting edge, widened the stops, to prevent them passing within the opening,

Fig. 107.* Fig. 108.† Fig. 109.‡



and made the internal cutting edge a flat surface. Thus Smellie's *scissors* became Denman's *perforator* (fig. 108).

The perforator remained unaltered from Denman's time until the present day, when Naegele suggested an improvement in the hinge-joint. In Denman's perforator it is necessary to open the handles, for the purpose of opening the blades, so as to break the bone. This is often very inconvenient, and an assistant is generally required for the purpose. Naegele, however, altered the hinge-joint in such a manner, that by pressing the handles together the blades were opened; thus, with Naegele's perforator,

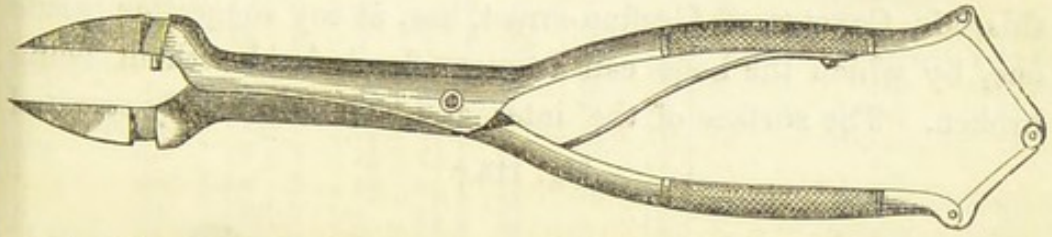
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* Fig. 107. Smellie's scissors. † Fig. 108. Denman's perforator.
‡ Fig. 109. Holmes's perforator.

one hand can accomplish what requires two with Denman's. In order to prevent the handles of Naegele's perforator closing too soon, while being introduced, a straight steel rod passes from one to the other, which can be very easily removed; but, if the catch between the rod and handle be not nicely fitted, if it be too tight or too loose, this object may be defeated; and if the handles are not kept quite apart while the perforator is being introduced, the points separate from each other too soon (fig. 81, p. 323). The late Mr. Holmes endeavoured to obviate these accidents—first, by altering the handles, removing the steel-rod, and changing their direction, so that, by pressing fully against them, the blades were kept closed; but lest they might open, the point of the perforator is attached to one blade only (fig. 109).

Professor Simpson has contrived a still more efficient instrument. Naegele's steel rod is attached to both blades of the crotchet, but joined in the centre; so that, by pressing against the rod, the blades are kept apart, it cannot slip; but by drawing the joint towards you with the finger, the rod is doubled and the blades close (fig. 110).

Fig. 110.*



The *Crotchet* has undergone but little alteration. That invented by Mesnard, and adopted by Smellie, is still very generally used. We have already stated to you the importance of having the shaft

Fig. 111.†



* Fig. 110. Simpson's perforator. † Fig. 111. Crotchet having the correct curve.

of the instrument properly curved, and not, as is often the case, made quite straight, which is only suitable for the extreme operation which we have described in Elizabeth Sherwood's case, and which you should not attempt. Very lately, Dr. Churchill

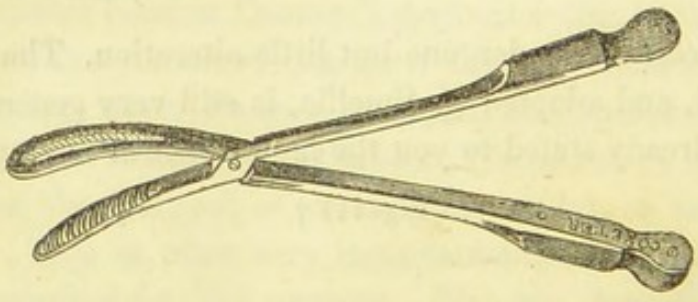
Fig. 112.*



has introduced some improvements in this instrument (fig. 112). The handle is placed at right angles with the shaft of the instrument, something like the handle of a boot-hook; and the point of the perforator is notched, so as to have two short points to hold the bone, in place of one long one, which might pass through it.

The *Craniotomy-Forceps* is sometimes employed in preference to the crotchet: we have already stated the objection to that instrument when made as originally designed by Dr. Davis. The strong points of blade, in forcing through the bone, too often break it up into fragments, without moving the head. To avoid this, Mr. Coxeter, of Grafton-street, has, at my suggestion, made one, by which the bone can be very firmly held without being broken. The surface of the internal blade is strongly serrated

Fig. 113.†



with rough lines, which correspond with grooves in the opposite blade, and the bone being held between them can hardly slip from their grasp.

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* Fig. 112. Churchill's crotchet.

† Fig. 113. Craniotomy-forceps.

EASUREMENTS OF FORCEPS[1] WHICH HAVE BEEN CHIEFLY USED IN BRITISH PRACTICE.

NAME.	LENGTH.				BREADTH.					AUTHORITY.
	Whole.	BLADE. Along curve.	BLADE. Direct.	Of handle.	Greatest between blades.	Between points.	Of blade.	Length of shank.	Second curve.	
amberlen's forceps[2]	11	7½	6¾	4½	2 11/12	1	1½	0	0	Measured from the original } vide fig. 91.
ffard's do.	12½	7¼	6⅔	5¼	2⅓	2	1¾	—	—	Mulder.
apman's do.	15	9¾	9	5¼	2⅛	0	1⅔	—	—	Do. vide fig. 92.
nellie's short do.	11½	6½	6	5½	2	0	1⅙	—	—	Do. vide fig. 93.
Do. long do.	12½	7¼	7	4¾	2	0	1⅔	—	2d c.	Do.
igh's short do.	11	7¼	7	3¾	2½	1/8	1	—	2d c.	Do.
Do. long do.	14	8⅔	7¼	5¼	2½	¼	1⅓	—	2d c.	Do.
hnston's do.	11	6⅔	6	4½	2½	0	1⅙	—	2d c.	Do.
wder's do.[3]	11⅓	6½	6	4⅝	2⅜	3/8	1½	—	0	Do.
borne's do.	11¼	6¾	6	4½	2¾	1/12	1⅜	—	—	Do.
nman's do.	10¾	6 7/12	6¼	4⅙	2 5/12	⅛	1 5/12	—	—	Do.
Do. do.	10	7	6½	3½	2 5/12	⅛	1 5/12	—	—	Measured,[4] vide fig. 72.
Do. do.	11⅜	0	7	4⅜	2⅞	1	1⅜	—	—	Ramsbotham.[5]
ighton's do.[6]	13½	0	8	5½	2⅞	⅞	2¼	3⅜	2d c.	Radford,[7] vide fig. 96.
pkins' do.[8]	12	8	5½	5	2½	⅜	2¼	1½	2d c.	Measured, vide fig. 103.
milton's do.[9]	13⅛	0	7⅝	5½	2 5/12	—	—	—	2d c.	Radford, vide fig. 94.
tken's do.[10]	10½	0	6½	4	3	1 11/12	1 5/12	—	0	Measured, vide fig. 74.
vis's do.[11]	11½	0	6½	4½	2⅝	0	2¼	1⅜	2d c.	Davis, vide fig. 104.
nquest's short do.[12]	11	7½	6	4	2 7/12	10/12	1 10/12	1	0	Measured, vide fig. 73.
Do. long do.[13]	14½	0	6½	6	2½	1	2	2	—	Radford.
msbotham's long do.	12¾	0	8½	4¼	2⅞	1	0	1½	2d c.	Ramsbotham, vide fig 97
üninghausen's do.[14]	13	8	7	6	2 10/12	7/12	1¾	—	2d c.	Measured, vide fig. 95.
atty's, W. (late) do.[15]	11	7⅙	6½	4	2 10/12	7/12	1 5/12	1/12	0	Do. vide fig. 98.
atty's, T. do.	12½	0	8	4½	3	1⅛	1⅝	—	0	Beatty } vide figs.
o. with shank do.[16]	12½	0	6½	4½	3	1⅛	1⅝	1½	—	Measured } 105, 106.
urchill's do.	12	8	7½	4½	2⅞	1	1 5/12	—	—	Do.
llins' do.	10	0	5½	4½	2⅞	1¼	1⅝	—	—	Collins, vide fig. 75.
egler's do.	12½	0	5	4½	2⅝	1	1⅝	3	—	Ziegler, vide fig. 99.
dford's long do.[17]	13¾	0	10¾	3	2⅝	0	2⅝	3½	0	Radford, vide fig. 79.
o., the short blade	13	0	10	3	2⅝	0	2⅝	3½	0	Do.
Y. Simpson's do.[18]	13	6 3/12	6	5	2 10/12	1 3/12	1 10/12	2	2d c.	Measured, vide fig. 100.

[1] The measurements of these forceps have been taken either from the authorities stated or from actual asurement, viz., 1. The whole length of the instrument, taken in a direct line from the extremity of the dle to the end of the blade. 2. The length of blade along the curve. 3. The length of the blade in a ct line, from lock to point. 4. Length of handle. 5. The greatest space between the blades. 6. The e between the points. 7. The breadth of the single blade. 8. The length of the shank.

[2] This forceps seems to have been the last and the most improved of four made by Chamberlen.

[3] Greatest breadth of blade near the lock.

[4] From one in my possession.

[5] Ramsbotham, Principles, etc., p. 288.

[6] Length of blade includes the shank.

[7] Radford's Essays "On the Long Forceps," p. 3.

[8] Shank forms a ring.

[9] The handle attached to one blade by a hinge-joint.

[10] A moveable roller is placed between the handles.

[11] Fenestræ very wide.

[12] The shank twisted.

[13] One handle screwed on to the blade.

[14] Introduced and used by Dr. Rigby. A pivot lock.

[15] There is a transverse opening in the shank, through which the opposite blade passes.

[16] The measurement is here given in one-eighth fractions, to correspond with Dr. Beatty's.

[17] The blades being unequal, the measurement of each is given. The locks are reversed. The measure the blade includes the shank, which forms a ring.

[18] Knees above joint to prevent unlocking; joint loose to allow lateral motion.

LECTURE XXII.

PRETERNATURAL LABOUR: BREECH, FEET, KNEE PRESENTATIONS.

PRETERNATURAL LABOURS are those in which some other part of the child than the head presents; they form another exception to Denman's definition of natural labour. Speculative writers have indulged in the opportunity thus allowed them to exercise their fancy, and have figured and described an endless variety of preternatural positions; in fact, there is no part of the child that could present in the pelvis that has not been made the subject of description: they detail not only presentations of the arm, foot, and breech, but also those of the back, abdomen, ribs, etc. These last seldom occur, and generally when the disproportion between the child and the pelvis is so great, in consequence of the smallness of the child, as to account for so unusual a deviation. It is, however, of more practical importance to direct attention to those varieties of preternatural positions which more commonly happen when the child is fully grown, and the pelvis is of its ordinary dimensions: it is in such cases that interference is most frequently required; and upon the skill of the operator will depend the safety of the child.

Preternatural presentations may be divided into two classes:—

1. Those in which the usual *position* of the child is *reversed*, and the lower part of the body presents at the pelvis instead of the head.

2. Those where the child *lies transversely* across the uterus, the body resting obliquely on the brim of the pelvis, so that the shoulder and arm present in place of the head. This is called in popular language "a cross-birth."

In the *first division* we find presentations of the *Breech*, *Foot*,

Knee, *Hip*, etc. The *second* is confined to those of the *Shoulder* and *Arm*.

Breech-Presentations afford the best examples of the *inverted position* of the child, which may, nevertheless, pass safely through the pelvis, although the chances of failure are immeasurably greater than when the child is in its usual situation, presenting the head. A little reflection on the inverted position of the child in the uterus is sufficient to show why this should be the case.

The child forms an oval figure, the back strongly curved, the head resting upon the chest, and the limbs doubled upon the abdomen. When the head presents, and that end of the oval is dependent, the efforts of the uterus to advance the child tend to maintain this form: the head, resisted by the pelvis, is pressed more against the chest, while the limbs are compressed by the uterus against the abdomen; but when the position is reversed, and the breech presents, there is the constant risk that the limbs of the child, as they enter the pelvic cavity, may drop down, the oval disappear, and the straightened body of the child act like a long and narrow wedge, imperfectly dilating the passages; the circulation of the funis, also, may be interrupted, and the delivery of the head impeded, if not prevented, in consequence of the passages being so insufficiently prepared. For these reasons interference is generally necessary to aid the delivery of the child, and to preserve it from injury. In too many instances, its life has been needlessly sacrificed from awkwardness; and, as the responsibility of any mismanagement must rest on the practitioner, it becomes a matter of importance clearly to understand these positions, to study the manner in which they pass through the pelvis, and to have a correct idea of the *mechanism* of their delivery.

The child may enter the pelvis with the back looking forwards, so as to correspond to the anterior or pubic segment of the cavity; or the abdomen and limbs of the child may occupy the same position. It passes into the cavity either in the right or left oblique measurement of the pelvis. Hence, as in head-presentations, *four positions of the breech* may be described—the *right*

and left anterior dorsal, and the *right and left posterior dorsal positions*. For all practical purposes, however, these may be reduced to two—the *Anterior Dorsal* and *Posterior Dorsal Positions*.

The *Anterior Dorsal Position* is the most frequent; and when the breech enters the brim thus—if it pass like the first position of the head in the right oblique measurement of the pelvis—the

Fig. 114.*



sacrum will correspond to the plane of the left ischium, and the thighs and genitals to the right sacro-iliac synchondrosis. In its descent, the breech observes the same law as the head: it enters the pelvic cavity obliquely—that is, the side of the breech next the os pubis descends lower than that next to the sacrum, and this position is retained throughout. If the limbs be not disturbed, and do not escape from the vagina, the lower part of the body of the child will pass in this oblique direction safely over the perinæum, and be expelled. The shoulders then enter the pelvic cavity in the opposite (the left oblique) measurement,

Fig. 114. Anterior dorsal position.

the arms folded, and corresponding to the right sacro-iliac synchondrosis. If the action of the uterus maintain sufficient pressure on the head, so that the chin continues resting on the chest, the head will enter the brim in the same measurement as the breech, having its shortest axis (the occipito-bregmatic) coincident with it. Consequently, the head may pass through and be delivered in this position quite as safely as in the usual manner. Assistance is not, therefore, absolutely necessary if these natural laws be observed, and the action of the uterus be adequate to its object; but this seldom happens, since there are many causes in operation to disturb and derange the order of delivery, which we shall presently consider. The breech may also enter the pelvic cavity at the opposite side, having the sacrum applied to the plane of the right ischium (the right anterior dorsal position). In this case the child passes through it in a similar manner as the former position, the relation to the pelvis being reversed.

Posterior Dorsal Position. In this position the head may enter the pelvic cavity like the third or left fronto-cotyloid position of

Fig. 115.*



* Fig. 115. Posterior dorsal position.

the head. The sacrum, then, corresponds to the right sacro-iliac synchondrosis, the thighs to the plane of the left ischium, and the nates lie obliquely in the cavity, descending more on the pubic than on the sacral side of the pelvis. Here, also, the same law is observed as in third positions of the head; the breech rotates from this position into the second anterior dorsal—or, in other words, the sacrum of the child glides from the sacro-iliac synchondrosis to the plane of the ischium on the same side of the pelvis, and is delivered with the back of the child looking forwards. The same rotation takes place when the breech enters the left side of the pelvis posteriorly (the left posterior dorsal position); and thus it is possible for the child to pass through and be delivered without assistance in any of these directions. It is, however, much more exposed to accidents in the latter than in the former (the anterior dorsal) position.

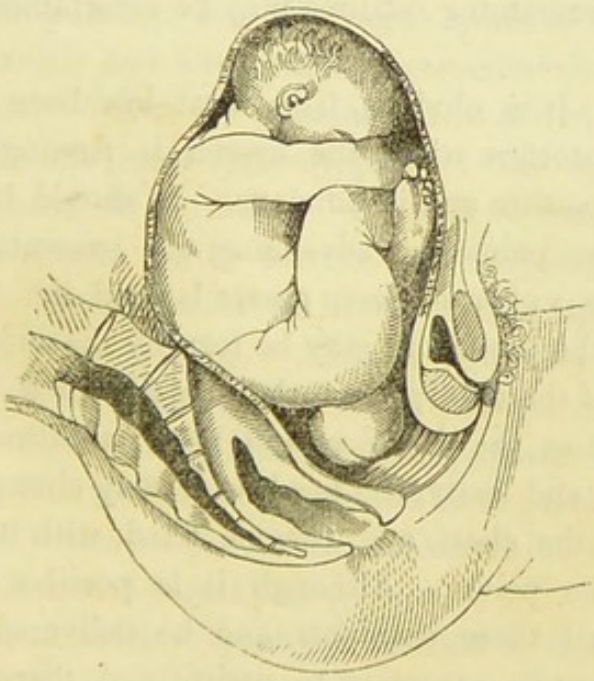
This brief outline of the manner in which breech-presentations pass through the pelvis, is sufficient to point out the provisions that Nature has made to secure the safety of the child, independently of all assistance, and to prove the importance of adhering to her principle in all attempts to deliver by manual interference. In fact, the chief cause of infant mortality, in cases of this description, is the too precipitate intermeddling with this process, by which means the position of the child, and the whole order of its progress, are completely deranged. If, for instance, the limbs of the child be prematurely seized, and brought rapidly down for the purpose of delivery, the body of the child is straightened, the chin leaves the chest, the arms are thrown up, the head presents perhaps the occipito-mental (the longest) measurement to the brim of the pelvis, and the arms, lying at each side of the head, may still further impede its advance, and render delivery extremely difficult: the delay generally causes the death of the child.

Diagnosis. The symptoms that accompany these presentations —and, indeed, preternatural labours generally—differ in some degree from natural labours. *The pains are not so powerful, and the intervals are longer;* the vagina suffers less distension than when the head is forcing its way through the passages; and hence,

the reflex stimulus to the action of the uterus which arises from the irritation of the vagina being diminished, the pains are weaker. *Auscultation* also gives some, but by no means a certain indication of this presentation: the fœtal heart is heard higher up, more in the neighbourhood of the umbilicus, and sometimes in the lumbar region: the *meconium* may also be observed colouring the vaginal discharge.

Digital Examination is, however, the only accurate means of determining breech-presentation. Usually one buttock, the most dependent, is found to occupy the pelvis: this is smooth, equal, and, if it be pressed firmly, bone is felt imbedded in the soft surface; this is the tuber of the ischium, which could scarcely be mistaken for the vertex. Still, there is the possibility of mistaking it for other positions. For instance, the shoulder may present in such a manner as to resemble the breech—the same soft, smooth, round, tumour is felt covering a point of bone; and although the difference in size between the head and shoulder might be sufficiently apparent to prevent mistake, yet in some

Fig. 116.*



* Fig. 116. Swollen scrotum from pressure.

cases it is not so, especially when the presentation is high in the pelvis, and the os uteri is not much dilated. Some diagnostic mark is necessary, which can readily be obtained by passing the finger sufficiently high to place it within the fold formed by the limb of the child. If it be the thigh, the genitals are immediately felt, which proves that the breech is presenting. If the arm, the ribs may be distinctly traced as the finger presses the thorax. Great caution is necessary in making such examinations, lest the genitals may be injured. The scrotum frequently suffers from imprudence on the part of the practitioner: it is sometimes so compressed between the thighs as to swell up to a very large size (fig. 116); this is increased by frequent examinations, which are repeated because the large tumour that is formed is too often an enigma; extreme congestion is the result, and in some instances the parts have sloughed. Even the face may present in such a manner as to cause some little embarrassment: the cheek, when swollen, communicates the sensation of a soft smooth surface, beneath which the malar bone is felt, just like the tuber of the ischium. This can only happen, however, in the beginning of labour; because, as the os uteri dilates, and the presentation descends, the remaining features may be ascertained, and remove any doubt.

Treatment. It is obvious, from what has been said, that all attempts to interfere while the breech is passing through the pelvis are premature and injudicious. It should be left to itself so long as the pains are advancing the presentation, until it arrives at the vulva, or even passes beyond it. There is here the risk that the perinæum may be torn by the sudden expulsion of the limbs of the child; when they are delivered, the funis may be compressed as the shoulders and head pass through the brim of the pelvis; and lastly, the head itself may change its position, separate from the chest, and become fixed, with its longest axis lying across the pelvis. Although it is possible that the child may escape all these accidents, and be delivered without aid, still it is generally necessary to assist; and, therefore, we shall explain—

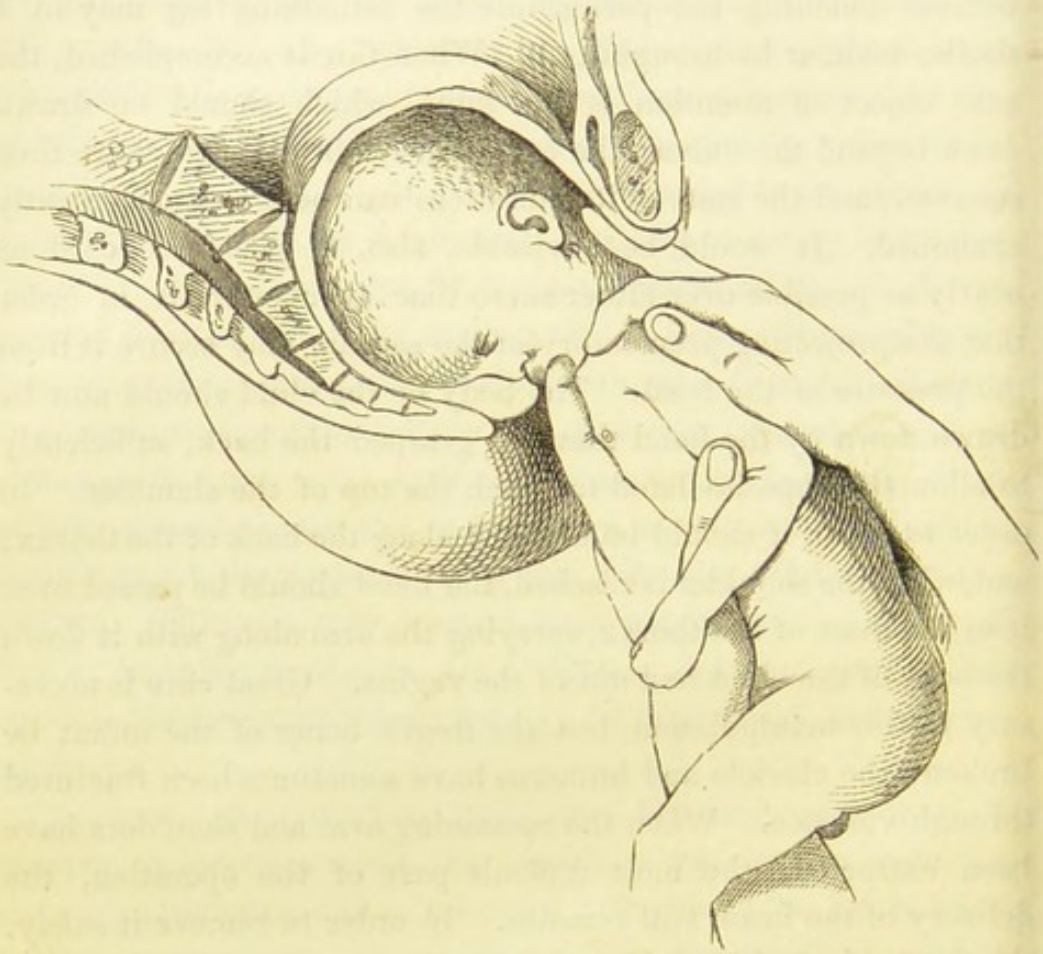
The *mode of delivery.* As soon as the breech appears beyond

the vulva, the back of the child should be grasped by one hand just above the pelvis, while the other is passed between the perinæum and the limbs, in order to bring down the feet: the leg or knee may be brought within the fingers, and pressed down along the hand in such a manner that it escapes from the vulva without touching the perinæum: the remaining leg may in a similar manner be brought out. When this is accomplished, the next object of attention is the funis, which should be drawn down beyond the vulva; the coils that lie in the vagina are thus removed, and the state of its pulsations can be more conveniently examined. It would be advisable, also, to place the cord as nearly as possible over either sacro-iliac synchondrosis, in order that the projecting promontory of the sacrum may secure it from the pressure of the head. The body of the child should now be drawn down by the hand that has grasped the back, sufficiently to allow the opposite hand to reach the top of the shoulder. In order to do so, it should be directed along the back of the thorax; and, when the shoulder is reached, the hand should be passed over it to the front of the thorax, carrying the arm along with it down the body of the child and out of the vagina. Great care is necessary in this manipulation, lest the fragile bones of the infant be broken: the clavicle and humerus have sometimes been fractured through violence. When the remaining arm and shoulders have been extracted, the most difficult part of the operation, the delivery of the head, still remains. In order to remove it safely, the first object should be to correct any malposition that may have occurred. The chin must be brought down upon the chest, and retained in that position. This is generally effected by passing the finger of the introduced hand into the mouth of the child; but this alone is not sufficient: the opposite hand should be passed up to the back of the head, so as to press firmly with two fingers against the occiput, while the mouth is drawn down in the manner described (fig. 117.)

It is sometimes difficult to alter the position in this way, and it may be necessary to pass the fingers along the face towards the forehead, so that they may press it down like a vectis; but this is seldom required. The head should be extracted as quickly as

possible, because the funis is now exposed to a dangerous pressure. In the act of extraction, the direction of the head should be changed as it passes through the pelvis. Before the head

Fig. 117.*



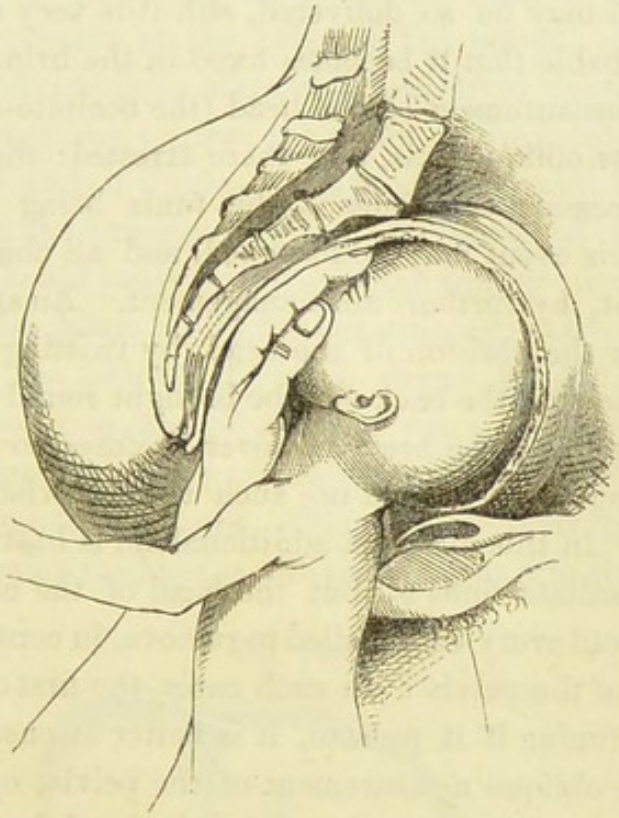
presses upon the perinæum, the direction of the force should be in the axis of the brim, and afterwards in the axis of the outlet. The head, as it descends, should also be rotated from the lateral towards the antero-posterior measurement of the pelvis; and during the whole of this manipulation the perinæum must be carefully supported.

The chief object of interference in breech-presentations is the preservation of the child: the pulsation of the funis should, therefore, be carefully observed during the delivery. If its rate be

* Fig. 117. Delivery of head.

much increased, or if the arteries beat feebly, the child should be extracted as rapidly as possible. In such a case, there is not time to wait for the return of the pains; it would be advisable, there-

Fig. 118.*



fore, that an assistant should press on the fundus uteri firmly with both hands, in order to cause its more efficient contraction as the child is being extracted. When the uterus acts strongly, the head is less likely to change its position, and the force of the pain should be as much as possible increased, to prevent the straightening of the head, which otherwise would take place when the body of the child was rapidly drawn down.

In the delivery of *posterior dorsal positions*, it is very necessary to *recollect the rotation of the child* as it passes through the pelvic cavity; neglecting to aid this change of position, or the ignorance of the attendant respecting it, has been a frequent cause of the child's death. It generally happens that the child is drawn

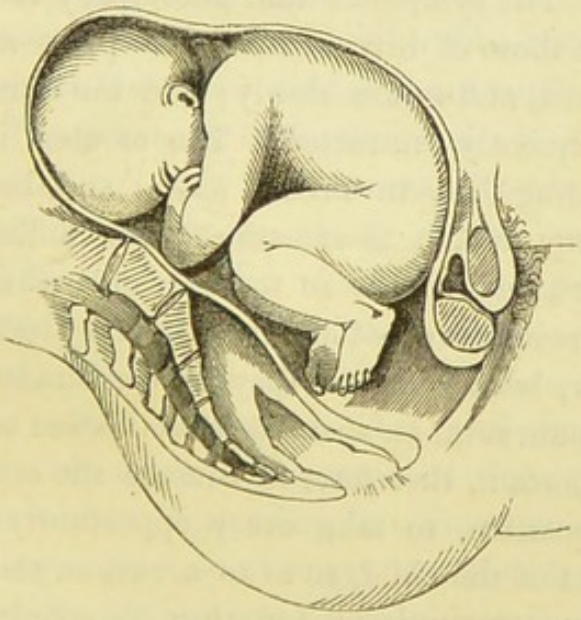
Fig. 118. Delivery of head. Hand used as a vectis.

down very hastily, but in the wrong direction,—the head is thrown up, and the chin rests on the linea ileo-pectinea. Further efforts to extract have only the effect of bringing the head into such a position that the face looks quite upwards, and the occiput descends upon the back of the child; and although it is possible that the head may be so delivered, still it is very unlikely; it is far more probable that it becomes fixed in the brim of the pelvis, the longest measurement of the head (the occipito-mental) being drawn into its oblique axis, and there arrested: the death of the child is a necessary consequence, the funis being so long compressed. This event may be hastened, and all chance of saving the child lost, by further mismanagement. An attempt is often made to alter the position of the head, by twisting the body that is expelled, so that the back may be brought round to the anterior side of the pelvis: the head, however, refuses to move, and the child is strangled, if we can use such a term where there is no respiration. In this dilemma additional aid is hastily summoned, and the consultant finds all but the head of the child delivered, which he is told every effort failed to remove, in consequence of the contraction of the pelvis ! In such cases, the first object of attention is the funis; if it pulsate, it is better at once to apply the vectis in the oblique measurement of the pelvis, opposite to that in which the head is arrested, to raise the head from its situation, and to turn it towards the sacro-iliac synchondrosis of the same side: when this is accomplished, the vectis may be withdrawn, and a finger pressed into the mouth of the child to bring down the head and complete the delivery. If this be done adroitly, and with promptitude, the child may yet be saved: sometimes the vectis may be dispensed with. It is sufficient to pass two fingers along the cheek to press round the head towards the sacro-iliac articulation, and, when the position is thus changed, to deliver as before. If the pulsation in the funis have ceased, there is no need for haste; the head may be extracted by the hands alone, or, if wedged in the brim, the cranium may be perforated behind the ear or through the mouth, the crotchet introduced, and the head brought down.

We have stated, that the natural efforts to deliver breech-

presentations should not be interrupted until there is some risk of injury either to the perinæum or to the child: the time, therefore, for interference, is usually when the breech has passed the vulva; but there are exceptions to this rule. In some cases, the pains are feeble, and return at long intervals; the child descends very slowly through the passages, and the funis is often exposed too long to pressure at the brim of the pelvis. It would not, therefore, be advisable to allow the breech to continue to move so slowly through the vagina; the action of the fœtal heart should be ascertained, and, if necessary, its progress should be assisted—but assisted on the principle we have endeavoured to lay down. An assistant should press firmly over the fundus uteri to increase the effect of the pains, while the practitioner, placing one or two fingers within the fold of the groin, draws it gently down *with the pain;* a moderate dose of ergot of rye would also be serviceable to stimulate the action of the uterus. In these instances of premature interference, the difficulty of delivery is always increased, because the head is seldom brought into the pelvis in a

Fig. 119.*



position so favourable as it would have been if the uterus alone expelled the child; consequently the risk to it is greater, and

* Fig. 119. Presentation of the feet.

its safety will depend entirely upon the skill and intelligence of the practitioner who undertakes the operation: hence may be inferred the importance of studying the mechanism of these presentations.

Presentations of the Feet are more hazardous to the child than breech-positions, because the soft parts are so imperfectly dilated by them; the pains are weaker, and the funis is more exposed to injury during the progress of delivery. In all such cases, therefore, assistance is generally required. One or both feet present sometimes in such a manner that the case is more like an imperfect breech-presentation; that is, the breech descending with the feet and limbs, doubled up on the body of the child, is arrested by the brim of the pelvis: the action of the uterus is directed from the breech to the limbs, which are forced down into the vagina, and thus constitute a footling presentation. Foot-presentations may be divided in the same manner as breech-presentations into *anterior dorsal* positions, in which the toes look towards the sacral side, and *posterior dorsal* positions, when they are on the pubic side of the pelvis.

Diagnosis. The symptoms that accompany these labours are also similar to those of breech cases; the pains are short, apparently inefficient, and return slowly; and the duration of labour may be consequently protracted. The os uteri is less perfectly dilated in footling than in breech cases; and, before the membranes are ruptured, it is sometimes very difficult to feel the presenting part, and equally so to determine what it is when it comes within reach; the foot and the hand may be easily mistaken for each other, because, while they are surrounded by the liquor amnii and membranes, an accurate examination cannot be made. It is very important, therefore, to educate the sense of touch as perfectly as possible, to take every opportunity of feeling the hands and feet of the child, so as to accustom the fingers to the sensation they communicate, and thus to acquire a facility in making these examinations. This may be practised with any infant after its birth. When an accurate sense of touch is acquired, the foot may be detected through the membranes, although only a small part of it be felt; but otherwise it is very

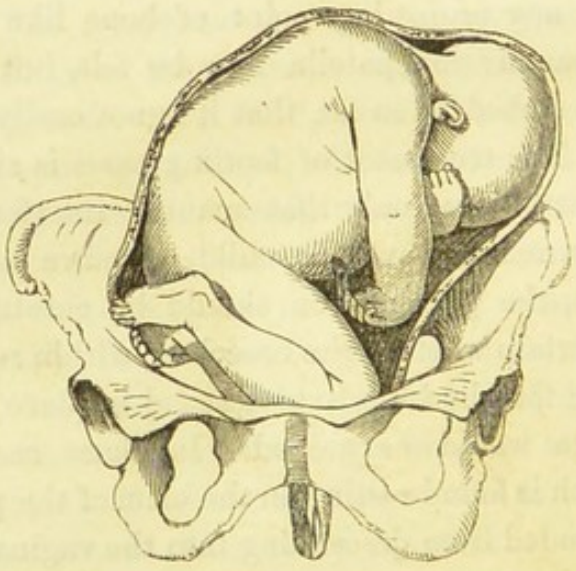
difficult. The fingers, when extended, resemble toes. When the foot is pressed up against the leg, the ankle is like the elbow: the knee and elbow also resemble each other. The diagnosis is best made when the waters are discharged. The toes differ from the fingers in being shorter and of more equal length; the great toe is not so far apart from the others as the thumb is from the fingers; but the most certain means of distinguishing one from the other, is by folding, or attempting to fold, the phalanges; the fingers can easily be doubled and the hand closed, but the toes cannot. The condyles of the ankle and elbow joints resemble each other very much; the os calcis communicates the same sensation as the olecranon process, and the foot, being very long in proportion to the leg, against which it often lies closely applied, resembles in some degree the fore-arm; the latter, however, is round and smaller near the hand, while the sole of the foot is flatter and broader near the toes: the distinction is easy if the finger be passed sufficiently high along the limb to make a careful examination of it. The knee-joint bears a closer resemblance than the ankle to the elbow-joint. It feels, however, rounder, and is without any projecting point of bone like either the os calcis or olecranon: the patella may be felt, but it is so small, and is often so embedded in fat, that it is not easily perceived.

Treatment. The treatment of footling cases is similar to that of breech-presentations, only that manual interference is more absolutely required to save the child. Before any attempt to deliver is made, the presentation should be carefully examined, in order to ascertain whether the breech be within reach; because, if it be possible for the breech to descend in place of the foot, a great advantage would be gained. In those cases, therefore, where the breech is found resting on the brim of the pelvis, the foot should be prevented from descending into the vagina; rather press up the foot during a pain, so as to get the breech more towards the pelvic cavity: it might even be possible to hook a finger in the groin and bring the breech down. So long as the funis is safe from pressure, it would be advisable to delay the delivery, in order to give the uterus time to effect this change; but if the cord come down, any delay is dangerous to the child.

If delivery be essential, your next object is to convert the case, if possible, into a semi-breech position; that is, to bring down one foot only, and to prevent the other leg from descending at the same time. This will have a useful effect on the dilatation of the passages, which is the great cause of difficulty in the safe delivery of these cases. If you cannot succeed, and both feet come down, the child must be extracted as soon as possible; and to aid this object, you should endeavour to dilate the perinæum as much as possible with the hand that is introduced into the vagina. This may be done by pressing the back of the hand firmly against the floor of the vagina, the perinæum, and the coccyx, while the child is being delivered: the distension excites the uterus to more powerful action.

Knee-Presentations are less frequently met with than those which have been described; and when they occur, the funis is more likely to prolapse, because, from the position of the child, it receives less support. Only one knee generally presents, which

Fig. 120.*



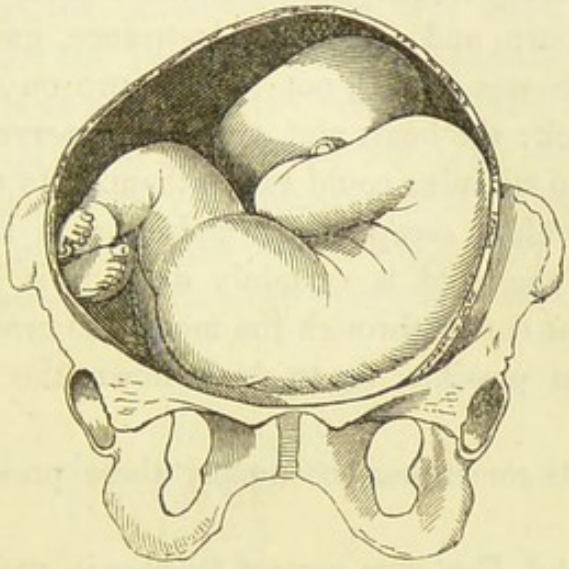
may be brought down while the remaining limb is left within the uterus, in order that the child may be delivered as nearly as possible as a breech case. The time for delivery must be deter-

* Fig. 120. Knee-presentation, with funis prolapsed.

mined by the state of the funis. If it be safe, the more time that is allowed for the dilatation of the os uteri the better; but if it prolapse, you cannot wait without endangering the child.

HIP-PRESENTATIONS rarely occur; they are, in fact, only a variety of breech-positions, and should be similarly treated; the child lies with the hip across the pelvis, presenting a round soft surface, covering a bony prominence (the trochanter): the fold

Fig. 121.*



of the thigh on the abdomen, and the spinous process of the ischium, may also be felt. As labour advances, this position will correct itself, and the breech descend into the pelvic cavity.

A *Distorted Pelvis, with a Preternatural Presentation*, greatly increases the difficulty of delivery, especially in the extraction of the head; the child is therefore generally lost, as it seldom happens that the funis escapes pressure; nevertheless it may do so, if the promontory of the sacrum project much, and the funis be placed near the sacro-iliac synchondrosis. If this should happen in the *ovate pelvis*, it is possible that steady traction in the axis of the brim may succeed in bringing the head through before the pulsation has ceased; and, if so, it may be easily removed from the cavity of the pelvis, and the child preserved;

* Fig. 121. Hip-presentation.

but in doing so, all violent efforts to extract the head should be avoided; pulling, or rather jerking at it, with all your strength, as is sometimes done, is very objectionable, because, if the child be living, it is the most certain way of destroying it that can be adopted. At this tender age, the odontoid process has only a ligamentous union with the vertebra dentata: it may easily be broken off, and death thus caused. The effect of concussion on the nervous centres, also, should be considered. We have seen (we could almost say frequently) cases thus delivered in which the child was still-born, and, from its appearance, gave every evidence that death was caused, not by pressure on the funis, but by nervous shock: the heart and respiratory nerves were paralysed, so that no stimulus could excite them. In other deformities the child seldom escapes—the pulsation in the funis soon ceases. When the child is certainly dead, it is better to perforate behind the ear or through the mouth, to evacuate as much of the brain as possible, or to draw down the head with the crotchet.

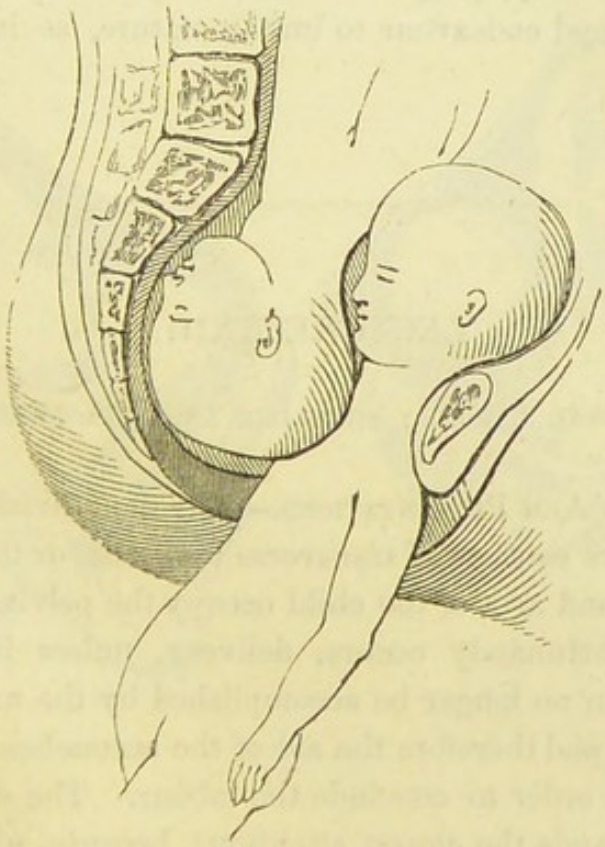
Complications sometimes accompany these presentations, that require notice.

The *Hand and Foot may present together* in such a manner as may make it difficult to distinguish them. When the membranes are ruptured, a careful examination should be made, and the foot brought down, in order to convert the case more completely into a footling presentation: if the funis be safe, it is better not to interfere further, but to leave the case for some time to the natural efforts, in order that the passages may be better prepared for delivery. If the membranes be entire, no accident can occur so long as the waters are retained in the uterus; and, therefore, interference is unnecessary.

Heads locked in Twin-Birth. A complication of a singular character has been recorded, in which delivery was rendered extremely difficult. The late Dr. T. Ferguson, of Dublin, relates a case of twins in which the first child presented the foot, and was delivered without any unusual obstacle in the progress of the labour, until the child's body was so far protruded as to enable him to ascertain, by the pulsation of the funis, then with-

out the os externum, that the child was alive. From this stage of the delivery he began to experience a most unusual and unaccountable resistance to the further descent of the child. This difficulty was produced by the head of the second child descending before that of the first, so that each locked in the other. The pulsation in the funis of the first child continuing, Dr. Ferguson wished to perforate the head of the second, that caused the obstruction: there was some delay in obtaining instruments, and, in the interval, the pulsation of the first child ceased; but, to the surprise of Dr. Ferguson, powerful expulsive pains forced down the heads of both over the perinæum, and the second child was born living. (*Dub. Med. Trans.* vol. i. p. 146.) Some years ago, Mr. Elton of Windsor related a similar case. The feet of the first child presented, and were brought down; but, "after the thighs had passed, the delivery became slow and increasingly

Fig. 122.*



* Fig. 122. Heads locked in a twin-birth. Mr. Elton's Case.

difficult; the abdomen suffered great compression in passing; the thorax still more; the difficulty became greater with the further progress of the body; the arms were extracted with much trouble, and, when it was practicable, an examination was made. I" (Mr. Elton) "found the vertex of a full-sized head presenting immediately over the breast in the position where there should have been a chin; the anterior base of the neck could be traced in close and compressed contact with the presenting head, the latter firmly impacted in the pelvic cavity." Mr. Elton divided the neck of the first child; and, having removed the truncated body, applied the forceps to the second child, which he delivered, but could not save, although attempts "to restore animation were long and anxiously continued." (*Medical Gazette*, July 24, 1846, p. 52). What is to be done in such a case as this? We certainly should not be disposed to destroy either child. Before taking up the perforator or the amputating knife, we should weigh well the practicability of applying the long forceps to the head of the second child, and endeavour to imitate nature, as in Dr. Ferguson's case.

LECTURE XXIII.

PRETERNATURAL LABOUR: SHOULDER AND ARM PRESENTATIONS.

Shoulder and Arm Presentations.—The next division of preternatural labours consists of transverse positions, or those in which the shoulder and arm of the child occupy the pelvis. When this deviation unfortunately occurs, delivery, unless in some rare exceptions, can no longer be accomplished by the natural efforts of the uterus; and therefore the aid of the accoucheur is rendered imperative, in order to conclude the labour. The study of these positions demands the closest attention; because, whenever they are met with, you are obliged to turn and deliver the child, and to do so with promptitude, in order to preserve its life.

The *Mechanism of Arm-presentations*, and their relation to the pelvis, should be thoroughly understood. A shoulder-position may present itself at any time most unexpectedly; and if you be not previously prepared with an accurate knowledge of its nature, and the mode of delivery, no time is allowed to study it; you must proceed with the operation at once, or give it up altogether. If you are sufficiently imprudent to persevere, and attempt to do that which you do not understand how to do, you become responsible to a most serious extent: such attempts have been followed by the most disastrous results, and have destroyed equally the life of the patient, and the character of the practitioner.

The shoulder and arm may present in *four different ways*. Either arm may occupy the brim of the pelvis. The back of the child may lie backwards or forwards. These four positions may (like breech-presentations) be included in two divisions.

Fig. 123.*

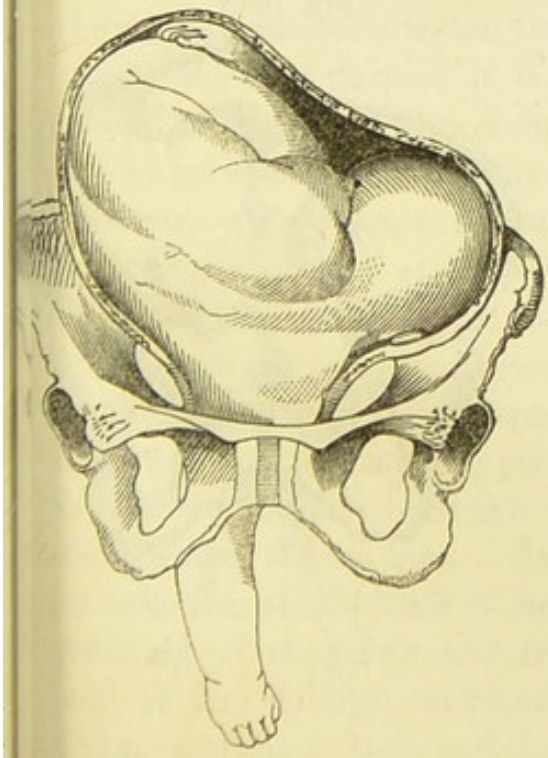
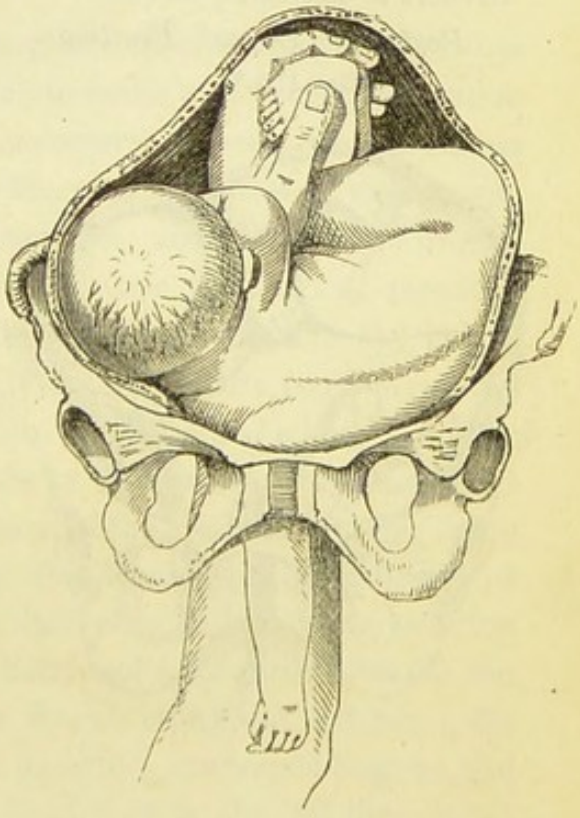


Fig 124.†



* Fig. 123. First anterior dorsal position: right arm presenting.

† Fig. 124. Second anterior dorsal position: left arm presenting.

1. The *Anterior Dorsal Position* of the shoulder, having the right arm or the left presenting. 2. The *Posterior Dorsal Position*, subdivided in a similar manner, according as the right or the left arm lies in the pelvic cavity.

Anterior Dorsal Positions are the most frequent; and the right arm, we think, presents oftener than the left. We shall consider this as the first position, and proceed to examine its relations.

In the *First Anterior Dorsal Position*, the right arm and shoulder occupy the brim of the pelvis: the head of the child, having the occiput forwards, rests in the left iliac fossa; the back lies obliquely across the lower segment of the uterus; the breech is upward and to the right side; the legs and remaining arm are collected together at the back of the uterus.

The *Second Anterior Dorsal Position* is similar to the first, only that its relations to the pelvis are reversed; the left shoulder is in the brim of the pelvis; the head in the right iliac fossa; the breech to the left side; and the limbs at the back of the uterus.

Posterior Dorsal Positions. In the *First Posterior Dorsal*

Fig. 125.*

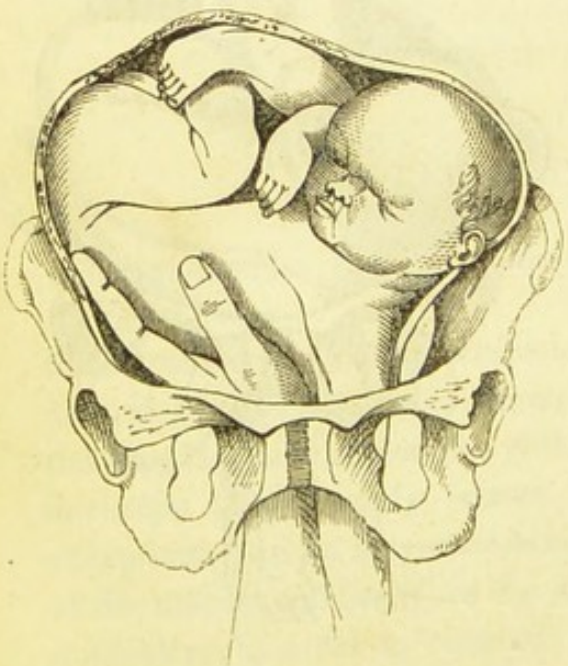


Fig. 126.†



* Fig. 125. First posterior dorsal position: left arm presenting.

† Fig. 126. Second posterior dorsal position: right arm presenting.

Position the left shoulder and arm present at the brim of the pelvis; the head, having the face forwards, rests in the left iliac fossa. The abdomen and limbs lie obliquely across the anterior walls of the uterus; and the breech is to its right side.

The *Second Posterior Dorsal Position* has the right shoulder and arm in the pelvis, the head in the right iliac fossa, and the breech to the left of the uterus; but, in every other respect, it resembles the first posterior dorsal position.

Any of the positions may be met with; but the same manner of turning the child cannot be adopted with each indifferently. In fact, the ill success of this operation, and many of the accidents that have occurred in attempting to turn the child, might be fairly attributed to ignorance of its exact position. A kind of haphazard attempt is made to reach the foot: if it succeed, it is drawn forcibly out of its proper direction, and the difficulty of delivery is greatly increased. Thus in this protracted attempt the child is generally sacrificed, and sometimes even the uterus has been ruptured.

The *Diagnosis* of any of these positions is easy, provided that the arm is sufficiently within reach to make a perfect examination of it. For this purpose it is necessary, as soon as the waters escape, to pass the fingers along the arm, as it lies in the vagina, as high as possible towards the shoulder; and then, as the fingers are being withdrawn, to supinate the arm as much as possible, and bring the hand of the child so placed outside the vulva. The examination of the hand will determine the position of the child in the uterus. The direction of the palm, whether it look forward or backward, corresponds to that of the abdomen and limbs of the child; and the position of the thumb, whether it be to the left or to the right side of the pelvis, will be the same as the position of the head. For instance, in the first position (anterior dorsal) the back of the hand looks forwards towards the pubic side of the pelvis, and the thumb is on the left side; the back of the child is, therefore, anterior, corresponding to the abdomen of the mother, and the head rests in the left iliac fossa; the abdomen and limbs lie towards the back of the uterus. In this manner any of these positions may be ascertained with

facility, provided that the membranes are ruptured and the waters are discharged, when the operation of turning can be undertaken with the greatest advantage.

The *signs* that indicate arm-presentations are sometimes observable, even before labour commences. The shape of the uterus is altered: it no longer presents its oval form, but is irregular in outline, as if divided into two tumours, a larger and smaller one. The stethoscope, also, proves a difference in the position of the fœtal heart: it is heard more towards the centre of the abdomen, in the neighbourhood of the umbilicus, rather than in the iliac regions. As soon as labour commences, the pains go on for some time with tolerable regularity and strength, but no advance of the child is made: "they are doing no good," as the midwives say, although sufficiently powerful for that purpose. If a vaginal examination be made, the membranes are generally found to protrude through the os uteri containing the liquor amnii alone: sometimes the phalanges or a limb may be felt, but, unless the hand be quite within reach, it is difficult to determine the presentation. We have met with cases where the membranes occupied the mouth of the womb, where even a hand was touched, and after all, the head came down, and the woman was delivered in the usual manner. Lest such might happen to you, it is very necessary not to be too precipitate in sounding an alarm, and preparing for an operation that may not be called for. As labour proceeds, and the dilatation of the uterus advances, the presenting part descends more and more into the pelvis; and then it will be in your power to detect the arm, even through the membranes. An arm-presentation being ascertained, no further vaginal examination should be made; unless the membranes are broken, and the waters are discharged, in which case it will be necessary at once to turn and deliver the child. The capacity of the pelvis, however, should be carefully examined, in order to determine the risk to which the child may be exposed in delivery.

Treatment. The treatment of shoulder-presentations is fixed in all cases where the operation of turning may be performed

with safety to the patient. Any question respecting it is only one of time—*when* the delivery should be undertaken.

Certain cases, however, fall under the notice of the practitioner, in which the safety of the patient is doubtful, and where it becomes a question whether such an operation can be ventured upon with propriety. Between these extremes, there are many varieties of cases that present conditions which modify the treatment: we shall, therefore, consider separately the treatment of—1, cases that present no difficulty in delivery by turning; 2, cases that are attended with difficulties to a greater or less extent; and 3, those cases where the operation of turning becomes too dangerous to be undertaken.

1. *Cases that Present no Difficulty in the Delivery* must be understood to embrace those that the practitioner has had the opportunity of observing from the commencement of labour; where there is no rigidity of the os uteri, nor contraction of the pelvis, to interfere with a successful issue: and in the management of which, the only questions he has to consider are the *time* and the *mode* in which the operation should be performed. If there be any difficulty in the delivery, it must be one of his own making.

The *time* best adapted for turning is when the os uteri is fully dilated, or nearly so. If the dilatation be incomplete, there is always a risk in the extraction of the head: the limbs and body may be brought through the os uteri, but there may be great difficulty in overcoming its resistance so as to allow the shoulders and head to pass, during which interval the funis is compressed, and the delay causes the death of the child; besides, the cervix uteri may be torn in the attempt, and the life of the mother hazarded. It is not, therefore, advisable to interfere before the mouth of the womb is sufficiently open to prevent any risk of this kind. For this reason, also, it is better not to rupture the membranes prematurely for the purpose of turning, because, so long as they are preserved, the liquor amnii dilates the os uteri more efficiently than the presenting part could, and this advantage is effectually secured: but whenever the membranes give way, and the waters are discharged, the hand must be passed

into the uterus in order to deliver, lest its fibres should contract strongly on the body of the child, and increase the difficulty of the operation.

The time, then, to interfere should be whenever the os uteri is quite dilated, whether the membranes are broken or otherwise, or when the waters are discharged, although the os uteri may not be quite dilated. In the latter case, the danger to the child is obviously increased.

The *mode of delivery* requires your attention, in order to avoid the errors that are frequently committed in this operation. The first step is to determine the exact position of the child: the moment, therefore, that the waters escape, the hand of the child should be brought down and examined. When the position is ascertained, the practitioner can judge which hand is the most convenient to introduce for the purpose of turning. In general, it will be found more easy to turn with the same hand as that presenting in the vagina. If the right arm of the child descend, the right arm should be used in delivery; and so with respect to the left.* You can readily determine this point by grasping the hand of the child, applying palm to palm; and if the thumb of each lie on the same side, the hands are the same. Let, then, the presenting hand be held with one hand, while the other is passed along the arm of the child to the axilla, and then directed over the thorax to the abdomen. The feet and remaining hand are generally found here so intermingled, that it is by no means easy (at least to the inexperienced) to distinguish the foot; the advantage, therefore, of previously acquired tact is here particularly obvious: but when there is a doubt whether the hand or the foot is seized, it may be removed by grasping the phalanges;

* On this point there is great difference among practical accoucheurs. Some always deliver with the right hand, because, from the habit of using it, they have more power, and a more acute touch; others prefer the left, because, the back of the hand being opposed to the sacrum, the palm and fingers are more easily applied to the body of the child. No rule can decide the question, the case itself must do so; and the practitioner should be ambidexter—prepared to use either hand according to circumstances.

if they can be closed, it is the hand; if not, being the foot, it should be held firmly, but no attempt as yet made to turn. If you should proceed at once to draw down the foot, there is a great chance that it may slip from the fingers, and not be so easily found again: it is preferable to get not only the foot, but as much of the limb as possible within the grasp of the hand before it is drawn down; by this means, also, more power is gained. We entirely agree with Dr. Radford that it is quite unnecessary to find the second foot before turning, because one limb is sufficient for the purpose, and in searching for the second there is some risk that you may lose the first; it is even possible that you may seize the foot of a second child: an advantage is also gained by leaving one foot in the uterus—the child, when turned, presents in a semi-breech position, which is more favourable for the purpose of delivery than if both feet were brought down into the vagina. When the limb is seized firmly, and traction is made in the intervals of pains, the child revolves quite easily in the uterus: the leg is brought into the vagina, and the remainder of the delivery is completed as in a breech or footling case; but you should recollect that there is nothing left to nature here—it rests entirely on your skill whether the child descend through the pelvis or otherwise. Observe, therefore the direction of the foot —that the toes are directed backwards. You should watch the funis, and bring it down when it comes within reach, and take care that the fundus uteri is compressed while the child is being withdrawn. In this manner, if the operation be undertaken with sufficient promptitude, and time be not unnecessarily lost in going through it, the child is generally saved.

When the hand is passed into the uterus, immediately after the membranes are broken, its fibres yield very readily; nevertheless, it is necessary to avoid irritation as much as possible, and hence, while passing the hand upwards, if a pain return, it is better to rest until the uterus again relaxes; thus, as it were, stealing the hand into the uterus in the intervals of the pains. If an opposite course be pursued, the introduction of the hand may excite strong uterine contractions, and thus the resistance to any attempt to force the hand upwards will be greatly

increased: the fingers become benumbed; sensation, which is so necessary, is lost; and there is even a hazard that the uterus may give way. Ruptures of the uterus are said to have been caused by the projecting limbs of the child, when its parietes (we presume) had been previously weakened by some morbid alteration of structure. How much more likely is such an accident to occur when the knuckles are pressed against the sides of the uterus, strongly contracted upon them! Make it a rule, *never to force* the hand into the cavity of the uterus, but to advance cautiously, pressing forward when the uterus yields, and ceasing to do so the moment its contractions return. When the child is turned, the more rapidly it is extracted the better chance there is of saving it.

2. *Cases attended with Difficulty in Turning* are generally those in which the membranes have been some time ruptured before the operation is proceeded with. This may happen when the *os uteri is rigid*, the waters having escaped early in labour, before the mouth of the womb is sufficiently dilated to admit the hand. Or, in consequence of inattention on the part of the attendant, or other cause of neglect, the shoulder may be allowed to remain in the brim of the pelvis for hours unobserved, the attendant not being aware of the nature of the labour. Had he known it in time, there might have been no difficulty in turning, but now it is too late, the waters have been for a long time discharged; *the shoulder is fixed in the brim, and the uterus is strongly contracted about the body of the child.* In either case, in consequence of the body of the child causing much more irritation than the fluid which surrounded it, the action of the uterus is increased, stronger pains return again and again, but are inefficient for the purpose: the result is, that spasmodic contraction of the uterus may be excited, and the fibres surround the child so closely as to render the introduction of the hand a matter of great difficulty. Sometimes inflammation of the uterus has taken place, an effect still more dangerous to the patient.

The *Treatment* of such cases is by no means so simple as that of the former class. If you were to proceed at once to turn, difficulties would oppose themselves in every step of the operation.

The resistance of the uterus to the introduction of the hand; the danger of using too much force; the effect of compression on the fingers, rendering them insensible and almost powerless; the extreme exertion required, and consequent exhaustion of the operator—all these impediments meet you, and would perhaps render the attempt abortive. La Motte relates that an operation of this kind nearly cost him his life. "Je crus très certainement que je mourrois après cet accouchement, ou j'épuisai et ma science et mes forces, et après lequel je restai sans respiration; en sorte *qu'il me fallut mettre sur un matelas devant un grand feu et me frotter avec des lignes chauds pendant plus d'une heure.*" (*Observ.* 262, p. 467). Smellie, also, after such an operation, says, "I never was more fatigued: I was not able to raise my arms to my head for a day or two after this delivery, and one of the gentlemen who was present was so much frightened that he resolved never to venture on the practice of midwifery." (*Midwifery*, vol. iii. p. 243, Case III.) You would not desire such scenes as these, and therefore it would be advisable to reduce as much as possible the causes of difficulty: some *preliminary treatment* is therefore required. The first object is to determine the existence of inflammation. If the passages be hot and tender; the os uteri swollen and painful; the uterus very hard, intolerant of the least pressure, and irregular on its surface; if the pulse be increased in frequency, with dry tongue and great thirst; you cannot interfere until these symptoms are subdued, and even then the manner in which the patient is delivered becomes a question of serious consideration. Inflammation may not be present, but the uterus is strongly contracted about the body of the child; spasmodic pains frequently return with great agony to the patient, who is irritable and anxious: the pulse is quick, and a certain amount of nervous irritation is excited. All such symptoms must be relieved; and the best means of doing so is by a free depletion from the arm, followed by nauseating doses of tartar emetic in combination with opium. If any inflammation be present, the proportion of tartar emetic may be increased. If there be spasm, with nervous irritation, opium and chloric ether may be given largely. By such means the os uteri will be rendered

more dilatable, the pains more regular, and attended with much less suffering.

The patient having been previously brought under the influence of chloroform, which in this case is essential, the *operation* may now be undertaken. The arm being stripped and greased along the back, the fingers in a conical form may be introduced into the vagina, and within the os uteri: there may be still some difficulty in pressing the shoulder back; but by caution in acting only during the intervals of the pains, and with some patience, you will succeed in getting the hand into the cavity of the womb. Great care is now necessary while pressing the hand forward to avoid irritation: the moment a pain comes on, the hand should be kept flat on the body of the child, and advanced only when the uterus relaxes. Take as your motto, "arte non vi," and trust to time, rather than force, for effecting your object. When the foot is reached the remainder of the operation is generally, although not always, easy. Sometimes, however, it is both difficult and fatiguing; difficult to gain and to distinguish the foot, and often requiring great exertion to overcome the resistance of the uterus. The long-continued pressure, also, on the body of the child and the funis, places its life in great hazard; and, therefore, it is extremely doubtful whether the child can be saved.

Our chief attention should be directed to preserve the mother from injury; consequently, when the os uteri is rigid, and slow in dilating, no attempt should be made to turn until the dilatation is somewhat advanced: no effort should be made to force open the os uteri in order to save the child, because it is very probable that you will not only fail in your object, but also do such injury to the uterus as will endanger the life of the mother also.

Mismanagement may cause great difficulty in turning. We have been called to cases where an unsuccessful attempt was made to deliver the child, and the second arm, by mistake, was brought into the pelvis; the presenting shoulder still occupied the brim, where it was so firmly maintained by the uterus that it was impossible to push it back. In such instances a full opiate was given, to allay nervous irritation; and, while the patient was

under its influence, the hand was cautiously introduced into the vagina to the shoulder. Here there was some difficulty in advancing, not only because of the shoulder, but of the arm that was brought down. The arm, however, was pressed back, and thus room was given for the hand to enter the cavity of the uterus. By advancing cautiously in the intervals of the pains, the foot at length was reached. The greatest difficulty, however, still remained. Easy as turning the child generally is, it is particularly difficult in such a case as this. There is very little room, and consequently very little power to act, when the shoulder thus occupies the pelvis: the limb that is seized cannot be drawn down completely, and it is equally impossible to pass the second hand into the vagina, for the purpose of pushing up the shoulder. The only resource, is therefore, to fasten a noose of tape on the ankle of the child, so as to secure it, and draw it down. This is not very easy to accomplish; but, if the foot can be brought into the vagina, a noose may be formed on the arm, and passed along to the foot, either by the disengaged hand or with the instrument for replacing the funis. If the foot cannot be brought out of the cavity of the uterus, the latter means is the only one you can employ. But we have no experience of its use in this way, having never met with a case where the foot could not be brought down at least to the vagina. When the noose is fixed, the assistant can draw the ends tightly, so as to secure the foot. The hand may now be brought down with the foot as far as it will go, and then, the tape being held firmly, one hand may be withdrawn from the uterus, while the opposite passes into the vagina, for the purpose of pushing up the shoulder, and thus turning the child. Some adroitness is required in this manipulation; but if it be done carefully and without violence, you will generally succeed safely. Be cautious also that the tape may not slip from the foot; because, if it do so, you will have to go over the whole process again. From the value of chloroform in allaying the irritability of the patient, and rendering the passages dilatable, it would be also of great use in such a case as this.

Deformity of the pelvis sometimes causes difficulty in delivering

the child. It is not easy to pass the hand through the pelvis; it is equally difficult to seize the foot when the hand and arm are confined in so limited a space; and if you succeed in turning the child, there yet remains the greatest difficulty—the extraction from the pelvis. Great force is often used for this purpose: the body and the shoulders are generally safely delivered, but the head becomes impacted. To remedy this, the fingers are placed, if possible, in the mouth of the child, if not, round the neck in front, while the back of it is seized by the opposite hand, the body perhaps held by an assistant, and a combined and powerful tug made to extricate it. The shock generally destroys the child; the odontoid process of the vertebra dentata is broken off. There is no object in using all this violence, because it cannot accomplish the only purpose that could justify it—the safety of the child; a more patient method will answer the purpose much better. When the head is thus arrested, the first object is to secure the funis, if it is pulsate, from pressure; and in a pelvis of this kind (the ovate pelvis) it may easily be placed at either side of the projecting promontory of the sacrum, which will, to a certain extent, protect it, and thus give time for the extraction of the head, which may often be effected by the hands alone. One hand may be passed up over the face to the forehead, so as to press the head well down on the chest, and the other applied to the neck; if a steady extracting force be then used, renewed at intervals, but without jerking or violence, it will succeed. The vectis may be applied over the forehead in place of the hand, but we do not think it answers so well. If your first efforts fail, do not despair so long as there is circulation in the funis; let the patient rest before a second trial is made to extract, and provided the funis is safe, no injury can arise to the child from leaving the head fixed in the brim for a short time: how often does it remain thus for hours in a difficult labour! During this interval the patient may be given an opiate, or, what we think is better, some chloroform. When she is refreshed by rest, and the passages are relieved from the irritation of your first efforts, you may again attempt to extract as before. If this fail, there is no other resource than to perforate behind the ear or through the mouth,

as soon as the pulsation in the funis ceases; but if the means we have recommended be managed with judgment, you will not, unless in extreme cases, have to perforate.

3. *Turning may be Impracticable or Dangerous.* For instance, the *uterus may be so spasmodically contracted about the body of the child*, that the hand cannot be introduced; a stricture is formed at the junction of the cervix and body of the uterus, which no reasonable effort can overcome, nor any general treatment relax: some other mode of delivery must therefore be adopted. The only practical means is *evisceration;* that is, to perforate the thorax at the axilla, and with the crotchet to remove the contents of both thorax and abdomen; the body being thus reduced, the crotchet can be hooked on the vertebral column close to the pelvis, and the breech and limbs brought down through the stricture. It may be necessary to perforate the head also behind the ear, in order to extract it. There is no operation in midwifery more troublesome to perform, or more disagreeable to look at, than evisceration: we have naturally an instinctive repugnance to tear away the infant piece-meal in this manner; still, in the case supposed, it must be done, there is no alternative, and unpleasant as it is, this operation is much safer, and better calculated to preserve the uterus from injury, than making violent efforts to force the hand into it for the purpose of turning the child. After one or more such unsuccessful attempts, you are compelled to desist, greatly fatigued by the exertion; and the uterus, being so much exposed to irritation from this violence, may afterwards become the seat of serious inflammation.

Inflammation of the uterus, if severe, would render turning impracticable, because one of its effects is softening of the fibrous structure, which may give way when the hand is strongly pressed against it, in the effort to reach the feet of the child: thus the uterus may be ruptured. This has happened more than once without the true cause being assigned; the practitioner may have been blamed for undue violence, but it is far more likely that he was to blame for want of caution in undertaking the operation at all under such unfavourable circumstances. You should therefore be on your guard against a mistake of this kind. If such

inflammation exist, it should be subdued by general antiphlogistic treatment, and the child removed by evisceration.

Inflammation of the uterus seldom occurs in arm-presentations, unless in very neglected cases, when the waters have been long discharged, and the uterus, irritated by its own fruitless efforts, is strongly contracted upon the body of the child. The presenting arm is generally swollen, perhaps putrid, as the child has usually been dead for some time previous: the passages are hot and tender, the uterus very irregular in its shape, and painful to the touch, and the patient in a high state of irritative fever. Even if you succeed in turning the child under such circumstances, no useful object can be gained by it; but when you reflect on the difficulties before you, that success is more than doubtful, that serious injury to the uterus is almost certain, and its laceration a very probable result, you will not venture upon so imprudent an operation. The child can only be removed by evisceration; and as it is frequently putrid, and the bones are very loose, great care is necessary in extracting the head, lest it separate from the spine and remain in the uterus.

Decapitation of the child is still practised in some cases where turning is impracticable. This operation has been performed since the time of Celsus, and now remains as a kind of relic of those mutilations of the child which were had recourse to in order to deliver a cross-birth, before the operation of Ambrose Paré. We confess that we have never met with a case of arm-presentation in which decapitation was indispensable; and, therefore, we may not properly appreciate the difficulties that it is intended to overcome. Under any circumstances with which we have met, it was far easier to perforate the thorax than to decapitate the child; but, even if decapitation were equally easy, it seems liable to objections from which perforation is free. When the head is separated, the body, it is true, may be easily removed; but how is the head to be delivered? If the operation be performed because the pelvis is contracted, its extraction would appear to us a matter of no ordinary difficulty. We cannot readily imagine a case requiring decapitation; but, as it has been performed by men of extensive practical experience with success, it would be

improper to allow these objections to outweigh facts. The late Dr. Davis and Dr. Ramsbotham have both decapitated the child. The late Dr. Ramsbotham invented an instrument for this purpose —a hook, having an internal cutting edge and a long shaft, which was fixed in a wooden handle of the usual length. The manner of using it is thus described by Dr. Ramsbotham:— "The finger having been passed around the neck, a large-sized blunt hook must be introduced upon it, and the presenting part must be brought as low into the pubis, as is consistent with the woman's safety. An assistant must then steady the blunt hook: the decapitator must be directed over the neck by its side; and, the first adapted instrument having been withdrawn, a sawing motion must be given to the cutting-hook by the right hand, while the first finger of the left is kept steadily in contact with its blunt point. It will soon be found that the structures give way, and that the separation is effected. The child's body must then be drawn out by whichever arm may protrude, and the head extracted by a crotchet or blunt hook introduced into the foramen magnum or mouth; nor will its removal *generally* offer much difficulty, *unless the pelvis be contracted in its dimensions.*" (Ramsbotham, p. 371.) Such is the operation, which we may presume presents some little difficulty *when the pelvis is contracted;* and if it be not contracted, and such mutilation be necessary, evisceration is much easier and safer to perform. Both operations are equally to be avoided; but if we are compelled to undertake either, that which is attended with the least risk is to be preferred.

Spontaneous Evolution, or the natural turning of the child, sometimes takes place. It is difficult to conceive it possible that a full-grown child could be forced crosswise through the pelvis; nevertheless, such has happened—children have even been born living in this manner. The natural delivery of a cross-birth was first noticed by Denman, who called it "*spontaneous evolution.*" (Denman, Ed. 8vo. Lond. 1824, 328). "As to the manner" (he observes) "in which this evolution takes place, I presume that, after the long-continued action of the uterus, the body of the child is brought into such a compact state as to receive the full force of every returning action. The body, in its doubled state,

being too large to pass through the pelvis, and the uterus pressing upon its inferior extremities, which are the only parts capable of being moved, they are forced gradually lower, *making room as they are pressed down for some other part in the cavity of the uterus which they have evacuated, until, the body turning as it were on its own axis, the breech of the child is expelled as in an original presentation of that part.*" (Denman, p. 327.) Some time after this explanation had been given, and generally received by the profession, Dr. J. C. Douglas, of Dublin, met with seven instances in which this natural delivery took place, and in none of them did he find anything like a spontaneous evolution of the child. Comparing his own observations with Denman's cases, he found them agree in the facts stated by Denman as to the mode in which the body is forced into the pelvis—"that the shoulder of the child is forced very low in the pelvis, and that the thorax occupied so much of its cavity as to preclude the practicability of the hand of the accoucheur being passed into the uterus for the purpose of turning." (*An Explanation,* etc., of *Spontaneous Evolution*, 3rd. ed. Dublin, 1844, p. 25.) But Dr. Douglas differs completely as to the manner in which the child is expelled, and prefers the term *spontaneous expulsion*, as being more expressive of the facts. He says:—"The fact, however, is, that the shoulder and thorax thus low and impacted, instead of receding into the uterus, are at each successive pain forced still lower, until the ribs of that side correspond with the protruded arm, press on the perinæum, and cause it to assume the same form as it would by the pressure of the forehead in natural labour. At this period, not only the entire of the arm, but the shoulder, can be perceived externally with the clavicle lying under the arch of the pubis. By further uterine contractions, the ribs are forced more forward, appearing at the os externum as the vertex would in natural labour, the clavicle having been by degrees forced round on the anterior part of the pelvis, with the acromion looking towards the mons veneris. But, in order to render as clear as possible the successive movements in this astonishing effort of Nature, I will endeavour to describe still more precisely the situation of the fœtus immediately prior to its expulsion. The entire of it some-

what resembles the larger segment of a circle: the head rests on the pubis internally; the clavicle presses against the pubis externally, with the acromion stretching towards the mons veneris; *the arm and shoulder are entirely protruded*, with one side of the thorax not only appearing at the os externum, but partly without it; the lower part of the same side of the trunk presses on the perinæum, with the breech either in the hollow of the sacrum or at the brim of the pelvis, ready to descend into it, and, by a few further uterine efforts, the remainder of the trunk, with the lower extremities, is expelled.

"And to be still more minutely explanatory in this ultimate stage of the process, I have to state that the breech is not expelled exactly sideways, as the upper part of the trunk had previously been; for, during the presence of that pain by which the evolution is completed, there is a twist made about the centre of the curve of the lumbar vertebræ, when both buttocks, instead of the side of one of them, are thrown against the perinæum, distending it very much; and immediately after, the breech, with the lower extremities, issues forth, the upper and back part of it appearing first, as if the back of the child had originally formed the convex, and its front the concave, side of the curve" (*Douglas, op. cit.* p. 25-27).

This explanation of the natural delivery of shoulder-presentations has been confirmed by Gooch, Ramsbotham, and other practical writers: it coincides also with the facts that have fallen under my own notice; nevertheless, we are inclined to think that spontaneous *evolution*, in the strict sense of the term, sometimes occurs. We have met with cases where the arm presented and occupied the os uteri completely; but afterwards it retreated, and the breech descended in its place. The united testimony of the profession confirms the description of Douglas, which, therefore, may be considered as the manner in which this *spontaneous expulsion* of the child takes place. But, knowing the confidence that may be placed in Denman's fidelity as an author, we are satisfied that spontaneous *evolution* also sometimes happens. We think that it is very likely, when the child is full-grown and living, that the shoulder, in the intervals of the pains, may gradually leave the

pelvis if the body were forced down into it by the action of the uterus. (See Dr. Doherty's case, *Dub. Jour.* vol. xxvii. p. 349; Dr. Copeman's case of back-presentation; Crosse's cases, p. 107). These cases are very rarely met with; but, when they do occur, how are we to manage them? Is it better to interfere, or leave it all to Nature? We were once sent for to see a case of this kind. The gentleman in attendance endeavoured to turn, but could not get his hand into the uterus. A second opinion was sought; we found the arm completely beyond the vulva, and the body of the child pressed into the pelvic cavity, so that the ribs could be plainly felt. It was evidently an attempt at spontaneous expulsion. The left hand was passed carefully between the perinæum and child, towards the breech; and a finger, hooked in the fold of the thigh, brought it down quite easily. The object should be, not to force back the child, but rather to complete what Nature had commenced.

LECTURE XXIV.

COMPLEX LABOUR.—UTERINE HÆMORRHAGE.

THE last division of labours embraces those accidental complications which may occur in the progress of parturition: some of them are extremely dangerous, even fatal, to the mother; the child is frequently sacrificed, and, with one exception, the aid of the accoucheur is always demanded; they form the last exception to Denman's definition of natural labour, and their study is of the highest importance to the practitioner.

COMPLEX PARTURITION includes labours attended with *Hæmorrhage, Convulsions, Rupture of the Uterus, Inversion of the Uterus, Prolapse of the Umbilical Cord, Twins*, etc. Of these complications, the first that we shall consider is *Hæmorrhage*—the first in practical importance—first, because the issues of life and

death are so much in the hands of the practitioner. The best-directed treatment may not save the patient who is attacked by convulsions. In rupture of the uterus the recovery of the patient is recorded as a remarkable exception to the general rule; but when hæmorrhage takes place, her safety depends, in the majority of instances, altogether upon the practical experience and promptitude of the accoucheur. This alone would be a sufficient reason for demanding a careful examination of the subject; but we have an additional and equally powerful motive for asking a patient and impartial attention to it—namely, that while, in a case of so much danger, it is desirable above all things to have rules of practice clear, decided, and intelligible, we find them, unfortunately, so involved in controversial intricacies as to render them obscure, uncertain, and contradictory.

In order to understand the principles of treatment in uterine hæmorrhage, it will be advisable to review, very briefly, the manner in which hæmorrhages take place from other parts of the body, and to point out the principles upon which are founded the different means employed to arrest them. We may compare or contrast the one with the other; and, if they be similar, there can be no difficulty in applying the principles of treatment for general hæmorrhages to floodings from the uterus. But if, as it appears to us, they be different, and in some degree opposed, it is of the utmost importance to observe and remember the essential characters of each, so as to avoid the very common error of employing treatment quite applicable to hæmorrhage produced in one way, to the arrest of hæmorrhage caused in a manner altogether different.

General View of Hæmorrhages.—There are many divisions of non-uterine hæmorrhages; that adopted by Bichat is the simplest, and will best answer the purpose we have in view. Hæmorrhages may arise either from *exhalation*, or from *rupture of a blood-vessel*. The first variety includes such as chiefly fall under the notice of the physician; the second, those hæmorrhages which it is the province of the surgeon to arrest. Either practitioner may meet with both varieties; but the object of this distinction is rather to direct your attention to the medical and

surgical treatment of hæmorrhages, in order to contrast them with the management of floodings at the time of delivery.

Hæmorrhage by Exhalation is most frequently observed on mucous surfaces; and whether the nostrils, the throat, the lungs, the stomach, the intestines, or the bladder be its seat, in all these instances the source of hæmorrhage exists in the minute capillary vessels, which allow red blood to exude from them. Why they do so, it is not our province to inquire; it is sufficient to state, hat vessels, which hitherto resisted its escape, now permit red blood to pass, and that these vessels still maintain themselves apparently unbroken. Hæmorrhages of this kind may be *active* or *passive*; either the result of local congestion in the part affected, or of diminished tone in the vessels, accompanied perhaps with an altered—a more fluid—condition of the blood itself. The former variety will best illustrate the general treatment. Take the simplest and most common example of *active* hæmorrhage by exhalation—hæmorrhage from the pituitary membrane, and observe the symptoms. The bleeding is preceded by symptoms indicating a determination of the circulation towards the part affected—the *molimen hæmorrhagicum* of authors. The pulse is full and bounding; the temporal arteries throb; there may be giddiness or headache, a disposition to sleep, noises in the ears, etc. At the same time that this local plethora exists, the circulation of the general surface and of the lower extremities is just as much below, as that in the head is above, the standard; the patient is therefore chilly, and complains of cold. When hæmorrhage takes place, the circulation is relieved, and these symptoms disappear; but if it continue, they are again renewed—there is an effort on the part of the circulation to supply the loss caused by the hæmorrhage—there is a determination of blood towards its seat, and the symptoms of congestion return. What are the principles of treatment? It is necessary to direct the current of the circulation from the seat of hæmorrhage, and to lessen its force; hence depletion, cold to the affected part, and other such means are employed. It is also requisite to cause the open capillaries to contract, and to promote coagulation of the blood; hence astringents are indicated, whether applied

locally or conveyed through the circulation. Everything that would excite the circulation must be avoided; and, if syncope take place, it is often the most efficient means of arresting the discharge.

Hæmorrhage by Rupture of a Blood-vessel is checked in a manner somewhat different, which is best observed when the arteries of the surface are injured. If an artery be punctured, divided, or lacerated, the effort of nature in the first instance is to coagulate the blood in the injured part. If an artery be divided, the two internal coats of the vessel retract themselves within the outer sheath; the fine cellular tissue, drawn out by this retraction, entangles the current of blood, and an external coagulum is formed, compressing and obstructing the orifice. A conical coagulum is also formed within the artery, and thus the impetus of the blood receives a check; the fibres of the middle coat of the artery contract; lymph is effused at the divided extremity of the vessel; and ultimately the breach is closed. Such is the contrivance of Nature for this purpose; and it would always be successful, only that the current flowing through an artery is so strong as to prevent its accomplishment in the majority of instances: nevertheless, in lacerated arteries, where, from the kind of injury, a more efficient means of coagulation is provided, she often succeeds. The great object of art is, therefore, to control the impetus of the circulation, and to cause the blood to coagulate. This is accomplished by ligature; but if this cannot be applied, strong compression with the tourniquet is used on the main trunk of supply, and coagulation is induced, by styptics locally applied. In this variety of hæmorrhage, syncope is also serviceable.

In this brief outline of general hæmorrhages, you will perceive that both varieties agree in certain common principles of treatment. First, the force of the circulation must be moderated as much as possible. Secondly, the formation of coagula in the mouths of the bleeding vessels must be encouraged, until they are closed by lymph and by the inherent contractile power of their coats. Let us now examine the points of resemblance, or of distinction, between general and uterine hæmorrhages.

Uterine Hæmorrhage.—Uterine hæmorrhage not depending upon gestation may be considered analogous to hæmorrhage by exhalation, and the same principles of treatment are applicable to it. Uterine hæmorrhage at the early months of gestation arises from rupture of some portion of the vascular net-work that ultimately forms the placenta; it may, therefore, be included under the second division of hæmorrhages, and is controlled by coagula, as well as by lessening the force of the circulation, in order that these vessels may more efficiently contract upon themselves. But when flooding occurs at the time of delivery, there are special conditions then only existing, connected with the circulation, which make a very essential difference in the character of the hæmorrhage, and in the manner in which it is controlled.

Dr. William Hunter observed, that "there is no circumstance in which the gravid uterus differs more from the unimpregnated than in the size and termination of its vessels." The uterus, at the period of parturition, is, therefore, very different from its ordinary condition. Let us briefly consider these peculiarities.

1. The womb is enlarged to its greatest extent; all its vessels are proportionately increased; the arteries in connection with the placenta are specially enlarged: and hence vessels carrying red blood appear to be much more numerous where the placenta is attached.

2. The arrangement of the vessels of the uterus is different from that of the arteries and veins in other parts of the body; consequently, the manner in which bleeding from them is arrested is not exactly the same.

3. The circulation going forward in the placenta, although part of the general circulation, must be considered special, at least in its object. The quantity of blood in the uterus at this time is far beyond what is required for the nutrition of that organ. It may be increased or diminished, within certain limits, without disturbing the general circulation. The contracted uterus may be almost emptied of its blood without affecting the pulse; but, if hæmorrhage exceed this point, if the uterus again relax, and

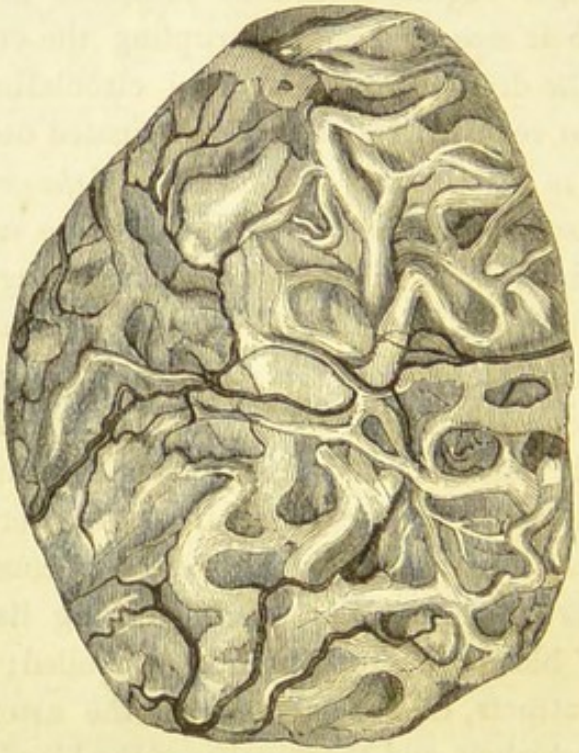
a new demand be made to supply the deficiency, then the circulation is at once reduced to its lowest degree, and the constitution receives a shock proportionate to the magnitude of the demand. The uterine vessels are precisely adapted to meet this condition. When they are completely filled, a very large quantity of blood circulates through them for the nutrition of the fœtus; but when this is no longer required, efficient measures are provided for diminishing their size, and so interrupting the current of blood as to reduce the draught on the general circulation as nearly as possible to that required by the unimpregnated uterus.

Circulation in the Uterus. The *arteries of the gravid uterus* are greatly increased in size, and "all through the substance of the uterus there are infinite numbers of anastomosing arteries, large and small, so that the whole arterial system makes a general net-work, and the arteries are *convoluted* or *serpentine* in their course." (Dr. W. Hunter's *Anatomical Description*, etc., p. 17). A quantity of blood is thus conveyed to and contained within the uterus, larger than could be effected if their course were more direct: these vessels can adapt themselves better to the constantly varying size of the uterus, when in the act of expelling its contents, and the current of blood is more efficiently controlled; because, when the uterus contracts, the spiral coils of the arteries are more twisted on themselves, and the impetus of the blood is diminished. It is possible, also, that the surrounding uterine fibres may so compress the arteries as to interrupt the circulation through them completely, by rendering the points of reflection in the arteries more angular, so as to give them a zig-zag rather than a spiral direction. You perceive, therefore, that by this mechanism the agency of a new power is introduced for the purpose of suppressing hæmorrhage, which is not employed in other arteries.

The *veins of the uterus* (fig. 127) are still more remarkable in the peculiarity of their arrangements, as compared with other veins. Their relative size to the arteries is greater: they are composed of a number of *large, short trunks*, communicating directly with each other, and forming an irregular net-work of vessels like capillaries greatly magnified: *their coats are single*, composed only of the lining membrane of the veins, which is

intimately adherent to the fibrous tissue of the uterus. *They have no valves;* therefore, when the veins are distended, an uninterrupted current of blood flows through them; but, if the surrounding fibres contract, temporary valves are formed, which

Fig. 127.*



break off the communication between these short trunks. *Their course is extremely oblique,* nearly parallel to the surface of the uterus; so that the veins may be described as forming layers or planes of veins freely communicating with each other.

Mr. Owen has made a careful examination of these veins in a portion of the gravid uterus furnished him by Dr. Lee. He "commenced the dissection from the outside, removing successively, and with great care, the layers of fibres, and tracing the veins as they passed deeper and deeper in the substance of the uterus, in their course to the deciduous membrane. Every vein,

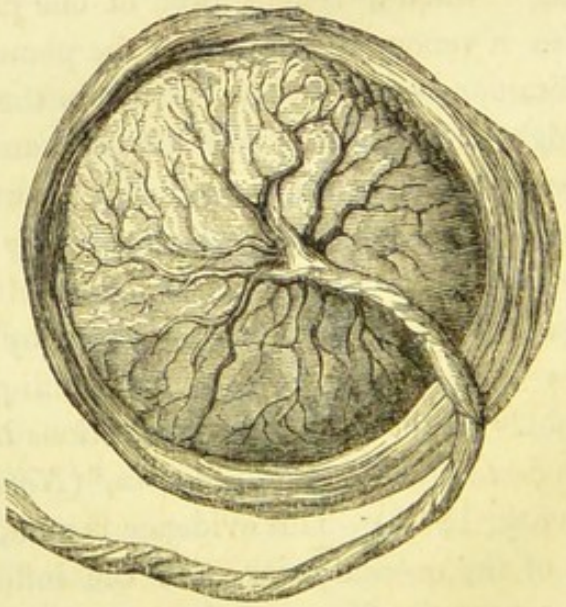
* Fig. 127. Veins of uterus.

when traced to the inner surface of the uterus, appeared to terminate in an open mouth on that aspect: the peripheral portion of the coat of the vein or that next the uterus ending in a *well-defined and smooth semicircular margin*, the central part adhering to, and being continuous with, the decidua. In the course of the dissection I" (Mr. Owen) "observed that, where the veins of different planes communicated with each other in the substance of the walls of the uterus, the central portion of the parietes of the superficial vein invariably projected into the deeper-seated one; and where (as was frequently the case, and especially at the point of termination on the inner surface) two or even three of these wide venous channels communicated with a deeper sinus at the same point, *the semilunar edges decussated each other*, so as to allow only a very small portion of the deep-seated vein to be seen. It need scarcely be observed, how admirably this structure is adapted to insure the arrest of the current of blood through these passages upon the contraction of the muscular fibres with which they are everywhere immediately surrounded." (*John Hunter's Works*, by Palmer, vol. iv., p. 68). Professor Goodsir repeated this dissection, and observed the same appearances (*Anatomical and Pathological Observations*, p. 61). Professor Simpson also made a similar examination, and observed that, "when a venous tube of one plane comes to communicate with a venous tube lying in the plane immediately beneath it, the foramen between them is not in the *sides*, but in the *floor* of the higher and more superficial vein, and the opening itself is of a peculiar construction. Looking down in it from above, we see the canal of the vein below, *partially covered by a semilunar or falciform projection*, formed by the lining membrane of the two venous tubes, as they meet together by a very acute angle—the lower tube always opening very obliquely into the upper. In the folds of these falciform projections *the microscope shows the common contractile tissue of the uterus*," (*Northern Journal of Medicine*, January, 1846.) This evidence is sufficient to prove the arrangement of the uterine veins, and the influence of this new agent—the contractile fibres of the uterus—in controlling any hæmorrhage that may flow from them. When the uterus contracts, these semilunar edges are converted into valves, and

where numerous short trunks intersect each other, the decussation of these valves completely closes the communication between the vessels; but when the uterus is relaxed, there is no interruption to the current of blood through the veins, and therefore the uterus in this state may be compared to a large sponge filled with fluid, while the same sponge strongly compressed and emptied of the fluid will illustrate the effect of uterine contraction. The oblique direction of the veins very much contributes to this effect; because, where two trunks meet at a very acute angle, it requires only a slight contraction of the uterus to produce a valve at the point of junction, and, if the contraction be great, the connection is broken off.

Circulation in the Placenta. As the arteries and veins are much more numerous in the neighbourhood of the placenta, and the chief cause of uterine hæmorrhage is the partial separation of that vascular mass from the surface of the uterus, it will be necessary to examine the connection between both, in order to understand the manner in which the blood circulates through

Fig. 128.*

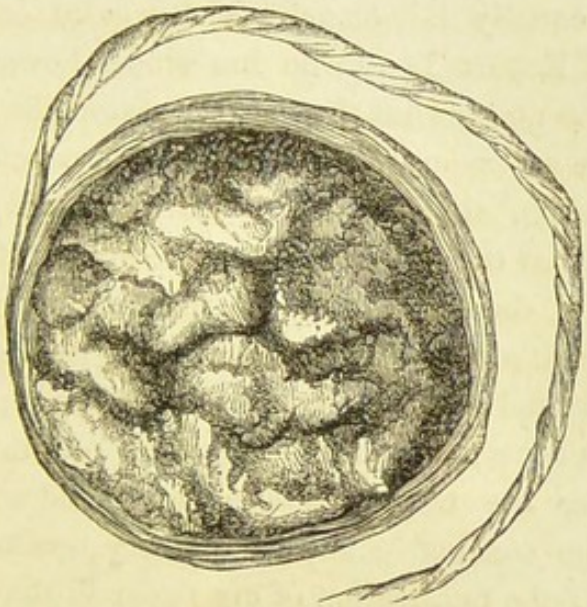


* Fig. 128. Placenta. Fœtal surface.

the placenta, and how this hæmorrhage occurs. This question will require your especial attention, because its demonstration is by no means easy: and hence it seems to be the rock upon which more than one ingenious theory of the causation of hæmorrhage has suffered shipwreck.

If the uterine side of the placenta be examined, you perceive a lobulated surface composed of an immense congeries of fœtal vessels compacted together into cotyledons. This surface is

Fig. 129.*



covered by a delicate membrane, and seems to be so applied to the walls of the uterus as to close the venous openings on its surface, without having any direct connection with them. The placenta may be peeled from the uterus more easily than the rind from an orange: no vessels seem to be broken, and the venous openings are freely exposed by the separation.

The natural inferences from these facts would be, that the placenta belongs altogether to the fœtus; that no maternal blood passes into it; and that any interchange between the blood of the child and the mother takes place only at the surface of the uterus, to which the placenta is applied like a cake of unbaked dough.

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* Fig. 129. Placenta. Uterine surface.

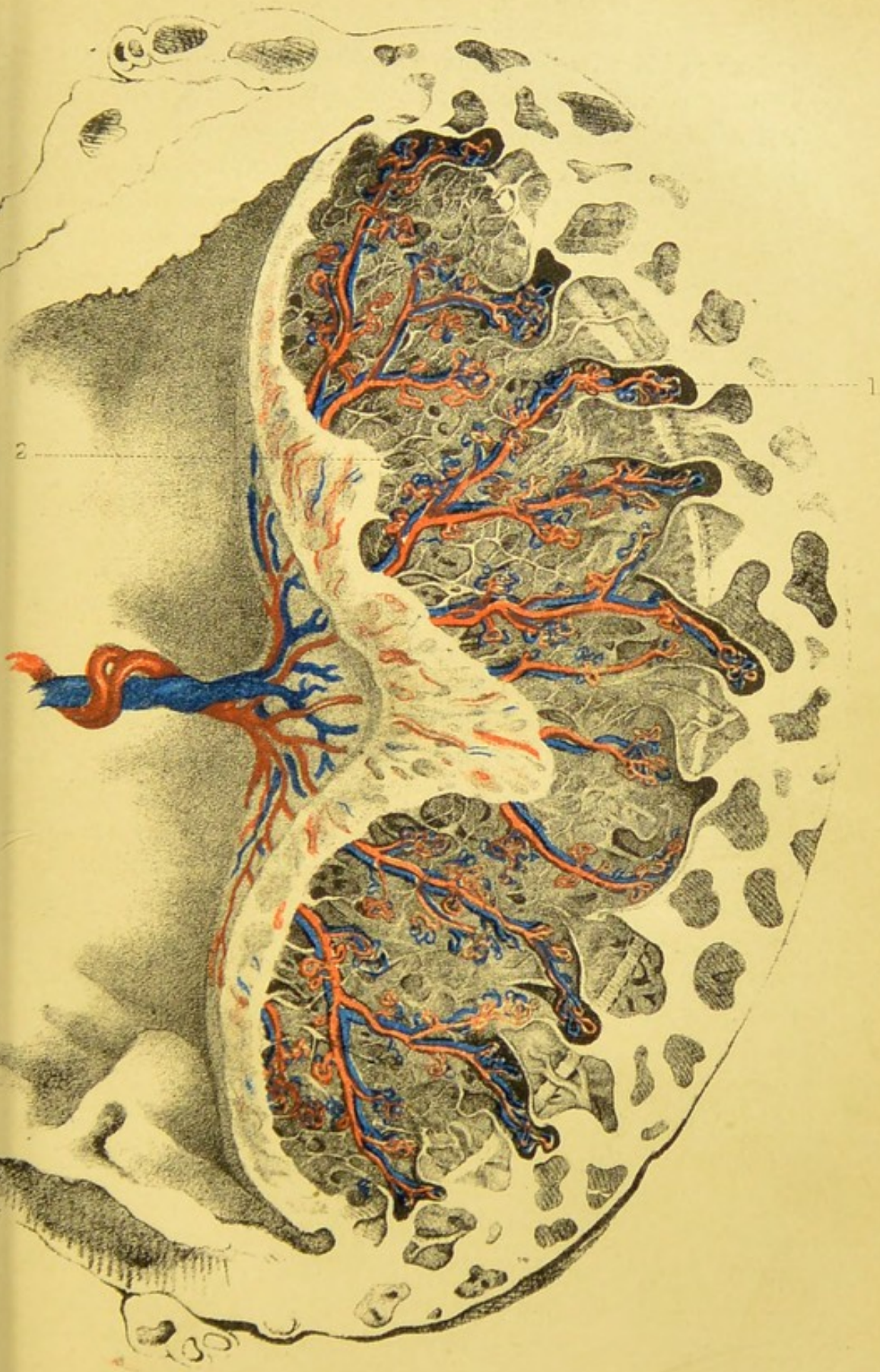
Such had been, and is even still, the opinion of some writers; but its inaccuracy has been clearly proved by observations to which we shall presently refer.

Many years ago, the Hunters demonstrated that vessels passed from the uterus into the placenta, and the beautiful injections left behind them still remain to testify this fact. Since then, several attempts having been made to repeat these injections, but without success, incontrovertible evidence seemed to be afforded in favour of the opinion that the placenta was entirely a fœtal structure. The injections, and the doctrine founded upon them, were considered to be equally fallacious. Such was at one period the opinion of Dr. Robert Lee; who has since, however, admitted his error, and has pointed out the means by which he detected it.

"It would be erroneous," he observes, "to conclude, as I did ten years ago, from similar failures" (in injections) "and other circumstances, that the maternal blood does not enter the cavernous structure of the placenta by the decidual arteries, and flow back by the decidual veins into the venous system of the uterus, as first demonstrated by John Hunter . . . The repeated examination of the uterus and placenta in their natural state, under water, and when the uterine vessels were filled with injection, having led to no conclusive and satisfactory results, it occurred to me soon after the publication of my paper in the *Philosophical Transactions*, in 1832, that the most likely means of discovering the real connection of these parts would be to examine the placenta when the vessels of the uterus were filled with their own blood and coagulated. . . . . I was able to satisfy myself and Mr. Lawrence, who was present at the examination, that coagula of the maternal blood extended from some of the openings in the lining membrane of the uterus into canals formed by the deciduous membrane on the margin of the placenta."*

John Hunter found that he could not trace either arteries or veins distinctly as vessels beyond the surface of the uterus, but

* See Appendix.



and. Lith.

1. *Fœtal Vessels.*
2. *Reticulate structure*

DIAGRAM VIEW OF PLACENTAL VESSELS.

from a drawing by Mr Tuson

Printed by M. & N. Hanhart.

that they then entered into a structure which he compared to the corpus cavernosum penis. Professor Goodsir, the latest observer, finds the same appearances. Making a dissection of the uterus in the manner of Mr. Owen, he says:—"In my progress I occasionally found that, when the probe was pushed along an unopened vein, its point appeared at another opening; and as I approached the internal surface of the wall of the uterus, these anastomoses of the veins became more numerous, the spaces which they inclosed presenting the appearance of narrow flat bands. At last, in introducing the probe under the falciform edges of the venous orifices, it was found to have arrived at the placental tufts, which could be seen by raising the falciform edges. *Having passed over the falciform edges, the venous membrane suddenly passed on each side to the great cavity of the placenta.* The flat bands which I have just described as the spaces inclosed by anastomosing venous sinuses became smaller, and *on entering the cavity itself, the bands were seen to have assumed the appearance of threads,* which passed in great numbers from the vascular edges of the venous opening, and from the walls of the cavity of the placenta, on to the extremities and sides of the villi and tufts of the placenta. The whole mass of spongy substance, that is, the whole mass of tufts, were in this manner perceived to be attached by innumerable threads of venous membrane to that surface of the parietal decidua of the placenta which was covered by the venous membrane. On proceeding deeper into the substance of the placenta, I perceived that, throughout its whole extent, villus was connected with villus, and tuft with tuft, by similar threads of venous membrane." (*Op. cit.* p. 61).

These reticulate threads form the cavernous structure of John Hunter: thus you perceive that the first and the last inquirers into this subject are nearly agreed in their description. Professor Goodsir has used a very happy expression, "the great cavity of the placenta"—a cavity, it is true, filled up by the aggregate tufts of fœtal vessels, just as the great cavity of the peritonæum seems filled up with viscera and intestines, but which cavity, nevertheless, exists. Into this cavity the maternal blood is poured by the curling uterine arteries, and from it the blood

returns into the uterine veins; no fœtal blood enters into it. But to place the relation of the maternal and fœtal vessels in a clearer light, we shall quote Weber's description of their arrangement. He says:—

"The whole placenta, and therefore every individual lobule entering into its structure, consists of two distinct parts; the one a continuation of the chorion and vessels of the embryo, the other a continuation of the membrana decidua and vessels of the uterus. From the chorion, for instance, dendritic processes or elongations are sent out, which, in small ova about a month old, are seen so small and simple, that they are called villi, but which grow by and by into large and numerously divided stems and branches. Into each of these dendritic processes of the chorion there penetrate a branch of the umbilical artery and a branch of the umbilical vein. Both vessels divide into branches, in the same manner as the processes of the chorion in which they run. Each particular trunk, with its divarications of the shaggy chorion, forms a lobe or lobule of the placenta, which is covered by the tunica decidua. To this investment many of the terminal branches of the chorion will be found to have grown. It is in the spaces between the divarications of the chorion that those vessels run which transmit the blood of the mother, and which are prolongations of the uterine arteries and veins: they penetrate in this way even to the most minute lobule of the chorion. The object of this structure seems to be, that the minute, convoluted, greatly elongated, and *extremely thin-walled capillaries* in which the blood of the fœtus is circulating, may be brought into the most intimate contact possible with the larger, but everywhere *excessively thin-walled canals*, in which the blood of the mother is flowing, that the two currents, without interfering with each other's motion, may pass each other to as great an extent as may be, with nothing interposed but the delicate parietes of each set of vessels. *The uterine arteries and veins, once they have entered the spongy substance of the placenta, do not further divide into branches and twigs, but immediately terminate in a net-work of vessels*, the canals of which are of far too large diameter to permit them to be spoken of as capillaries, and

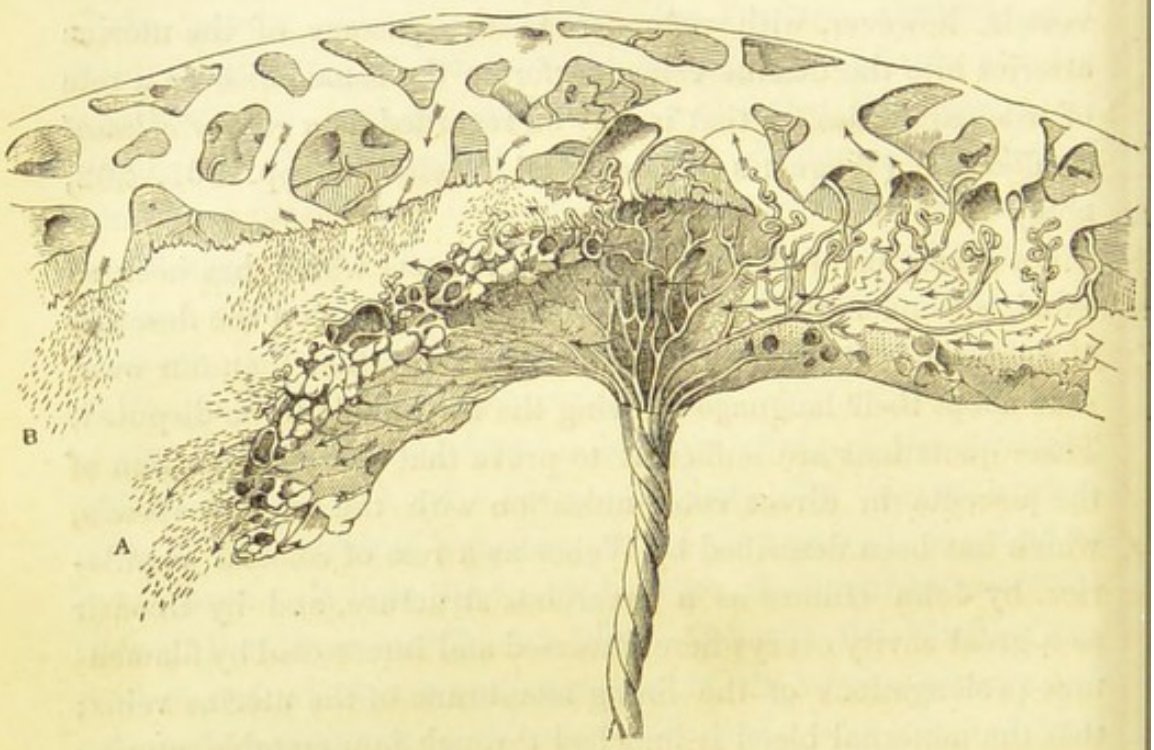
of which the parietes are so thin, that they cannot be shewn apart by the most careful dissection. This vascular rete which connects the uterine arteries and veins with each other, completely fills the spaces between the branched divisions of the chorion, and the extremely thin parietes of the canals of which it is composed insinuate themselves at all points into the most intimate contact with the branches and convoluted masses of the capillaries of the umbilical system of vessels. This net-work of vessels, however, with reference to the passage of the uterine arteries into the uterine veins, performs the same office as a rete of true capillaries, so that it may be regarded as *a rete of colossal capillaries.*" (Wagner's *Elements of Physiology*, pp. 201, 202, note).

On a question of so much difficulty, and one which has been so much misunderstood, we have preferred to give you the descriptions of the best and most careful observers, rather than our own, —to adopt their language as being the least likely to be disputed. These quotations are sufficient to prove that there is a portion of the placenta in direct communication with the uterine vessels, which has been described by Weber as a rete of colossal capillaries, by John Hunter as a cavernous structure, and by Goodsir as a great cavity everywhere traversed and intersected by filamentous prolongations of the lining membrane of the uterine veins; that the maternal blood is impelled through innumerable uterine arteries into the great cavernous cavity of the placenta, and, having supplied the necessary nutriment to the fœtal blood, flows back through the large oblique canals that communicate with, or are part of, the uterine veins; that these venous canals and the cavernous structure are composed of a tissue of extreme delicacy; and lastly, that there is no direct communication between this maternal circulation of the placenta and that going forward in the fœtus. What, then, would be the effect if this vascular connection between the placenta and uterus were broken through?

Partial Separation of the Placenta. From the nature of this injury, the torn curling arteries might not pour out much blood (See Appendix). Any hæmorrhage must arise chiefly from the

broken veins, and not, recollect, from one, but *from both* of the divided extremities. There are thus two sources from which blood escapes: 1. The openings that communicate with the network of colossal capillaries, by which the cavernous structure is emptied of maternal blood, to be again filled by the uterine arteries. This may therefore be considered as arterial hæmorrhage of the uterus

Fig. 130.*



through the placenta. 2. The venous orifices on the surface of the uterus. The maternal blood flows from both extremities of the divided veins; in the former instance in a direct current from the uterine arteries through the cavernous structure; in the latter by regurgitation from the veins of the uterus. You can understand, therefore, not only the possibility but the certainty of the fact which the late Dr. Hamilton stated many years ago, —which Professor Simpson has since with so much ability con-

* Fig. 130. Diagram sketch to represent the sources of hæmorrhage from placenta and uterus. A. Arterial current through placenta. B. Venous reflex current from uterine sinuses.

firmed, but which still remains an enigma to perplex some writers on the subject—that, when the placenta is partially detached from the uterus, blood flows from its denuded surface, and the exposed uterine veins (or sinuses, as they are called), are not the only sources of uterine hæmorrhage. When the placenta is completely separated from the uterus, and its connection with these arteries broken off, you can also perceive that blood will no longer flow from the surface; and the only blood that can then be expressed from it, is the residue lodged in the cavernous structure of the placenta.

Natural Provisions to Check Hæmorrhage from Partial Separation of the Placenta. The arterial discharge through the cavity of the placenta can only be controlled by coagulation of blood in the cells of its cavernous structure. This is greatly promoted by the nature of this structure, as well as by the slow progress of the circulation through it. The spiral course of the arteries lessens the impetus of the circulation; and when their tortuosity is increased by the contraction of the womb, the current of blood is arrested, and coagulation takes place. The contraction of the uterine fibres exerts a still more important influence in arresting any discharge from the exposed veins; because, as is evident from their anatomical relations, the connection between the veins is broken off by temporary valves, the flattened trunks are compressed, and regurgitation of the blood is prevented. The importance, nay the necessity, of this new agent, to prevent the occurrence of hæmorrhage from the uterus, is, we trust, sufficiently obvious.

Hæmorrhage after Complete Detachment of the Placenta. Hitherto we have directed your attention to the effect of a partial separation of the placenta from the uterus, which is the most common cause of hæmorrhage before the birth of the child. Let us now observe the results of its complete detachment, such as takes place after the birth of the child, whether it be retained in the cavity of the womb, or be expelled from it. If hæmorrhage should then arise, the chief source of the discharge is the venous openings of the uterus. The slender lacerated arteries are not likely to produce the violent flooding sometimes observed; nor

can we direct you to any other means of preventing it than by securing an efficient contraction of the uterus. But it has been objected to this principle—and the difficulty occurred to the acute mind of Gooch (*Account of some of the more important Diseases of Women*, p. 832)—that you may have relaxation of the uterus without any hæmorrhage, and conversely a profuse flooding while the uterus is firmly contracted. It is necessary to consider how this may be, and how far it interferes with what has been laid down. It appears, then, that hæmorrhage must be the result of a *complete relaxation of the uterus*. But there are many reasons why hæmorrhage may not occur when the uterus is *partially relaxed* —a very common condition after the birth of the child. For instance, you will frequently meet with cases where, after delivery, the placenta lies loosely in the cavity of the uterus, which may be large, imperfectly contracted, in that state most commonly called "relaxed," and yet no hæmorrhage follows from it. If the fundus be firmly compressed, and its regular and efficient contraction be secured, the placenta is expelled along with a greater or less quantity of coagulated blood. Why does not hæmorrhage take place?

First. Because the uterus is not *perfectly relaxed*. A slight contraction of the uterus is sufficient to raise the falciform valves, and thus partially, but not completely, to close the communication between the different venous trunks. The regurgitation of blood is at least retarded, although not altogether prevented.

Secondly. The current of the uterine circulation is altered, both in direction and in force. The arterial blood is no longer drawn towards the cavernous structure in the placenta, but flows into the intercommunicating branches in the parietes of the uterus. The current of the venous blood is directed much more rapidly towards the great central trunks of the abdomen, because these vessels are now relieved from the pressure of the gravid uterus, and, by their expansion, the venous blood is drawn more strongly from the terminal branches towards the central canals.

Thirdly. The venous openings on the surface of the uterus are not at all freely exposed: on the contrary, they are often filled up and covered by fragments of the deciduous membrane, by broken

tufts of fœtal vessels, and by small coagula resting within them, and acting as plugs, which, it appears to us, would be quite adequate to prevent the escape of blood when the circulation is not directed strongly towards the uterine surface.

Hæmorrhage is not, therefore, the necessary consequence of this partial relaxation of the uterus after labour: something more is required to cause regurgitation of the blood to the amount of serious flooding. We know, from the coagula expelled, that some regurgitation always takes place; but, so long as they do not become causes of irritation, they are not accompanied by flooding.

Causes of Hæmorrhage from Contracted Uterus. Let us now examine the converse proposition. It sometimes happens that, when the uterus is strongly contracted, flooding takes place. We cannot perceive the difficulty which this fact seems to present. Is relaxation of the uterus the *only cause* of hæmorrhage? or are there other causes which may produce it? We shall mention a few: there may be more.

Fragments of the placenta are frequently left behind in the uterus, which afterwards separate without any hæmorrhage occurring. But this does not always happen. One of the few fatal cases of uterine hæmorrhage that have fallen under our notice depended on this cause. A woman had been safely delivered; the placenta was expelled into the vagina, and partly protruded through the vulva; the attending midwife removed it too forcibly; hæmorrhage followed. When we saw the patient, the placenta was taken away, and had not been examined. The uterus was firmly contracted to its usual size after delivery: nevertheless, blood continued to drain from the vagina, and ultimately increased to flooding. In spite of every means that was used, exhaustion and death took place. One means was, however, omitted, in consequence of the contraction of the uterus: the hand was not passed within its cavity, which the sequel proved to be an unfortunate omission. A small portion of the placenta, of about the size of a crown, was attached to the back of the uterus near the cervix.

Slight lacerations of the uterus frequently occur, and these sometimes cause hæmorrhage, although the uterus is contracted.

Dr. Rigby quotes Naegele's experience of this source of flooding, as the result of a practice which we shall have again to consider. "Cases" (of placental presentation) "have occurred, where the child was turned and delivered with perfect safety, and the uterus contracted into a hard ball: in fact, everything seemed to have passed over favourably; a continued dribbling of blood had remained after labour, which resisted every attempt to check it: friction upon the abdomen, and other means for stopping hæmorrhage, by inducing firm contraction of the uterus, were of no use, for the uterus *was already hard and well contracted:* the patient had gradually become exhausted, and at last died. On examination after death, Professor Naegele has invariably found the os uteri more or less torn." (Rigby's *Midwifery*, p. 259). In the case quoted by Gooch, there was an unusual excitement in the general circulation previous to labour, which he assigns as the cause of the hæmorrhage.

Morbid growths also, either from the surface or in the parietes of the uterus—*intra-uterine polypi*, for instance—may maintain hæmorrhage when the uterus is contracted.

But are these exceptions—and, we think, rare exceptions—to a general rule, to be considered sufficient to overturn a principle that has been founded on such clear anatomical evidence, and has been proved by daily, almost hourly, experience? Are we to say that, because hæmorrhage does not always depend upon relaxation of the uterine fibres, their contraction is a matter of no importance? If we were to lay down such a proposition, we should lead you into an error that the first case of hæmorrhage with which you might meet would expose; where you would find that flooding continued while the uterus was relaxed, and that it ceased the moment the hands were placed firmly on the fundus to secure its uniform and complete contraction.

Reciprocity of Uterine Atony and Hæmorrhage. We have stated to you that relaxation of the uterus is not the only cause of hæmorrhage, neither is hæmorrhage the only cause of its relaxation. Atony of the uterus may arise from constitutional debility, prolonged labour, and other causes beside hæmorrhage; and, therefore, you can perceive why in such instances flooding

may be increased by this weakened condition of the uterus, and a reciprocal effect produced; want of tone in the uterus causing hæmorrhage, and hæmorrhage increasing the atonic condition of the womb.

We trust, then, that we have succeeded in proving—

1. That the anatomical relations of the uterine arteries and veins to the contractile tissue of the uterus are such, that the circulation through these vessels can only be controlled by the contraction of its fibres; and that every provision is made to render even *slight* contractions of the uterus a means of moderating the force of the uterine circulation, and preventing a regurgitation of blood.

2. That the mode of controlling and arresting uterine hæmorrhage differs in this respect from that employed in general hæmorrhages; because, while bleeding from the general circulation is controlled by a power inherent in the vessels themselves and independent of the surrounding tissues, in uterine hæmorrhage it is the reverse.

3. That it is quite possible that the uterus may expand without hæmorrhage taking place; and conversely, that there may be flooding when the uterus is contracted; but those exceptions do not invalidate the general principle, *that contraction of the uterine fibres is the essential means of arresting uterine hæmorrhage.*

LECTURE XXV.

UTERINE HÆMORRHAGE (*continued*).

Influence of the Nervous System on the Uterine Circulation. We have explained the means provided by Nature to prevent hæmorrhage from the uterus: they present an illustration of mechanical contrivance equally interesting with that observed in

natural labour; but, beautiful as is the adaptation of mechanical principles to the purpose they are designed to accomplish, I cannot permit you to look on the uterus as being in this respect a piece of mere mechanism. The womb is a vital machine, and all this ingenuity of contrivance is subordinate to, and governed by, the vital principle that regulates its movements. Unless we observe the influence of this power, and understand the importance of preserving its integrity, we shall fail in comprehending in their full extent the principles on which the correct treatment of uterine hæmorrhage is founded. We have now to examine the uterus as a living organ, and to consider the influence of the nervous system in aiding or preventing the efficiency of that mechanism to which we have alluded. Such is the direct relation between nervous power and muscular contraction, that a deficiency of one necessarily leads to an imperfection or absence of the other; and consequently, if the nerve-force be weak, the uterus will not sufficiently contract, and hæmorrhage must be the result.

The connection also between the nervous and circulating systems is, if possible, still more intimate. The blush that suffuses the cheek, the syncope resulting from the shock of unexpected intelligence—are so many evidences to prove the influence of the nervous system over the circulation. Shame will cause a blush: shame will also excite uterine hæmorrhage. A remarkable example of the certainty of this fact has been stated to us by our friend Mr. Forbes, with whose permission we will relate it.

A patient of his was taken in labour, August 28th, 1845, and delivered on the 29th, after seventeen hours' labour, of a living male child. The placenta separated without hæmorrhage, and everything went on well until September 8th, ten days after delivery. At that period, the uterus was reduced to its usual size: the woman had been sitting up for two days, without any inconvenience or alteration in the lochial discharge. On the morning of the 8th a most violent flooding took place, accompanied by extreme exhaustion, from which the patient was recovered with the utmost difficulty. A difficulty quite as great was to ascertain the cause of the flooding—so violent, and occurring so long after

delivery. It was revealed by mere accident. It appeared that early on the same morning a former lover made his appearance at this most inappropriate time: the surprise of both can be conceived; but the effect of the violent mental shock on this patient was the hæmorrhage that followed.

Influence of Uterine Hæmorrhage on the Nervous System. The preceding case, we trust, sufficiently proves the influence of the nervous system over the uterine circulation. This influence is perfectly reciprocal: we find that one of the first effects produced by flooding is a *diminution of nerve-force*, and consequently a tendency in the uterus to relax. Another effect is *increased excitement both in the nervous and circulating systems:* the patient is more watchful and restless, the action of the heart more hurried, and the circulation again directed towards the cavity of the uterus. Hæmorrhage is therefore increased; but you must not attribute this effect solely to relaxation of the uterus. Here, as elsewhere, there is a *molimen hæmorrhagicum;* congestion takes place, and (as it appears to me) the uterine arteries pour out quite as much blood as regurgitates from the veins.

A third, and the most fatal, effect of hæmorrhage is a total *loss of nervous power*, by which the uterus is completely relaxed, flooding is uncontrolled, and convulsions, the precursor of death, give a fatal evidence of the shock to the nervous centres. If you observe the symptoms that accompany uterine hæmorrhage, you can easily trace them to this cause, and you will find that they indicate these changes in nervous influence. Take, for instance, a case of *post partum* hæmorrhage: flooding may commence with only a slight draining from the uterus, or perhaps coagula may form in its cavity; no impression is as yet made on the nerves; presently the uterus loses its firmness, and feels spongy, or rather like dough; the bleeding increases. In consequence of this partial relaxation, the nervous system is excited; the pulse becomes rapid, and assumes the hæmorrhagic character; the patient grows restless, sighs frequently, or yawns, and is anxious for air; and then often comes the frightful deluge that places her at once in the grasp of death. A prolonged syncope is succeeded by increased restlessness, amounting to jactitation; respiration

becomes extremely laboured; retching, blowing of the cheeks, and convulsions of all the voluntary muscles, with atony of the uterus, prove the complete loss of nervous power, and close the scene.

In all this train of symptoms, the gradually increasing excitement and subsequent depression of the nervous system may be observed; and hence the necessity of strict attention to remedy this condition in any plan of treatment that is adopted.

Treatment of Uterine Hæmorrhage. From these general observations you will perceive that, in the mode of arrest, uterine hæmorrhage differs essentially from hæmorrhage in other parts of the body. In the latter case, as we have shown, the exposed vessels have inherent provisions for retarding the escape of blood. In the uterus, the arrest depends altogether upon its contractile tissue; and hence, as in general hæmorrhage one of the greatest objects of treatment is to cause contraction in the coats of the vessels themselves, so in flooding from the uterus the chief effort is to excite and to maintain the contractility of the uterine fibres. In consequence of this intimate connection between the vessels of the uterus and its muscular fibres—the absolute dependence of the former on the latter—it is essential in the treatment of floodings to pay much more attention to causes that impair muscular contractility, than is required in the treatment of other hæmorrhages. The nervous energy of the uterus must be preserved; and for this purpose a line of treatment is called for that would be quite inapplicable in general hæmorrhage.

In order to illustrate this principle, we shall direct attention to the different agents and therapeutic remedies employed—first pointing out those that are applicable to general hæmorrhage, and then contrasting them with such as control flooding from the uterus.

Syncope is a natural provision to relieve a bleeding vessel from the momentum of blood propelled into it by the heart: it is therefore a very efficient means, in general hæmorrhage, of promoting coagulation of blood, of causing contraction in the coats of the vessel, and, therefore, of arresting the discharge; but, in floodings, syncope is frequently a most dangerous symptom;

fainting is much more prolonged in the latter than in the former instance, and sometimes the patient never recovers from it. Syncope will not cause the uterus to contract; and the only useful effect it can produce in uterine hæmorrhage is, by suspending the heart's action, to give a temporary check to the discharge which returns instantly with the pulse. The danger of syncope in uterine hæmorrhage is its duration; the heart may cease to act altogether: we are therefore often obliged to use stimulants to prevent this, and to restore the circulation.

Coagulation of Blood is the chief agent by which, as we have already explained, Nature closes a wounded vessel, and prevents effusion of blood. Its efficiency in lacerated arteries is frequently evident; but, in flooding, coagula have no such effect: they are washed away with the torrent of blood that gushes from the womb when it loses its contractile power—nay, they may increase hæmorrhage, and convert a slight draining into a serious flooding. For instance, a small coagulum may form in the cavity of the uterus, and gradually increase; the uterus becomes irritated by the distension of its parietes, and renews its action: its contraction is followed by relaxation of the uterine fibres, and an increase of the discharge; the uterus still further expands, till at length its cavity is filled by an enormous mass of coagulated blood, attended with the most aggravated symptoms of exhaustion in the patient. The beneficial effects of coagula are observed when they are subordinate to uterine contraction: they then close the venous openings on the surface of the uterus, and prevent the slight regurgitation of blood which may take place: hæmorrhage from the uterine arteries is also prevented by this means.

You perceive, therefore, that these natural means for controlling non-uterine hæmorrhage may have the most opposite effect upon uterine flooding. The same contrast may be observed in therapeutic remedies.

Depletion is frequently employed in general hæmorrhage—for instance, in epistaxis—because, the impetus of an over-excited circulation being diminished, coagulation readily takes place in

the open vessels, and their coats more easily contract. Is such the effect in uterine hæmorrhage? We admit that there are certain cases, in which women of a plethoric habit and impetuous circulation require depletion to *prevent* hæmorrhage, and who will even bear the loss of blood in this way after it takes place; but if you reflect on what has been already stated, you will perceive that in uterine hæmorrhage, such as usually occurs at the period of delivery, depletion can accomplish no such purpose: on the contrary, it may be highly injurious to the patient, because, when a large demand has been already made by the uterus on the circulation, if it be still further reduced by a loss of this kind, the power of the nervous system will be diminished in the same proportion, and the energy of the uterus may be so impaired that uterine contractility is destroyed. The judicious practitioner, therefore, never employs depletion to arrest flooding from the uterus.

Cold is another agent of great utility in all hæmorrhages; nevertheless, it is necessary to exercise some discretion in employing it in floodings. In other hæmorrhages, the refrigerating effect of cold is serviceable, because it both checks the activity of the local and moderates the force of the general circulation; consequently it aids very much in promoting coagulation and constringing the bleeding vessels. The effect, however, is by no means the same in uterine hæmorrhage: local refrigeration is useful; but, if cold be employed generally, and the circulation be lowered by it, the danger of the case may be greatly increased. Judging from some opportunities we have had of witnessing this effect, we look upon general refrigeration with great apprehension; the circulation may never recover itself: but if, on the contrary, the chilling effect be confined to the uterus alone, while the circulation is supported, it becomes very efficient. Cold may be employed, also, on another principle—as a stimulant to the uterus: in this way its beneficial effect is most remarkable. The contractile power of the uterus is often so impaired by severe flooding, that it is extremely difficult to excite its action. In such cases, a stream of cold water poured from a height on the abdomen over the uterus, or injected into its cavity from the

vagina, will stimulate it to contract; but, even when it is employed in this manner, a strict attention must be given to support the action of the heart. This principle did not escape the attention of the observant Gooch. He mentions the case of a lady whom he attended, in whom, both before and at the time of labour, the force of the circulation was very great: "she was flushed and had a quick pulse." After delivery she had a most violent flooding; and Gooch remarks that, "After the violence of the hæmorrhage was over, although the abdomen was covered with pounded ice, it returned again and again, slightly in degree, yet sufficiently, in the debilitated state of the patient, to produce alarming occurrences of faintness; the uterus, too, which had become firm and distinct, became so soft it could no longer be felt. . . . . Finding the ice so insufficient I swept it off, and, taking a ewer of cold water, I let its contents fall from a height of several feet upon the belly: the effect was instantaneous: the uterus, which the moment before had been so soft and indistinct as not to be felt within the abdomen, became small and hard, the bleeding stopped, and the faintness ceased—a striking proof of this important principle, that cold applied with a shock is a more powerful means of producing contraction of the uterus than a greater degree of cold without the shock." (*Op. cit.* pp. 338—339). We might also add, that this case is an equally powerful evidence of the importance of uterine contraction in checking hæmorrhage.

Astringents and *Styptics*, which are so useful in hæmorrhage by exhalation, have little power in floodings. The mineral acids, acetate of lead, and such like remedies, are almost useless; neither can caustics be beneficially applied: we shall not, therefore, dwell upon them, but proceed to the consideration of those medicines and other remedies that are essentially required in floodings, some of which are quite inapplicable in general hæmorrhages.

Stimulants are almost indispensable in uterine floodings; they would be most mischievous in general hæmorrhage. Why is it so? It is necessary to call to mind the principle which we have endeavoured to prove, and to impress upon your attention—viz.,

that flooding can only be efficiently controlled by contraction of the uterine fibres. Assuming the truth of this proposition, it follows, that a most essential point of practice must be to maintain the contractility of those fibres: now nothing so much impairs this contractile power as extreme loss of blood, because the nerve-force of the uterus becomes exhausted in proportion as the general circulation is reduced, and its relaxation is consequently increased. The quantity of blood impelled by the heart may be only just sufficient to support feebly the vital functions, the attention of the nervous system (to use figurative language) is directed entirely to maintain the efficiency of those functions, and its influence over those which are more distant and secondary gradually disappears: muscular contractility is, therefore, impaired. In order to correct this condition, it is necessary to stimulate by artificial means the action of the heart, so that it may carry on the circulation; and hence the use of stimulants. With this object in view, it is essential to preserve the temperature of the extremities; in fact, to use every means in your power to make the small quantity of blood circulating through the system answer the purpose required of it.

While efforts are thus made to maintain the general circulation, it is no less necessary to supply the deficient nervous energy of the uterus; hence *stimulants are used locally* to excite uterine contraction, and of these, such as act most directly on the nerves of the uterus are always the most efficient. When cold excites a shock; when the introduction of the hand into the uterus causes irritation of its nerves; when an electric current is passed through the uterus—in all these cases, contraction of the uterus follows, provided that the action of the heart is maintained.

Opium is another remedy of essential value in uterine hæmorrhage, but one whose agency seems to me to be much misunderstood: it is chiefly viewed as a sedative, and its use is shunned lest it may prevent contraction of the uterus. The paradox has been proposed, How can opium cause the uterus to contract in hæmorrhages, and to relax in other cases; for instance, when given for this purpose in arm-presentations? The same medicine

cannot produce opposite effects on the same structure. In this query, the condition of the nervous system, a most essential element, is totally overlooked; and the influence of opium, when nervous irritability is almost exhausted, is compared with its effects when the same power is excited to the greatest degree. It is assumed that the operation of opium must be the same when the uterus has lost all power to contract, and when it is contracted spasmodically. The question, therefore, may easily be answered by stating that opium is both a stimulant and a sedative; and that one effect or the other is produced, according to the relation existing between the nervous energy of the uterus, and the dose of the medicine given. If nervous irritability be not impaired, or if it be increased, a very small dose of opium will stimulate, while a larger one will exhibit its sedative effects; but if, on the contrary, that irritability be destroyed, and the uterus atonic, the same large dose will only act as a stimulant, nor will the sedative property of the medicine be observed until nervous energy is restored.

The truth of this fact we have frequently observed in cases of extreme flooding. The usual dose (ɱ xxx.) of tincture of opium has been repeated again and again, before any effect was observed either on the uterus or on the patient. As soon, however, as the nerves were roused to activity, then the uterus began to obey the stimuli employed for its contraction; the pulse to return; the respiration to become more easy; the restlessness of the patient less. And, in proportion as nervous influence was established, the sedative effect of the medicine became manifest: thus a sound and tranquil sleep, even for a short time, was the most certain evidence that the contractility of the uterus had returned, and was the most favourable symptom of the patient's safety.

In the use of opium, therefore, strict attention should be paid to the degree of hæmorrhage, and to its effect on uterine contractility. When the loss of blood is slight, or at least not sufficient to impair the tone of the uterus, a large dose of opium would be dangerous, lest it might act as a sedative, overcome the influence of the nerves, and cause the uterus to relax. When the

loss is great, and followed by exhaustion of the uterus, then the very same quantity of the medicine will produce an opposite effect: it will act as a stimulant, and cause contraction of the uterus.

Ergot of Rye is perhaps the most popular remedy in uterine hæmorrhage, because it is a specific stimulant of the uterus, and excites contraction of its fibres. Its popularity, however, has led to a very indiscriminate use of the medicine; and, though often successful, it just as frequently has failed in its effect. A great deal of this uncertainty is attributable, it is true, to the varying quality of the drug; no medicine is of more doubtful efficacy: but we think that its failure in extreme floodings arises, in many cases, from a misapplication of it. It is given as a specific when it is impossible that any specific effect could be produced. In order to excite the action of this, or of any other medicine, the nervous system should be capable of conveying the necessary impressions; but when this is not the case, secale cornutum cannot stimulate the uterus; nevertheless, if it regain its irritability, or if ergot be given before the uterus has lost its tone, in either case its efficacy is undoubted, and it may be usefully employed. Assuming this explanation as true, ergot of rye may be contrasted with opium. When the nerves of the uterus have lost their natural irritability, and the uterus is in a state of atony, opium is the most efficient excitant to its action, because it then acts upon these nerves as a most powerful stimulant; but when that irritability is restored, or if it be only slightly impaired, it acts as a sedative, and may paralyse the uterus. Ergot of rye, on the contrary, is quite inefficient in nervous exhaustion of the uterus; because, so far from acting as a stimulant, it seems to have a sedative effect (at least upon the heart), while its specific action is obvious the moment that exhaustion is removed. Opium is therefore of the highest value in saving a patient from the consequences of extreme flooding; ergot of rye, in preventing such hæmorrhage from taking place. Both remedies may be used in the same case; but one can never supply the place of the other.

The explanation of the action of these medicines in arresting

uterine hæmorrhage that has just been offered, may, like every other medical theory, be controverted; and, however much we might be convinced of its truth, we should fear to found any practical rule upon it, did the certainty of the rule depend upon the truth of the doctrine: but the case is reversed—the theory is founded upon practical observations that we have frequently had the opportunity of making. Cases have occurred in which these remedies, administered in the manner stated, have produced the effects described. We have therefore the less hesitation in offering a theory which, whether true or false, can make no alteration in the rule that it is intended to explain.

Electricity is an agent that had been suggested some years ago by Dr. Ramsbotham, and has been introduced by Dr. Radford, as a means of exciting an atonic uterus to contraction, and thus arresting hæmorrhage. The principle upon which electricity acts is quite consistent with the views we have endeavoured to lay before you; there is no stimulant more energetic in exciting muscular contractions than electricity: none has a more powerful influence on a torpid nerve. It is reasonable, therefore, to infer, that no means could better excite a dormant uterus into active contractions. Reasoning in this way, Dr. Radford applied the electric current, first to the bladder in a state of atony, and then to the flaccid uterus, in several cases of hæmorrhage, with complete success. It produced not only tonic contraction, "but it had also the power of energetically exciting alternate contraction when applied at intervals." "The alternate contraction," he says, "excited by the agent is analogous to, and as powerful as, that which is observed in normal labour, and the tonic contraction greater." (*Provincial Med. and Surg. Journal*, Dec. 24, 1844, p. 603). Mr. Dorrington (*Ibid*, March 11, 1846, p. 105); Mr. Wilson (*Ibid*, April 29, 1846); and Mr. Clarke (*Dublin Hospital Gazette*, March 1, 1848), all quote cases confirming Dr. Radford's experience.

Direct Irritation of the Uterus is a most efficient aid in promoting its contraction. Friction *over the surface* has constantly been observed to excite contraction of its fibres; but so slight an irritant frequently fails in arresting hæmorrhage, simply because

it is only partial in its effects: it does not secure an uniform and equable contraction. For this purpose, strong compression with one or both hands on the fundus, and irritation not only of the anterior but of the posterior surface of the uterus, are essential to secure the object. It is often necessary to maintain this state by a continuance of very strong pressure afterwards, to which we shall have again to refer. The introduction of the hand *into the cavity* of the uterus is a practice founded on the same principle. This manipulation causes great irritation—sometimes too great irritation; and, therefore, requires prudence and caution in its adoption. In cases of great exhaustion, I have known it followed by convulsions and death; but in other instances it proved the only means (accompanied by external pressure) of causing an uniform and efficient contraction of the uterus. Much depends on the condition of the patient. When it is adopted as a *dernier ressort* to excite a flaccid uterus, the shock of the operation sometimes overcomes the patient, already in the last stage of exhaustion, and she never rallies. Such an application of this means is therefore extremely dangerous; but when the uterus is in a semi-contracted state, possessing a certain degree of contractility, the hand may be introduced with benefit. The uterus, which is often only partially and irregularly contracted, is restored to its proper order of contraction; and when the fundus is supported by external pressure, the hand is expelled, and the hæmorrhage ceases. Dr. Gooch recommended the introduction of the hand for another purpose: he supposed that the placenta might be compressed against the walls of the uterus, and hæmorrhage thus stopped. We confess that we cannot see the advantage of this practice: passing the hand into the cavity of the uterus is no trifling operation; but if you undertake it—if you succeed and reach the placenta—if it be detached—why not take it away? Another mode of direct irritation of the cavity of the uterus is the injection of iced water : it has been strongly recommended by Dr. Tyler Smith, and is especially applicable to those cases of extreme exhaustion where the hand cannot be introduced.

Compression of the Aorta has been proposed by Baudelocque,

and highly recommended by M. Chailly, as a means of arresting hæmorrhage. The aorta is compressed just above the bifurcation of the iliac vessels, by the fingers of the hand passed down behind the uterus into the space left when it has contracted after the expulsion of the child. The strong recommendation of Chailly leads us to direct your attention particularly to this point of practice: it is very easily carried into effect, and may form a part of the same pressure that is used to secure the uniform contraction of the uterus. We cannot well compress the aorta, without also compressing the cava and bifurcation of the iliac veins; which seems to us of equal, if not of greater importance, because the veins are a great source of flooding, and if we can prevent the regurgitation of blood from these great trunks into the uterine veins, an important means of prevention is accomplished.

Transfusion was strongly recommended some years ago by Dr. Blundell. The novelty and reasonableness of the suggestion, the experimental skill and the eloquence of its advocate, soon brought it under the most favourable notice of the profession. The principle of transfusing the blood of a healthy person into the half-empty veins of a dying woman, and thus artificially supplying the quantity of blood necessary to support life, has in it something so reasonable as to require little argument in its favour. Nevertheless, it is a principle by no means easy to act upon: the operation is surrounded with difficulties, and requires great caution, lest anything else than pure blood be infused into the veins. When we consider the risk attending the admission of air into the veins, it is hardly justifiable to attempt it, unless the patient be *in extremis*. On the other hand, Dr. Blundell attributes its failure to delay, by which the case was brought into this condition. He says, "I have myself seen two die, whose lives I feel persuaded might have been preserved to society, had transfusion been more promptly begun." (Blundell's *Obstetricy*, by Castle, p. 350.) Dr. Ashwell mentions two unsuccessful cases. We have witnessed three cases, in which transfusion was performed without any accident: they all died. Transfusion is extremely hazardous, and if there were a reasonable chance of saving the patient

by other means, we would not venture on the experiment. Its value seems to consist in the supply of blood afforded artificially to the woman sinking from the loss of this vital fluid: it is, therefore, especially applicable to extreme cases; and if it be of any use, the effect in such instances must be the *experimentum crucis* to determine it. The cases in which we have seen it tried were precisely those in which the operation seemed to be most distinctly indicated—that is, when the bleeding had ceased, but the pulse was flickering, and the symptoms of exhaustion in the patient becoming every minute more and more manifest : a little more blood was wanted to carry on the vital functions, and transfusion seemed to be the only way to supply it.

The able researches of Dr. Routh and others place the operation of transfusion in a more favourable light than that in which it has been often viewed. Dr. Routh has collected twenty-six cases in which transfusion has been adopted, both in extreme hæmorrhages and in cholera, with the results. The following table enumerates the cases of hæmorrhage, two of them being non-uterine.

No.	In whose Practice.	Mothers. L.	Mothers. D.	Authority.
1	Dr. Blundell.		1	Physiological Researches.
2	,,		1	,,
3	,,		1	,,
4	Mr. Doubleday.	1		Lancet, 1825-6, p. 111.
5	Dr. Waller.	1		,, ,, p. 154.
6	Mr. Doubleday.		1	,, ,, p. 702.
7	Dr. Uwin.	1		,, ,, p. 295.
8	Mr. Brown.	1		,, 1826-7, p. 457.
9	Dr. Blundell.	1		,, 1828-9, p. 432
10	Mr. Clement.	1		,, ,, p. 232.
11	Mr. Doubleday.	1		,, 1827-8, p. 698.
12	Dr. Kleth.	1		,, 1834, p. 156.
13	,,	1		,, ,, ,,
14	Healey and Frazer.	1		,, ,, p. 924.
15	Mr. May.	1		,, 1839-40, p. 871.
16	Mr. Bickersteth.	1		Med. Gazette, vol. xiv p. 599.
17	Mr. Savy.	1		Am. Journal of Med. Sciences, 1830, p. 255.
18	Mr. Douglas Fox.	1		Ditto, 1827, p. 299.
Forward . .		14	4	

No.	In whose Practice.	Mothers. L.	Mothers. D.	Authority.
	Forward .	14	4	
19	Dr. R. Oliver.	1		
20	M. De Berg.	1		Gazette Méd., 1838.
21	Dr. Ashwell.		1	Guy's Hospital Reports, vol. ii.
22	M. Goudin.	1		Archives Gén. de Méd., 1830, p. 132.
23	Mr. Brown.	1		Northern Journal of Med., 1845, p. 214.
24	Mr. Banner.	1		Lond. Med. Jour., vol. iii. p. 588.
25	Mr. Brigham.	1		Med.-Chir. Review, vol. ix. pp. 26, 613.
26	Mr. Jewels.		1	Ditto, p. 514.
		20	6	
	Cases of non-uterine hæmorrhage -	2		
	Uterine hæmorrhage -	18	6	

Thus, in twenty-four cases of uterine hæmorrhage in which transfusion was practised, six only were lost—just one-fourth.* Such favourable results give every encouragement to its adoption; but great care is necessary both in the selection of the time for the operation and the mode of performing it.

LECTURE XXVI.

SPECIAL FORMS OF UTERINE HÆMORRHAGE.

Floodings may occur at any time during labour: before or after the birth of the child—before or after the separation of the placenta. They may occur also several days after labour. We shall consider each variety separately; whether it occur before the birth of the child, between the birth of the child and that of the placenta, or afterwards.

Floodings before the Birth of the Child present two varieties, depending on the situation of the placenta. This viscus is most commonly applied to some part of the body or fundus

* Professor E. Martin, of Berlin, has given a tabular account of fifty-seven cases of transfusion in recently delivered women, of whom forty-five recovered. (New Sydenham Society's *Year-Book* for 1860, p. 350.)

uteri; but occasionally it is attached to the cervix and os uteri. You can appreciate the important difference which this mere change of position makes in the character and danger of the hæmorrhage.

In the former case, when labour proceeds, every pain is a temporary check to the discharge; but in the latter, the contractions of the uterus only increase it, by breaking through the attachment of the placenta to the mouth of the uterus. In the one instance, hæmorrhage is an accidental complication, that may or may not arise; in the other, it is the unavoidable effect of the action of the uterus. Hence the late Dr. Rigby of Norwich appropriately divided these floodings into *Accidental* and *Unavoidable*—a division simple in itself, sufficiently expressive of their essential difference, and one which has not since been improved upon.

Accidental Hæmorrhage before birth is caused by the partial separation of the placenta from the fundus or body of the uterus. The causes generally stated to produce this detachment, are shocks, violent exertions, as straining, mental emotion, plethora, spasmodic contractions of the uterus, etc. Not one of these appears to us sufficient *per se* to separate the placenta from the uterus. The edge of the placenta adheres very firmly to it. When an attempt is made to remove the placenta, this margin is the only part not easily detached: there is also evidence to prove that the uterus may receive a very violent shock, and the placenta not be disturbed. (*Medico-Chirurgical Transactions*, vol. xii.). The structure of the placenta is such as to admit of its expansion and contraction without breaking through its connection with the uterus. We question very much, therefore, that any spasmodic contractions could separate it. These causes seem to us to produce their effect in a different way. Each of them must, in a greater or a less degree, disturb the general circulation, especially in the uterus: the placental circulation cannot, therefore, escape this excitement; the delicate coats of the vessels that pass into the placenta from the uterus are broken through, and blood is effused between the surfaces; this continues to increase, until

ultimately it forces its way beyond the edge of the placenta, and thus detaches it from the uterus. Such an effect can only be produced when the force of the circulation is greatly increased, and the effusion of blood rapid, so that the edge of the placenta is torn from its attachment by the accumulating weight of the fluid. A less degree of force produces a different effect; the blood may not escape, but be effused and coagulate on the uterine surface of the placenta, thus preventing any further discharge; consequently in such instances, until the placenta is detached and expelled, it would be impossible to say whether there has been any hæmorrhage. This is not, however, always the case; the most alarming symptoms, and even death, have been the consequence of a hæmorrhage of this kind, when the edge of the placenta has not yielded to the weight of the blood effused. Drs. Hardy and M'Clintock refer in their valuable report to two cases of this kind, which had been related to them by Dr. Johnson, late master of the Dublin Lying-in Hospital. "In neither of these cases was there any external hæmorrhage whatever; and the separation of the placenta seemed to have been produced in one by outward violence; but, in the other, it was apparently of spontaneous origin. Both these patients sank under the loss of blood; and upon *post mortem* examination nearly the same appearances were found in each—viz. the placenta, except at its extreme margin, was entirely detached from the uterus, and the cavity or interspace between the two contained an enormous quantity of coagulated blood." (*Midwifery and Puerperal Diseases*, p. 194).

Small coagula on the uterine surface of the placenta are a common occurrence. The ordinary effort of labour seems to be sufficient to produce these partial effusions. They do not affect the constitution of the patient, nor cause any external discharge, therefore they pass unnoticed; but when the circulation is excited, and blood poured out rapidly, there is no time for coagulation; it bursts its way through all restraints, and thus causes accidental hæmorrhage.

Besides these more common causes dependent upon an over-excited circulation, we sometimes meet with others of an opposite character giving rise to hæmorrhage. Some women of a leuco-

phlegmatic temperament may have been the subject of anæmia, may have had leucorrhœa, menorrhagia, etc. When they become pregnant, the slightest cause produces hæmorrhage; hence miscarriages are frequent: but if they arrive at the full term of pregnancy, it is seldom without some slight hæmorrhage taking place in its progress; hence, when labour begins, they are hardly able to meet it: the contractions of the uterus are weak, and if hæmorrhage take place it is less easily controlled, because atony of the uterus, and exhaustion of the patient, are so easily induced. In such cases, a very slight flooding may be attended with most serious results.

The *Symptoms* that accompany accidental hæmorrhage are seldom uniform. The flooding generally commences as a narrow stream trickling from the vulva, which ceases to flow when the pains are present, and returns as they subside: presently a sudden gush of blood is observed, accompanied with coagula, and then the hæmorrhage may continue to return in gushes, or one violent torrent may place the patient at once in *articulo mortis*: this last form of accidental hæmorrhage is not so frequent. The constitutional effect of the hæmorrhage is first observable in the pulse and in the action of the uterus; the pains are weaker, and the pulse is more rapid and jerking; but the symptoms of nervous irritation and exhaustion very soon follow. The patient becomes restless, throws herself about the bed, or makes an effort to rise; vomiting may take place; the respiration is hurried, she calls for air, and feels suffocated, and then perhaps she faints; the syncope may be prolonged, and excite the greatest apprehension; she is pulseless, the countenance is deadly pale; the eyes are fixed, or slightly drawn upwards; the extremities are cold; as she revives, she speaks incoherently, respiration is stertorous, jactitation is increased, and sometimes she rolls about the bed like a drunken person; the pulse becomes more rapid and jerking, small, and extremely compressible. Again she faints, with still more alarming symptoms: the whole surface is cold, the countenance cadaverous, the pulse is not felt, the cheeks are blown out with every expiration; convulsions may supervene; and at length, after a few gasps, the last evidence of life ceases.

The *Treatment* must be prompt and decisive. Accidental hæmorrhage usually occurs in the first stage of labour, when the membranes are unbroken, and the liquor amnii prevents the uterus from contracting about the body of the child. In order, therefore, to control flooding, the uterus should be made to contract as much as possible, and coagulation should be promoted in the spongy texture of the placenta: both objects are accomplished by *rupturing the membranes*, because the uterus contracts on the body of the child, and, the placenta being compressed between both, the blood is prevented from escaping so freely from its uterine surface. This effect may be rendered more perfect by using means to increase the tonic contraction of the uterus, which rupturing the membranes alone will not always accomplish. Therefore *ergot of rye*, or the *electric current*, may be used; a drachm of liquor secalis cornuti infused in a wine-glass of water may be given alone, or, what is better, in combination with opium. Thirty or forty minims of tincture of opium may be added; and in proportion as exhaustion increases, larger doses of opium may be repeated. When you wish the aid of the electric current, the electro-magnetic apparatus should be employed, and currents passed either transversely or in the longitudinal axis of the uterus: rods, holding sponges moistened in a saline solution, are connected by wires to the apparatus, and may be applied to any part of the abdomen; a sponge may be introduced within the vagina, and connected in the same manner with the battery: by these means currents may be made to pass in any direction. The only objection to this mode of exciting the uterus is the delay which might arise in preparing the instrument. Entrust the management of these details, therefore, to an assistant, and do not lose a moment in carrying out the treatment of the case, independently of this agent. Your patient's life hangs by a thread; and if your attention be taken off from her, even for an instant, she may relapse into the syncope of death.

While you are thus endeavouring to arrest the torrent from the uterus, you must at the same time, if possible, *prevent the effects of a languid circulation*, and *maintain the action of the heart*. Stimulants may be given, even largely; we have known a glass of

brandy scarcely support the pulse. Brandy with laudanum is more decisive in its effect; the temperature of the extremities must be maintained, and as pure air as possible allowed to circulate freely through the apartment. Be careful, also, to avoid changing the position of the patient much; any exertion is extremely injurious to her, and especially recollect the danger of raising her from the recumbent posture. If these means fail, or are tardy in their operation, *transfusion* will, no doubt, occur to you; let it be tried, and if you do so, use every precaution to avoid failure. Let your assistant prepare the apparatus, having the basin for the blood raised to the temperature of 98°. Take the blood from the strongest and healthiest person you can find; let the vein be freely opened, so that the current may be rapid; and to insure this effect, you may adopt Dr. Waller's plan, and give the person a full draught of brandy and water; but above all things let no air enter the vein—this is the danger chiefly to be dreaded; some blood should, therefore, be forced through the tube before it is inserted into the vein.

In accidental hæmorrhage there is seldom occasion for these extreme measures; rupturing the membranes, and ergot of rye, are generally sufficient to arrest the discharge. We have explained the principle on which the discharge of the liquor amnii produces this effect; and the practice has been recommended by Mauriceau, Puzos, Denman, Rigby, Merriman, Ramsbotham, Collins, and other eminent practitioners. Its value, however, has been disputed by Leroux, Dewees, and Burns, who advocate the *introduction of plugs* into the vagina to cause coagulation, and thus check the flooding. With regard to this point of practice, we have no hesitation in deciding in favour of rupturing the membranes; we have never found it to fail, but the plug employed as a substitute is evidently liable to grave objections. A coagulum in the vagina can have no effect on vessels in the body or fundus of the uterus: are we then to wait until the coagula increase so as to stop these vessels? If so, the placental side of the uterus must be wholly filled with coagula; and even then it is doubtful whether they could prevent the hæmorrhage. You may, therefore, plug the vagina, and fancy the hæmorrhage has ceased

because no more blood flows externally, but the symptoms of exhaustion rapidly accumulating will soon convince you of your error. If the membranes be ruptured, the vagina may then be plugged, as a temporary expedient; because, although some coagula may collect in the uterus, the quantity must be small, and the amount of blood lost would be less than if it flowed uninterruptedly from the vagina; but even on this topic we cannot speak without some hesitation. We confess we like *to see* whatever discharge may flow from the uterus; nor do we feel satisfied so long as there is the least trickling of blood. If the vagina were plugged, we could not tell whether the hæmorrhage had completely ceased, and might be deceived by the absence of all external appearance of hæmorrhage.

Turning the child for accidental hæmorrhage has been practised since the days of Ambrose Paré. All the older practitioners did so, and many of their patients died in consequence; latterly there was more caution in having recourse to it, and now the practice is rather an exception to the general rule. It therefore requires some consideration. You will find it very seldom necessary to turn the child; the means already detailed are generally adequate to control flooding, and to avert impending danger, without turning; but if it should happen that they are not sufficient for the purpose, the child should be removed. The success or danger of this effort to save the patient rests, in a great degree, on the judgment of the practitioner: if the operation be performed at all, it should be undertaken before the patient is much exhausted. If you do so, and make every provision to support her while going through it, you will succeed; but if, like many cases reported, you proceed to turn the child because the woman is so exhausted that you fear she will die undelivered, you place her, by the operation, beyond all possible chance of recovery.

Unavoidable Hæmorrhage: Placenta Prævia. Unavoidable hæmorrhage is a much more serious variety of flooding than that which we have briefly described; consequently, from the time when its nature was correctly understood, its treatment

received the most earnest attention: controversies, of course, have sprung up about it, and, like troublesome weeds, have so interlaced themselves with the subject, that it is difficult to separate the one from the other; they have also covered it with so many intricacies, and so obscured it, that it is not very easy to place the matter before you in a clear and intelligible light. The source of danger is in the attachment of the placenta to the cervix and mouth of the uterus (*placenta prævia*); because, when the os uteri begins to dilate, this connection is broken through, and hæmorrhage unavoidably follows. Even before the full term of pregnancy, the attachment of the placenta may be disturbed, and hæmorrhage may be the result: hence premature labour frequently accompanies this form of flooding. The contractions of the fundus uteri, so far from checking, only increase the discharge: we are consequently deprived of the advantage which this powerful agent gives us in controlling the bleeding vessels.

Fig. 131.*



Natural Means of Checking Hæmorrhage from Placenta Prævia.

The extent and danger of this form of hæmorrhage depend

* Fig. 131. Placenta prævia.

upon the unusual and most unfavourable position of the placenta: it would consequently seem as if Nature had neglected her usual prescience, and had not employed the same provident attention to guard against the effect of this accident that is manifested in so many other instances. "Well" (says Dr. Rigby), "has a celebrated teacher (Naegele) observed, 'there is no error in Nature compared to this; for the very action which she uses to bring the child into the world, is that by which she destroys both it and its mother.'" True as this proposition seems to be, and fatally true as in too many instances it has been found, nevertheless we cannot permit you to consider it as true in its entire extent; because even here Nature endeavours to avert the consequences of this dangerous displacement. Her manner of doing so we shall briefly explain; because it is very essential that you should clearly apprehend the natural means by which such hæmorrhage might be arrested, in order to apply the resources of art with effect.

Let us suppose, then, a case in which the placenta is completely attached to the mouth of the uterus, and that labour has just commenced; what takes place? The first effect of the pains must be to break the vessels passing from the margin of the os uteri into the maternal portion of the placenta. The curling arteries of the uterus are closed by coagula formed in their torn coats; they may not, therefore, pour out much blood. (See Appendix). Such is not the case, however, with the large uterine veins when they are broken across; one fragment is an opening that communicates with the large net-work of veins in the uterus; the other leads directly into the cavernous structure of the placenta. Through both these orifices blood may be discharged; being, in the former case, venous blood, flowing in a contrary direction to its course from the uterus; and in the latter, arterial blood, passing directly through the cavernous structure of the placenta, and escaping from the broken openings on its surface. Such being the sources of hæmorrhage, does the progressive dilatation of the uterus increase or control the discharge? If it increase the hæmorrhage, Nature has committed a capital error; she sins against her great law to

do nothing in vain, and gives life only to destroy it. If the hæmorrhage be controlled, she is consistent with herself, and even here establishes the possibility of life being preserved by her own efforts. We shall endeavour to prove the latter hypothesis, and demonstrate the manner in which dilatation of the uterus controls unavoidable hæmorrhage. Let us examine the effect of this dilatation on each source from which blood flows.

The *arterial current* through the placenta is in direct proportion to the number of arteries that supply blood to the cavernous structure; but, as the dilatation of the uterus increases, this number diminishes, because they are successively broken off from the placenta; and when the dilatation is completed, the placenta being detached, hæmorrhage from this source must cease, as the supply is cut off. This provision, however, would always fail, if it depended upon the complete dilatation of the uterus for success. A certain period of time (some hours) may be occupied in effecting it; and if an uninterrupted current of arterial blood were flowing from the placenta for a very much shorter period, the woman would expire long before the placenta was separated. Some means of retarding or interrupting the current is necessary; and here we find the *importance of the reticulate texture of the placenta;* the blood moves slowly through it, and, if it accumulate, tends to coagulate—the placenta acts like a sponge. Any cause compressing the placenta, which may prevent the free discharge of blood from these orifices, will cause an accumulation and consequent coagulation of blood in the spongy texture, thus preventing further hæmorrhage. The force of the fundus uteri acting on the cervix also acts upon the placenta, and exercises a pressure upon it proportionate to the strength and frequency of the pains. Thus, if the uterus retain its power, and be in full action, the tendency of its contractions is at the same time to cause and to arrest the discharge of blood from the placenta; to cause it, by breaking the connection with the uterus; to arrest it, by pressure on the whole mass of the placenta. Did hæmorrhage, therefore, depend upon this source alone, it would be much more under the control of treatment

than we find it. Our chief object then would be to increase the counter-pressure on the placenta from the vagina, so as to cause coagulation in its structure.

We have, however, to consider another source of flooding—that derived from the exposed *veins* of the uterus. This venous blood regurgitates from the general venous system, and will flow freely and most dangerously so long as the cervix uteri remains expanded, and no contraction of the tissue takes place: because the venous canals, and their openings of intercommunication, are fully dilated, and, so long as they remain in this state, if any of these be exposed on the surface of the uterus, profuse venous hæmorrhage will be the result. But the dilatation of the os uteri is, in fact, the contraction of the cervix: the womb cannot open unless the tissue of the cervix contract upon itself. We do not assume that this contraction of the cervix is a muscular effort, as some suppose; it is sufficient for this explanation to admit, that the cervix possesses contractility of tissue. Now this contraction of the cervix has precisely the same effect upon the veins here, as the muscular contraction of the fundus has upon them in other forms of hæmorrhage; the sinuses (as they are called) are more or less closed; the veins are compressed; the temporary valves are set up, and thus the regurgitation of blood from this source is prevented. As the dilatation of the uterus advances, the whole of the exposed portion of the cervix and placenta is directly compressed by the head of the child, an additional aid in preventing the escape of blood.

The *natural means, therefore, of checking unavoidable hæmorrhage is the complete separation of the placenta from its attachment to the cervix of the uterus;* because, by this means, all the uterine arteries are broken off from the placenta, and the veins are closed by the dilatation of the uterus which is necessary to effect the separation. If we have rendered the design of Nature sufficiently intelligible, you can readily perceive why she so often fails in accomplishing her purpose, and why these hæmorrhages are so dangerous. In order to effect the dilatation of the uterus, and carry out this intention, the pains must be vigorous, and the contractile power of the uterus unimpaired: but unfortunately, in

too many cases this essential element is wanted. Slight hæmorrhages may have occurred before labour, so as to weaken the tone of the uterus; or, what is more frequent, the first rupture of the blood-vessels is followed by such a violent gush, that the patient is exhausted, the action of the uterus is enfeebled, and the pains are consequently weak and inefficient. As they proceed, and slowly separate the placenta, gushes of blood from newly ruptured vessels accompany every pain, increasing the exhaustion of the patient and the atony of the uterus, until at length the uterus has lost all power of accomplishing this object, and the patient expires. Such hæmorrhage is equally fatal to the child, because the fœtal blood is deprived of all influence from the maternal circulation; the necessary changes are not carried out, it receives no nutrition, and dies equally exhausted. The child is generally said to die from hæmorrhage of the fœtal vessels; but the fœtal vessels are not always ruptured, which is a necessary condition; however, it presents the same appearances as if they were—and hence hæmorrhage is the cause usually assigned for its death. You will perceive, therefore, that Nature has not failed to provide against the effect of this malposition, but that her efforts are generally useless, because exhaustion is so rapidly induced in the patient. She is not, however, always so unsuccessful: cases are recorded where the dilatation of the uterus was accomplished, the placenta detached, hæmorrhage arrested, and the patient saved by the provisions of Nature alone. Professor Simpson records 141 cases, in the majority of which the placenta was expelled safely by the natural efforts (*Monthly Journal of Medical Science*, March, 1845, p. 181-183): several have been since reported, a sufficient proof of the correctness of our position.

The Manner and Extent of Attachment of the Placenta to the cervix uteri are subject to great variety, which modifies the amount of hæmorrhage and the danger of the case. The whole placenta may be applied to one side of the cervix, and only touch the os uteri just sufficiently to give a character to the hæmorrhage. It may lie over the os uteri, and a small portion be attached to the opposite side of the cervix; or it may be attached

equally round the neck. Thus there may be either a *partial* or a *complete presentation* of the placenta. In the former case, the complete dilatation of the os uteri is not necessary to arrest hæmorrhage. It may be treated in the same manner as accidental hæmorrhage: the membranes may be ruptured, and the liquor amnii discharged; the head will then descend upon the placenta, and compress its cavernous structure strongly against the cervix uteri, thus causing coagulation in that structure, and closing the venous openings in the cervix. In the latter case, however, this is not sufficient; and hence the extreme danger of this complication.

The *Symptoms* that indicate presentation of the placenta require the closest attention, because the timely notice of such an accident is of importance, in order to undertake its successful treatment. Hæmorrhage may occur at the seventh, eighth, or ninth month of gestation. The manner is characteristic: a sudden gush of blood from the uterus may take the patient quite by surprise; there has been no shock or violent exertion to cause it; she has been perfectly at rest, or asleep perhaps, when, without any previous pain or notice, this discharge appears. It is too profuse to mistake for the show; she therefore becomes alarmed; assistance is hastily sent for; and, by means of rest, cold, etc., it seems to be arrested. It may return again in a few hours, or perhaps not for some days, when labour regularly sets in, the hæmorrhage *accompanying* the pains. At first, perhaps, it is slight, but the frightful torrent is not long delayed: after a few more pains, a gushing tide of blood from the uterus places the patient in the utmost danger; syncope follows, and all the symptoms of exhaustion rapidly succeed each other. In other instances, the patient has not even this monitor: the first symptom of labour is profuse flooding, followed instantly by all its worst consequences. This peculiarity in the manner in which hæmorrhage presents itself may be considered as diagnostic of its cause, and the influence of the pains in increasing it is a further confirmation of its source. It is right, however, to apprize you of an error that may easily be committed by the inexperienced. Sometimes a slight hæmorrhage is caused by the partial separa-

tion of the membranes from the side of the uterus: a certain quantity of blood trickles down, and occupies the space between the membranes and os uteri: here it is confined; and, according to the time it remains, may be either quite fluid, or partly coagulated, or, if long retained, may form a firm coagulum. When labour begins, and the os uteri opens, the blood is discharged with or without coagula; or there may be a slight discharge of blood with the pains, just sufficient to excite the attendant's apprehensions. His suspicions appear to be confirmed when an examination *per vaginam* is made: he finds a large and firm mass occupying the os uteri, just like the placenta; and hence falls into an error that, we fear, is not unfrequently committed: he sets down a presenting coagulum for a placenta presentation. In such cases the hæmorrhage ceases after the first discharge, and is not renewed with the pains; and when a coagulum, such as we have described, is observed, it may be distinguished from the placenta by the facility with which the finger may be passed between it and the cervix uteri: the placenta adheres to the cervix, the coagulum does not.

Diagnosis. An *early vaginal examination* is always necessary whenever hæmorrhage appears. Both fingers, if not the hand, should be passed into the vagina, and the cervix uteri carefully examined. If the placenta present, the cervix feels more full and spongy than usual, and communicates neither the sense of fluctuation of the liquor amnii nor the firm resistance of the head. If the os uteri be open, the uterine surface of the placenta is felt presenting a minutely granular surface; the cotyledons also may be traced if the dilatation have advanced; but these characters are lost if there be any coagulation in spongy structure; the presenting part of the placenta then resembles a clot of blood, and only differs from it in seeming to be attached immoveably to the placenta. The extent of the attachment of the placenta cannot easily be ascertained: the whole cervix that protrudes into the vagina should be examined; and, if the placenta be attached more to one side than the other, the cervix will feel fuller on that side, and communicate a doughy sensation to the finger; but, unless the placental margin be near the os

uteri, or the dilatation be sufficiently advanced to reach the edge of the placenta, you cannot be certain about it. The moment that the situation of the placenta is detected, the practitioner must at once determine the course he is to pursue: the safety of the mother, and the possibility of preserving the child, depend solely on his promptitude and decision.

LECTURE XXVII.

SPECIAL FORMS OF UTERINE HÆMORRHAGE (*continued*).

TREATMENT. The treatment of hæmorrhage from placenta prævia is at the present time involved in a most inextricable controversy. We shall not ask you to unravel it, but rather to keep steadily in view those principles which we have laid down for the treatment of uterine hæmorrhage, and to call to mind the explanation we have given of the utero-placental circulation: these will serve to guide us through the labyrinth.

You may be called upon to treat unavoidable hæmorrhage under very opposite conditions. You may be aware of the position of the placenta before or at the moment when any hæmorrhage appears: labour is only commencing; the patient is free from any exhaustion; the pains are active; you may expect the flooding, but it has not yet arrived. On the other hand, you may be sent for in great haste to save a patient who is dying from hæmorrhage. You find her pulseless, the surface cold, the uterus scarcely acting, the bed saturated with blood, and the patient gasping. If you were to treat both these cases in precisely the same manner, you would certainly commit a most serious mistake. Between these extremes there are degrees of difficulty and of danger which must modify our treatment. Let us, first, therefore, consider the most favourable of these examples, viz.:—

Cases where Hæmorrhage is only Commencing. Here the chief object is, if possible, to save both the mother and the child: you

know, when the deluge comes, that the child is lost, and it is very doubtful whether the mother may be saved. To preserve the child, it is necessary to remove it from the uterus. To save the mother, the connection between the placenta and uterus must be broken off. If the former be done incautiously, the mother may be sacrificed; if the latter be hastily carried into effect, the child will be destroyed. We must avoid falling into either of these errors, and must act upon correct principles in our treatment. To accomplish the objects in view, it is necessary to turn and deliver the child: but this cannot be done until the dilatation of the uterus is in some degree advanced, or at least until the os uteri is dilatable. *Never attempt to force open the mouth of the womb* for this purpose. The mouth of the womb, however, is generally very dilatable, and will admit the hand, cautiously introduced, even when slightly open; but if it should not, our first step is to use the most efficient means to arrest the discharge while the uterus is dilating. This may be effected, 1, by directly compressing the placenta; 2, by maintaining and increasing, if necessary, the action of the uterus.

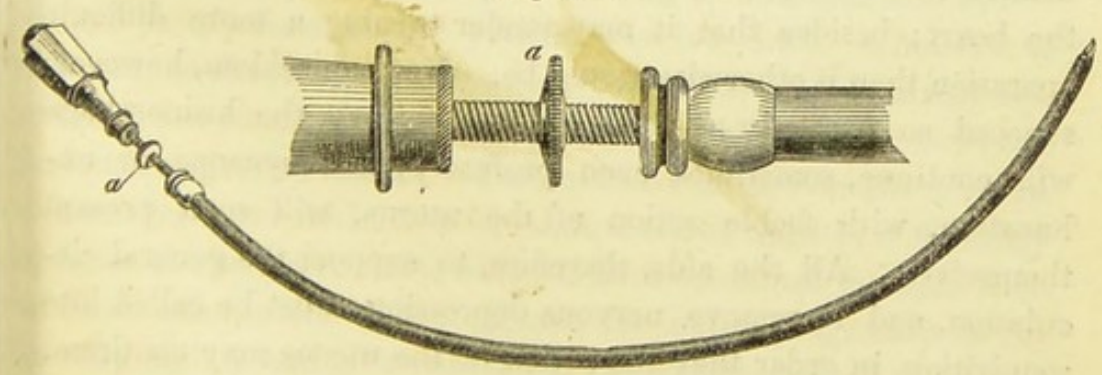
1. *Compression of the Placenta* is usually accomplished by plugging the vagina. The tampon (as it is called) is directly applied to the source of the hæmorrhage: the exposed portion of the placenta is compressed, and a coagulum is formed within the os uteri, which must close its openings, and also the venous orifices on the surface of the uterus. The irritation also of a plug so applied, by distending the vagina, causes a more rapid dilatation than might otherwise take place.

The mode of *plugging the vagina* is very much governed by fancy: some use a single plug; others several separately introduced; some will employ silk handkerchiefs or sponges for the purpose; others are satisfied with common hemp. We have been in the habit of using two or three small plugs in preference to one large one, because it is necessary to remove the plug from time to time in order to judge of the extent of the hæmorrhage, and sometimes also to relieve the urethra from pressure. If, therefore, a single plug be withdrawn, the coagula will be disturbed, and the hæmorrhage renewed; but if the outer pieces

only be taken away, this will not be the case, and the extent of hæmorrhage may be judged by the degree to which these plugs are saturated; they can be replaced by others, so as more efficiently to favour coagulation. When you have made the necessary vaginal examination, introduce a sponge; and let it be applied directly to the os uteri. Let this be followed by two or three others until the vagina is filled, and support the whole of them by a napkin soaked in ice-water, and applied to the vulva.

Another means of compression is to *puncture the membranes*, and allow the liquor amnii to escape. This practice has been suggested by Dr. Radford, but for a different purpose. In order to avoid the sudden discharge of the liquor amnii in cases of exhaustion, and thus adding to this danger, he proposes to puncture the membranes through the placenta with a trochar made for the purpose, and to allow the liquor amnii to flow away *gradually*. It appears to us that this practice would be equally serviceable in the case we are supposing; because, by allowing the head or presenting part to descend on the placenta, the compressing force would be greatly increased, and the dilatation of the uterus more rapid. The objection to it is, that turning might be more difficult; but, knowing the effect of hæmorrhage in rendering the os uteri dilatable, we do not apprehend much

Fig. 132.*



* Fig. 132. Gum-elastic catheter, with spear-pointed stilette passing through it. *a*, Screw-nut to sheathe the point.

difficulty in such a case as this. We should not, however, advise you to pass a trochar *through* the placenta: large trunks of vessels ramify from the funis over its fœtal surface: the instrument may be forced through one of these, and cause hæmorrhage from the fœtal vessels. For this purpose, a long gum elastic catheter of the *largest size* may be so made as to have a pointed stilette to pass quite through it; this can easily be prevented from passing beyond a certain distance, by a button or screw at the end opposite the point.*

This instrument, having the point sheathed, may be passed within the os uteri, between the placenta and the cervix; and when it is quite above the placenta, the point can be pushed forward through the membranes; the stilette being then withdrawn, the liquor amnii will flow away chiefly through the catheter. This operation should, of course, precede the use of the plug.

2. *To Maintain, and to Increase, if necessary, the Action of the Uterus*, is the next object of attention. It is your duty to watch closely the effect of the hæmorrhage on the constitution. If you have succeeded in arresting the discharge completely, so that the general circulation is not excited, and there is no nervous irritation, a moderate dose of ergot of rye will be sufficient to ensure an efficient action of the uterus; but if you wish to save the child, we should recommend you to avoid giving large doses of this medicine, because of its known sedative influence on the action of the heart; besides that it may render turning a more difficult operation than it otherwise would be. You can seldom, however, succeed so perfectly as this; on the contrary, the hæmorrhage will continue, sometimes even profusely; and syncope, or exhaustion, with feeble action of the uterus, will soon present themselves. All the aids, therefore, to support the general circulation, and to remove nervous depression, must be called into requisition, in order that the action of the uterus may continue: stimulants with opium may be given internally, and the tem-

* The same instrument may be used for rupturing the membranes to induce miscarriage or abortion.

perature of the extremities maintained by wrapping them in warm blankets, and applying hot jars to the feet. A free circulation of pure air in the apartment should be secured, and the patient kept completely in the recumbent position.

While these steps are being taken to arrest the consequences that you know will follow such symptoms, the delivery of the child, the most important proceeding, will, of course, occur to you: the only question is, when should it be done? We would say, the moment symptoms of exhaustion begin to appear: if you wait for their full development, it would be better not to venture upon such an operation; but if such symptoms be not present, it would be desirable to delay a little, in order to give the uterus time to dilate sufficiently to pass the hand easily within it. If, however, the patient show the slightest evidences of commencing exhaustion, you must deliver at once.

Turning the Child is at any time a serious operation, and in no case more so than under the circumstances we are at present considering: not because the operation is then peculiarly difficult; on the contrary, in consequence of hæmorrhage, the uterine fibres offer less resistance than usual to the introduction of the hand, and the accoucheur has, consequently, much less difficulty than when the uterus is strongly contracted on the child; but it is an operation attended with considerable danger, from the shock the patient receives. The records of midwifery afford ample testimony of the fatality of turning in unavoidable hæmorrhage, chiefly because the patient was too much exhausted to support the shock of the operation. She either died immediately, or in a few hours afterwards. In the case supposed, however, no such objection exists. You proceed to deliver the moment exhaustion shows itself, or before that, if the os uteri be sufficiently open for the purpose. If the labour have continued for some time without exhaustion in the patient, the outer plugs may be removed, and a vaginal examination cautiously made. You will thus generally be able to ascertain the degree of dilatation, without disturbing much the plug in contact with the placenta: if the os uteri be one-half or even one-third dilated, you may deliver. In either case, when about to operate, the external plugs being

removed, it is better to leave the remaining one in its position. Consider it as part of the placenta, and pass the fingers on to the edge of the os uteri; press them forwards in a conical form between the placenta and cervix, detaching the former from its surface: the more quickly this can be done the better, so as to admit the hand and arm into the uterus; because, when a portion of the placenta is thus detached, the introduced arm acts as a kind of temporary plug, and hæmorrhage is more efficiently restrained. The membranes, if entire, may then be broken through with the fingers; but, if they resist, the catheter may be introduced, so as to puncture them without the necessity of using much force. The hand and arm then pass along the head and body of the child to the limbs, which, in nine cases out of ten, lie posteriorly to the right side of the uterus. As you always meet the shoulder and arm first, you can have no difficulty in recognising the leg; do not, therefore, lose time in searching for the foot: if the knee first meet you, seize it, and bring it down quickly into the vagina. The limb of the child then becomes a plug in the place of the arm of the accoucheur; the remainder of the delivery should be as rapidly completed as is consistent with safety to the cervix uteri. In such a case as we are now speaking of, the cervix will almost always yield very readily, and therefore there is a reasonable chance that the child may be saved; but everything depends upon promptitude. In such an operation you will find it more convenient to use the left hand than the right. It generally happens, when the child is removed, that the placenta follows immediately: be prepared, therefore, for this, and, if necessary, use artificial respiration if the child be slow in taking its first inspiration. When the child and placenta are removed, hæmorrhage generally ceases: the patient may be given a full opiate, ice-cold cloths may be applied to the vulva, and the whole secured by the abdominal bandage carefully applied. If, however, hæmorrhage should continue, the single plug wrung out of ice-water may be introduced into the vagina, and a full dose of ergot of rye given, which will arrest it.

Cases where the Patient is in Extreme Exhaustion. We have dwelt at some length on the treatment of a case where

flooding has just commenced, and where the whole management of it is in your own hands. Let us now direct your attention to the second condition to which we have alluded—a case in which, without any previous notice of danger, you find a patient suffering all the worst consequences of flooding, and you are called upon to interfere.

If, in such a case as this, you were to adopt the same practice as that which we have just described—if you were at once to turn the child and deliver—the fate of the patient would be sealed. The late Dr. Rigby justly observed, that "the success of turning depends upon its being done before the patient has lost too much blood" (*Uterine Hæmorrhage*, p. 33); and the fatal effects of performing it too late, when the patient is extremely exhausted, will be best understood from a few examples.

Giffard relates a case of this kind, on which he remarks; "Although I despatched this delivery in a few minutes, and without the loss of any quantity at that instant, yet the poor woman, from the preceding excessive evacuations of blood, which had occasioned convulsions, and great loss of strength and spirit, died in about half an hour after she was delivered." (*Cases of Midwifery*, p. 89.)

Smellie mentions a case in which he was persuaded to deliver his patient by her sister, who argued that "it was the only chance to save her life, and if she should die no one could be blamed." Smellie yielded to this very popular and cogent argument, and after some little difficulty, "he delivered the child in the preternatural way, on which the flooding stopped, but she was so weak that she expired in a few minutes. (*Midwifery*, vol. iii. p. 162.)

The late Dr. Rigby relates two cases in which there was extreme exhaustion: both were delivered by turning: one died in six hours, the other in half an hour after the operation. And on these cases Dr. Rigby justly remarks: "So far from turning having been prematurely done, I am convinced its want of success was owing solely to its being performed too late." (*Uterine Hæmorrhage*, p. 121.)

This list might very easily be lengthened considerably: the records of practice afford numerous examples of the fatal effect

of turning in extreme exhaustion. The question, therefore, proposes itself,—What are we to do in such cases? It is very difficult to answer it without venturing a little on the troubled sea of controversy. The general reply is, that which so much influenced Smellie. We should not let the woman die undelivered. We assume that she must die, and, therefore, prefer that she should do so *secundum artem*, rather than expire with the child in her womb. We shall presently see whether this manner of reasoning is valid. Let us examine the opposite side of the question, and reflect on those cases where turning was not attempted. We shall refer to Dr. Lee's collection of cases for one which is very instructive.

"(Case 262), a woman in the 7½ month of pregnancy had a great discharge of blood from the uterus for thirty-six hours before I" [Dr. Lee] "saw her. A large portion of the placenta was hanging through the os uteri into the upper part of the vagina. I proposed immediately to deliver by turning the child, but she obstinately refused to submit to the operation, and I was apprehensive she would die undelivered. The hæmorrhage continued with great violence for several hours, when the placenta and a dead fœtus were expelled without assistance. She remained long in a state of great exhaustion, but ultimately recovered." (*Clinical Midwifery*, 1st ed. p. 144). Nature accomplished her work here, and the woman did not die undelivered.

Numerous instances are recorded in which the delivery was accomplished by the natural efforts: the placenta was detached, the hæmorrhage ceased, the mother recovered, and sometimes even the child was saved. If, then, it be true that the natural separation of the placenta arrests hæmorrhage; if it be consistent with our knowledge of the structure of the placenta and of the utero-placental circulation, that such should be the case; and if turning the child be proved to be a most dangerous operation in cases attended with extreme exhaustion, is it not reasonable to think that the *artificial separation* of the placenta in these cases—a much less serious operation, a mere imitation of Nature—would be a justifiable practice, and one that hardly merits the very severe censure it has received? The objection may,

perhaps, occur to you, If separation of the placenta be safer than turning, why not always do so? We would reply that, although safer for the mother, it is destructive to the child; and our practice must be guided by the same principles in this as in other obstetric operations: if it be possible to save both mother and child by turning, we must turn; but if we have any doubt about the mother's safety, we must not hesitate one moment because of the child. Some practitioners will not scruple to destroy the child with the perforator, when there is a doubt about the mother's safety. Why then should we hesitate, in the present instance, to sacrifice the child, if we be satisfied that the separation of the placenta will arrest the hæmorrhage and save the mother; especially if by doing so we avoid exposing her to the shock of so dangerous an operation as turning in extreme exhaustion. It is no reply to this argument to say that some women have been thus delivered in the last stage of exhaustion, and have escaped; we only ask you to examine the records of midwifery practice, to find the number who have not escaped, but who have lost their lives through this operation.

Again, it may be said that, in those cases where Nature succeeds, the action of the uterus is strong; that it is the contraction of the uterine fibres, not the separation of the placenta, which arrests hæmorrhage; and therefore, that artificial separation would not be applicable in cases of exhaustion. It is quite true that contraction of the uterine tissue takes place in the natural effort to separate the placenta, and equally so that the venous openings are in a great degree closed by the head descending on the cervix; but we have also perfectly clear evidence that coagula form in the spongy structure of the placenta to arrest the current of arterial blood, until this source of hæmorrhage is cut off by the separation of the placenta: we may therefore infer that, if this did not happen, if the current from the arterial side were too impetuous to admit of coagulation, the placenta would still be a fatal source of flooding, although all the exposed uterine openings were closed. Exhaustion implies a want of tone in the uterus, which has an equal influence on the arterial as on the venous source of hæmorrhage. If, therefore,

the placenta be suffered to remain attached, you not only run the risk of continued flooding from this source, but you are prevented from using the most efficient means to close all the uterine sinuses, because some of them at least are in connection with the placenta, and the regurgitant current from the uterus may as readily escape through the attached portion of the placenta as from the sinuses which are exposed. We have already mentioned to you a case of fatal hæmorrhage, where a small portion of the placenta was left in the uterus, the remainder being expelled. Was flooding here from the placenta or from the uterus? We are perfectly convinced that, if the placenta were completely removed, flooding would have been as much in our power to control as in many similar cases. But it is more conclusive to appeal to facts. The brief history of a few cases will give more instruction on such a point than a thousand arguments. Mr. Stickings, of Lenham, Kent, relates a case of placenta prævia, the state of the patient on his arrival was as follows:—"She was insensible, and completely blanched; the pulse scarcely perceptible; extremities cold; the loss of blood from the uterus had been excessive, but the hæmorrhage at this time had ceased. The state of the poor woman at this juncture was most alarming, and my impression was that she would rapidly sink. With much difficulty I" [Mr. Stickings] "administered some brandy; soon after this, finding some slight symptoms of returning animation, I made an examination per vaginam, and discovered part of the placenta detached, and external to the os uteri, the remaining portion adhering to its neck. . . . . I, without hesitation, removed the remaining portion of the placenta (about a third): it was detached without difficulty; more brandy was given with much benefit. On the return of the pains, I ruptured the membranes, and in about twenty minutes after the discharge of the liquor amnii a dead child was expelled. . . . . With the exception of extreme debility, she completely recovered without one bad symptom following." (*Medical Gazette*, Sept. 26, 1845, p. 943.) Could there have been stronger proofs of extreme exhaustion, by which the pains (the contractions of the uterus) were suspended? and yet, although the placenta was not completely separated, hæmor-

rhage had ceased. We cannot attribute this cessation to active uterine contractions.

Dr. Waller, in his Clinical Remarks, mentions a case (8) of partial placental presentation. "The patient had been under the care of a midwife, who had ruptured the membranes on the preceding day, and then left her. Another woman was sent for in the evening, who also got alarmed at the bleeding; and, like her predecessor, decamped, leaving the sufferer to her fate. A medical man saw her on the following morning, who immediately requested my" [Dr. Waller's] "attendance. At that time *the hæmorrhage had abated;* the pulse, though rapid and soft, was not so feeble and faltering as I have frequently witnessed in similar cases"—the delusive reaction that we have often seen: "there was a general warmth of the surface, but the countenance was deathly and corpse-like. . . . On introducing the hand for the purpose of examination, the placenta was easily felt *lying in the vagina,* but no portion of the child: the knees presented. The child was readily drawn down: some difficulty was experienced in bringing the head through the pelvis. Notwithstanding the discharge was trifling, the signs of sinking increased. . . . After an interval of about fifteen minutes, the pulse fell, the patient threw her head back on her pillow, and instantly expired." (*Medical Times,* Jan. 15, 1848.)

In this instance of fatal exhaustion, although the placenta was separated and the hæmorrhage was thereby arrested, nevertheless the patient was so overcome by the previous floodings, that she sank in fifteen minutes after the child was removed. The only doubt that occurs to us in this case is, whether the patient sunk *because* the child was removed; whether the contracting womb, taking the pressure off the great venous trunks, did not turn the scale against her. But, had Dr. Waller dared to leave the child in the uterus, while it could be so easily taken away, to what opprobrium would he not have been exposed, had the woman died? Nevertheless, to leave the child until she was more perfectly recovered, would have given her, it appears to us, her only chance.

These instances we have selected, because they may be con-

trasted, and have been reported by gentlemen who have been perfectly impartial observers of the controversy carried on respecting the proposal to separate the placenta artificially; who have been neither advocates nor opponents of the practice, and on whose testimony, consequently, the strictest confidence may be placed.

In the preceding lecture (pp. 446 *et seq.*), we pointed out to you the resources of Nature in arresting unavoidable hæmorrhage—that her remedy consists essentially in detaching the placenta from the surface of the uterus. We have now given you reasons why we should not adopt this practice in all cases of placental presentation, and will now consider how far this imitation of Nature may be applicable in certain exceptional cases, where the legitimate practice of turning the child cannot safely be adopted.

Extreme Exhaustion in the patient is one of these exceptions. We trust that we have given you sufficient proof that, in such instances, turning the child is particularly dangerous: we have quoted some convincing examples to testify the powers of Nature in arresting hæmorrhage even in these unfavourable circumstances, although she sometimes failed in saving the patient. It now remains for us to determine whether artificial separation of the placenta may be safely adopted—that is, whether it will arrest or increase the flooding; because, in such a hazardous emergency as this, the safety of the mother only must be consulted—the child is but a secondary object. We shall again bring before you the evidence of Dr. Waller, because he was "not an unconcerned spectator of the controversy which has of late been carried on regarding the mode to be adopted in the treatment of placenta prævia, but preferred delaying an opinion until he was enabled to form one from facts which had occurred under his own especial notice"; and further, because "he entered upon the inquiry with a strong prejudice against the new method, it being contrary to what he had been taught, and equally opposed to what he had been long teaching others, to suppose that it would be a safe practice to effect a complete separation of the placenta from the walls of the uterus whilst the fœtus was still within its cavity." (*Medical Times*, Jan. 8, 1848, p. 233). In

one case (24), Mr. Doughty requested Dr. Waller's assistance in the early stage of the labour before serious exhaustion came on. The placenta was felt encircling the os uteri: a small portion was detached anteriorly, through which the funis had descended. The os uteri was considerably dilated; the undilated portion was rather firm; bleeding was going on, but it was not excessive. "Prior to turning, I detached the placenta entirely from its connection with the uterus, for the purpose of ascertaining whether the hæmorrhage would be thereby increased. I thought this a favourable opportunity of testing Dr. Simpson's plan, knowing that, if alarming symptoms came on, I had the labour under my own control. *No hæmorrhage followed the separation.* The hand was carried forward, and the child extracted: although in a state of asphyxia, the ordinary means succeeded in restoring it. The mother had no bad symptom, recovering as quickly as she had been accustomed after an ordinary confinement." (*Medical Times*, Jan. 15, 1848, p. 257). In another case (27) of partial presentation, the uterus rigid, the os very partially open, there was considerable hæmorrhage. "As there was no possibility of turning, when I [Dr. Waller] first saw the patient, the placenta was detached, and dilatation waited for. *No hæmorrhage occurred;* and, in less than twelve hours afterwards, turning was had recourse to, and a dead child extracted." (*Ibid*).

Dr. Waller's case was reported in 1848; but since then we have a mass of evidence on the point which seems to us conclusive.

Dr. Trask, of New York, has taken great pains to investigate this question. He has collected and compared 353 cases of placental presentations derived from all sources; he may be looked upon as a perfectly impartial inquirer, and arrives at the following results.

Of these cases, 169 were complete, and 88 partial presentations of the placenta; the exact position of the placenta is not stated in 96 cases. The whole number (353) are divided into three classes of cases:—

1. Cases delivered before the separation of the placenta	251
2. Cases of spontaneous expulsion of the placenta	36
3. Cases of artificial separation of the placenta	66
	353

In each of these classes, there were certain cases so imperfectly given that no conclusion could be drawn from them; thus, in the cases of spontaneous expulsion, seven are omitted, leaving twenty-nine, and so on; but sufficient remain to prove the important questions we are considering. The results as to the most frequent modes of delivery may be thus stated.

Mode of Delivery.	Total.	Mothers.		Proportion of Deaths.	Children.	
		Living.	Dead.		Living.	Dead.
Turning.....	200	141	59	1 in 3·4	56	80
Spontaneous explsn.	29	27	2	1 in 14	3	19
Artificial separation.	66	47	13	1 in 4·6	15	32
	295	215	74	1 in 3·9		

Dr. Trask observes (*Prize Essay*, Philadelphia, 1855), "There were 200 cases of turning; 141 recovered, and 59 died, or one in three and four-tenths" (p. 46); and, "we have forty-seven recoveries and thirteen deaths, or one in four and six-tenths, as the gross mortality *after artificial separation*, while that after spontaneous expulsion is a trifle less than one in fourteen" (p. 82). Dr. Trask further refers to Dr. Simpson's collection of 654 cases (*Lancet*, 1847), to which he has added 284 since published, making a total of 938 cases of placental presentation, in which there were 237 deaths, or one in 3·95. "The mortality of those cases in our first table," (delivery by turning, etc.) "in which the presentation of the placenta is noted, is precisely the same, viz., 66 deaths to 195 recoveries, or one in 3·9 of the whole" (p. 83).

After the most cautious and careful inquiry, Dr. Trask arrives at the following conclusion: "That the gross mortality after artificial separation of the placenta is, therefore, *somewhat less* than the general mortality under ordinary modes of treat-

ment, and especially *less than after turning*, but it is very much greater than after spontaneous expulsion" (p. 83). Dr. Trask has analysed those cases in which artificial separation had been adopted, both as to the position of the placenta and the condition of the patient prior to its separation. He finds 35 cases of complete presentation, and only seven of partial; and the large majority (31) were cases of "alarming prostration." "From this comparison" (he observes) "it is very plain that the 66 cases in which the placenta was artificially detached embrace a considerably larger proportion of severe cases than is ordinarily met with; indeed, the mild and severe cases among these correspond remarkably not only in proportion, but in numbers, with those among the deaths just given above; that is, they were, as a whole, previous to the separation of the placenta, suffering apparently about an equal degree of exhaustion with those patients who, subject to the ordinary treatment, died."

Again, we have still later (1861) the able researches of Dr. William Read, of Boston, Massachusetts (*Library of Practical Medicine*, vol. xxiii.), who has collected not less than 910 cases, from Portal, Mauriceau, and the earliest writers down to the present day. These he has carefully analysed; he has given a short abstract of each case, and has collected them under eight different heads. To use his own words:

"In the first Table will be found fifty-two cases, where the placenta was *spontaneously expelled*, and the child born by the unassisted uterine contractions.

"In Table second, will be found twenty-six cases *of spontaneous separation of the placenta, with artificial delivery of the child.* That is to say, that the pains were vigorous enough to throw off the placenta, but not sufficient to complete the labour.

"In the third Table, we have *artificial separation of the placenta, with natural delivery of the child.* That is to say, the placenta having been completely detached from the uterus, the labour was finished by the pains alone. In this table, there are thirty-one cases.

"Table fourth includes those cases in which *both placenta and child were artificially delivered.* Of these were fifty-one cases." In these cases, the placenta was removed first, the child then delivered.

"Table fifth contains those in which the placenta was *partially detached*, and *natural delivery* of the child followed. That is to say, room enough was gained by detaching a portion of the placenta to permit the passage of the child, but without entirely cutting off the circulation between the fœtus and mother. This table contains 123 cases.

"Table sixth includes those in which, with *partial detachment* of the placenta" (in introducing the hand) "resort was necessary to *artificial delivery* of the child. This table contains 555 cases.

"Table seventh collects all those cases in which *the placenta was perforated*, and the child variously delivered. It contains forty cases.

"Table eighth exhibits those (32) in which *the mother died undelivered*."

Omitting this last table, as proving nothing, we have arranged the remaining seven tables in such a manner as will shew the proportionate mortality in each of these divisions. It is right to state, however, that many cases were imperfectly recorded. The result to the child is sometimes omitted, but that to the mother is generally given sufficiently to prove the questions under discussion. We have placed together the total

Classes of Cases.	No.	Mothers.		Mortality	Children.	
		L.	D.		L.	D.
1. Spontaneous expulsion of placenta and child	52	43			11	26
2. Spontaneous expulsion of placenta, artificial delivery of child . .	26	21	5	1 in 5·2	2	17
3. Artificial separation of placenta, natural delivery of child . . .	31	28	2	1 in 15·5	3	24
4. Artificial separation of placenta, artificial delivery of child . . .	51	40	11	1 in 4·6	9	24
	160	132	18	1 in 9	25	91
5. Partial separation of placenta, natural delivery of child . . .	123	109	14	1 in 9	56	55
6. Partial separation of placenta, artificial delivery of child . .	555	416	139	1 in 4	223	246
7. Perforation of placenta, artificial delivery of child	40	29	11	1 in 3·7	12	20
	718	554	164	1 in 4·3	291	321
General Total	878	686	182	1 in 4·8	316	412

results of those cases in which the placenta was either spontaneously expelled or separated previously to the birth of the child, so as to compare them with those cases where the placenta was removed afterwards.

These tables place the general mortality (1 in 4·8) somewhat lower than those of Dr. Trask, but agree with his in proving the greater mortality in cases where, according to the usual practice, the placenta was either partially separated or perforated, and the child delivered by turning, than in those in which it was either spontaneously expelled or separated and removed before the birth of the child. Hence, then, the assumed danger of separating the placenta before the birth of the child is disproved. The danger concerns the child, not the mother, as is obvious from the tables. Dr. W. Read's researches demonstrate, also, other important facts. They shew that if the uterus maintain its force it will arrest the hæmorrhage by *separating the placenta*, and generally save the patient. Thus, as we have said, "Nature averts the consequences of this dangerous displacement" (p. 447). They prove, also, that the atonic condition of the uterus, the result of hæmorrhage, is the great danger; and that it is, in those cases, safer (Table III) to separate the placenta, and leave the child to the natural efforts, than to deliver it by art, as in Tables IV and VI. Drs. Trask and Read both prove the danger of turning in exhaustion, and the safety of separating the placenta.

If it should unfortunately happen that you are called to a case of extreme exhaustion—if you find your patient almost pulseless, with cold extremities, cadaverous countenance, perhaps tossing herself about the bed, in the effort to breathe—we have no hesitation in telling you to remove the placenta at once; to plug the vagina immediately afterwards; to give her a large dose of laudanum (forty minims) in brandy; to support in every way the temperature of the surface; and, if you find the action of the uterus still feeble, you may try the electric current to promote its action. (We presume, of course, that the apparatus has been previously prepared for you.) But should the pulse be restored, and reaction at all take place, we think you will find that a full dose of ergot of rye will sufficiently answer the purpose. We

do not ask you to remove the child even then, because we are very doubtful that any advantage is gained by doing so. The source of hæmorrhage is not at the fundus, but in the cervix uteri, exactly where it is compressed by the head of the child on one side, and the plug at the other; which, it appears to us, will far better control any subsequent bleeding from the sinuses than the removal of the child from the cavity of the uterus. Besides, there is a double risk in such an operation: your patient may be unable even yet to bear the shock that we know it produces, notwithstanding the reaction and signs of amendment. It is also doubtful, as we have stated, whether the sudden emptying of the uterus might not be attended with fatal consequences, when the pressure is suddenly taken off the great venous trunks in the abdomen, which are imperfectly filled with blood. It might be thought unnecessary to plug the vagina after the removal of the placenta, inasmuch as hæmorrhage ceases on its separation. We advise it as a *precautionary* measure, to meet the possible contingency that hæmorrhage may occur. There is no rule without its exception; and although in ninety-nine cases no flooding may follow, in the hundredth you may regret not having plugged the vagina.

Rigidity of the Os Uteri we have found an impediment to delivery in some of the cases just related. We have, therefore, to consider its treatment in cases of unavoidable hæmorrhage. You can readily perceive the risk, in such a complication, of laceration in the attempt to force the hand into the uterus. We have already alluded to Naegele's experience of this accident. He mentions cases of placenta prævia, where the child was turned and delivered with perfect safety, but a continued dribbling of blood remained after labour, which resisted every attempt to check it. "On examination after death, Professor Naegele has invariably found the os uteri more or less torn." Dr. R. Lee's twenty-third case seems to illustrate this:—"Hæmorrhage at the eighth month; three attacks during one month at long intervals, renewed spontaneously with the utmost violence; *os uteri thick and rigid;* vagina filled with coagula; placenta adhering all round the inner surface of cervix; artificial dilata-

tion attempted without success; membranes about to be ruptured when two fingers were passed between the placenta and uterus; a foot was felt and brought down into the vagina, and turning accomplished with great difficulty, *from the orifice of the uterus grasping like a rope the neck of the child.* Labour completed in half an hour by artificial dilatation, but the hæmorrhage continued in spite of all treatment, and complete exhaustion followed. She died in half an hour from loss of blood." (*Clinical Midwifery*, p. 377).

Dr. Collins gives a case of laceration of the uterus (No. 34) in unavoidable hæmorrhage. "There was no hæmorrhage on admission, but on examination the placenta was found at the mouth of the womb, which was not more dilated than the size of half-a-crown, with its edge thick, but not very rigid. . . . . About an hour and a half after admission [into the Dublin Lying-in Hospital], suddenly the most profuse hæmorrhage set in, so much so, that in two or three minutes the blood was running in every direction over the edge of the bed : this was consequent on some slight uterine action. There being no chance of life without speedy delivery, we determined to make the attempt, *though the parts were badly prepared:* accordingly the hand was very slowly and cautiously introduced, and the feet brought down with little exertion : the uterus acted strongly, and felt well contracted after delivery. The placenta came away with the child. Great debility succeeded the operation, with a slight discharge of blood at intervals; and, on examining an hour after, a laceration of the neck of the uterus anteriorly, and to the right side, was discovered, commencing at its junction with the vagina, and extending upwards. She died shortly afterwards." (*Practical Treatise*, p. 28). The child was saved.

These cases related by authorities of the greatest practical experience are sufficient to prove the danger of introducing the hand into the uterus through a rigid os uteri. Dr. Collins's case was particularly striking, because the os was not very rigid, the greatest care was used (and we have personal experience of Dr. Collins's caution): nevertheless, the uterus was ruptured. Should we separate the placenta here also ? If in such a difficulty we

had no other alternative than to separate the placenta, or to turn the child, we certainly should prefer the former as a less dangerous operation; but if we reflect a little on the cause of the rigidity, we shall not often be placed in such a dilemma as this. Our own experience points out to us, that rigidity, such as is met with in difficult labour, very seldom occurs in an unavoidable hæmorrhage. The very presence of flooding prevents the os uteri from becoming rigid, and generally renders it rapidly dilatable. The cause of rigidity here is the resistance of the cervix *unprepared for dilatation.* Hæmorrhage may occur prematurely at the seventh or eighth month; the patient is at once reduced to the utmost danger by the flooding, if the os uteri be not ready to yield: the cervix is not sufficiently unfolded, but the practitioner, impressed with the conviction that something must be done instantly, forces his way into the uterus through all opposition, and a fatal result is the consequence. But if it were possible for us to retard the flooding in the first instance, so as to give the uterus time to dilate, it would do so more rapidly than under ordinary circumstance, and this danger might be, perhaps, avoided. We think that, if the means that we have before mentioned, the compression of the placenta, were properly carried into effect, it might save us from so great a hazard. If the membranes were ruptured, the waters discharged, the vagina carefully plugged, and ergot of rye with opium given, the hæmorrhage would be sufficiently stayed to give time for the os uteri to dilate. If, however, our efforts failed, we should separate the placenta in preference to turning, because it seems to us much less dangerous to pass one or two fingers within the os uteri, than to force the whole hand and arm through it while in this rigid state.

Summary. To sum up, therefore, the rules which we wish you to follow as the result of this discussion, protracted beyond what we could wish, we would advise you—

1. *In a case where no exhaustion has taken place,* or where it is but commencing, to turn and deliver the child the moment the os uteri is sufficiently dilated. If it be dilatable (and this is generally the case), you may pass through it, although it be not

larger than a crown-piece. If it be not so, by properly compressing the placenta, and using other means to support the circulation, you will prevent exhaustion from increasing, until you can deliver the patient.

2. *In a case of extreme exhaustion*, with frequent fainting, fluttering pulse, rapid, laboured, perhaps stertorous respiration, blowing of the cheeks, jactitations, incoherency, general pallor and coldness of the surface, do not attempt to turn the child; rather separate the placenta, and leave the child undisturbed, until some decided reaction takes place. We are aware that this rule is a direct infringement of the principle of those who look with horror on the risk of allowing a woman to die undelivered. It appears to us to be the only chance of preventing her death.

3. *When the os uteri is rigid*, use every means to compress the placenta, and to increase the action of the uterus, so as to give it time to dilate, and to enable you to turn; but if hæmorrhage so increase as to cause a dangerous degree of exhaustion, separate the placenta rather than force your hand and arm into the uterus.

LECTURE XXVIII.

SPECIAL FORMS OF HÆMORRHAGE (*continued*).

POST-PARTUM HÆMORRHAGES may occur either before or after the separation of the placenta: they are far more frequent than those we have been considering, and are too often the result of mismanagement. Those that happen before the expulsion of the placenta are generally the most serious. In a former lecture (xiv. pp. 225-9) on the Management of Natural Labour, we pointed out to you the importance of allowing the uterus to expel the child slowly, and, while it is doing so, of supporting the contracting fundus with the hand, so as steadily to compress it; we stated to you the necessity of bandaging the abdomen after

delivery, so as to maintain a moderate pressure on the fundus; and we cautioned you strongly against leaving the patient too soon, lest she might be disturbed. An over-anxious nurse, too solicitous to make her patient "clean and comfortable," will take immediate advantage of your absence, and will most officiously busy herself in changing her apparel, removing the soiled bed-clothes, etc. Your patient is consequently moved about, made to sit up perhaps, and never allowed to be at rest until the nurse is satisfied. Now a neglect in any one of these particulars may cause retention of the placenta and hæmorrhage. If you leave the uterus to itself, it may contract irregularly; if it be not supported afterwards, there is the risk of its suddenly relaxing, and becoming filled with coagula: but if the nurse officiate in the manner we have described, there is the greatest possible chance that flooding will be the consequence.

Hæmorrhage, however, may occur notwithstanding the best and the most careful management. Some women are greatly disposed to plethora; even during pregnancy there is a tendency to hyperæmia, and during labour the circulation is highly excited. After delivery, if not before, violent flooding takes place. On the other hand, the constitution of some patients is in a state precisely the opposite: there is a disposition to anæmia; the uterus contracts imperfectly, and in such a habit slight loss of blood may be followed by exhaustion, and a most dangerous increase of hæmorrhage. All these several causes may produce flooding after the birth of the child; but the first, that arising from mismanagement, is by far the most frequent.

HÆMORRHAGE BEFORE THE SEPARATION OF THE PLACENTA may depend either upon inertia of the uterus, on irregular contraction of its fibres, or upon morbid adhesion of the placenta to its surface.

Inertia of the Uterus is equally the cause and the effect of hæmorrhage. If the uterus become exhausted from long-continued efforts to expel the child, if it be enfeebled by any constitutional cause, hæmorrhage is the consequence. At first, perhaps, it is slight; but, as the debility of the uterus increases, it soon amounts to profuse flooding: the patient is placed at once

in extreme danger, and the practitioner is in equal difficulty to cause efficient contraction of the uterus. This want of contractile power in the uterus becomes the chief object of his attention.

The *Symptoms* that characterise this condition of the uterus are very different from those that attend a mere suspension of its action after labour. The placenta is often retained simply because the uterus is not sufficiently excited to expel it, and the term "inertia" is as frequently misapplied in the latter as it is correctly used in the former case. You should be careful, therefore, not to confound the one with the other, but to recognise true inertia as soon as it presents itself: you may do so before any hæmorrhage takes place, even when the child is being expelled. The fundus of the uterus has not its usual firm feel under the hand: it seems spongy or like dough, and is larger than it ought to be, because it very seldom contracts to its full extent. After the delivery of the child, the uterus does not remain contracted. You may have followed the contracting uterus with the hand, moderately compressing it, and in a short time you find that it has eluded your grasp, and cannot be felt. Strong frictions over the lower part of the abdomen may again excite its action; but only for a moment—again it is lost. While this want of tone is observed in the uterus, there is a corresponding amount of constitutional irritation in the patient. The pulse is increased in frequency, and assumes the jerking hæmorrhagic character; the patient is watchful and restless; she complains of sinking, and does not experience the usual relief from the termination of her sufferings. All these symptoms may precede any hæmorrhage, and should be most carefully watched: they are the monitors of what is approaching. Hæmorrhage generally begins with a slight draining from the vulva, just sufficient to keep the napkins saturated; but in a short time, if no means for prevention be used, the stream rapidly increases to a torrent, deluging the bed, and forming a pool on the floor beneath. If the attendant be not on his guard, this may be the first notice of danger, because the patient is sometimes too much exhausted to give any intimation of her condition; she lies on her side in a

listless, dozy state; syncope may follow, and hæmorrhage for a moment cease; it soon, however, returns with the pulse, and a violent gush of blood places the patient at once *in extremis;* a more prolonged syncope returns, from which she may never recover. Sometimes a fit of convulsions precedes dissolution. In this description we have assumed that there was either none or at least a very inefficient assistance, because we know of no case in which well-directed treatment is more effectual in arresting fatal consequences. By coolness and decision you may save your patient absolutely from the jaws of death: but if placed on your guard by premonitory symptoms, you ought generally to avert the occurrence of such extreme symptoms. We say generally; because there are some melancholy exceptions in which a feeble constitution is irrecoverably prostrated by the first discharge.

The *Treatment* of such cases must be directed, 1. To restore the tonic contractile power of the uterus: 2. To remove the placenta: 3. To prevent, as far as possible, any subsequent relaxation of the uterus.

1. *To Restore the Tonic Contractile Power of the Uterus.* In order to accomplish this object, you must endeavour by every means in your power to support the general circulation. Without attention to this, mere local treatment would be utterly inefficient, and might possibly increase the danger. If there be great exhaustion, the patient should be given a drachm of tincture of opium in brandy: this may be repeated in more moderate doses, until the pulse becomes steady. If the stomach be very irritable, and reject this, it will sometimes bear cold broth, and morphia may be substituted for tincture of opium. Smellie used to give portable soups dissolved in water. The patient should be kept in a perfectly horizontal position, which is not very easy when exhaustion is commencing. The arms and legs should be wrapped in hot flannels and blankets, the curtains drawn back, the window raised, and a free circulation of air secured in the apartment. Locally, every means must be employed to retard the force of the circulation in the uterus. The most convenient mode is to have a bucket containing flannels, over which may be placed lumps of ice, and a sufficient quantity of water thrown over the whole.

These flannels may be wrung out, and applied from time to time to the hips and vulva. At the same time that these means are being carried into effect, the strongest pressure should be maintained on the fundus uteri, to prevent its relaxation. The success of your treatment becomes evident when you feel the fundus first becoming distinct, and then more firm, under the hand. In many cases the pressure is sufficient to cause the expulsion of the after-birth; but if not, it must be renewed.

2. *To Remove the Placenta.* For this purpose, let one hand still compress the fundus; or assign this duty to an assistant, clearly explaining what is to be done; and then pass the hand into the vagina to the os uteri. Sometimes, by drawing down the hand again slowly, the back of it being pressed strongly against the posterior wall of the vagina and the perinæum, the uterus is excited to contract and expel the placenta into the vagina, whence it may be removed. If not, draw down the funis to its full extent, as far as it will go, and let the hand in the vagina, guided by it, press forward into the uterus. The fingers formed into a cone will readily dilate the os uteri sufficiently to admit the hand; and here, again, it sometimes happens that the act of dilatation will excite a sufficient contraction to expel the placenta; if not, you must proceed; but, as a precaution, it would be well to give the patient a full dose of opium previously to entering the cavity of the uterus. When the placenta is reached, do not at once seize it in order to draw it down; rather seek to pass the hand above it, towards the surface of the cavity of the uterus. This portion of the uterus is now placed between the introduced hand and that which compresses it externally through the abdomen; by increasing this pressure, the irritation very seldom fails in causing the uterus to contract; the moment this is observed, let the hand be slowly withdrawn, having the whole placenta within it, and let a strong pressure be made on the fundus uteri externally. Thus, the placenta may be safely withdrawn; and, if the uterus be properly secured, no further hæmorrhage will take place.

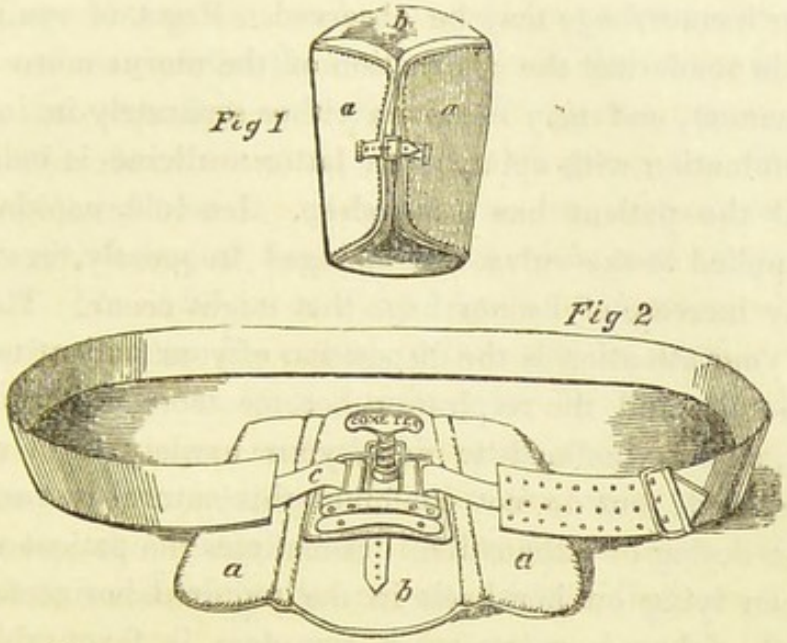
3. *To Prevent, as far as possible, any Subsequent Relaxation.* When contraction of the uterus takes place, and it is made thus

o expel the hand and the placenta, from that moment the compressing force cannot be taken from the fundus, because there is a constant tendency in the uterus to relax again, and if it does so, hæmorrhage is renewed. To prevent this, it is often necessary to press very firmly with both hands, and to continue this pressure for some time: if you be fatigued, an assistant may take your place; but you must be particularly careful that he understands your object, because we have seen more than one instance where pressure was made everywhere but where it should be. But compression of the uterus, when made properly, becomes an extremely efficient mode of preventing relaxation. In order to insure this effect, by the continuence of the pressure, the abdomen must be very carefully bandaged.

The *application of the bandage* requires great attention; your object now is much more than to give the uterus moderate support. It is necessary to compress it firmly; therefore compresses are essential, as the bandage alone is insufficient. Several napkins, rolled up about the size and shape of folded stockings, may be applied on each side of the uterus; others, as pads, above the fundus, but in a manner that each pad may be larger than that beneath, so as to form a kind of inverted pyramid, pressing down upon the fundus. The whole should be kept in their position by the bandage drawn as tightly as possible over them. When a patient is bound up in this manner, she suffers, when she is recovering, no small inconvenience from the tightness of the bandage: there is the greatest possible desire to take out a pin or two to get relief, but if this be done the compresses are all deranged, and perhaps the hæmorrhage may be renewed. A patient who has just escaped the fatal effects of hæmorrhage cannot, therefore, be left to herself, or be exposed to the risk of its renewal. If the bandage be unpleasant to bear, cautiously loosen and re-pin it; but, if the least draining appear, you must continue the pressure as before. Several contrivances have been suggested to prevent an inconvenience of this kind, and at the same time to regulate the amount of pressure more accurately. The late Mr. J. R. Pretty contrived a very ingenious instrument. The following is his description of the bandage:—"It consists of three

pads, the central one being the largest; the lateral ones are thicker and narrower, and fold over the central one when not required for use; these can be carried separately from the belt,

Fig. 133.*



etc., and when together are not larger than a small book. The belt is of webbing, about three inches wide, and is fastened by a buckle and strap. It has attached to it Mr. Coxeter's improved tourniquet, the screw of which is only half the length of the one on the old principle, and yet it raises as much web; so that this is easily carried." (*Medical Gazette*, Jan. 16, 1846, p. 117.)

The object of this bandage is to maintain pressure on the uterus laterally as well as above the fundus, and to increase or diminish the pressure by means of the tourniquet: thus you may cautiously relax the pressure, or again increase it to any extent, without disturbing the abdominal bandage, which, in this case, need not be so tightly applied as when you have no additional means of increasing the compressing force.

Although the hæmorrhage is thus arrested, your anxious duties

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* Fig. 133. Mr. Pretty's bandage. 1. Pad folded; *a a*, lateral pads clasped; *b*, central pad. 2. Pads opened; *a a*, lateral pads; *b*, central pad having the tourniquet, *c*, attached to it.

have not yet ceased; the state of the circulation and of the nervous system must be closely watched. So long as the pulse preserves its hæmorrhagic character, is quick, compressible, and jerking, or if the patient remain watchful and restless, she is not safe, although no further hæmorrhage may be observed. Ergot of rye is then valuable in rendering the contraction of the uterus more steady and permanent, and may be given either separately in infusion, or in combination with opium; the latter medicine is indispensable until the patient has some sleep. Ice-cold napkins must still be applied to the vulva, and changed frequently, in order to notice any increase of hæmorrhage that might occur. The chief object of your attention is the disposition of your patient to sleep: when the pulse and the respiration become more uniform, if she lie quiet, and is inclined to dose, your anxiety is in a great degree relieved; but do not confound this natural rest with the stertorous dosing of exhaustion. Sometimes the patient will not sleep when lying on her back in the required horizontal position; and, although every other symptom is favourable, this watchfulness will cause you uneasiness. When this is the case, it is advisable to change the patient cautiously to her side, and at the same time to interpose a dry warm sheet between her hips and the bed, already sufficiently saturated. The room should be kept as cool and as well ventilated as possible, and at the same time perfectly still; the senses are now unusually acute, and the slightest sound disturbs the patient. If you succeed in this treatment, and two or three hours' rest be procured, the circulation is quite restored, all nervous irritation has disappeared, and the patient rapidly recovers.

Irregular Contraction of the Uterus is frequently attended with hæmorrhage, but generally not so severe as in the former case; the fact of the uterus being contractile makes an important difference. The fundus is sometimes very unequally contracted, which you may not perceive if you examine only its anterior surface. When the hand is placed on the abdomen, the uterus may feel sufficiently contracted, and yet the placenta is retained, and hæmorrhage takes place: and, if a more careful examination be made, you will find the cause of this condition. Sometimes the

posterior surface is relaxed, or perhaps one side of the fundus is contracted, and the opposite not so. Whenever, therefore, the placenta is retained, and hæmorrhage occurs while the uterus seems to be contracted, do not at once decide that there is an hour-glass contraction, and proceed to remove the placenta; rather seek to equalise the contraction of the uterus by pressing firmly, but equally, over the whole fundus; pass the hand posteriorly over its sacral surface, and grasp the sides of the fundus with both hands: this irritation often succeeds in restoring the proper order of uterine contraction, and expelling the placenta. If this be not sufficient for the purpose, the hand may be introduced into the vagina, within the os uteri, or into the cavity of the uterus, in the manner we have described in cases of inertia: the uterus will then contract and expel the placenta. It is very seldom necessary to enter the cavity of the uterus in these cases; the uterus has not lost its contractility, and is therefore much more easily excited into action than when there is inertia.

Stricture of the Cervix Uteri is not by any means a frequent cause of retention of the placenta; and when it happens, if hæmorrhage take place, it is generally internally into the cavity of the uterus. The placenta is usually detached from the surface of the uterus, and is only prevented from passing into the vagina by the stricture. The blood, that in other cases flows away, collects and coagulates above the placenta. The coagula increase in size and number until they distend the uterus; their irritation excites its action, and an increased discharge of blood and more coagula are the result; the uterus yields to the distension until it becomes almost as large as it was before delivery, and internal hæmorrhage to a very serious extent sometimes takes place: symptoms of exhaustion suddenly present themselves, and the patient is at once found to be in the greatest danger, when perhaps the practitioner has been very patiently expecting the delivery of the placenta, quite unconscious of what has been going forward, because no discharge from the vagina has been observed. The pulse is feeble, almost imperceptible; the patient

is restless, and disturbed by retching; the uterus is enormously enlarged.

The *Treatment* of such a case is obvious. The stricture must be overcome, the placenta and coagula removed, and the contraction of the uterus permanently secured. In order to relieve the stricture, it is necessary to draw down the funis, and, keeping it on the stretch, to pass the hand along through the vagina and os uteri into the cavity of the cervix: this seems larger than might be expected, and hence you might readily imagine the hand was in the cavity of the uterus; but if the funis be still followed, it will be found passing through this cavity by an opening that seems like a rent in the uterus—the stricture of the cervix. When you arrive thus far, it is necessary to proceed cautiously; one or two fingers may be first introduced, and an effort gently made to distend it; a third may be admitted, and a fourth, until you have a cone formed by the fingers, which may be pressed steadily forwards through the stricture. At first the stricture offers great resistance, but when it yields, it generally does so rapidly, and admits the hand into the cavity of the uterus: here you find the placenta and an enormous quantity of coagula, all which must be removed with great caution. If they were suddenly withdrawn, hæmorrhage and a dangerous syncope might follow. It would be desirable to previously give the patient some stimulant, with opium and ergot; in fact, to use every means to induce an uniform and adequate contraction of the uterus, while the hand is being withdrawn with the placenta and the coagula. When this is accomplished, there is not so much danger of any subsequent relaxation of the uterus, as there is no inertia; but it would, nevertheless, be advisable to guard against its occurrence.

These cases are sometimes called hour-glass contractions of the uterus. One cause of deception arises when the attempt is made to pass the hand into the uterus. The hand and arm enter the vagina, pushing the uterus before it so high, that the practitioner supposes he must have entered the uterus; he then feels the os tincæ contracted, gets the fingers and hand through it into the cavity of the uterus, and removes the placenta,

which he is now convinced was retained by an hour-glass contraction of the uterus, the os uteri being mistaken for the contracted portion.

The accident which may truly be called "hour-glass contraction" is, according to some authors, of frequent occurrence; they record many instances of it: others, however, speak of it as being rare. We are inclined to the latter opinion; we do not think it at all so frequent as it is described: very few cases of it have fallen under our own observation, although we have been summoned more than once to supposed cases of hour-glass contraction, when none at all existed, the mistake arising in the way we have explained—the os uteri being mistaken for the stricture. You must therefore be cautious to avoid confounding the one case with the other, and to recollect that in true hour-glass contraction the hand passes, as it were, through a double stricture, the first being at the os uteri.

Morbid Adhesion of the Placenta, when it is partial, always causes hæmorrhage, but when it is complete does not do so. The latter, however, is very rare; we can only remember to have met with one case of the kind: the former variety is frequent, and is the proper object of our attention. Hæmorrhage from this cause is not generally so severe as in inertia uteri, because the uterus is, to a certain extent, contracted, and the morbid alteration in the placenta assists in preventing the flow of blood from this source: there is generally a draining hæmorrhage going on for some time, until the constitution begins to feel the effect of it; exhaustion suddenly presents itself, with an increase of the hæmorrhage, and the patient is placed at once in danger.

Morbid adhesion may be readily ascertained by observing the effect of pressure on the fundus uteri—it feels hard and firmly contracted, nevertheless the placenta is unmoved. If, while pressure is so made, the funis be drawn down to its full extent, it may be brought out of the vagina some distance, just as when the placenta is following it; but the instant that the hand is removed and the uterus ascends, the funis is drawn up again into the vagina.

When the cause of retention is known, there is only one mode

of *Treatment*—the placenta must be removed. The funis will conduct the hand to the placenta, generally somewhere near its centre: from this point the fingers should be directed towards the circumference, so as to find the portion that has been detached; when this is found, the separation of the remainder is generally easy; but it is very necessary to separate the placenta, if possible, completely, to leave nothing behind, because a very small part of the placenta thus allowed to remain attached may continue the hæmorrhage to a serious, if not to a fatal extent. Sometimes you may not be able to find an unattached portion, in which case the separation is rather more difficult. The margin of the placenta is not so easily ascertained as you might suppose: the smooth membranes that cover its fœtal surface prevent you from detecting the edge of the placenta plainly; you cannot use the eye; you may feel the soft mass of the placenta, and can distinguish it from the firmer and more unequal surface of the uterus; but it is necessary to break through the membranes to detect the edge of the placenta. This is often very difficult to separate, because it adheres so firmly to the uterus; but when it is detached, the remaining portion peels off easily. The nature of the adhesion, however, may prevent this: the vessels of the placenta may be broken through, the fingers become entangled; and the greater portion is removed, but some part is left behind. In such cases the closest attention must be paid to the subsequent treatment of the case: there is a risk that hæmorrhage may be renewed, but the chief danger to apprehend is absorption of the decomposed and putrid residue of the placenta into the circulation.

Hæmorrhage after the Separation of the Placenta may depend upon inertia of the uterus, upon an over-excited circulation in a plethoric patient, or upon mismanagement. The last is by far the most frequent cause: the patient may be too soon disturbed after her delivery, for the purpose of changing the dress or bed-clothes, or her friends may keep her in a constant state of excitement by their kind but too officious congratulations. The result is flooding. Again, if she escape these dangers immediately after delivery, your patient may be allowed perhaps on the third or fourth day to get out of bed: the circulation is again

excited in the uterus, still very large and easily distended, and hæmorrhage is the consequence. She is not even safe on the tenth or fourteenth days. One of the most alarming hæmorrhages we ever had to treat occurred on the tenth day after delivery. The lady had gone on very well up to that time; but while she was sitting up in the evening in her bed-room, enjoying a hearty supper and the society of some friends, the stimulus of the one and the excitement of the other brought on a most unexpected and violent flooding, which required the utmost exertions to arrest. All these cases are derived from mismanagement. Plethoric habits are very liable to hæmorrhage after the separation of the placenta; and of these, some may be said to have a hæmorrhagic temperament. The circulation is excited to a great degree during labour; and if the patient escape hæmorrhage before delivery, if your cautious management prevent flooding before the expulsion of the placenta, still it is sure to follow sooner or later afterwards. This is the kind of case which Gooch describes, when he speaks of hæmorrhage notwithstanding the uterus being contracted: "For many hours before the accession of labour the patient was flushed, and had a very full quick pulse. Abstinence from meat, wine, and warm drinks, a cool room, and a saline purgative, diminished but did not remove this state of the circulation, which continued in a considerable degree when the child was born; it was expelled very gradually, and after the removal of the placenta the uterus felt in the hypogastrium contracted in the ordinary degree; nevertheless, about twenty minutes afterwards, there came on one of the most frightful hæmorrhages I ever witnessed" (*Diseases of Women*, pp. 333-4). This patient had similar attacks in every succeeding confinement; nor were they prevented, until Gooch, for some time before labour began, placed her under the strictest surveillance. By a rigidly abstemious diet, saline purgatives, a scruple of nitre three times a day, he at length succeeded. "After the birth of the child, and the removal of the placenta, the uterus contracted not more than in her last labour; but not the smallest degree either of flooding or faintness took place." We cannot express better the mode of managing these cases, than in his own

language. "How often," he says, "a disturbance of the circulation plays an important part in uterine hæmorrhage, it is difficult for an individual to know; but I suspect sufficiently often to deserve the especial attention of practitioners. I advise them, when they meet with patients subject to hæmorrhages after delivery, to notice the state of the circulation before labour, and, if disturbed, to employ means for tranquillising it before labour comes on. I advise them during labour to use cordials cautiously" (we should say not at all) "lest the placenta should separate during an excited state of the circulation. I advise them after delivery, though the uterus may feel contracted, to be slow to leave their patient, if the circulation is greatly disturbed" (*Ibid.* p. 338). In these directions we cordially agree.

Uterine Inertia sometimes continues longer after a delivery than might be expected, and will cause hæmorrhage even at the tenth or fourteenth day. We witnessed the occurrence on the tenth day of flooding, which was nearly being fatal, in a poor emaciated woman, to whom we have already alluded in a previous lecture (xv. p. 238). By careful attention to her while in the hospital, she gradually gained strength; but on the tenth day, while she was sitting up for the first time, flooding came on, attended with syncope and great exhaustion. She would have died, had it not been for the most energetic measures. We think that opium, in large doses, saved her. The case, however, forms a striking contrast to Gooch's, and shows you how the most opposite causes often lead to precisely the same results. To treat a case of this kind successfully, you must, as in the former instance, commence before labour, and follow a course opposite to that recommended by Gooch. Good diet, if it can be had, before labour, and even cordials during labour, may be necessary to give such a patient proper support. After delivery, the greatest caution must be used to increase the tone of the uterus: ergot of rye is indicated, with tonics. If hæmorrhage occur, opium is the best remedy to control it.

LECTURE XXIX.

PUERPERAL CONVULSIONS.

Convulsions are the next subject for our consideration—a most alarming and dangerous complication of labour. There is no attack to which the parturient woman is liable, of so frightful an appearance, or that causes more terror to the by-standers; there is none in which the practitioner is more called upon to exercise a calm self-possession, or where he must be more careful not to suffer himself to be disconcerted by the dismay of anxious friends. An attack of puerperal convulsions may be considered as the climax of nervous irritation. You may observe from the first period of conception, throughout the whole pregnancy to the time when labour has commenced, a succession of symptoms, which are the result of nervous sympathy (as it is commonly called) with the function of the uterus. The stomach and digestive organs, the brain, the heart, all give evidence of irritation caused by the phenomena going forward in the uterus. The spinal and ganglionic systems of nerves are called into unusual activity, and hence we find that they are more easily excited, and more readily deranged in their functions during pregnancy and labour than at any other period. The most extreme and dangerous result of this excitement is convulsions.

Varieties of Puerperal Convulsions. Puerperal convulsions may occur at any time during pregnancy; but their most frequent period is on the approach or during the progress of labour. They do not always present the same characters: on the contrary, an important difference may be observed in the symptoms they present. Sometimes these attacks assume all the characters of epilepsy, sometimes of hysteria. Cases present themselves where symptoms of apoplexy predominate, and give

that character to the fit; and again we find that these paroxyms are the final symptoms of extreme hæmorrhage. A similar form of convulsions takes place when the action of the heart is at its maximum, and when it has almost ceased from loss of blood. Some writers describe puerperal convulsions as if all forms were alike. Others enumerate varieties, and speak of epileptic, apoplectic, anæmic, and hysterical convulsions. We shall propose for your consideration three forms—1. *Sthenic or Hyperæmic Convulsions;* 2. *Asthenic or Anæmic Convulsions;* 3. *Hysterical Convulsions.* These are essentially distinct in their characters and in their treatment.

Sthenic Convulsions have been confounded with epilepsy, apoplexy, and even with hysteria; the same name has been applied to opposite varieties, and hence much confusion has arisen both in the description and in the treatment of this dangerous attack. To remove this source of perplexity, we shall first direct your attention to those convulsions which are clearly the consequence of labour, and then examine the varieties that depend upon irritation of other organs than the uterus, or which are the result of certain conditions of the constitution.

Sthenic convulsions occur most frequently in patients who are of a plethoric habit, in whom the circulation is unusually active, and where we have every evidence that blood is in excess. In such instances, the irritation of any organ largely supplied by the ganglionic nerves will cause convulsions, when the spinal system is predisposed to irritation in consequence of the newly excited function of the uterus. Thus a hearty meal, a sudden fright, a loaded state of the intestines, will cause an attack independently of labour. But when labour begins, when the action of the uterus is powerful, if it meet with much resistance to its efforts, and its action be impeded by uterine congestion, convulsions are frequently the result.

Puerperal convulsions may seize the patient either before or in the progress of labour, or after it has concluded. Those that occur before or in the commencement of labour generally depend upon the irritation of some other organ than the uterus, and hence are much more fatal than those which are the result of labour: in fact, two

sources of irritation are acting upon the spinal system in place of one. Dr. R. Lee relates the case of a lady who "returned home after midnight from a large dinner party, at which she had partaken of a variety of dishes and wines, and had been seated before a large fire" (*Clinical Midwifery*, p. 17). Labour came on soon afterwards and with it violent convulsions. Another patient "being in the eighth month of her pregnancy, dined on curry and rice, and ate bacon and eggs for tea" (*Op. cit.* p. 19). The following day she had convulsions and premature labour. Both these were fatal cases; and in each the stomach was a primary, the uterus a secondary source of nervous irritation. Violent mental emotions act precisely in the same manner. More commonly, however, these are not the causes that induce the paroxysm; on the contrary, labour proceeds to a certain point without interruption: the action of the uterus is perhaps powerful, the head large, and the resistance to its advance great. A severe struggle arises, congestion takes place in the uterus, the pains are interrupted, a morbid irritability is excited, which is communicated to the spinal centre, and thence reflected over all the muscles in violent convulsions. The uterus alone is the source of irritation here, and therefore the cause of the attack is more easily removed.

Premonitory Symptoms often give timely warning of what is about to happen. Some women during their pregnancy are liable to headache, throbbing of the temples, giddiness, ringing in the ears, motes and flashes in the eyes: they are easily flushed, especially after a meal, and sometimes there is a puffiness about the face, an œdematous appearance that is very suspicious. Again, at the time of labour there is a peculiar restlessness about these patients: they are intolerant of their pains, and in the middle of a violent exclamation are perhaps seized with a paroxysm. A severe rigor in the progress of labour, especially in the second stage, has been remarked by the late Dr. Hamilton as a sure indication that convulsions are approaching.

The *Symptoms* that characterise the fit are very much the same as in epilepsy. For a moment the whole body is fixed, the face grows livid, the eyes are drawn upwards and outwards, the mouth

is partly open and twisted, the nostrils are dilated, and respiration is suspended. This sudden change is instantly succeeded by a violent convulsion of the whole body; the countenance becomes frightful; the eyes blood-shot, at first staring widely open as if the person were being strangled; then the eye-balls are distorted, the pupils being sometimes drawn in opposite directions; in other cases, the eye-ball seems as if it revolved rapidly on an axis; the eyelids also are thrown into a quick vibratory motion. Other features are equally deformed; the cheeks are swollen and livid; the mouth is retracted and covered with a bloody foam; the teeth are violently clenched, and the tongue is driven forcibly against, if not between them; a deep inspiration is succeeded by a number of rapid expirations, accompanied by a hissing sound that is very characteristic. The legs and arms are thrown about; and such a violent succussion of the whole body takes place, that the bed and sometimes the room are shaken by it. This paroxysm lasts for two or three minutes; and when it subsides, the face, still bloated, regains somewhat of its former appearance; the eyes are drawn up beneath the lids, and the muscles of the body are relaxed, although some twitchings of the mouth and face may be observed; the patient then falls into a comatose state that may or may not be temporary. When she recovers herself she looks vacantly around her, seemingly unconscious of what has happened; nevertheless, she dreads the return of the pains much more than before, as if she were aware that there was some injury done to her by them, but she could not tell what it was. The action of the uterus is in no way suspended, but on the contrary rather increased: and hence a labour that, from its protraction, may have caused the convulsion, proceeds to its conclusion much more rapidly after the fit. The effect on the child is generally, although not always, fatal. There may be only a single paroxysm, or several, the fits returning with every contraction of the uterus: when this is the case, they may continue for some hours after delivery. It is right also to remind you, that these paroxysms may be increased or diminished according to the manner in which the patient is treated. Under such circumstances as these, the uterus is unusually irritable: a vaginal examination commonly

induces a fit, and consequently much meddling in this way will certainly do mischief. The appearance of the urine also deserves attention. Dr. Lever, Dr. Simpson. and Dr. Cormack, each have directed the attention of the profession to its albuminous state, which, taken in connection with the œdematous condition of the surface, would indicate the existence of renal disease in many instances.

Convulsions as modified by Apoplectic Symptoms. In this description, we have confined your attention to puerperal convulsions when uncomplicated with any secondary attack; but this is not always the case. *Apoplexy* may supervene, and render the result much more dangerous. Women who are liable to such an attack are generally short, plethoric-looking persons, with florid complexions and short necks, just such as apoplectic patients are usually described to be; but sometimes this is otherwise. We have met with cases of a very opposite character, where symptoms of cerebral congestion very like apoplexy followed convulsions. The majority, it is true, were such as we have mentioned; and in the lower walks of life especially we have seen cases of this kind among women with low foreheads, in whom the animal predominated over the intellectual development of the brain. These patients were violent in their tempers, addicted to the use of stimulants, very intolerant of their pains; and if labour were protracted, they were seized with convulsions, often accompanied by symptoms of apoplexy; but other women attacked in a manner precisely similar were delicate-looking persons exposed to privations, and had many causes of intense mental anxiety.

Apoplectic symptoms modify the convulsive paroxysm. It is not so severe, at least in appearance, neither is the succussion quite so violent. There is less distortion of the features, but the lividity is greater and more permanent; the eyes are more fixed; the pupils are dilated, or strongly contracted; they are not influenced by light (Dr. Ramsbotham has seen the pupil dilate on the approach of a candle); the mouth is drawn to one side, the countenance is bloated, respiration is deeply stertorous, and the cheeks are puffed out in expiration. During the interval between the fits, the patient is quite comatose; she lies snoring, insensible

to everything around her; the action of the uterus nevertheless continues, but is scarcely noticed by the patient; the pains are only marked by her moaning in this heavy sleep, or being then particularly restless, just as if she were troubled by night-mare: the circulation about the head and neck goes forward with great force—all the arteries throb, and the veins are quite distended; but while such is the case in the upper part of the body, the circulation is just as feeble in the lower extremities. Unless very active and well-directed treatment be adopted, the patient is seldom roused from this state: she continues in the same stertorous stupor, from which she never awakes; the uterus, however, is not in the least influenced by this condition of the nervous system; the pains return regularly, labour advances rather more rapidly, and, unless some unusual difficulty present itself, may be completed without any assistance. Symptoms of cerebral congestion may also be observed in women who are anything but plethoric. Such cases are certainly rare, but still they sometimes present themselves.

Before we enter upon the question of treatment, it will be necessary to reflect a little upon the nature of these attacks, and to obtain, if possible, clear views both of the varieties that may be observed in the character of the convulsion, and in the constitution of the patient. Nothing, it appears to us, has caused more confusion in the rules of treatment than have been laid down than the practice of applying the same name and the same treatment to the different forms of convulsion that occur during labour; and still more so, of treating the same form on exactly the same principle in very opposite conditions of the constitution. No one commits the error of treating a well-marked case of hyperæmic convulsions and an extreme case of anæmic convulsions in the same way; but many may make the mistake of not distinguishing these opposite forms when anæmia is disguised by hyperæmic symptoms.

We shall therefore first consider the *nature of puerperal convulsions;* then endeavour to determine *the causes that excite them;* and lastly, deduce *the principles of treatment.*

Nature of Puerperal Convulsions. Puerperal convulsion

such as we have described them, have been generally considered epileptic; such is the term applied to them by many authorities. Dr. Ramsbotham, however, believes them to be a modified form of apoplexy. "I look upon a case of puerperal convulsions to be, in fact, one of apoplexy, only that we have superadded to the common apoplectic phenomena violent spasmodic contractions; and this symptom is dependent upon the irritable and excitable state of the nervous system always in a greater or less degree accompanying pregnancy and parturition" (*Obstetric Medicine*, p. 456.) We confess that we cannot accede to either of these views; true puerperal convulsions seem sufficiently distinct from both epilepsy and apoplexy to render it necessary not to confound them. It is quite true that epileptic convulsions may occur during labour, and that apoplexy is often the consequence of puerperal convulsions; but the paroxysms of the attack we are describing may occur independently of either.

If our attention were confined solely to the physiological view of these convulsions, we must admit that epileptic and puerperal convulsions agree essentially in the manner in which all the voluntary muscles are excited: they agree also in their effect on the muscles of respiration; and we find that their influence on sensation, volition, and the mental faculties, are perfectly similar. We may therefore infer, that the proximate cause exciting the convulsive movement is influenced in the same way, and is equally set in motion by the remoter causes of the attack. But these causes are by no means alike in their character, there is a pathological difference between them, which must make a very important ground of distinction, when we have to consider the proper treatment to be pursued in order to arrest them.

Epilepsy and Puerperal Convulsions compared. Epileptic and puerperal convulsions differ in the way in which they are produced: they do not exactly agree in all their symptoms, and there is an important difference in their effect on the constitution of the patient. Epileptic fits occur in the most unexpected manner; there is no evidence of any exciting cause for the attack; the patient may have been perfectly well, at least apparrently so, when suddenly a creeping sensation, an *aura* as it is

called, is felt to commence at the extremities, and while it is passing upwards she gives a wild and peculiar scream, and falls into a fit. When it ceases, and she recovers from the temporary coma which succeeds, she is pretty nearly as well as before: she may have been bruised, or the tongue may have been cut; she feels fatigued or complains of headache, but that is all; she is able to pursue her ordinary occupations, and no immediate return of the fit may be expected. This is very different from the description we have given of puerperal convulsions, which are generally preceded by symptoms indicating a highly excited state of the circulation, which often terminate in the most marked symptoms of apoplexy, and are so frequently fatal. In puerperal convulsions, if no means, or what is the same thing, if inefficient means be employed to arrest the paroxysms, a fatal result is the consequence. In epilepsy there is no such danger: wounds, bruises, or burns, are the worst you need apprehend.

In order to render this comparison clearer, we shall place the characters of each side by side: first those that agree, then those that differ.

Epilepsy agrees with Puerperal Convulsions, in

1. Violent convulsions of the voluntary and respiratory muscles.
2. Total loss of consciousness.
3. Lividity of features from apnœa.
4. Followed by temporary coma.

They differ from each other in the following characters:—

In Epilepsy—	In Puerperal Convulsions—
1. An aura precedes the attack.	1. Symptoms of cerebral congestion precede the attack.
2. There is no hissing expiration.	2. Hissing expiration is very characteristic.
3. Fits return periodically at long intervals.	3. Fits return in rapid succession.
4. The paroxysms are seldom fatal.	4. The paroxysms are often fatal.
5. Epileptics usually give evidence of some pre-existing constitutional derangement.	5. The healthiest women are often attacked.

From this parallel, you will perceive that epileptic and puer-

peral convulsions nearly agree in the form of attack, but differ in the manner of their incursion, and in the ultimate course that they take. If, therefore, you confine your attention solely to a physiological view of the subject, they agree in nearly every particular; but if you look a little further, and consider carefully the whole of the symptoms, both before and during a paroxysm of puerperal convulsions; if you take into account the previous health of the patient, and the extreme danger of a fatal termination to a number of paroxysms succeeding each other at short intervals, you will perceive an obvious difference between them. When these convulsions so nearly agree in their physiological characters, it may seem to you something very like "splitting hairs" to make this distinction: the term "epileptic" (you will say) applies to puerperal convulsions equally well as to the paroxysms of epilepsy. We cannot think so. We should willingly call puerperal convulsions "epileptic"; only, if we did so, if we did not point out the essential difference in their pathological aspect, you might imagine that, being similar diseases, they required a similar treatment. If the excellent suggestion of Dr. Marshall Hall were adopted, if the term "epileptic" were discarded, and some generic term applied to embrace convulsions having certain physiological characters in common, there would not be this difficulty; but as terms are at present used, inasmuch as puerperal convulsions are, in their treatment, essentially distinct from epilepsy, we are desirous that you should separate each convulsion as far apart in your mind as possible; and, therefore, to assist you, we shall call them by a different name: the terms "sthenic" and "hyperæmic" appear to us to convey the essential character of the convulsions we are now discussing.

Are Hyperæmic Convulsions Apoplectic? Dr. F. H. Ramsbotham, who seems fully aware of this blunder, and who is equally anxious that the profession should avoid it, describes puerperal convulsions as being a form of apoplexy; not only for the purpose of drawing them away from their notions about epilepsy, but also with the object of guiding them into a more correct idea of the proper treatment of these attacks. In a practical point of view, therefore, any mistake is on the right side; but still we think

these hyperæmic convulsions differ essentially from apoplexy: they may occur, and no apoplectic symptoms take place; and it very seldom happens that in *post mortem* inspections of the brain there is any appearance of effusion: unusual distension of the veins is the only morbid change common to both, and even this may be absent in puerperal convulsions.

Asthenic or Anæmic Convulsion is a striking contrast to the preceding form. It is the final symptom in extreme hæmorrhage; in this instance clearly arising from a total deficiency of blood to support the vital functions. Do not, however, confine yourself to this example alone; there are cases occasionally met with in which the same effect seems to be induced by a deficiency of *nutrient* blood in the system—instances where poverty and privations seem to be the predisposing causes of the attack, especially when accompanied, as is often the case, by great mental anxiety. The combination of so many causes of depression of the vital powers has the same effect in producing convulsions as extreme hæmorrhage; hence we have called these "asthenic" convulsions, to imply that they are the result of debility. This variety is not caused by the violent action of an over-excited uterus; these paroxysms are not the result of severe labour, but of constitutional exhaustion. They often take place, therefore, before labour, or when it has only commenced, and are too frequently fatal. We shall reserve their consideration until we enter upon the question of treatment.

Causes of Puerperal Convulsions.—These may be considered in two points of view: the *remote or predisposing causes*, and the *proximate or exciting causes*. They have been also classed as "centric" and "excentric" causes: the former being those that act directly on the nervous centres, the latter such as operate upon it indirectly through the agency of some distant organ. Impure blood, for instance, is a "centric" cause of convulsions, because it is supposed to be a direct irritant of the medulla oblongata; irritation of the stomach, intestines, bladder, or uterus, are "excentric" causes, because the nerves of the affected organ communicate the irritation to the spinal system, which reflects it in violent convulsive paroxysms.

Predisposing Causes of convulsions are hyperæmia, anæmia, and toxæmia—an excess of blood, a loss of blood, or an impure blood.

When blood is in excess, and the circulation is excited, an irritant, which at another time would have no effect, may, under such circumstances, cause convulsions. An indigestible meal, for instance, or an excess in spirituous potations, have brought on an attack; so also in such habits the action of the uterus, especially when powerful, has induced convulsions.

When blood is deficient, as in cases of extreme hæmorrhage, the same effect is produced, sometimes without any direct irritation: but especially if the uterus be exposed to any new excitant, as the introduction of the hand to turn the child or to remove the placenta, convulsions are frequently the consequence.

When blood is impure, convulsions may also take place. Albuminuria, we know, produces renal convulsions; we have now sufficient evidence to prove that it predisposes to puerperal convulsions.

Epilepsy has been considered as a predisposing cause of puerperal convulsions, but we greatly doubt that such is the case. We have met with several cases of labour in epileptics; and, led astray by the assumed identity of these attacks, we dreaded convulsions, but none took place. Drs. Hardy and M'Clintock record the same experience; they state that "it does not appear that females who are subject to epileptic fits are more liable on that account to attacks of puerperal convulsions. On the contrary, it would seem that they enjoy an exemption, and that even the epileptic attacks occur with less frequency, and with a mitigated severity, during pregnancy. This certainly was the case in three or four instances of pregnant epileptic females who came under our notice." (*Midwifery,* p. 269). Dr. Tyler Smith has quoted fifteen cases of epileptics. "The number of pregnancies in the fifteen cases amounted to about fifty-one. Puerperal convulsions of a decided character only occurred in two labours. In one, there were three attacks of convulsions after the eleventh labour of an epileptic patient, and in another there was a single seizure the day after one of five labours" (*London Journal of*

Medicine, vol. ii. p. 87). In fact, the predisposition seems to lead in the opposite direction. Pregnancy and labour have the effect rather of suspending than of exciting these attacks.

Proximate Causes of Convulsions. The causes which immediately excite the paroxysm are more difficult to expose, because they are wrapped in the mysteries of the nervous system.

If direct mechanical irritation be applied to the medulla oblongata, precisely the same convulsive action is excited as takes place in puerperal convulsions; hence we infer that the proximate cause is some irritant of the medulla oblongata. What is the irritant? It may either be direct or indirect; that is, certain conditions of the blood may act as direct excitants; or irritation of the peripheral nerves of the uterus or of any other vital organ may be reflected upon the medulla and become an indirect excitant. These two sources will embrace all the assigned causes of convulsions. Some authors have considered local congestion, and consequent *pressure of the blood on the medulla,* as a proximate cause; but this can hardly be true, because precisely the same effect is produced in extreme hæmorrhages where the pressure is altogether removed. Pressure on the brain may cause stupor, coma, stertor, paralysis, but it is not so clear that it produces convulsions. *Nervous sympathy* has been assigned by others. This is correct when considered as a popular expression to signify reflex nervous action, but the term is too vague to attach to it a sufficiently precise meaning. The influence of the gravid uterus on other organs—the sympathies of pregnancy—are often the best evidences of health: but the irritation of which we now speak is a morbid action that takes place only under special conditions; we shall not, therefore, adopt a term that may create confusion in our idea of a proximate cause.

The *direct proximate cause* of convulsions is impure blood; for instance, when the kidneys are unable, from Bright's disease, to fulfil their proper function of eliminating urea from the blood, renal convulsions take place. So, also, it has been ascertained that the convulsions of pregnancy and labour are sometimes accompanied by, and dependent upon, disease of the kidney. The most remarkable symptom of this disorder, the presence of

albumen in the urine, has been met with by Dr. Lever in almost every case of puerperal convulsions; his observations have been confirmed by several other practitioners: hence the question arises, Is albuminuria always the cause of puerperal convulsions? Dr. Simpson inclines to the opinion that it is more so than is generally supposed. In the cases of puerperal convulsions with which we have met, the majority were strong, healthy young women, without any œdema, who did not impress us with the idea that they were labouring under a chronic disease; nevertheless there are cases, perhaps numerous, where œdema is present, and where convulsions have their origin in this disorder. How are we to explain the presence of albumen in the urine of women of the former class, who give every indication of rude health? Dr. Cormack has endeavoured to resolve this question. He supposes that the pressure of the gravid uterus on the emulgent veins causes congestion of the venous circulation of the kidney; it is known that such congestion has the same effect as Bright's disease; the albumen is taken from the blood and the urea left. Hence he attributes convulsion in healthy young women, pregnant for the first time, to congestion of the renal veins, caused by the gravid uterus, which, in such cases, is pressed more strongly backwards by the tonic contractions of the abdominal parietes. Ingenious as this theory is, we fear to adopt it in these instances; first, because the pressure exercised by the gravid uterus is too gradual to cause any great amount of congestion--the circulation has sufficient time to find new channels for itself, and relieve the emulgent veins; secondly, because the period of the attack would be more frequently at the last month of gestation or the commencement of labour than we know it to be. We are rather disposed to consider this congestion of the kidney and albuminous urine to be the effect of another cause, than a proximate cause *seipso* of convulsions. We may, therefore, assign albuminuria as a predisposing, and the consequent impurity of the blood as a *direct proximate cause* of convulsions.

The *indirect proximate causes* appear to play the most prominent part in these attacks. We have sufficient proof that morbid excitation of the peripheral nerves that supply any vital organ,

will cause convulsions; this we can only explain by assuming that the irritation is conveyed directly to the spinal centre, whose excito-motor influence communicates it to the muscles generally. In this sense, irritation of the brain from shock—of the stomach from repletion—of the intestines from scybala or worms—may excite convulsions. It only remains for us to consider whether in puerperal convulsions the uterus is in a similar condition, whether its nerves are morbidly excited and reflect the irritation over the voluntary muscles in convulsions. If this be true, if we be able to refer convulsions in a certain class of cases to morbid irritation of the organic nerves, whether existing in the brain, stomach, bowels or uterus—to these eccentric causes—it would be clearly illogical to seek for two causes to explain one and the same effect in the same case. If we be satisfied that this irritation of the afferent nerves exists, and we believe that it is reflected through the medulla in these violent paroxysms, we need not go further and puzzle ourselves about other causes.

Taking, then, this view of the question, let us inquire—Have we adequate proof that morbid irritation of the uterus will induce convulsions? and if so, What renders the uterus morbidly irritable?

Will uterine irritation produce convulsions? In answer to this question, we shall quote the experience of Dr. F. H. Ramsbotham, who says: "I have met with three or four cases which have strongly impressed me with the idea advanced in the text" (viz., that the affection originates in some deranged state of the uterus, and the irritation is propagated from that organ to the brain), "the most striking of which is the following:—I was called some years ago, by one of the midwifes of the Royal Maternity Charity, to the assistance of a woman under puerperal convulsions: by free depletion the convulsions entirely ceased, and in a few hours perfect consciousness returned: about fifty hours after the attack, active labour came on, and in less than five hours more the child was born dead; the placenta did not descend, and in two hours subsequent to the expulsion of the child, I was summoned: I found her perfectly sensible, in good spirits, and she made no complaint. There had been no hæmor-

rhage, the uterus was not strongly contracted, and the placenta entirely within it. Under no greater anxiety than I usually feel when the placenta is retained, I proceeded in the ordinary way to remove it. The moment I had passed my hand completely into the uterine cavity, the patient turned upon her abdomen, and without uttering any expression of pain, went into a convulsion, though not of the violent kind: intense coma supervened, which yielded to no treatment that I could devise, and terminated fatally in about two hours from the removal of the placenta. The vagina, and especially the inner surface of the uterus, communicated to the hand a more pungent sense of heat than I recollect to have experienced on any other occasion" (*Obstetric Medicine*, p. 568-9). Dr. Ramsbotham then quotes, from the late Dr. Ingleby work on uterine hæmorrhage, another instance of a similar kind. "A highly-esteemed friend of mine" (Dr. I.) "once found it necessary to pass the hand into the uterus for the purpose of removing an adherent placenta, the ergot of rye having been previously administered: the introduction was carefully performed, the straining and opposition on the part of the woman were exceedingly great; and at the moment when the operator's hand had reached the organ, my own hand making counter-pressure on the abdomen, the patient became violently convulsed, and died in less than a minute" (Ingleby on *Hæmorrhage*, p. 186).

A case very similar to this once occurred to ourself. The patient had a very severe attack of hæmorrhage after the delivery of the child, and before the expulsion of the placenta, which induced me to remove it. We did so without any difficulty; but, like Dr. Ingleby's patient, ours resisted the operation. In the struggle she was seized with convulsions, and died in a quarter of an hour. Such cases are not rare exceptions to the general rule, and they form so many proofs that convulsions are produced by irritation of the uterine nerves. We find, also, that when the uterus is emptied of its blood, or is too full of blood, the same effect is produced.

What renders the uterus thus morbidly irritable? This question will require a little patient attention. We know that, in cases of

protracted or severe labour, the large head of a male child, forcing open for the first time the passages, is in itself a very powerful irritant, not only of the uterus, but of the vagina, thus causing "extensive reflex muscular actions." It appears to us, however, that this alone is not an adequate cause: if it were so, cases of puerperal convulsions would approximate much nearer in number to those of difficult labour than they appear to do. Dr. Collins reports four hundred and thirty cases of protracted labour, and only thirty cases of convulsions. Drs. Hardy and M'Clintock mention two hundred and fifty-nine cases of tedious and difficult labours, and but thirteen cases of convulsions. We quote from these reports, because we know that severe labour was a frequent cause of puerperal convulsions in the Dublin Lying-in Hospital. The operation of some other excitant, besides undue distension of the passages, seems necessary to explain this effect. The condition of the circulation and its influence upon the nervous system are important elements in the inquiry. The intimate relation that subsists between the nervous and circulating systems is a matter of every-day observation: the nervous function cannot be deranged without the circulation being excited; neither can the equilibrium of the circulation be destroyed without the nerves, in one way or another, giving evidence of irritation. Let us, then, examine whether, in cases of convulsions, there is such a disturbance of the circulation in the uterus as would warrant us in attributing to it a morbid excitation of its nerves, and consequently a corresponding irritation of the medulla, so as to cause convulsions. Nothing seems to us more evident. If we except those cases that are referable to the irritation of other organs—as the brain, the stomach, the kidney, the intestines, we find that the majority of cases occur when there is either an excess or a deficiency of blood in the uterus. When the uterus is nearly deprived of its blood, we have seen that the introduction, ever so gently, of the hand, will cause convulsions; and sometimes they take place without this irritation. Congestion of the uterus appears to have just the same effect. In the majority of cases, there is every evidence of plethora: the premonitory symptoms are those of an over-excited circula-

tion; the action of the uterus is impeded by the excess of blood circulating through it; the pains do not, therefore, produce their full effects; at length nervous irritation is excited, and convulsions take place. You perceive, then, that it is not alone the irritation of the cervix of the uterus or vagina distended by the large head of a male child, that will induce convulsions in cases of difficult labour; but this irritation accompanied by an excess of blood in the uterus, just as the introduction of the hand, produces the same effect when there is a deficiency of this vital fluid. You may recognise this difference, if you observe closely cases of difficult labour. In one example, you will notice a protracted pressure on the cervix uteri, on the vagina and perinæum, causing local congestion, tenderness, inflammation, etc., but no convulsions. In another, you may observe every symptom of hyperæmia of the uterus: its contractions become short and interrupted — we might add, unusually painful: the efforts of the uterus are thus for some time fruitlessly continued, and at length are superseded by the convulsive paroxysm.

If, then, we admit that irritation of the organic nerves of the uterus is frequently the proximate cause of convulsions, and that this irritation is produced by an excess of blood in the uterus, we should not confound cause and effect: we should not mistake for a cause, the congestion which the commencing paroxysm always produces at the nervous centres. The convulsive fit has the effect of interrupting the circulation in every way; first, as Dr. Marshall Hall has clearly shown, by the direct pressure of the platysma myoides on the blood returning from the brain; secondly, by the spasm of the glottis impeding respiration, and preventing the passage of venous blood into the lungs; thirdly, by the pressure on the venous circulation of the extremities, the blood, by the spasmodic contractions of all the voluntary muscles, being forced too rapidly forward into the great central trunks; and lastly, by the increased pressure on the venous circulation in the uterus, in consequence of its more powerful contractions producing a similar effect. It is not surprising, therefore, that with such an accumulation on the venous side of the circulation, we should find every proof of pressure on the brain, and symptoms

of apoplexy; neither is it unintelligible why the *post mortem* appearances seldom prove more than venous congestion. You may also perceive, in the highly congested state of the kidney, the cause of the albuminous urine to which Dr. Lever and Dr. Cormack have so ably directed the attention of the profession. This should not be confounded with cases where albuminuria has been observed during pregnancy. In the latter case, albuminous urine, its cause having been of longer duration, will be present so long as the morbid condition of the kidney remains: in the former, it accompanies the convulsions, and disappears when they cease.

We have seen that the irritation of other organs excites convulsions in the same manner as the uterus, and may stimulate the uterus into action. This also constitutes a proximate cause of puerperal convulsions: but, in this instance, labour is the effect, not the cause of the attack: hence convulsions generally precede labour, or both come on simultaneously. There is a striking difference, also, in the danger of the attack, between these convulsions, and those that are the effect of labour. The paroxysm excited by severe labour may be controlled by relieving the condition of the uterus that produces them. Those that depend upon the irritation of other organs are not so amenable to treatment, because the cause of the irritation may not be so easily removed; and, even where it is so, as in the stomach or bowels, still the induction of labour maintains the effect on the nervous centres. In the former case, you have only one source of irritation to deal with ; in the latter there are two. Hence, when the puerperal convulsions are the result of mental shock, of repletion, of disease of the kidney, and other such causes, they are much more fatal.

Summary. As we have been drawn into a rather protracted discussion of these difficult questions, we shall briefly sum up the conclusions at which we have arrived.

1. Puerperal convulsions should not be confounded with epilepsy, nor with apoplexy. They agree with the epileptic attack in their physiological, but not in their pathological characters.

Apoplexy is an effect of the paroxysms which may or may not follow from them.

2. The predisposing causes of puerperal convulsions are either an excess of blood (hyperæmia), a deficiency of blood (anæmia), or impure blood (toxæmia).

3. The proximate causes of convulsions are chiefly *excentric*, being the morbid irritation of the afferent nerves supplying the different vital organs. Impure blood, as in albuminuria, is a *centric cause.*

4. *Morbid irritation of the uterus* is the most common proximate cause of puerperal convulsions, the result either of hyperæmia or anæmia. Hence the division into sthenic or hyperæmic convulsions; and asthenic or anæmic convulsions. Under the latter head we include not merely loss of blood, but poverty of blood; because the effect seems to be similar, only differing in degree.

5. *Morbid irritation of other organs* also causes puerperal convulsions; because, during pregnancy, and at the time of labour, the nervous system is more excitable than at any other period: and hence any organ may easily be rendered morbidly irritable. Puerperal convulsions so caused are much more fatal than the former, because the nervous centres are exposed to a two-fold source of irritation—the organ primarily affected, and the uterus that is secondarily excited.

6. *Intense pain* is an emotional cause, which may induce convulsions independent of the condition of the circulation or the blood.

7. In the whole of these phenomena we must perceive a beautiful illustration of the reflex nervous function: the peripheral nerves that supply the affected organ rapidly communicating the irritation to the spinal system, which, as an excito-motor centre, radiates the irritation over the whole of the voluntary muscles, and the muscles of respiration, in violent convulsive paroxysms. Even the involuntary muscles, as the uterus and heart, do not escape, but give every evidence of greatly increased muscular contractions.

LECTURE XXX.

PUERPERAL CONVULSIONS (*continued*).

In the preceding lecture, we pointed out to you three forms of puerperal convulsions,—the sthenic, asthenic, and hysterical convulsions: we inquired also into the causes, both remote and proximate, that induced the paroxysm in the first two varieties (to which your attention was confined), in order to determine more accurately the principles of treatment. If we have made the subject sufficiently intelligible, you will perceive that the same effect is the result of very opposite causes. An excess or a deficiency of blood in the uterus, impure or depraved blood circulating in the system, will predispose the constitution to an attack of convulsions at the time of labour. The exciting cause may be either irritation in the uterus, or in any of the organic viscera; or unhealthy blood. It is obvious, therefore, that one and the same plan of treatment will not suit these different conditions: you cannot treat convulsions from hyperæmia, anæmia, and mental shock, precisely in the same manner.

Treatment of Sthenic or Hyperæmic Convulsions.—Hyperæmic convulsions are most frequently met with. In such cases you generally have well-marked premonitory symptoms: the bounding pulse, throbbing headache, singing in the ears, etc. give you sufficient notice of the excitement in the circulation, and the impending danger; if, with these symptoms, the pains be short, and the action of the uterus laboured, you may be certain of convulsions unless prompt relief be afforded. A large and decided depletion is clearly indicated: thirty or forty ounces of blood may be taken with advantage; every extraneous source of irritation should be removed; if improper food or drink be taken, if the bowels be constipated, emetics and active cathartics are necessary. The salutary effect of depletion may be maintained

by placing the patient under the influence of tartarised antimony; the force of the circulation is reduced by the nausea excited, and the labour proceeds more favourably to its conclusion. It is of great importance to notice quickly, and to avert with promptitude, these premonitory symptoms; because we are persuaded that decision at this stage of the threatened attack may prevent it altogether, while hesitation and feebleness will only more certainly determine the paroxysm.

If, however, convulsions seize the patient unexpectedly, the first object of your attention is to save her from being injured during the fit: a cork should be placed between the teeth, in order to preserve the tongue from being cut. In the violent succussion of the fit, the patient may be jerked from the bed; she often throws herself about the bed with great violence; you must prevent her from being hurt, by removing everything out of her way, but not, recollect, by holding her down with all your strength: this is a very common mistake. We have seen the bed surrounded by friends, some holding the body, others the legs and arms, as if they could thus stop the convulsion. The only effect of their exertions is to exhaust the patient: she complains of great fatigue and soreness when she recovers herself. Nothing more should be done than to prevent her from falling out of bed; the less the convulsive paroxysm is restrained the better; you may, however, diminish its severity, or possibly arrest it, by exciting a nervous shock—cold affusion is sometimes found very serviceable. Denman used to recommend that a large basin of cold water be placed within reach, and, when the fit was commencing, that the face should be dashed with a whisk. We have adopted this practice frequently, and with complete success: the paroxysm was sometimes stopped altogether, and if it took place, it was much less violent than before.

The general treatment of the case can only be undertaken when the fit is subsiding, just as the stage of coma is approaching. Depletion, to the extent we have stated, should be at once carried into effect; it would be advisable also to administer an active cathartic enema—a terebinthinate enema is the most efficient for this purpose. The head, and especially the back of the neck,

should be covered with cloths rung out of iced water; but, at the same time, it is very essential, that the temperature of the lower extremities be maintained, the circulation being just as feeble there as it is strong about the head and neck. If the return of the paroxysm be thus prevented, you may give the patient a full dose (ten grains) of calomel, and in two or three hours the usual saline senna mixture, adding to it from half a grain to a grain of tartarised antimony. It will be well, also, to continue the use of tartar emetic, in half-grain doses, for some time afterwards : its influence in controlling the action of the heart is very great, and, if judiciously given, will generally render a second depletion unnecessary: when it is administered for this purpose, it should be combined with tincture of opium, so as to prevent any undue irritation of the intestines.

Delivery of the Child. The most important question that we have to consider is, the delivery of the child: the uterus is morbidly irritable, and the child is an irritant so long as it remains in its cavity. Should it not be at once removed ? The apparent conclusiveness of this argument has, in most cases, led to immediate delivery, without much hesitation as to the operation that may be necessary for the purpose: the child is extracted either by the forceps, the crotchet, or by turning, according to circumstances. We very much doubt the propriety of this practice as a general rule. We do not mean to object to the introduction of the forceps when the head is within reach, and there is sufficient room for the application of the instrument; neither, if the head be impacted, and the child's death ascertained, need we feel any difficulty about perforation: but to destroy a living child, or to pass the hand into the cavity of the uterus, for the purpose of turning it, on the principle that it must be at once removed, appears very objectionable, because it is unnecessary. In many of these cases the child is delivered by the natural efforts, generally dead, but sometimes living. Unless, therefore, you were satisfied of its death, it would be unjustifiable to destroy it by the perforator. If proper constitutional treatment be adopted, the hazard to the patient is not increased by any delay that caution may require; while, on the other hand, by precipi-

tate interference positive danger may be incurred. This seems to us to be especially the case when the child is turned, because the irritation from the presence of the child in the uterus is as nothing when compared with that caused by the hand forced into the cavity of the womb for this purpose: a mere vaginal examination often induces a paroxysm of convulsions; you can therefore appreciate the danger of the more violent operation of turning the child under such circumstances. You will find, in the history of such cases, that the fits continued afterwards, and that a fatal result was too often the consequence. Statistical results afford a very strong confirmation of this objection.

Authorities.	Total Cases.	Pregnancy.		Period of the attack.			Position.		Mode of Delivery.							
		First.	Subsequent.	Before Labour.	During Labour.	After Labour.	Vertex.	Preternatural.	Natural	Mothers died.	Forceps.	Mothers died.	Crotchet.	Mothers died.	Turning.	Mothers died.
nellie	10	not stated		5	5	—	10	—	3	1	3	1	—	—	4	1
rriman	36	28	8	not stated		3	not stated		13	4	7	—	8	1	3	1
e	55	25	9	14	23	10	43	—	32	9	7	4	12	2	2	1
Ramsbotham* ..	25	14	3	11	11	3	20	2	15	4	2	—	5	1	3	3
ver	14	8	6	4	8	2	12	2	8	—	4	1	—	—	2	1
sh. Clarke.....	19	16	3	—	17	2	19	—	8	3	3	2	6	—	—	—
llins	30	29	1	10	18	2	29	1	15	—	6	—	8	5	—	—
rdy and..... } e Clintock .... }	13	10	3	2	8	3	13	—	6	1	3	1	4	1	—	—
	202	130	33	46	90	25	146	5	100	22	35	9	43	10	14	7

You will perceive from this table, taken from all available sources of British practice, that in two hundred cases of convulsions one half were delivered by the natural efforts — the number of deaths being twenty-two, or about one in four and a half. Fourteen were delivered by turning, and half of them died. This number includes only four preternatural positions; we

* The writer has been informed that these twenty-five cases are only a part—the worst part of those which occurred in the late Dr. Ramsbotham's practice; they cannot, therefore, represent his success in the treatment of Convulsions, but are sufficient to shew the comparative success of the different modes of delivery.

may, therefore, infer, that the remainder were vertex presentations, delivered by turning to prevent a fatal result; and yet, where no interference was attempted, the mortality, so far from being increased, was less than one-half of what took place when the hand was passed into the uterus to turn the child. If you take a comparative view of the different modes of delivery, and their results, you must arrive at the same conclusion, and feel satisfied that turning is more dangerous than any other.

Table of Proportionate Mortality.

Delivery.	Total Cases.	Deaths.	Proportion, one in
Natural	100	22	4½
Forceps	35	9	4 nearly
Crotchet.....	43	10	4½ ditto.
Turning	14	7	2

This abstract from the general table will, at a glance, show the comparative mortality. Thus, whether the patient be delivered by the natural efforts, by the forceps, or by the crotchet, the mortality is nearly the same. If there be any difference, it is in favour of natural deliveries; but where the operation of turning the child was had recourse to, the mortality was just doubled.

So far, therefore, as the delivery of a patient in hyperæmic convulsions is concerned, we should recommend you to trust to the action of the uterus (which is always increased) to effect the delivery; at the same time controlling, by general treatment, the severity of the paroxysms. If the head descend within reach of the forceps, you may apply them if the paroxysms be continuing; but if they have subsided it is better not to do so, lest you renew them. If the head be impacted, or if it be difficult to apply the forceps, and the child's death be ascertained (and this usually soon takes place), you may remove it by the crotchet; but we would caution you strongly against turning the child. In

certain cases, as preternatural presentations, turning is unavoidable; but this rarely occurs. The more usual practice is to turn the child in vertex presentations, under the erroneous impression that, if the child be not at once removed, the danger will be greatly increased. There is much more danger in the operation itself.

In this summary of treatment, we have confined your attention to one form of the attack, where there was an excess of blood in the uterus, the labour perhaps severe, the uterus rendered morbidly irritable, and convulsions the result. We shall now examine another variety, which may well be contrasted with that we have been considering.

Treatment of Asthenic or Anæmic Convulsions.—Anæmic convulsions from loss of blood are the final and the fatal symptoms of extreme hæmorrhage. With this we have nothing to do: but asthenic convulsions from a deficiency not only in the quantity but in the quality of the blood sometimes take place; when they present themselves, they are always extremely dangerous. A very slight loss of blood occurring in a constitution previously debilitated by poverty and privations will induce the paroxysms; and sometimes they take place without any loss of blood. Dr. Lever relates a case that will afford an excellent example of this form of convulsion. "Eliza H., aged thirty-six, in labour with her fifth child. When seven months' pregnant, she had a discharge of blood about a week previous to her labour. She was much depressed in spirits, and complained of feeling weak; her pulse was feeble—80. She had been living in a state of the most abject penury; for two or three months subsisting for days on a single meal of bread and tea. Her face and body were covered with cachectic sores. She had several fits of convulsions before expelling a small living female child. After the birth of the child she lay insensible, and could not be made to swallow either medicine or sustenance; the pulse remained exceedingly feeble—72; the convulsions continued to recur, though less powerfully than before, and, as depletion was contra-indicated, abundant dashing of the face with cold water was the only remedy which circumstances permitted to make use of. A full dose

of æther, liquor opii sedativus and ammonia, was with difficulty administered. The convulsions continued all night with scarcely any abatement, interrupted only by intervals of coma; pulse 72, weak; pupils contracted; conjunctiva clear; she passed her urine in bed. In consequence of the abject destitution of her home, she was removed to Guy's Hospital, and placed under Dr. Ashwell's care in the obstetric ward. During her removal she had a convulsion, and reached the ward nearly lifeless. . . . She remained in this critical state for some days, but then gradually and slowly revived, and left the hospital in a state of convalescence" (*Guy's Hospital Reports*, vol. viii. p. 496).

We have quoted this case nearly at length, because it shows very clearly the character of this attack, and points out the proper treatment of such cases. You perceive that abject destitution will predispose to these fits: this woman would probably not have been saved, had she not had the advantages of Guy's Hospital. The medicinal stimulants, camphor, ammonia, etc., no doubt did much; but we suspect the culinary aids, the sago and wine, the improved nutriment, the care and attention she received, did much more for her. Hæmorrhage was the apparent cause that induced the convulsions here; but under similar circumstances they may arise without any loss of blood. Dr. Lever relates another case of asthenic convulsions, in which there is no mention made of hæmorrhage. We were once called to a case of this kind, in which the patient had been bled previously; she was living in an obscure apartment, exposed to many privations; there was no difficulty in her labour, and she easily gave birth to a living child, a girl; but in the midst of her pains she was seized with convulsions, and from the first paroxysm never recovered from a state of coma; her pulse was rapid and feeble, and although stimulants and opium, with what nourishment she could take, were freely given to her, still they failed to restore her. She died in forty-eight hours after the first fit: no *post mortem* examination was allowed. We could not at first satisfactorily explain these symptoms, and therefore made every inquiry respecting her. She was not only destitute, but she had been badly treated by her husband, who had deserted

her; so that, in addition to impoverished diet, there was a certain amount of mental depression in operation to induce such an attack. Thus you may observe that deficiency not alone in the quantity but in the quality of the blood will cause convulsions, especially when accompanied by its general attendant, mental depression. Unless these cases have the advantage of kind treatment and nourishing diet, as well as medical assistance, they are generally fatal.

Intense pain in irritable habits leads to convulsions; and when such is the case, chloroform becomes a most valuable remedy—much more than depletion, cathartics, or any of the means already referred to. We were called to attend a lady, pregnant with her first child, January, 1861. Labour made a regular and favourable progress from 6 o'clock A.M., to about 2 o'clock P.M. : there was no difficulty, nor any congestion of the uterus, but the pains were very acute. She would not take chloroform, and, being a woman of much fortitude, she struggled to command herself, but in the contest she became giddy and lost her sight, and convulsions followed. She was bled, without controlling the attacks. Chloroform was then administered with perfect success; the paroxysms were at once controlled; tranquil sleep followed, and the convulsions did not return. A still-born child was delivered by the forceps, and the lady perfectly recovered.

Such cases may be met with, but they do not belong to either of the classes we have described; their treatment, therefore, is different, and proves the value of chloroform, not only as a remedy in such an attack, but as a means of preventing it.

It may be stated as a rule, that convulsions occurring during pregnancy, or before parturition, are more dangerous than those which accompany or follow labour. The former depend upon extraneous causes; the latter upon the uterus: the former may arise with women who have had many children; the latter occur almost invariably with the first child. In the latter, hyperæmia is the most prominent constitutional feature; in the former there is every evidence that the constitution is suffering from debilitating causes. Such is the conclusion that appears derivable from a comparison of the series of cases reported by the late

Dr. Ramsbotham and by Dr. Collins. Both were taken from very extensive, but very different, fields of practice. In Dr. Ramsbotham's cases, convulsions generally induced labour; in Dr. Collins's, labour produced the convulsion. Dr. Collins had to treat young women, pregnant for the first time, with strong constitutions, and of plethoric habits; Dr. Ramsbotham was called to give his assistance in such cases as this:—"A poor woman in the neighbourhood of Shoreditch, pregnant of her fifteenth child, and about seven months advanced in that state." (Ramsbotham's *Observ.* pt. ii. p. 278, Case 162). In both instances, the most judicious treatment was adopted: Dr. Collins generally saved his patient; but Dr. Ramsbotham had many fatal cases.

We have wished to contrast these two forms of convulsions, because they are as equally opposed in their treatment as in their characters. Depletion, tartar-emetic, purgatives, and a general antiphlogistic treatment, are required in the convulsions of primiparæ. Stimulants, opium, good diet, warm purgatives, and counter-irritation, are more suitable for the convulsions of a broken-down constitution.

Opium, as a remedy in convulsions, has met with good and ill success: it has been highly praised, and as strongly condemned. This apparent opposition in the experience of its effects may be reconciled. Opium may be given very improperly, when it is attempted to control by its influence the paroxysms of hyperæmic convulsions. So long as the exciting cause of the fit is in active operation, a kind of struggle goes on between the excitant and the remedy, that generally ends in a great increase of severity in the convulsions; but when opium is given in the convulsions of debility, it acts as a stimulant to an exhausted nervous system, and arrests the fits. It is right to state that in such constitutions opium, as Dr. J. Reid observes, has sometimes been taken as an habitual stimulant (*Symptoms, etc., of Puerperal Insanity*, p. 28).

Stimulants, such as camphor, ammonia, wine, brandy, etc., are useful on the same principle as opium: they restore the activity of the circulation, and with it a certain amount of nervous

energy. When inanition is the most obvious cause of the debility, and of the convulsions consequent upon it, a nutritious diet cautiously administered, is of more efficacy than medicines. The only remedies of the antiphlogistic class required in such cases, are *purgatives*. The bowels are usually constipated, and it is possible this irritation may have been the immediate cause of the attack. It is always advisable, therefore, to procure a free evacuation from them before opium is administered. When these remedies are necessary, the warm stimulant cathartics are the best, such as aloes, assafœtida, turpentine, etc.

Depletion is contra-indicated; generally it cannot be at all employed; in some instances, nevertheless, it may be used with caution. When convulsions take place, venous congestion is always the consequence : it is necessary to relieve this, which may sometimes be done by the sudden shock of cold to the surface. Dashing the face with cold water will sometimes cut short the convulsions and relieve the congestion; but this may not be sufficient, and therefore depletion is required. The safest method is to cup the back of the neck, to take six, eight, or ten ounces of blood, and to follow this by counter-irritation. A blister, or mustard poultice may be applied over the part that was cupped. When blood is thus taken from a circulation already sufficiently feeble, great attention is necessary to support the strength of the patient, and to maintain the temperature of the surface. The lower extremities should be kept constantly wrapped in warm flannels or blankets.

Immediate delivery of the patient is not required, and may be more dangerous here than in sthenic convulsions. In both cases the operation renews the paroxysms, which continue long after delivery; but in the asthenic form, this alone may determine its fatal determination; while in sthenic convulsions there is still hope that the constitution will maintain itself until they gradually subside. Beside this, in the former variety there is less difficulty than in the latter in the expulsion of the child; consequently there is less reason for a precipitate interference.

Morbid Irritation of other Organic Viscera may cause puerperal convulsions, which are generally much more fatal than

hyperæmic convulsions, because, in such instances, there are two centres of irritation in place of one: the organ that is directly affected, and the uterus, which is indirectly excited—the primary and secondary centres of excitation. Thus the paroxysms may seize the patient during pregnancy, and induce premature labour; or they may occur just before labour, and hurry it forward. In both cases, the action of the uterus is the consequence, not the cause, of the attack. In this view, gestation and labour act only as predisposing, not as exciting causes. A patient who at any other time might escape the consequence of excess in eating and drinking, may be seized with convulsions when labour is approaching. A supper of oysters, that at a more favourable moment would only cause a sounder sleep, may, if labour be near, induce convulsions which rapidly hasten to a fatal termination. A sudden fright, which would only cause syncope if pregnancy did not exist, excites paroxysms that cannot be controlled. In this manner, irritation of the brain, stomach, or intestines, when it excites a corresponding irritation of the uterus, gives rise to the most dangerous form of convulsion that we meet with.

The *Treatment* of such cases must be directed to relieve the organ that is the primary centre of irritation. If it be the stomach, emetics which are prompt in their action, as mustard, sulphate of zinc, etc., are the most efficient. When the stomach is relieved, anodynes may be given with advantage. If the intestines be loaded, active purgatives, both by the mouth and rectum, are necessary. If the brain be excited in a plethoric patient, cupping the back of the neck, counter-irritation, cold to the head, calomel in full doses, purgatives, and tartarised antimony, may all be required; but if she be of a feeble constitution, camphor, ammonia, and opium, are more serviceable.

Hysterical Convulsions are altogether different from those we have been describing. We pointed out to you in a former lecture, (xv. p. 236) the characters of the hysteric temperament, when it produces tediousness in labour. Such patients are very excitable and intolerant of their sufferings: the progress of labour is frequently suspended by their nervous irritability, which the

protraction increases, until at length their impatience, and the severity of their sufferings, throw them into a paroxysm of convulsions. When there is such morbid irritability of the nervous system, the pains of labour are more intense than in a perfectly healthy woman. Hysterical females often suffer from neuralgic pains during their labour: their sufferings are consequently greatly increased, and these convulsions may be looked upon as the result of extreme nervous irritation, and consequent exhaustion of nervous power: hence we find that the action of the uterus, in place of being increased, is suspended by the paroxysm, thus affording a diagnostic sign to discriminate these fits from the former puerperal convulsions.

The *Symptoms* that characterise the convulsion are the same as or similar to those observed in ordinary hysteric fits. The patient may complain of a sense of oppression at the præcordia, and feel the *globus hystericus* in her throat; but most commonly the intensity of her sufferings absorbs her entire attention, until suddenly the convulsions seize her. She is generally loud in her expressions of agony, throwing herself violently about the bed, and, when the pain is at its height and her torture at its climax, the body becomes at once rigid as if in a tetanic spasm. We have seen a patient thrown into a complete opisthotonos, the head and heels alone touching the bed. Irregular convulsive paroxysms succeed, presenting every variety of character. Sometimes the muscles of the abdomen and the lower extremities are spasmodically contracted, while the arms are thrown about, and the face is in convulsive action; or the whole body may be thrown into convulsions, and the patient roll about the bed in its paroxysms. Other cases approach the characters of the true puerperal convulsions: the patient being seized with a distinct and violent rigor, followed by a state resembling coma. We are quite convinced, however, that this apparent insensibility is not true coma: the loss of consciousness is, we might say, simulated; the patient hears everything that is said, and a little deception has sometimes a very salutary effect in arresting the paroxysms. We have known a patient become quite tranquil, when she overheard a consultation about an operation for her delivery. If the fits have ceased, a

vaginal examination will certainly renew them, but in a very different manner from the true puerperal convulsion. In the latter case, the patient is quite unconscious of the examination, and makes no resistance to it; still, a paroxysm follows the act: but in the former she expresses the strongest reluctance, and struggles violently against the examination, in the midst of which the convulsions take place. Respiration is hurried and irregular, but there is no hissing expiration, nor spasm of the glottis.

Diagnosis. Hysterical convulsions, like the disease to which they belong, simulate other convulsions; and therefore you may meet with cases so closely resembling those that are truly puerperal, that you will find it very difficult to distinguish the one from the other. A very embarrassing case of this kind once presented itself to us. When the paroxysm was approaching, the patient ground her teeth, smacked her lips, and foamed at the mouth: the features became distorted, and the whole body was thrown into a tetanic spasm. A violent rigor succeeded, so as to shake the bed, and a distortion of the features, very similar to sthenic convulsions, was observed. As the fit subsided, she fell into a doze, breathing loudly, almost stertorously: still she was not sound asleep, she was very easily disturbed, and, if any attempt were made to give her drink, or make a vaginal examination, she at once became restless, tossed about in the bed, and almost brought on a second paroxysm. When left alone, she awoke from this imperfect doze, and looked round, at first unconsciously, but, as if suddenly recollecting herself, withdrew from observation, and hid her head in the bed-clothes. In this case there was no perfect loss of consciousness; and this, taken in connection with that absence of the respiration peculiar to the true convulsion, was sufficient for the diagnosis.

Hysterical convulsions differ very much from true puerperal convulsions in their effect upon the uterus; the latter generally hasten the progress of the labour; the former always retard it, and protract the delivery.

The *Prognosis* is very difficult. Hysterical convulsions are never dangerous; true puerperal convulsions are always so; but, if hysterical convulsions be the result of some great mental shock,

then they are the most dangerous, because they are the forerunners of the worst form of puerperal convulsions.

The *Treatment* of hysterical convulsions also differs from that which is found the most useful in hyperæmic convulsions—depletion, tartar emetic, and such like antiphlogistic remedies, cannot be employed. You may look upon a case of this kind as being one of nervous exhaustion, that depletion will increase: for the same reason, tartar emetic, and other remedies that depress the circulation, are objectionable. Our first object should be to arrest the paroxysms, which may be done by the use of cold water dashed against the face, to cause a shock to the nervous system. It has the same effect in stopping the paroxysm here as in the sthenic convulsion, but not alone from its direct effect on the nerves. The patient has not lost her consciousness, and shows every evidence of dislike to so disagreeable a remedy. She therefore exerts a certain amount of mental control, and the convulsions cease.

In hysterical patients, the bowels are generally very irregular, frequently constipated, and the large intestines loaded with scybala: the evacuations are dark-coloured, and most offensive; hence the irritation of hardened fæces often causes and maintains the convulsions. Strict attention should, therefore, be paid to the state of the bowels—an enema of turpentine or assafœtida is often of great service in removing such irritants, and shortening the fits. When the bowels are completely relieved, the diffusible stimulants, such as ether, ammonia, camphor combined with opium, generally procure the patient some sleep; but, in convulsions of this kind, chloroform is of much service and will generally control the paroxysm.

The treatment of patients liable to such attacks is most successful when undertaken before labour begins. Here, especially, prevention is better than cure. If, during pregnancy, the state of the digestive organs be attended to, the bowels kept open, and the character of the evacuations improved, the risk of such attacks during labour will be greatly diminished.

LECTURE XXXI.

RUPTURE OF THE UTERUS.

Rupture of the Uterus is the most fatal of the complications of labour. Some years ago, the Profession looked upon any mode of treatment with despair. Smellie laid it down that nothing could be done; and we find one of his pupils, in his account of a case of ruptured uterus, stating with evident satisfaction—"According to your prudent advice, I spoke nothing of the matter, but pronounced her a dead woman" (Smellie's *Midwifery*, vol. iii. p. 386). Denman also argued that, "when the uterus is ruptured, both reason and experience shew that the patient has a better chance of recovery by resigning the case to the natural effort of the constitution, than by any operation or interposition of art" (*Essay on Ruptured Uterus*). The case, however, of Dr. A. Douglas, led him to think something might be done; and since his time, recoveries from this serious accident have been, from time to time, reported; which prove, that even in these cases, we are not to despair, but rather to examine more carefully the principles of treatment.

General Conditions. Rupture of the uterus may occur during pregnancy or during labour: we shall direct your attention to those lacerations only that happen during parturition.

The *Seat of the Laceration* varies. It is most commonly found at the junction of the cervix uteri and vagina; it may engage the cervix alone, or extend through both it and the vagina; sometimes the vagina only is ruptured. When the cervix is torn, it is generally either anteriorly, opposite the pubes and linea ileopectinea, or posteriorly, opposite the promontory of the sacrum; it may, however, be rent at the sides, and occasionally the lacera-

tion extends through to the fundus. The rent may pass obliquely upwards, or be transverse: thus, the cervix has been torn completely from the body of the uterus, the vagina from the cervix. A very valuable monograph on the subject has been published by Dr. Trask, in which he has collected not less than four hundred and seventeen cases of this accident. One hundred and ninety-eight occurred during parturition, and the situation of the rent is thus given:—

"*During Labour.* Of the entire number of cases, *one hundred and ten* are distinctly spoken of as involving the cervix; *seventeen* the fundus; and *seventy-one* the body of the womb. Of these seventy-one, by far the larger part are reported as ruptures of the anterior or posterior part, or of the right or left side; and in some of these, it is highly probable that the rupture involved the cervix also" (*American Journal of Medical Sciences*, July, 1856, p. 106).

The cervix . . .	110
The body . . .	71
The fundus . . .	17
	198 cases.

Laceration may be Partial or Complete. In some cases the muscular fibres alone give way, leaving the peritoneum uninjured; in others, the peritoneum and a few of the external fibres of the uterus are torn. Sir C. Clarke, Drs. J. Ramsbotham, Collins, Lever, and others, relate cases of this kind, and describe the appearances: the posterior surface of the uterus presented a number of transverse fissures, as if cut with a knife.

Ruptures may occur in the First or in any Subsequent Labour. Dr. Trask has given two hundred and thirty-nine cases in which the labour is mentioned.

No. of Pregnancy	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	several
No. of Cases	31	25	30	27	21	25	14	7	7	12	8	5	2	25

From these tables, it appears that, if each pregnancy be taken separately, a larger number of cases are found in the first than in any other; but if all subsequent pregnancies be taken collectively, their united numbers preponderate considerably. Thus, in Dr. Trask's tables, there are thirty-one first and two hundred and eight subsequent labours, You will perceive, that first labours are very far from having an immunity from these accidents.

Ruptures are more frequent in the birth of Male than of Female Children. The reports of the Dublin Lying-in Hospital prove that lacerations with male births are in the proportion of more than two to one female birh.

	Boys.	Girls.	Total.
Dr. Collins . . .	23	10	33
Drs. Hardy and M'Clintock .	8	1	9
„ Sinclair and Johnston .	10	7	17
Total . . .	41	18	59

Thus, in fifty-nine cases, forty-one boys were delivered, and only eighteen girls.

Disproportion in the Pelvis generally exists. The character of the obstruction is recorded by Dr. Trask in ninety-nine cases; and of these at least seventy-four were in contracted pelves.

These three facts—a first labour, a male child, and a contracted pelvis—being found so frequently in connection with rupture of the uterus, the conclusion might readily be drawn, that protracted labours predispose to this accident; we have the conditions which render labour difficult, and, if difficult, protracted. The natural inference, therefore, is, that protracted labours are peculiarly liable to this accident; yet such is not the fact. Again we must refer to Dr. Trask, who has given the duration of labour in 147 cases of rupture, which present the following results:—

"*Time from the Beginning of Labour to Rupture.* Taking the whole of our [Dr. Trask's] cases in which this is specified, we find that rupture occurred in—

6 hours and less	from the beginning of	labour in	38 cases.
12 hours and over 6	,,	,,	36 ,,
18 hours and over 12	,,	,,	10 ,,
24 hours and over 18	,,	,,	20 ,,
36 hours and less	,,	,,	16 ,,
48 hours and less	,,	,,	14 ,,
3 days and less	,,	,,	11 ,,
4 days and less	,,	,,	2 ,,
		"Total . .	147 cases."

(*Op. cit.*, p. 105.) Thus, then, it appears that in 104 of these cases, the rupture took place within twenty-four hours' labour, and in only forty-three beyond that time; and further, that while it occurred within six hours from the beginning of labour in thirty-eight cases, there are only two instances of the accident in a four days' labour.

We cannot, therefore, justly assign protracted labour as a prominent cause of ruptured uterus. You may also observe that, although these lacerations are more numerous in first labours, the difference between the first and any subsequent delivery is not great. All labours seem to be equally liable to rupture of the uterus; and the causes of this accident must be sought for in some other source than the mere duration of labour.

Causes of Laceration. These may be divided into *mechanical* and *pathological.*

Mechanical Causes. When the head of the child compresses the neck of the womb strongly against the pelvis, either anteriorly against the linea ileo-pectinea or posteriorly against the promontory of the sacrum, it may be so pinched that the action of the fundus tears it. In this way anterior and posterior lacerations of the cervix are commonly explained. To the same class of mechanical causes may be referred ruptures from violence. The late Dr. Campbell related a case in which a rent in the cervix, vagina, and perinæum, was caused by dragging with the forceps

a horribly mutilated fœtus through a pelvis which "was ascertained to be too narrow to admit the transit of a living fœtus" (*Lancet*, 1828-29, vol. i. p. 34); and, singular to say, she recovered from these dreadful injuries. Dr. Trask states that there is, in the museum of the New York Hospital, "a specimen of rupture of the anterior wall of the uterus and of the bladder, by the forcible introduction of the forceps" (*American Journal of Medical Science*, vol. xii. p. 146.) The same fatality sometimes attends the operation of turning the child. The late Dr. Ingleby related a case in which a practitioner, in the attempt to deliver by turning, passed his hand through the anterior part of the vagina into the abdomen. In another case, the mother of eleven children had been in labour sixteen hours, and the midwife turned and delivered a living child; "during the operation the patient gave a loud scream, and fatal syncope came on after delivery": she died in two hours, having a rent in the right side of the uterus through the muscular coat only (*Lancet*, 1841, 1842, vol. i. p. 796). We might easily accumulate these cases (Dr. Trask has collected twelve of them); but those quoted are sufficient to prove the danger that sometimes arises from mechanical violence in operative midwifery. Another mechanical cause depending upon mismanagement arises from the improper administration of ergot of rye. This very popular drug, which is so extensively used, has been sometimes the cause of laceration of the uterus. We have already pointed out (p. 268) its influence on the life of the child; we have now evidence of its effect on the life of the mother. Mr. Coward relates a case in which a powerful dose of ergot of rye was given by a midwife, without regard to a very rigid os uteri. Most violent uterine action was set up. After some time, prostration ensued, and she very soon expired. The *post mortem* inspection exhibited a large transverse rent posteriorly and at the neck, through which the fœtus passed into the abdomen (*Med. Gazette*, vol. xxvii. p. 372). In another instance, a strong healthy woman was taken in labour of her tenth child; after five hours' labour the pains ceased; the midwife gave ergot, the pains returned, and the womb burst (*Lancet*, 1836-37, vol. i. p. 381). Delmas relates the case of a young girl,

aged twenty, in good health, and in labour of her first child: after eight hours' labour, the os uteri was nearly dilated; the waters escaped, and she seemed doing well; her attendant, however, gave her a dose of ergot of rye; the pains were increased, but the head receded; she was found exhausted; the shoulder presented, and the child was turned; she died in a few days (*Journal Prat. Méd. de Montpelier*).

In these cases, the laceration was caused by the violent action of the uterus which this medicine excited; and we are the more anxious to bring them before you, because the attention of the profession has been very little drawn to this cause. Dr. Trask's opinion on this point so perfectly coincides with our own, that we have no hesitation in adopting his language. "The medical journals," he observes, "for obvious reasons, contain but few cases of rupture from the imprudent administration of ergot. There can be no doubt that the injudicious exhibition of this drug has been the source of infinite mischief. It is difficult to obtain data upon this subject; for few in whose practice such cases occur would be disposed to report them, and those met with in consultation-practice are kept secret from motives of delicacy. Dr. Meigs remarks 'that in some of the cases he has seen, at least three followed the ergotic contractions induced by the imprudent exhibition of secale cornutum.' Dr. Bedford, in his valuable additions to *Chailly's Midwifery*, most earnestly directs the attention of students to this subject, and states that he has in his museum *four wombs* ruptured by the improper use of secale cornutum" (*American Journal of Medical Sciences*, vol. xii. p. 391).

The *Pathological Causes* of ruptured uterus especially deserve attention, because they are as yet imperfectly understood, being only partially inquired into; and we believe their influence in the production of this accident is much greater than is generally supposed. When we were attached to the Dublin Lying-in-Hospital, we had the opportunity of closely observing the cases of ruptured uterus that occurred there, and were surprised to find many deviations from the descriptions given of the essential characters of this complication. Believing it to be produced by the violent action of the uterus which tore itself in its efforts to

force the head of the child through a contracted pelvis, we watched anxiously for it in severe and protracted labours, where such causes are in operation, but no such effect took place. On the other hand, we were surprised to find rupture of the uterus where no mechanical causes adequate to explain it existed; and thus, while in one case the most powerful action of the uterus went on and gradually overcame the difficulties opposed to it with perfect safety, in another, a succession of feeble and inefficient pains suddenly ceased and were followed by all the symptoms of rupture; in a third, the patient went through her labour apparently without accident, nevertheless, in twelve hours afterwards there was every evidence that laceration had taken place. These anomalies led us to examine more carefully into the causes of laceration; and a rich and, at that time, an uncultivated field of inquiry presented itself; the uterus generally exhibited one or another morbid alteration. In 1835, a paper was published in the *Dublin Journal of Medical Science* (vol. vii. p.198), pointing out such morbid appearances as presented themselves. What were then only suspicions have since received fullest confirmation from obstetric authorities, as well as from the direct evidence of illustrative cases. In 1836, Duparcque, in an elaborate paper on the subject, directed the attention of the profession to the morbid condition of the uterus (*Histoire complète des Ruptures et des Dechirures de l'Uterus*). Since then, several authors allude to "*thinning*" and "*softening*" of the uterus as causes of rupture; and now the morbid state of a lacerated uterus is deemed worthy of inquiry. *Thinning* or *partial atrophy* of the uterus is not an unfrequent cause; four examples of this morbid change presented themselves to our notice. Dr. Collins mentions another, stating that the cervix was not *thicker than strong brown paper* (*Treatise*, p. 305). Dr. Trask quotes a case related to him by Dr. Channing, of Boston, where the part in which the rupture occurred was "*as thin as membrane.*" Several other cases are recorded in which the attenuated part is described as being "thin as paper," "frail as

cobweb," etc.* When a change of this kind takes place, the symptoms are often very obscure. There may be a very extensive laceration without any severe pains, or any of those prominent symptoms that often precede the accident. You can appreciate what would be the effect of ergot of rye, if it were given to increase pains rendered feeble from this morbid condition of the uterus.

Softening is another pathological cause of laceration. The fibrous tissue seems to be the first tissue affected; the mucous membrane may then be involved, but the peritoneum generally escapes. This morbid change may be only slight, affecting a few of the uterine fibres; or it may be extensive, converting the affected portion of the uterus into a putrid mass. Thus we have found a kind of aneurismal sac formed in the parietes of the uterus, in consequence of a partial rupture of the uterine fibres; no symptoms of laceration shewed themselves during labour, nor did any appear until several hours afterwards, when the sac burst. In the same manner may be explained some of those obscure cases of sudden and fatal hæmorrhage some days after delivery. Dr. Collins relates one, in which the patient was seized with violent flooding on the fifth day after delivery. She died in an hour; and, on dissection, it was discovered that a patch of the uterus of about the size of a shilling had given way, corresponding to the projection of the sacrum (*Treatise*, p. 288).

Dr. Collins mentions another case of this character, which will explain its peculiarities. "A woman was delivered of her sixth

* Dr. Trask, in his last paper (*American Journal of Medical Sciences*, July 1856), further remarks: "The cases now presented afford still further confirmation of the views urged more especially by Dr. Murphy, and supported by our previous statistics, that a diseased condition of the womb is frequently met with in cases of this accident. . . . We have sixty-seven cases in which the condition of the womb happens to be reported. In thirteen only it is reported healthy; in twenty, softened; in twenty-one, thinned; in one, thinned and softened; in three, both thinned and thickened; in eight, 'diseased;' in one, thin and brittle. The larger proportion of instances in which the condition of the womb is stated among the cases now presented, is probably due to the fact, that attention has been only quite recently turned to this point" (p. 102).

child (a head-presentation) after eight hours; immediately after delivery there was a considerable gush of blood; the hæmorrhage continued to increase in an alarming degree, and she died in thirty hours. After death, the inner coats of the vagina and os uteri were found ruptured to a considerable degree." Some of the fibres of the cervix and os uteri had evidently been softened, and gave way, the rent extending into the vagina. Hence in this case the child was expelled forcibly by the uterine action, nor was there any difficulty in this delivery of the head; the placenta, too, was thrown off without assistance. "*She had no symptom of rupture except extreme exhaustion*, nor was her labour severe with the present or any former child" (*Treatise*, p. 396).

A review of several such cases as these points out the progress of this disorganisation in the uterus. It commences in the fibrous structure, which then yields even to a slight force; hæmorrhage immediately follows. The effused blood may be, for a time, confined between the lining membranes of the uterus; in one case pressing inwardly toward the abdomen, and detaching the peritoneum from its surface, at length it gives way, either at a point, or in a rent more or less extensive; in another, it may open on the mucous surface, and produce severe external hæmorrhage. When the uterus is thus perforated, the symptoms of rupture that had formerly been obscure and doubtful, now become quite distinct and intelligible.

The extreme of this morbid change is that condition which is called *Putrescency of the Uterus*. A more extensive softening of tissue takes place, which converts the affected portion of the uterus into putrilage. Such cases have been met with, when puerperal fever was rife; and are, therefore, attributed to the action of a morbid poison. Severe inflammation will sometimes produce it, as has happened in some of those neglected cases where the labour has been severe and protracted, and where inflammation has set in and has proceeded to this dangerous extent before relief has been afforded.

Cracks in the Peritoneum complete another form of rupture that may be referred to this class of causes, although it is very difficult to explain how they are produced. It is very clear, that

mechanical causes can have no possible effect, because the rents are not at the cervix, and the peritoneum sometimes gives way before labour, and in other cases very soon after it has commenced. Mr. White (*Dublin Journal*, vol. v. p. 325); Mr. Partridge (*Medico-Chir. Trans.* vol. ix. p. 72;) Dr. J. Ramsbotham, Dr. Lever, and Sir Charles Clarke (*Transactions of Association for the Improving of Medical and Surgical Knowledge*, vol. iii.), each quotes instances of this kind. In all these cases, the apparent cause leading to the accident was trifling. In Mr. White's case, the patient turned suddenly round from fright before labour began. Mr. Partridge's patient was seized in the eighth month of her pregnancy with sudden pains in the abdomen, and vomiting. In Sir Charles Clarke's case, the peritoneum was torn after two hours' labour. Some predisposing morbid cause must have been in operation in these cases. We suspect that it produces the same change on the outer surface of the uterus, that we have already noticed on the inner; that is, softening of the fibrous structure. We know that in the healthy uterus the peritoneum is so intimately attached to the fundus uteri, that it is extremely difficult to separate it; but when the structure beneath it is softened, it is detached quite easily. Hence slight effusions of blood from lacerated fibres might be formed beneath the peritoneum, raising it from the surface. If such were the case, any accident that would determine blood towards the uterus might so increase the effusion, that the peritoneum would give way, producing the cracks that have been observed. In this point of view, Mr. Partridge's case is very worthy of attentive consideration.

Symptoms.—These are never uniform. Sometimes they are well marked and distinct, sometimes exceedingly obscure; they may be so obvious that all doubt as to the accident is removed, or so uncertain from their gradual development, that the injury is not recognised until some time after it has happened.

Premonitory Symptoms may be either present or absent. The most usual notice of danger is the violent action of the uterus, accompanied by intense pain; this symptom is especially dangerous, if the patient have complained, before labour, of pain in the same situation as that to which she at present refers it. In certain

cases, the patient complains during her pregnancy of acute attacks of pain in some parts of the uterus: if this pain return when labour is going on, and be particularly intense, there is great reason to apprehend laceration, if the action of the uterus be violent. Sometimes the patient describes her sufferings in the most forcible language; she tells you she will burst if not relieved, and seems quite conscious of her danger.

When the rupture takes place, the symptoms are usually well marked: a violent pain, causing intense agony, suddenly ceases, and is immediately followed by all the symptoms of nervous shock, accompanied by those of hæmorrhage. The countenance is extremely pallid, having an expression of anxiety and alarm: a clammy sweat breaks out on the forehead and angles of the mouth; the lips are livid, and the cheeks cold; violent retching succeeds, which is generally uncontrollable; everything taken is immediately rejected, the ejected matter being usually the contents of the stomach mixed with mucus, but sometimes dark, of the colour of coffee-grounds. This is a very unfavourable symptom. The general surface is cold, the respiration laboured, and the pulse scarcely to be felt; it is extremely rapid, beating at the rate of 150, and often irregular. The shape of the abdomen is quite unequal; the usual oval form of the uterus is lost, and in its place, a large and firm tumour (the contracted uterus), is observed either at one side or protruding prominently below the umbilicus. In some cases, the child may be felt quite distinctly through the abdomen. Hæmorrhage may be noticed flowing from the vagina, and the head, if presenting, is usually found to have receded; if it should not, great care must be taken in making a vaginal examination, lest it may do so. In some cases the child escapes completely into the abdomen; but this is not so frequent, although in most instances the limbs of the child may be distinguished through the abdominal parietes.

There is the greatest possible variety, however, in the symptoms. The laceration is sometimes so obvious, that even the bystanders can hear the rent. Dr. Trask mentions that in one case the noise was so loud, as "to awaken the physician, who was taking a nap in the adjoining room." In other instances, the

only evidence of rupture is the cessation of pains: even this has been mistaken for uterine inertia, and ergot of rye has been given to increase them. Again, in certain cases, labour is completed without any indication of mischief: nevertheless, laceration has taken place, which soon afterwards becomes manifest. So severe an accident generally causes a violent constitutional shock; but there are cases where neither the stomach, nor pulse, nor respiration, have been in the least influenced at the time of the accident, the patient lying perfectly tranquil, expecting the return of pains: the symptoms of constitutional irritation have appeared subsequently, and in a more gradual manner. In the majority of cases, however, it is otherwise; the altered form of the abdomen may be recognised, and considered as a diagnostic mark of rupture.

TREATMENT will need a careful examination: promptitude and decision are essential in order to give the patient a chance of recovery, and yet a decided step in a wrong direction may place her at once beyond all hope. We have to consider two questions: first, Can we prevent laceration from taking place? secondly, How are we to proceed when rupture occurs?

Prevention of Laceration. The unexpected manner in which this accident often happens, without a single premonitory symptom showing itself, is evident from the cases we have related: we have also proof how frequently the laceration is the result of a previous morbid change in the uterus. It would be, therefore, extremely unjust to lay it down as a principle, that rupture of the uterus may be prevented, or to attribute so frightful a catastrophe to any want of attention or foresight on the part of the practitioner in attendance: yet this seems to be rather a popular error. The practitioner who has been so unfortunate as to meet a case of this kind, is seldom free from the most unjust suspicions; and, on the other hand, "the lucky man," who has had an immunity from this accident, is sometimes inclined to attribute to superior skill what is only the result of his good fortune. You cannot generally prevent laceration of the uterus; but there are some cases in which the violence and severity of the pains, and the resistance to the action of the uterus, are so great, as to give

you timely warning that interference is necessary. In all such instances, the previous history should be accurately inquired into, in order to ascertain any evidence of disease of the uterus. Inflammation commencing in the passages must always be considered as a premonitory symptom; because, if it proceed, it may terminate in softening; and softening may lead to rupture.

Treatment when Rupture has occurred. This consists in the immediate removal of the child; in obviating as far as possible the shock which the constitution receives from so serious an accident; and using your best directed efforts to assist nature in repairing the injury. With regard to the first point: the facility of delivery, and the chances of a successful issue, depend very much upon the position of the child at the time of the accident. If the head be in the pelvic cavity, the case is more favourable than when the child has escaped into the abdomen, and there is less difficulty in deciding on the proper course to pursue: we shall therefore consider each case separately.

When the Head is in the Pelvic Cavity, it may be removed either by the forceps or by the crotchet. The forceps may be used, if it can be applied without disturbing the position of the head; but if there be any difficulty in the application, or the least risk of pushing back the head, you should remember that the uterus no longer exercises any counter-pressure on the child, and that you may displace the head altogether in making the attempt. The danger of pressing the head against or through the laceration is too great to authorise this mode of delivery under such circumstances. When the life of your patient is in such imminent peril, the safety of the child is of no importance, and should not weigh in the selection of the instrument you employ; but all hesitation on this point is removed by the fact that the child is nearly always destroyed by the accident. In comparing the merits of the crotchet and the forceps for the purpose you have now in view, the only question to determine is, which instrument is the least likely to displace the head? If there be sufficient room for the forceps, use it; but if the head be at all tightly fixed, so as to require any force in its application, we think the crotchet preferable if it be properly used.

You can readily understand that in such a case as this you could not perforate in the usual manner. If you were to apply the perforator to the most depending part of the head, and press upwards against it, you would displace it far more effectually than by any application of the forceps. In order, therefore, to perforate so as to prevent displacement, it is necessary to direct the perforator, placed on the pubic side of the head, from before backwards. Let the point of the instrument be applied to the head immediately below the symphysis pubis, so as to fix it between the perforator and the sacrum; press the instrument towards the sacrum until the opening is made, and having succeeded thus far, pass the forefinger within the opening before the perforator is withdrawn; the crotchet may then be introduced and the head drawn down.* While this is being done, an assistant should press firmly on the child in the abdomen to prevent it from receding. When the child is delivered, the placenta must be taken away; as it is generally separated from the uterus at the time of the accident, and forced into the abdomen. Great caution is required in removing it, lest the laceration be increased. The hand is conducted by the funis to the rupture through which it passes. Do not follow it, nor attempt to force your hand through the rent into the abdomen; rather draw down the placenta by the funis to the opening in the uterus, and endeavour to get a portion of the placenta through it with the least possible disturbance. Having succeeded thus far, you may draw away the remainder without any difficulty.

When the placenta is removed, the next point we are generally directed to observe is, to replace the intestines if they protrude through the wound. This is not at all necessary, and may be highly objectionable. We very much doubt that in any of these cases there is the least risk of strangulation of a protruding

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* The contrivance suggested by Dr. Arnott, and put into practice by Professor Simpson, might be preferable to either forceps or crotchet. An India-rubber cloth disc applied to the head, and maintained there by an exhausting syringe, would perhaps better answer the purpose.

intestine. What is to strangulate it? The contractions of the uterus would have an opposite effect, because they would increase rather than diminish the rent. It is quite possible, that if any portion of the intestines could get within the opening before the child is withdrawn, the contraction of the uterus that follows its removal might cause strangulation: the rent that was expanded by the body of the child to several inches, may be reduced to one or two when it is taken away; and if the intestines pressed into and occupied the former space, they must become strangulated when the opening is so much reduced: but this is very unlikely to happen, unless in those cases where the child slips completely into the abdomen, so that the intestines fall within the rent while it is in the act of contracting.* In the case we are now discussing, it is more usual for a loop of intestine to descend and fill up the rent *after* the contraction of the uterus, when its size has been reduced; there is therefore no danger of strangulation from contraction of the uterus, because none takes place, and if it did, the rent would be increased. The necessity for replacing an intestine so situated is very doubtful, nor is by any means so practicable as it is described to be; you may push back the protruded portion, and find after the first fit of retching, more intestine down than before. The chief objection, however, to this practice is not merely that it is useless, but that it might be injurious by disturbing too much the coagula surrounding the laceration, and increasing the irritation of the peritoneum by manipulation. The principal object of treatment, from the commencement to the termination of such a case as this, is to keep the lacerated wound perfectly at rest, and to remove from it every possible source of irritation: for this reason, therefore, it is better to leave the intestine undisturbed, than to make useless and injurious attempts to replace it. The remarkable case of recovery related by Dr. M'Keever (*Essay on Rupture of Uterus*), in which a considerable portion of intestine protruded, not only

* Dr. Trask gives twenty-four cases of hernia of the intestines through ruptures, and only one of strangulation.

into the vagina, but from the vulva, proves the possibility of restoration under the most unfavourable circumstances: we need not, therefore, feel much apprehension about the minor prolapse of intestine that generally occurs.

When the Child has escaped into the Abdomen, the case becomes so hopeless as to raise a doubt in the minds of the most eminent practical authorities as to the propriety of its removal. "Reason and experience show," says Denman, "that the patient has a better chance of recovery by resigning the case to the natural efforts of the constitution, than by any operation or interposition of art" (*Midwifery*, p. 242). The case of Dr. Andrew Douglas, "in which, though the uterus was ruptured, he turned the child, the patient recovered and afterwards had children," led Denman to alter his opinion. "If no other case had been recorded, this would have been of sufficient authority to render it in future the duty of every practitioner to attempt without delay to deliver the patient, and, bad as her chance certainly would be, to be strenuous in using all the means which art dictates to extricate her, if possible, from her imminent danger, and to preserve the child." Arguing in this manner, on the authority of one or two successful cases of turning after rupture of the uterus, the rule has been laid down, that when the child has escaped into the abdomen, it should be removed by this means. Yet it appears to us, that you could not adopt a more efficient means of depriving the patient of all chance of recovery than by making such an attempt. Reflect for a moment on the steps of such an operation; the hand and arm are forced through the laceration, the coagula pushed aside, and the rent increased. Can you expect to escape a renewal of hæmorrhage? You proceed to introduce your hand into the peritoneal sac, and, to use the vivid language of Blundell, "you perceive the intestines, feel the beat of the large abdominal arteries, touch the liver, and ultimately reach the feet of the child." These being drawn down and the child turned, there yet remains its extraction through the laceration; the limbs, the body, the shoulders, the head, passing like a wedge, tearing open the wound to its fullest extent. What hope could you have of the patient's recovery after such an

operation? Yet Dr. Douglas's case recovered; Dr. Blundell's patient was saved; and, if we were to adopt Denman's manner of reasoning, these cases, with a very few others, would be sufficient to authorise us still to turn the child. The inaccuracy of such a conclusion, and the consequent danger of such an operation, is not to be learned by the few rare instances in which *vis medicatrix naturæ* surmounts every danger and difficulty. We shall arrive much nearer the truth by an analysis of all those cases that have been under treatment when the child was in the abdomen. Dr. Trask has quoted 217 cases of rupture, in which some were delivered by turning, some by gastrotomy, and others undelivered—in fact, left to the efforts of Nature for cure. An analysis of these cases presents the following important results:—

Delivered by	Total Cases.	Saved.	Lost.	Per Cent Lost.
Gastrotomy	29	22*	7	24
Turning, Perforation &c.	118	38	80	68
Undelivered	70	15	55	78

These cases, although numerous, cannot be considered to represent the whole of the cases treated according to these different modes, because no doubt many fatal cases have been suppressed; but, as there is no reason for supposing that one class of cases has been omitted more than another, we may fairly assume that the publication or suppression of such cases has been equally under the influence of the same causes; therefore the proportionate mortality here given cannot be far from the truth. We find that those cases which were delivered by turning, and those abandoned to Nature, were nearly equally fatal: between three and four-fifths of them were lost, while about two-thirds of the cases delivered by gastrotomy were saved. These facts are highly important, because they are consistent with the conclusions

* 2 cases of Gastrotomy omitted—1 during pregnancy, 1 after turning.

at which we must arrive when we reflect upon these different modes of treatment.

We have already pointed out the extreme danger of turning, which, it now appears, is almost as bad as abandoning the case altogether. It remains for us to consider the operation of gastrotomy, its advantages, and the objections to it. When the abdomen is thus opened, and the child removed from it, two important objects are gained: the original wound is left perfectly undisturbed, and the child is removed much more quickly, and with less difficulty, than is possible by turning, especially when the pelvis is contracted. The importance of facility in delivery, thus avoiding the shock of a severe and protracted operation, is proved by Dr. Trask's researches. He gives 161 cases of delivery by different modes, with the following results:—

	Saved.	Lost.
Delivery accomplished with ease	48	38
Ditto with more or less difficulty	22	53

"This statement exhibits," as Dr. Trask justly observes, "most conclusively the influence of a speedy and easy delivery on the patient's chance of recovery, by showing the great preponderance of easy deliveries in those who survive, and of difficult deliveries in those who sink."

It is just possible that the child might be saved by its quick removal from the abdomen. Among the cases quoted by Dr. Trask, there were three instances in which the child was saved by gastrotomy, but none in which it survived when removed from the abdomen by turning. Professor Bedford, of New York, had three cases of ruptured uterus (two of them arm-presentations) in which he turned and delivered the children living; but these evidently were withdrawn from the uterus, not from the abdomen. The safety of the child, however, is a secondary question: the chief object of our attention is to give the mother the best chance

of being preserved in so serious an injury. It is the more necessary to bear this in mind, because popular prejudice arrives at a perfectly opposite conclusion. The only condition on which it recognises the operation of gastrotomy is for the purpose of saving the child when the mother is dead or dying. The idea of "cutting the child out of the belly," in order to save the unfortunate patient, is quite unintelligible. If this operation, therefore, be undertaken at all, its object should be clearly understood and explained; because to perform it when the mother is dying, for the mere chance of saving the child, would be cruel in the extreme, and justly deserves the eloquent reproval of Dr. Blundell: "Who that has a heart of flesh in his bosom could coolly sit down in a real case to argue for the advantage to be derived to the fœtus from the performance of Cæsarian incisions, before the maternal life is totally and beyond all doubt extinct? Who that has a heart of flesh in his bosom could have firmness sufficient to perform this operation under such circumstances? Who could look on the dying eyes of his patient without suffering the knife to drop from his hand? Who would like himself to be disturbed at such a moment? As long as men are surgeons, surely surgeons may continue to be men" (*Midwifery*, p. 709). The object of your efforts is to save the mother; and therefore this operation should only be performed when there is a reasonable chance of its success—as great, at the least, as the operation of turning the child. The objections to the operation are, the assumed danger of opening the cavity of the peritoneum, the risk of additional hæmorrhage, the increased shock of the operation, and the greater difficulty to repair a double injury. To these objections we might easily reply, that the peritoneum is already exposed; that no hæmorrhage of any importance can take place; that adequate means may be used to obviate the shock which may be produced; and the wounds that have been made (both lacerated and incised) would have a far better chance of healing favourably when one of them is left undisturbed and the other is under the immediate observation of the practitioner, than when the wound in the uterus is torn up a second time, But the chief objection to this operation, and that which is most difficult to meet, is popular

Mrs Blandy is hoping

prejudice. Any operation that is not seen, however painful it may be, or however dangerous, is not looked upon with the same horror as when the surgeon takes his knife and proposes to cut into the abdomen. Although both operations—turning and gastrotomy—may be equally fatal, still the former will not share anything like the opprobrium that attaches to the latter. The practitioner, therefore, requires no ordinary firmness to follow the course that his judgment dictates; nor will this operation for ruptured uterus be generally recognised until some bolder spirit dissipates, by his success, the prejudices that flit around it. Recoveries from ruptures of the uterus are sufficiently rare to justify any mode of treatment that has not been generally adopted. The facts brought forward give strong suppport to that which is now proposed, and reason seems to point it out as much more suitable to the cases we have now under consideration than the operation of forcing the hand through the rent into the abdomen, in order to turn.

With regard, then, to the mode of delivering the child, you may take the following rules:

1. When the head of the child is in the pelvic cavity, and the forceps can be applied without difficulty, let it be employed.

2. When the head is fixed in the cavity, or so tightly adapted to the pelvis that it must be moved back, in order to apply the forceps, this instrument should not be used. Perforation is then necessary, and the operation should be performed with great care, lest the head may be displaced.

3. When the head is fixed in the brim of the pelvis, perforation may still be adopted, although there is a greater risk of displacing the head, because the perforator must be directed more upwards than towards the sacrum. If it be tightly fixed, it may offer sufficient resistance to enable you to make an opening; but if otherwise, and the head be pushed back above the pelvis, the child must be removed either by turning or gastrotomy. The former operation is very objectionable; and, therefore—

4. When the child is in the cavity of the abdomen, forced thither either by the uterus or by the hand of the practitioner, the

only operation that appears to give a reasonable chance of success is gastrotomy.

5. When the child still remains in the uterus, notwithstanding the laceration, it may be removed by turning, because the hand is not of necessity passed through the rent; but even here great caution is required, lest the uterus be further torn by any awkwardness in manipulation.

The *shock of the accident* must be guarded against when any operation for the delivery of the child is about to be undertaken; otherwise the patient may perish while being delivered. If the pulse be feeble, or hardly to be felt, or if she be in a state of syncope, no attempt should be made to remove the child until there is some evidence of returning strength. She should be given a full dose of opium with some stimulant, as ether, ammonia, or brandy, the temperature of the surface and extremities maintained, and the patient not moved from her position until the pulse is restored. As soon, however, as reaction takes place, the child should be at once removed; because so long as it remains in the abdomen it is the chief source of irritation, and of consequent depression of all the vital powers.

Lacerations of the Os Uteri have been very little noticed, although our impression is, that they are almost as frequent as lacerations of the perinæum. They are not called ruptures of the uterus, because the injury is not attended by the same fatal consequence as when the peritoneum is torn: the rent in the mouth of the womb heals with as little constitutional disturbance as that in the perinæum, and therefore does not attract attention. The frequency of this accident, however, may be estimated by the traces that are left behind in the cervix, when the uterus becomes afterwards the seat of disease. Having had occasion, we may say, constantly to examine the os and cervix uteri, both by touch and with the speculum, long after delivery, in consequence of symptoms of inflammation, we have found abundant evidence of previous mischief in the deep fissures of the cervix, accompanied by great induration and ulceration. If inquiry were made of the patient's labours, she was sure to give a florid account of their severity—"the child obliged to be taken

away by instruments," etc. Such effects as these should be remembered, if we would form a just estimate of the consequence of difficult labours, and especially of the imprudent use of instruments.

Separation of the Cervix Uteri has sometimes taken place: the whole disc of the vaginal portion of the cervix has been detached, and expelled with the head. Mr. N. P. Scott, of Norwich, relates the first case of this kind (*Med.-Chir. Trans.*, vol. xi.). The os uteri was rigid and contracted, it did not yield to the prolonged efforts of the uterus, and was at length torn off. A similar case occurred to Mr. Hugh Carmichael, of Dublin (*Dublin Journal*, vol. xci. p. 53-54). Dr. E. Kennedy met with two such cases in the Dublin Lying-in Hospital (*Ibid* p. 154). Dr. Lever also relates two cases—one of them of great practical interest. It occurred in the practice of Mr. Evans. Labour commenced on Tuesday morning at three o'clock, and continued to two o'clock on Thursday, nearly thirty-six hours, without producing any effect on the os uteri. Depletion, purgatives, local fomentations, anodynes, and tartar emetic, had been used without effect: the os was thinner, but merely admitted the tips of two fingers, and still felt like a hardened string: the cervix was dilated, thin, and greatly on the stretch: the pains had been for some time very frequent, vehement, and forcing. Dr. Lever "divided the whip-cord margin of the os uteri towards the posterior half of the sides of the pelvis, in the direction of each sacro-iliac synchondrosis. The incisions were made during the contractions of the uterus; the patient made no complaint, in fact they gave her no pain. The immediate result was a diminution of the œdematous condition of the cervix, and the loss of a small quantity of thin watery blood. The pains which had been so forcing did not at first entirely cease, but were much moderated; still, feeble as they had become, slight progress was made: there was a cessation for half an hour; they then recommenced: at four o'clock, the os uteri had dilated to the extent of two inches diameter, and at a quarter to five, a female child was expelled still-born, but was resuscitated on the application of the usual remedies" (*Guy's Hospital Reports*). The

patient, who had been sixty hours in active but fruitless labour before this operation, was delivered in less than sixty minutes after it was performed. This is a highly instructive case, because it points out the remedy for this extreme rigidity, and confirms the propriety of the practice pointed out in a former lecture (p. 247)—that of incising the cervix. Hitherto the practitioner thought himself fortunate if the death of the child enabled him to remove it before any dangerous symptoms shewed themselves; but you perceive that, by promptly relieving this unyielding condition of the cervix, *the child may be saved,* and the mother secured from any risk of so serious an accident as that just described. Besides, recollect that in using such a means we are, after all, only imitating Nature, who, in her own way, frequently incises the cervix, and sometimes separates it altogether: you cannot go wrong in following her example; and therefore, when you meet with these very embarrassing cases, where the labour is prolonged, the os uteri undilatable, and the child living, we feel justified in recommending you to incise the cervix for its relief. As a proof that this summary method of removing a difficulty is not so dangerous as would at first sight appear, it is remarkable that five of the six cases above mentioned perfectly recovered, and the sixth died of "puerperal arthritis," evidently the result of the absorption of putrid matter, not only the cervix uteri, but the vagina and perinæum being in a state of slough. Had the operation to which we have alluded been timely performed, even this woman might have been saved.

Laceration of the Vagina may occur without involving the uterus. Dr. Dogherty, Professor of Midwifery in Queen's College, Galway, relates one case of this kind which was fatal (*Dublin Journ. of Med. Science,* vol. xxvii. p. 326); Drs. Harvey and M'Clintock relate another that escaped (*Report,* p. 394-5).

The cases we have quoted, taken collectively, bear evidence of great variety, both as to the causes and the characters of the lacerations of the parturient passages.

LECTURE XXXII.

INVERSION OF THE UTERUS. PROLAPSE OF THE FUNIS. PLURAL BIRTHS.

INVERSION OF THE UTERUS is a very serious accident of delivery, and one which, more than any other, has reflected odium on the practitioner; the most disgraceful blunders, and the most frightful results, have been the effects of ignorance of its nature. The uterus, which, if properly managed, would have contracted in the usual manner, has been inverted solely because the attendant did not know how it ought to contract, and, by making violent efforts to draw down the placenta, drew down the uterus along with it. It has been left inverted so long that it could not be reduced; it has been mistaken for the placenta, and absolutely torn away. In the black catalogue of fatalities from obstetric mismanagement, there are no cases so obviously chargeable to the incompetency of the accoucheur as those of inversion of the uterus. The nature of the accident should therefore be studied and understood.

Causes. The causes of inversion of the uterus are most usually traceable to violence, although sometimes the accident happens spontaneously.

Pulling at the Funis improperly is, perhaps, the most frequent cause. The placenta being retained, an attempt is made to sepa- it by pull ing the cord: at first, perhaps, gently, by and bye with more force, and at length, "a long pull and a strong pull" brings down the placenta and fundus uteri completely beyond the vulva. One example will be sufficient to show you how it is done. "A patient, being averse to the presence of a medical man, insisted that she and the midwife 'could manage it' (that is, the delivery of the placenta,) before he came. Acting on this impression, the

two set to work, the woman clasping her fingers together, and pressing down with the palms of her hands applied over the fundus, while making a bearing-down effort; the midwife, on the other hand, at the same time pulling strongly and resolutely by the cord: and thus was the placenta delivered, and accompanied by a gush of blood," with which the bed was saturated; the uterus was inverted, and the woman died before assistance could reach her (*Edinburgh Monthly Journal*, June, 1848). This is a striking case. More commonly, however, the mode of inverting the uterus is less obvious: the uterus is not at once drawn inside out by the funis, but the fundus is so depressed within the cavity of the uterus, as to excite an irregular and inverted action of its fibres; an invagination of the uterus takes place just like an intestine, and the depression is more and more involved until the inversion is completed.

Shortness of the Funis is assigned as a cause producing inversion, but this very rarely happens: we never met with a funis so short as to prevent, when the head is expelled, the body from following it: eight or nine inches would be quite sufficient for this purpose, and it is very unusual to find the cord of less length than this. In the statistics of the Dublin-Lying-in Hospital, there has not been a single case of inverted uterus in 71,000 cases, and there must have been several instances of short funis. Drs. Hardy and M'Clintock observe—"No example of acute *inversio uteri* has ever fallen under our notice; and the accumulated experience of Drs. Clarke, Labatt, Collins, Kennedy, and Johnson, in this hospital, does not furnish a single instance of the occurrence of this accident, though the number of women delivered during their united masterships amounts to upwards of seventy-one thousand" (*Practical Observations*, p. 223).

Spontaneous Inversion of the uterus sometimes happens. Mr. J. Clarkson relates an instructive case of this kind. He was called to a lady, aged thirty-four, "a short stout woman then in labour of her eleventh child. He found her walking about the house apparently very comfortable, having had but few pains, and those at long intervals, during the day. She informed me" (Mr. C.) "that all her other labours had been quick, and as the

membranes had ruptured at three in the afternoon, nearly eight hours before my visit, she felt convinced that her labour would speedily be terminated. As she walked across the room, I observed her abdomen unusually prominent, and suspected she might have twins; but in this I was mistaken. At my request, she placed herself on the bed, so that an examination *per vaginam* might be made, when I discovered the head already low down in the cavity of the pelvis, the os uteri receded beyond reach of the finger, and the labia and perinæum soft and dilatable. As yet there had been no uterine contraction since I entered the room, but, just as she was getting off the bed, in order that it might be more comfortably prepared, a violent pain came on, and almost before I could apply my hand to the perinæum the child was expelled, and the placenta brought to the os externum by the continuance of the same pain. Having hastily tied and divided the funis, and removed the placenta (which was perfectly loose), I passed my finger to ascertain the condition of the os uteri, which I could feel high up, widely dilated, and embracing a soft globular substance, which protruded through it and occupied the vagina. This I at first imagined was the bag of membranes belonging to the other fœtus I had suspected to be there. To satisfy myself, I placed my other hand on the abdomen, but, to my surprise, could feel nothing like the uterus there, although I made deep pressure for it" (*Lancet*, vol. ii. p. 406). Mr. Clarkson found that the uterus was partially inverted, and used the proper means to restore it to its place.

This case illustrates the cause of this spontaneous inversion. The uterine fibres had evidently lost their tone, being weakened by frequent pregnancies. The abdomen gave the uterus no support; the fundus projected prominently over the pelvis. The dilatation of the uterus, and the advance of the head into the pelvic cavity, caused no pain; but when the patient changed her position, so as to bring the pressure of the child more in the axis of the pelvis, a violent expulsive pain completed the delivery. The uterus was suddenly emptied of its contents, the fundus uteri was forced down within its cavity by the single expulsive effort, and the inversion produced. When the uterus is in this

semi-flaccid state, the pressure of the superincumbent parts might readily cause a cup-shaped depression in the fundus when that pressure is increased by strong contractions of the abdominal muscles. The same cause that, in a healthy uterus, would effect more perfectly its regular and uniform contraction, may produce, in the atonic uterus, irregular contractions and inversion: hence it is possible that there are many cases of retained placenta from irregular contraction of the uterus, of after-pains, and sometimes of hæmorrhage, the result of very partial inversion of the uterus when it is in this condition. This case also affords a good example of the source of some blunders that have been committed. Had it not been for the caution and intelligence of Mr. Clarkson, the woman might have been treated as having twins. Whenever this accident occurs, it is very important to recognise it at once, so as to prevent mischief, because delay always increases the danger.

The *Symptoms* demand immediate attention. The inversion may be *complete* or *incomplete*. A *complete* inversion, happening immediately after delivery, can cause no difficulty. The uterus may be seen beyond the vulva, sensitive, and covered with blood, having, perhaps, the placenta attached to it. If a vaginal examination be necessary, the os uteri may be felt surrounding the neck of the tumour that is formed. The patient is prostrate from the effect of the accident; and the pulse, respiration, countenance, stomach—all give evidence of the shock the constitution has received. When the inversion is *incomplete*, these symptoms are more progressive. Soon after the delivery the patient complains of a renewal of her labour-pains; at first they are slight, and are mistaken for after-pains, but soon become so violent, and are accompanied by such a sensation of forcing, that the patient imagines that another child is coming into the world. She is fortunate if her attendant do not fall into the same mistake—confound the fundus of the uterus, as it is pressing into the vagina, with the head of the child, and proceed to assist the delivery. At length the fundus is forced beyond the vulva, and the inversion is immediately followed by the symptoms of nervous shock — rapid pulse, hurried respiration, coldness of surface,

vomiting, and great anxiety. If the abdomen be examined above the pubes, the uterus cannot be traced. The surface of the tumour is generally covered with blood, but hæmorrhage may be only slight, or very profuse: there is a great variety in this respect. Cases have occurred without hæmorrhage, and where the placenta has been peeled off the surface without any loss of blood. In other instances there has been profuse hæmorrhage. Dr. Lever relates a case of fatal hæmorrhage which followed the separation of the placenta from an inverted uterus. Mr. Newnham has also observed hæmorrhage followed by immediate dissolution in such cases. Dr. Radford, on the contrary, has seldom found serious hæmorrhage, and has removed the placenta frequently with safety. This contradictory experience might, perhaps, be reconciled. If the uterus have lost its tonic contractility, and if it be too flaccid to retain its form under the force compressing it, hæmorrhage, perhaps profuse, will be a natural consequence of this condition. If, on the other hand, there be no uterine inertia, but the fibres, through some violence, be made to assume an inverted action, the fundus of the uterus being drawn down partially, and by its contractions forced further in a wrong direction, until the inversion is completed,—in such a case it is likely that no hæmorrhage will take place, because the contraction of the uterus in this inverted position is just as great as, if not greater than, in its natural situation, and therefore the effect on the uterine vessels must be the same. In fact, if this view be correct, the presence or absence of hæmorrhage would be governed by the same cause here as in a case where no inversion has happened. In both instances it would depend upon the presence or absence of an efficient uterine contraction.

Diagnosis. The uterus, when inverted immediately after delivery, cannot readily be mistaken for anything else: it is only when the immediate effects of the accident have passed away, and the uterus has remained for some time in its new position, that there may be a difficulty in determining its nature. It may then be easily mistaken for polypus: a large pyriform tumour, the neck of which is surrounded by the os uteri, bleeding readily, and not reducible, are characters common to both. The uterus, however,

presents a rough surface, and it generally retains its irritability: when this is absent, the diagnosis is still more difficult.

Dr. Gooch relates an interesting case, which will illustrate the difficulty of diagnosis.*

The *Treatment* is obvious: the uterus should be immediately replaced before the contraction of the uterine tissue becomes permanent. Denman found it impossible to restore the uterus when four hours elapsed from the accident. This limit of time seems,

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* Mr. Borret, of Yarmouth, with whom, when this happened, Dr. Gooch was residing as a pupil, was called to a lady in labour with her sixth child. On his first examination, he found a large fleshy tumour within the vagina. The anterior segment of the os uteri was easily felt, but the posterior was occupied and covered by the attachment of the tumour. After the orifice had dilated, and the membranes had burst, the head of the child not descending, Mr. Borret introduced his hand, brought down the feet, and extracted the child. The placenta was expelled spontaneously. The patient now being delivered and easy, he left her at seven in the morning. At three in the afternoon he found her in strong pains, as if there was another child; but, as the abdomen was flat, and the contracted uterus could be distinctly felt in the abdomen, he was satisfied that there was not, and gave her an opiate. At eight o'clock at night he found that the pains continued violent, with the sensation as of a substance coming away; and on examination, he discovered a soft round tumour pressing against the outer orifice. What could it be? He could have thought that it was the uterus inverted, but it was the same tumour which he had felt in the morning before the child was born: there was no hæmorrhage, the placenta had been expelled spontaneously, and the uterus was distinct in the hypogastric region. He consulted his medical friends in town, and sent off to Norwich for Mr. Rigby. The pains continued with violent expulsive efforts all night, and the next morning they found her with a languid pulse and pallid countenance; a large fleshy livid tumour had been forced out of the vagina, and every pain brought it more and more in sight: she continued to suffer and sink through the rest of the day. In the evening Mr. Rigby arrived, but she expired about half an hour before. As soon as he arrived he examined the tumour, and was convinced that it was the inverted uterus. On opening the uterus next morning, the uterus was found contracted ; but its orifice was dragged down as low as the external orifice by a tumour which grew from it by a thick stalk; it was attached to the posterior part of the orifice, and, some way up the neck, was of a livid colour, and weighed three pounds fifteen ounces (*Gooch Diseases of Females,* p. 281-82).

however, not without exceptions. Dr. Tyler Smith reported to the Royal Medical and Chirurgical Society (April 13, 1858), a case of complete inversion of the uterus of nearly *twelve years' standing*, which, by continuous pressure dilating the os uteri, "which was very small and rigid," he succeeded in replacing. His mode of doing so was this: "The right hand was passed into the vagina night and morning, and the uterus squeezed and moulded for about ten minutes at a time. . . . In the interval between these manipulations, the vagina was distended, and firm pressure exerted upwards by a large air-pessary. These means gradually dilated the os uteri to such an extent as to allow a partial return of the uterus, and on the eighth day from the commencement complete re-inversion took place."

We cannot find any case similar to this of reduction of a uterus after a lengthened period, but, standing alone, it will justify cautious attempts at replacement; these attempts, however, must be guarded—not violent; patient and persevering—not forcible. We have met with cases of inflammation of the inverted womb ending in death, caused by violent attempts to replace it.

If the inversion be irreducible, its treatment belongs to a different subject from that which we are at present discussing.

The mode of replacing an inverted uterus is somewhat similar to that of prolapsed uterus. The tumour is firmly compressed with both hands, and the centre of the fundus pushed upwards by the fingers forming a cone: when the reverted portion arrives within the pelvis, the difficulty of advancing it increases, because the uterus is so much folded on itself; but when the fundus passes this point, it flies back to its natural position, just like an India-rubber bottle. Much of your success will depend upon promptitude: the uterus should be returned quickly; but if there be much delay or violence, it may become impossible to do so. Recollect, therefore, the opposition which the perinæum may give: it is necessary to press it back strongly while attempting the reduction, otherwise you might fancy the inversion was irreducible.

When the placenta is attached to the uterus, it has become a disputed question whether it should be removed first or not.

The bulk of the placenta is undoubtedly an impediment to the restoration of the uterus; but the danger to apprehend from its removal is hæmorrhage. Dr. Lever's case is a convincing proof of the risk of such an accident. For this reason, Mr. Newnham, and many experienced practitioners, strongly urge the importance of leaving the placenta undisturbed until the uterus is replaced. On the other hand, the experience of Dr. Radford and others has satisfied them that no hæmorrhage follows the separation of the placenta. We believe, as has been stated, that this depends upon the degree of contractility in the uterus at the time of accident. It would be a safer plan not to touch the placenta in the first instance, if it were possible to return it with the uterus; but if this should prove difficult, some information of the condition of the uterus may be obtained by a careful examination of the tumour itself. It is generally covered with blood: let this be wiped off carefully, and observe the manner in which the vessels on the surface pour out their blood: if slowly and only *guttatim*, the placenta may be removed at once with perfect safety, and if so, it is certainly much more convenient; but if, on the contrary, the surface be again rapidly covered with blood, the separation of the placenta would very likely increase the hæmorrhage to a dangerous, perhaps a fatal extent.

When the uterus is restored to its situation, the hand should not be withdrawn suddenly, lest the fundus again descend. Firm pressure should be applied on the fundus externally through the abdomen; and, when an uniform contraction of the uterus is secured, the hand will be expelled as it is withdrawn: a bandage should then be carefully applied, and the patient kept perfectly at rest for some time. A dose of ergot of rye would also be advisable, in order to secure more efficiently the tonic contraction of the uterus.

Prolapse of the Funis is another complication of labour that is calculated to reflect in no small degree on the practice of midwifery. The accident is extremely simple, the remedy perfectly obvious, and the effect on the child fatal, if that remedy be not promptly applied. In many instances the funis descends,

and the pulsation has ceased before the displacement is discovered: this may account in some degree for the great infant mortality that attends this complication; but still this is hardly a justification for the great proportion of deaths that take place. Dr. Churchill quotes seven hundred and twenty-two cases of prolapsed funis, in three hundred and seventy-five of which the child was still-born—more than one-half. It would, therefore, be extremely desirable, if we had some means in our power of rendering this accident less fatal.

The funis may present at any period of labour, either before or after the membranes have ruptured, in the first or in the second stage of labour. The cord cannot be exposed to any dangerous pressure so long as the membranes are entire: it is only when the waters are discharged, and the presenting part compresses the funis, that the child's life is hazarded. We meet with two varieties of this accident after the membranes are ruptured: 1—when the funis descends before the dilatation of the os uteri; 2—when it presents in the second stage of labour after the dilatation is completed.

Prolapse of the Funis in the First Stage of Labour is more difficult to manage than when the os uteri is fully dilated. It may be produced either by the sudden discharge of a large quantity of the liquor amnii, consequent upon an early and premature rupture of the membranes; or it may attend a preternatural displacement of the child. In either case, if the os uteri be but little dilated, and we cannot replace the funis, we are placed in the dilemma either to sacrifice the child, or to attempt its removal by turning—at best but a doubtful remedy under such circumstances, and one that may be hazardous to the mother, who is not placed in any danger by an accident of this kind. These cases are consequently the most fatal, because the practitioner is naturally reluctant to have recourse to so serious an operation as turning the child, when the certainty of danger to the mother is much greater than of safety to the child. It is only when turning is imperative, as in shoulder-positions, that such an attempt is made if the funis pulsate.

Prolapse of the Funis in the Second Stage of Labour is more within reach of treatment, because the head may sometimes be extracted by the forceps, the funis may be more easily replaced, or the child delivered safely by turning, if the operation be promptly performed after the rupture of the membranes. In the majority of cases the pelvis is roomy, and will admit the forceps to be used without difficulty; there is no just reason, therefore, for withholding it when the life of the child is in such imminent danger; we might as well refuse our hand to a drowning man, and let him struggle out of danger the best way he could, as to leave a child to the natural efforts of the uterus under such circumstances. There are certain exceptions, however, when the pelvis is contracted irregularly, which would render the forceps a doubtful remedy. The head may become fixed in the brim of the pelvis, and yet the funis descend in the space afforded by the irregularity. In these instances the long forceps might certainly be used, but they very often fail in effecting the delivery: the only operation, therefore, to which recourse could be had in order to save the child, is turning, and even this operation is by no means certain in its effect, because the funis is exposed to the risk of pressure during the whole operation, unless, indeed, it be protected by the projecting promontory of the sacrum.

In general, however, there is sufficient space in the pelvis to turn the child if necessary; and it appears to us that we are fully justified in giving the child this chance for its life, if we cannot otherwise save it. The practice of delivering the child either by the forceps or by turning is adopted more decidedly on the Continent than here, and with much greater success so far as the child is concerned. You may observe the results of these cases in the two great midwifery establishments of Dublin and Paris:—

DUBLIN LYING-IN HOSPITAL.

Authority.	Total Cases.	Funis prolapsed.	Delivered Living by				Children.	
			Forceps.	Turning.	Funis replaced.	Natural.	Alive.	Dead.
Dr. J. Clarke ..	10,387	66	not stated.	not stated.	not stated.	not stated.	17	49
Dr. Collins	16,414	97	1	—	5	18	24	73
Drs. Hardy and M'Clintock..	6,634	37	1	—	5	6	12	25
	33,435	200	2	—	10	24	53	147

MATERNITÉ, PARIS.

Authority.	Total Cases.	Funis prolapsed.	Delivered by								Children.	
			Forceps.		Turning.		Funis replaced.		Natural.			
			Alive.	ed.	Alive.	Dead.	Alive.	Dead.	Alive.	Dead.	Alive.	Dead.
Boivin	20,517	38	13	3	25	6	—	—	—	—	29	9
Lachapelle	22,243	24	3	1	6	2	10	—	5	5	16	8
	42,760	62	16	4	31	8	10	—	5	5	45	17

In the Maternité, the proportionate frequency of these cases is much less than in the Dublin Lying-in Hospital. In the latter there were 1 in 112; in the former, about 1 in 700 cases. In the Paris Hospital the child was generally delivered either by the forceps or turning, which was not the practice in Dublin, and the infant mortality seems consequently to have been greatly diminished. In order, however, to form a just estimate of the success of this practice, it would be desirable to know the results to the mother, which are not given in the French reports. In the Dublin Hospital there were no maternal deaths,—"none of the mothers sustained any injury in the delivery" (Collins, p. 346.) We are not told whether such was the case in the Maternité; which is a most important desideratum, because the risk to the mother is the objection raised against turning the child. Drs. Hardy and M'Clintock observe, that "in the hospital the operation of turning was not had recourse to on such grounds (prolapsed

funis), as Dr. Johnson considers that the probability of saving the child by this measure is not sufficiently great to justify its adoption, or to counterbalance the risk to which it exposes the mother." In the Dublin Hospital, also, a number of cases were admitted, having the funis already prolapsed and pulseless, and therefore beyond the reach of any treatment. Making every just allowance for these sources of error, we are very much disposed to think that we are too timid in refusing the French practice. There is generally quite sufficient space in the pelvis to perform any operation you please with facility, and the time to interfere in a case of this kind is immediately after the membranes are ruptured—the most favourable moment for turning the child. We should, therefore, not hesitate to recommend you to deliver the child immediately when the funis descends, if you find it impossible to replace it.

Reposition of the Funis is obviously a most desirable object to gain; and consequently several means have been proposed to accomplish it. The first and simplest is to attempt to replace the cord by the fingers. Drs. Hardy and M'Clintock have adopted it with success, and prefer it to the different contrivances which have been proposed. The plan they have been in the habit of pursuing is as follows:—"The patient is placed as much as possible across the bed, upon the side opposite to that on which the procidentia exists: thus, if it be toward the right sacro-iliac junction (as happened in nearly all the cases we have seen of this complication), she reclines on her left side, in the usual obstetric position; but if the descent have taken place at the left sacro-iliac symphysis, she is made to lie on her right side. This is the first point to be attended to: the next is the hand. In preferring one hand to the other, our object is to use that whose dorsal surface can most conveniently be kept near the sacrum; for much greater facility will be thereby obtained in accommodating the fingers to the concavity and direction of the pelvis. If, therefore, the woman be lying on her left side, the left hand is used; if on the opposite, the right hand. These preliminaries being arranged, the index and middle fingers are introduced into the vagina during an interval between the pains,

and the funis is drawn gently forward, in order, if possible, to bring it to a shallow part of the pelvis. We then endeavour to pass it up, beginning with the most dependent portion, and afterwards elevating the remainder by little and little, until the whole has been pushed up out of reach of the fingers. In this way the reduction has sometimes been accomplished, although the os uteri was not dilated to more than half its extent. We have found in different cases, where the pulsation was vigorous in the cord, that although we could not elevate it fully above the head, yet that, by keeping the fingers steadily in their position for a few minutes, the entire coil had been drawn up. The impetus of the blood in the umbilical arteries, together with the lubricity of the parts concerned, may perhaps account for this occurrence." (*Midwifery and Puerperal Diseases*, p. 342-43.)

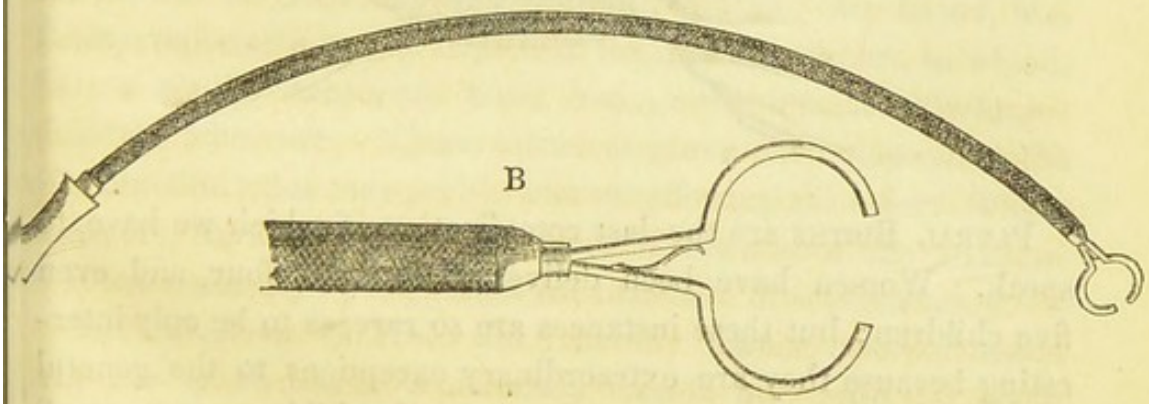
The late Sir R. Croft went a step further, and proposed to hook the cord over the limb of the child, which he twice succeeded in doing; but we fully agree with Burns's remark on this practice—"If the hand is to be introduced so far, it is better at once to turn the child." (*Principles of Midwifery*, p. 433). Dr. Mackenzie proposed to enclose the prolapsed portion of the funis in a bag, and thus to return it. We have known this method to succeed, but it is very awkward and inconvenient, and has more frequently failed. Osiander suggested a plan that has answered his expectations, and we have twice tried it with success: that is, to press up the funis with the fingers between the pains, and follow it with a sponge placed between the head and the pelvis. When the next pain comes on, an effort must be made to prevent the sponge from being forced from the vagina: if you succeed, the funis escapes as the head passes the sponge, compressing it against the pelvis. Several attempts have been made to connect the cord to a long gum-elastic catheter, which may be pushed up beyond the point of pressure, carrying the cord along with it. Professor Michaelis, of Kiel, adopts the following method. A strong gum elastic catheter of the largest size is selected, through which a soft ligature of tape or worsted is passed, having the loop of the ligature coming out at the eyelet-hole of the upper extremity of the catheter. The catheter is introduced into the

vagina, and the loop, being passed through the coil of the funis, is brought down to the os externum by the finger: the catheter being also withdrawn, a stilette with a wooden handle is then introduced into it, so that its point may pass out at the eyelet-hole: the loop of the ligature is passed over the point, which is again withdrawn into the catheter, having the ligature hung upon it, and then pushed up to the end of the catheter. As soon as the loop is thus secured, the catheter is again introduced into the vagina to the funis, and, in doing so, the ends of the ligature are drawn, so that the loop is shortened and brought up to the upper orifice of the catheter having the funis within it. The cord, being thus secured, is passed by the catheter above the head. The ligature is detached as soon as the stilette is withdrawn. M. Chailly has proposed a different method of carrying out the same principle, which he states Champion (of Bar-le-Duc) has often practised with success. The manner of proceeding is as follows. A thread is passed round the cord, and both ends are brought beyond the vulva; they are then passed behind the stilette of a very large catheter, the stilette being brought through the eyelet-hole for the purpose, which is then replaced and pushed to the end of the catheter, having the threads secured. Mr. Stevens has contrived a catheter for this purpose that is very ingenious. The stilette is made to pass quite through the catheter, so that about an inch of it can be made to project beyond the catheter. The extremity of the stilette is divided, and springs open as soon as it is pushed forward; the inner surfaces of the divided parts are made rough. The catheter is passed up to the funis, and a small portion of the membrane of the cord is placed between the open extremities of the stilette; the stilette is drawn within the catheter and secured by a screw at the opposite extremity; the forked extremity of the stilette is thus closed upon the membrane of the funis, and holds it. The catheter, with funis attached, is then pushed up beyond the head.

Of all these contrivances the last would be the most useful, if it could be made to answer its intended purpose: but we have found no small difficulty in getting the funis within the grasp of the

stilette, in consequence of its lubricity. A modification of this instrument has occurred to us, which, we think, might obviate this inconvenience, and answer the purpose. The divided extremities of the stilette are curved, so as to form segments of small circles. When the stilette is closed, these segments meet and form a ring, having an open space between them: when it is opened, which may be done by pushing the stilette forwards to its full extent, the segments separate sufficiently apart to enable you to remove the instrument safely. The manner of using it is to pass the instrument up to the funis, having the stilette open: let the cord be placed between the segments, which may then be closed, by drawing back the stilette. In this manner, the funis is, as it were, passed through a ring, which is pushed above the head. The circles should be made sufficiently small to hold the funis closely, but not so tightly as to interrupt the circulation.

Fig. 134.*

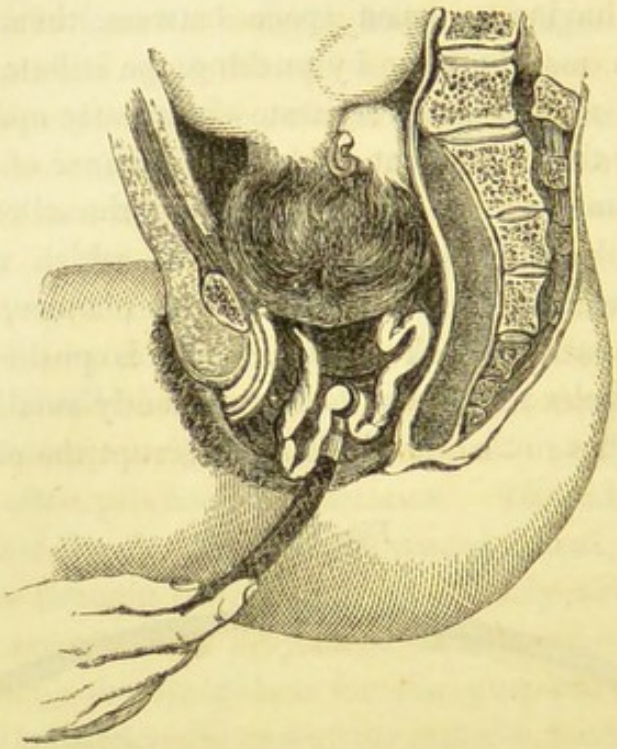


If it were possible by any of these means to effect the reposition of the funis, a great object would be gained: we should be enabled in many instances to save a life that otherwise would be destroyed, and this without any apprehension on our mind of danger from the operation. But if our hopes in this respect be not realised—if we fail in replacing the cord—we would again repeat that we are bound to interfere: to deliver with the forceps

* Fig. 134. A. Catheter, having the ring closed. B. Extremity of catheter, ring opened by spring when pushed forward.

if the head be at all within reach of its application; and if not, to turn the child.

Fig. 135.*



Plural Births are the last complication of which we have to speak. Women have been delivered of three, four, and even five children; but these instances are so rare, as to be only interesting because they are extraordinary exceptions to the general rule. When such accidents do happen, the children are so small as to present no difficulty at birth.

Twins occur in the proportion varying from one in seventy-five, to one in a hundred and eight cases. Both may present the vertex; or one may be a natural, the other a preternatural presentation. They seldom attain the same size and weight as single children, although there are some remarkable exceptions in strong, healthy women. Neither do twins always grow equally in the womb; one may be larger than the other, and there are

* Fig. 135. Instrument applied for the reposition of funis.

cases where the development of one is completely arrested, while the other proceeds to the full size. Thus, at the same birth, a child fully grown to the ninth month may be accompanied by a second only developed to the fifth or seventh month. Nay, the second ovum may be altogether destroyed. We met with one case of this kind in the Dublin Lying-in-Hospital; the skeleton of a fœtus at the fifth month was found among the membranes of a placenta, expelled after the birth of a child fully grown. It seemed as if the process of softening of the tissues, which is called "putrescency," had destroyed every portion of the second fœtus but the skeleton. Drs. Hardy and M'Clintock mention a case of twins in which the first child was strong and healthy; the second much smaller, with the skin of copper colour, and considerably advanced towards putrefaction: the cuticle everywhere peeling off. Cruveilhier, in his *Illustrations of Pathological Anatomy*, gives a plate of twins with united placentæ, one healthy, and the corresponding child fully grown; the other morbid, and the growth arrested at four and a half months. My friend, Mr. Pretty, reported a case of triplets in the *Medical Gazette*, in which, from a similar cause, one child had grown considerably larger than the other two. These instances prove the independent life of each child; one may perish without affecting the other. When, therefore, we meet with a difference in the size of the children, it is not necessary to suppose them instances of superfœtation.

The *Symptoms of Twins* are generally obscure *before delivery*. The *size of the uterus* is certainly larger; but there are many causes of error in forming an estimate of it. For instance, an uterus of the ordinary size may be thrown very much forward, and the abdomen may project much more than usual; or, on the other hand, a very large uterus containing twins may not project if the parietes of the abdomen be strong, and the pelvis large. When the liquor amnii is in excess, the uterus is very much distended, but may contain only one small child. The *shape of the uterus* is generally, although not always, altered; it is wider, more irregular, and sometimes the outline of two portions may be traced by an imperfect line of demarcation traversing the abdomen obliquely; but the same irregularity may be caused by a

cross-birth. *Auscultation* supplies the most decisive evidence. If the fœtal heart be heard *equally distinctly* at opposite sides of the abdomen; if the pulsations be not synchronous; if the position of the two sounds be remote, one at the groin, the other at the ribs, we may infer that there are twins. When the stethoscope is used for this purpose, the pulse of the mother should be noted, because sometimes it is very frequent; and the action of her heart may be heard through the abdomen and mistaken for that of the fœtal heart.

The symptoms, *after delivery of the first child,* are clear. The great size of the uterus, and the membranes felt through the os uteri, are sufficient proofs.

The *Treatment* of these cases requires prudence and judgment. When you have ascertained that there is a second child in the womb, keep your mind to yourself; because nothing alarms a patient more than the apprehension of having to undergo the pains of labour twice over, and women with twins are more easily depressed than others, because of the exhaustion that is sometimes produced by this additional demand upon the constitution. The *too great distension of the uterus* may weaken its tone, and if so, *hæmorrhage* may follow the delivery of either child; the danger is greatly increased in consequence of the much more extensive supply of blood to the two placentæ. The greatest caution should therefore be used to prevent this. *A bandage* carefully applied round the abdomen during labour is useful, because it supports the uterus during its action. After delivery of the first child, *its funis should be carefully tied* on the placental side; instances are met with of double placenta having between the two portions large communicating branches, sufficient to cause profuse hæmorrhage if the funis be not secured. *The membranes of the second child may be at once ruptured;* the dilatation of the passages has been already accomplished by the first child; besides, the contractions of the uterus are more efficient, and the risk of hæmorrhage less. *The delivery of the second child should be effected at once.* You may give the uterus a little time to renew its action, a quarter or half an hour; but there is no object in waiting one, two, three, or four hours, as is some-

times done; every moment of delay exposes the patient to risk from hæmorrhage.

When the second child is delivered, the greatest attention should be given to insure a proper contraction of the uterus, in order that the delivery of the placenta may be safely effected. After it has been expelled, the bandage and compress should be carefully applied, and, as an additional security, a dose of ergot with opium may be given; if, however, the fundus uteri feel hard, well contracted, and no external hæmorrhage be observed, this medicine may be dispensed with.

The patient should be carefully watched after delivery, because twin-cases are far more liable to inflammations, fevers, etc., than others; more caution is therefore necessary to insure a favourable recovery.

LECTURE XXXIII.

ANÆSTHESIA.

Anæsthesia means the diminishing or annulling sensation. It has been discovered within the last few years, that certain volatile substances possess this peculiar property; and hence anæsthesia has been introduced into the practice both of surgery and of midwifery, for the purpose of relieving the extreme sufferings to which patients are exposed in surgical operations and in the agonies of labour. The agents chiefly used, are *sulphuric æther* and *chloroform*, which are found to exert a most powerful influence over the nerves; they can destroy, for the time, their power of communicating sensations or exciting motions; the influence of the cerebrum may be removed as in sleep; the action of the vital organs that depends on the integrity of the organic nerves, may be disturbed; and even the last traces of nerve-force existing in the *post mortem* irritability of the muscles may be completely obliterated.

Agents, therefore, possessing such enormous powers, and at the same time conferring such benefits on suffering humanity, have necessarily become subjects of much controversy. The advocates of chloroform, delighted with its effect in surgical operations, and in assuaging the severities of labour, point out with enthusiasm its advantages. Its opponents, on the other hand, look upon an agent of such power with much apprehension, and condemn in no measured terms the boldness of those who venture to employ it.

We shall not now occupy your attention with these controversies. It is sufficient to say, that anæsthesia is now generally used in midwifery as well as in surgery, and the only controversy that remains for discussion is whether chloroform or sulphuric æther is best for the purpose.

It will be sufficient for our purpose to point out to you what chloroform is, what are its obstetric uses, and what cautions are necessary in its administration.

Properties of Chloroform. *Chloroform* is one of many substances that possess similar properties, only differing in degree.* Hydrogen and carbon form the base, which may exist alone, or be united to a third element, and thus form a ternary compound. They all possess anæsthetic properties; they influence the nervous system in a similar manner, but differ essentially in the degree and rapidity with which their effects are produced. Alcohol, sulphuric æther, chloroform, hydrocyanic acid, are examples of

*Anæsthetics.	Carbon.	Hydrogen.	Chlorine.	Oxygen.	Nitrogen.	Specific Gravity.	Boiling Point.
Benzin, or Benzole ..	2	1	—	—	—	0·8850	176°
Chloroform	2	1	3	—	—	1·4800	141°
Dutch liquid.....	2	2	2	—	—	3·4484	180°
Sulphuric æther.....	4	5	—	1	—	0·7154	96°
Alcohol	4	6	—	2	—	0·7938	173°
Hydrocyanic acid	2	1	—	—	1	0·7058	79°
Chloride of carbon....	4	4	—	—	—	1·5520	248°
Chloric æther	A mixture of chloroform and alcohol.						

these ternary compounds which have anæsthetic properties, but of very different degrees of power.

The anæsthesia of *alcohol* is slow in appearing; nor is it until the potations are prolonged and deep, that such an effect manifests itself. Nevertheless, cases have occurred in which an inordinate draught of brandy has been followed by instant loss of nervous power, and the drunkard has fallen down perfectly insensible in a state of anæsthesia.

Sulphuric æther acts more promptly, and is preceded by a stage of excitation not so prolonged, nor so boisterous, but still not dissimilar to that of alcohol.

Chloroform is yet more rapid in annulling sensation, and its exciting stage much shorter than that of sulphuric æther.

Hydrocyanic acid acts with a rapidity that renders it a poison of most fatal power; there is no intervening stage, but sensation, motion, consciousness — all nervous energy — are instantly destroyed by it.

The third element of the compound seems not to be essential to, but rather to regulate the intensity of, the anæsthetic effect. The same hydrocarbon base combined with oxygen (alcohol, sulphuric æther) has less power than when united with chlorine (chloroform); and again, the combination with nitrogen (hydrocyanic acid) forms an anæsthetic of the highest intensity. So also of the compounds with oxygen. Alcohol, which contains two volumes, has less power than sulphuric æther, having only one of oxygen. Anæsthesia seems to be at its maximum when the hydrocarbon is combined with nitrogen, and at a minimum with oxygen.

It has also been proved that, in the hydrocarbon base, hydrogen is not the essential element, because chloride of carbon (carbon and chlorine) and benzole (carbon and hydrogen) produce similar effects; and hence the inference is, that carbon is the anæsthetic element, which remains dormant until called into activity by the gases with which it may combine.

The Action of Chloroform on the Animal Tissues has been the subject of close observation. Anæsthetics differ in their mode of action. Alcohol acts with most power through

the stomach; less by inhalation; least, if at all, by the skin. Chloroform acts chiefly by inhalation, less through the stomach, and least by the skin: its action being only partial, and limited to the surface to which it is applied. Hydrocyanic acid conveys its influence by all these channels; and, if pure, will destroy life when dropped on the skin as rapidly as when received into the stomach or inhaled.

When the vapour of chloroform is received into the lungs, it is quickly expanded over all the air-cells; these are surrounded on every side by the ultimate capillary ramifications of the pulmonary arteries and veins, and also by the fine fibrillar expansions of the pneumo-gastric nerves; thus its influence may be conveyed to the nervous centres, either directly through these nerves, or indirectly through the blood; but the former belong to a division of the nervous system not susceptible to its action unless in large doses, so large as to become dangerous. The blood is the channel, therefore, through which it exhibits its phenomena; by this means it is conveyed with great rapidity to every portion of the body, and hence its manner of combining with the blood becomes a question of importance.

Action on the Blood. Chloroform is not very soluble in the blood—much less so than alcohol—and consequently a large proportion of free chloroform travels through the circulation. This is supposed to exert a strong affinity for oxygen; not sufficient, however, to absorb it and form new compounds, yet enough to prevent the usual affinities from taking place. Carbonic acid is, therefore, not formed in the same proportion; and, carbon not being sufficiently removed from the tissues, the anæsthetic element remains to exhibit its influence. Several facts seemed to prove the relation between anæsthesia and the expiration of carbonic acid. Dr. Snow has shewn, by numerous experiments, that the quantity of carbonic acid evolved from the lungs is diminished under the influence of æther and chloroform. Dr. Prout has demonstrated the same fact in drunkards; and again, it is found that extreme cold reduces the proportion of carbonic acid expired, and becomes an anæsthetic. It acts precisely as chloroform. There is the same loss of sensation (numbness) and

prickly pain, followed by drowsiness; the same inability to regulate voluntary motions, and ultimately complete *sopor*. Hence we infer, that anæsthetic force is in inverse proportion to the quantity of carbonic acid expired.

This disturbance of the respiratory function necessarily modifies the colour of the blood; but the degree and manner in which such changes are effected must depend, in a great degree, upon accidental causes, as well as upon the power of the anæsthetic. Carbonic oxyde is one of the most powerful of these agents; and Mr. Nunneley observed in animals poisoned by it, "that both venous and arterial bloods were *bright florid*." Dr. Snow remarks, that "when the blood which flows from the arteries and veins can be separately examined, whilst the *patient is well under the influence of the narcotic (chloroform)*, it is seen that the arterial blood is somewhat *less florid*, and the venous *less dark*, than under ordinary circumstances." Again, it has been found in animals slowly put to death by chloroform, for instance, after several experiments, that the blood in the arteries was *as dark as in the veins*.

It is probable that, in the first case, carbonic oxyde perfectly neutralised the oxygen, which passed freely through both sides of the circulation, and rendered the blood equally florid. In the second, chloroform did so to a certain extent, but only partially; hence a certain proportion of free oxygen entered the veins, and an equal quantity of carbonised blood passed through the lungs unchanged to the arteries; and lastly, in the third case, in which there was sufficient time for the oxygen to be otherwise disposed of, all the blood became carbonised by carbon which could not be removed. This, however, remains a question of inquiry; but there is no doubt that chloroform does not dissolve in the blood, as is the case with alcohol, nor does it make any change in its properties.

The large number of experiments (three hundred and sixty-three) performed by Mr. Nunneley on the lower animals, render his remarks of the highest authority. He does not think that blood is changed, or, as it is said, "poisoned." "It does not lose its power of coagulating; nor is that which is taken from an

animal in so complete a state of anæsthesia as to be presently fatal, or even immediately after death has been occasioned, when examined under the microscope, seen to be much, if at all, altered in its character; consequently, neither the fibrine nor the globules can be much changed; and unless the anæsthesia be very profound, or *prolonged*, the blood does not vary much in its colour. *That which flows from a wound during an operation is as bright as usual.*" (*Trans. Prov. Med. and Surg. Association*, vol. xvi. p. 359.)

The *Action of Chloroform on the Nerves*, and its manner of causing anæsthesia, is best observed by the effect of small doses of the vapour gradually increased. The blood conveys the vapour to the heart: the heart transmits it to every nerve in the body. But these are not all equally under its influence. Of the three divisions of the nervous system, the cerebro-spinal is the first affected; then the reflex; and lastly, the ganglionic nerves.

The first communicates sensation, motive power, volition, reflection. A small dose of chloroform will annul sensation without disturbing the power of motion or consciousness. An example will explain this. A lady suffered intense pain from abscess of the breast, which was on the point of bursting. She could not bear to have it touched ever so lightly. We gave her an inhaler containing chloroform; she held it to her mouth and inspired the vapour two or three times. We could then touch and examine the breast without difficulty. Her face was directed from us while breathing chloroform, and while she was thus occupied, we plunged a lancet into the abscess. She did not feel the least pain, and was delighted to find the object of her dread so easily removed. If the dose be increased, the power of motion is controlled, the hand drops, the patient cannot move herself; volition and consciousness begin to be affected; an imperfect sleep supervenes, the patient remaining in a kind of doze, yet answering a question if asked distinctly; she will tell you that she hears everything that is said, but this is evidently not the case.

As the cerebro-spinal system is becoming more completely in-

fluenced by chloroform, the next—the reflex division—becomes engaged. This presides over all the movements termed sympathies, over the passions or emotions, and over the whole respiratory apparatus. The excitor nerves are first affected—the irritability of the eye-lids, of the nostrils, of the fauces, and lastly, of the glottis, is controlled; the motors then lose their power; the eye is drawn upwards; the respiration becomes stertorous; the action of the thoracic muscles is slower, less perfect; the inspirations are incomplete, and a form of asphyxia takes place which may be fatal. Hence the importance of observing the influence of this agent on the respiratory nerves. Fortunately this loss of power becomes evident from the stertor which it causes; and although this may occur as safely as in natural sleep, still it must be looked upon as a beacon to indicate danger.

Thus far chloroform may be safely used; but if we pass one step beyond this, and increase the quantity of vapour, or, what amounts to the same thing, if we do not carefully guard against its too great accumulation, danger is instantly present. The respiratory tract is the last portion of the reflex division of the nervous system which becomes affected: stertor is the earliest evidence; the thoracic muscles then lose their tone; the inspirations are less perfect and at longer intervals; the chief muscular action is carried on by the diaphragm. At length this also ceases, and death takes place.

It is important to contrast this form of asphyxia with that more commonly observed in instances of drowning, strangulation, spasm of the glottis, etc. The latter is caused by the absence of oxygen; the irritability of the respiratory nerves and the activity of the muscles under their control remaining unimpaired. The former arises from a deficiency of carbonic acid; oxygen is present, but the thorax cannot expand for its admission. In one case, the most violent efforts at inspiration are made, which gradually subside, as the blood becomes more perfectly carbonised and death takes place. In the other, these efforts are feeble *ab initio*, and death occurs without a struggle. In both instances, the lungs present the same *post mortem* appearances. Death from intense

cold will illustrate one form of asphyxia; death from croup, the other.

The quantity of the vapour that is sufficient to act upon the reflex nerves, may also influence the emotions. Sensation, reflection, volition have disappeared; the patient is in a kind of dream, which manifests itself by incoherency, inarticulate mutterings, and sometimes by more violent exclamations. The impressions produced by much suffering are occasionally exaggerated in this dream.

We were once summoned to attend a lady in her confinement, who had suffered very severely from her pains before we saw her. Chloroform was administered in small doses, but apparently with little effect: the dose was increased; she rambled a little, and, when the pain came on, shouted out much more loudly than before she was given chloroform. We were, certainly, rather puzzled, but determined to persevere. She always slept in the intervals: the respirations and pulse were carefully watched; and the moment stertor was heard, the vapour was discontinued. A living child soon entered the world, and took part in exclamations that continued even after it was born. She soon, however, became quiet; but when we were pressing the uterus moderately to expel the placenta, her vociferations were renewed. They soon ceased; she was left undisturbed, and for some time asleep. When she awoke, we were surprised to find that she did not know when the child was born; she was not aware that she had been crying out. She said she must have been dreaming; and such, in truth, is the only explanation we can offer for this case, so remarkable an exception to the general rule.

The intimate relation between the reflex and the ganglionic nerves which chiefly supply the uterus, renders their influence on its action in labour an interesting object of observation. We know that similar organs—the stomach, the bladder, the rectum—are all largely supplied by the ganglionic and also by the reflex nerves; each have distinct duties to fulfil, but yet are in the most intimate relation with each other. Food or any other irritant excites the motions of the stomach through the excito-motor nerves: its

continued action and digestion are carried on by the ganglionic system. So also urine excites the bladder, fæces the rectum; but the expulsive efforts are ganglionic. It has been noticed long ago by Dr. John Power, that the expulsive action of the uterus is the result of irritation reflected from the cervix when expanded to its full extent. Dr. Marshall Hall's valuable discoveries have since been made known; and Dr. Tyler Smith has applied them to shew that the uterus is also under the control of the reflex system of nerves. Hence it is necessary to determine how far chloroform, by controlling the activity of these excito-motors, may arrest the action of the uterus. It seems to have this power to a certain limited extent. The periodic expulsive efforts of the uterus will continue, although this reflex force is destroyed; no inertia, no loss of tone is caused in the uterus, but its action may be deranged or suspended. If such, however, should happen, it is only temporary; the uterus still observes its law of periodic action; its contractions will return, and revive the energy of the reflex nerves. Cases have occurred over and over again, in which the patient was under the full influence of chloroform, but the action of the uterus has in no way been altered. A remarkable case occurred in our own practice, which will illustrate this.

We were summoned to a case in which the arm presented: the waters had been some time discharged, and we were obliged to turn the child. The patient was brought under the full influence of chloroform; and while she was in this profound sopor, the operation was proceeded with. The pains returned regularly; and, in the interval between them, we endeavoured to pass the hand into the womb. We never experienced so much difficulty, in consequence of the strong contraction of its fibres about the child. Chloroform did not relax them in the least degree; and, so far as the operation was concerned, gave no assistance whatever. The patient, however, was saved from the intolerable suffering which attends this operation, and her recovery was greatly promoted by its means. In other instances, we found turning greatly facilitated, not by overcoming the contractions of the uterus, which was sufficiently yielding, but by relaxing the passages.

The third division of the nervous system, the ganglionic, is the last to yield to the influence of anæsthetics. Chloroform may overcome the cerebro-spinal centre of sensation, motion, volition and reflection; it may paralyse the excito-motor spinal axis, disturb or even exalt the emotions, and yet scarcely touch the ganglionic system.

This is a most valuable fact in relation to its obstetric use; because one of the objections, levelled with the most force against the administration of chloroform in labour, is the assumed danger of paralysing the uterus—an objection the more specious, because the action of the uterus may be for a time suspended under its influence. The difficulty of paralysing the uterus may be best learned from the following experiment, related by Dr. Tyler Smith.

"A guinea-pig was *nearly* killed with chloroform, and a stilette was at once passed through the whole spinal marrow from the cauda to the cranium; but no spinal movement of any kind took place." Chloroform had obliterated excito-motor irritability. "*The spinal marrow was broken down entirely. Still the peristaltic action of the heart, intestines, and uterus, had not ceased.* The heart and intestines both contracted and dilated, as having to receive and transmit onwards their contents. The uterus only shortened itself, as in an effort to expel its contents through the vagina. *The uterus and intestines continued to act, moreover, after the beat of the heart had ceased.* Thus, there is apparently a definite order of dying in the different organs under the control of the ganglionic system.

"*In the human subject, the uterus evidently contracts so as to deliver its contents after both heart and intestines have ceased to act; it is the ultima moriens of the ganglionic system, just as the respiratory organs are of the spinal system*" (*London Journal of Medicine*, Dec., 1849, p. 1109).

Chloroform may, however, stop the action of the heart if directly applied to it. This has been shown by experiments on the lower animals. We have narcotised a kitten with chloroform. The heart was exposed, still palpitating; some chloroform was dropped upon it; the action ceased, but was quickly renewed

when the chloroform evaporated; this was repeated several times. This fact has an important relation to the mode of its administration. When a concentrated dose of pure chloroform is inhaled, "the poison," as Dr. Sibson observes, "penetrates to the heart from the lungs in a single pulsation; and, at the beginning of the next systole, the blood is sent through the coronary artery to the whole muscular tissue of the heart. The blood passing into the coronary artery is less diluted, is more strongly impregnated with chloroform, than the blood in any other part of the system except the lungs." The direct effect of chloroform on the heart is also shewn by the experiments of M. Gosselin. In one experiment, he injected two *grammes* of chloroform into the external jugular vein of a middle-sized dog. The animal died in less than a minute: an examination was made immediately after death, and the heart was found voluminous and distended. In another, he injected three *grammes:* the animal appeared at first to suffer a little, then stretched out its paws without any convulsive movements, let its head drop, and died. The whole occupied less than a minute. (*Archives Générales de Médecine*, tome xviii, Dec., 1848.) These facts may explain the cause of death in the majority, if not in all the instances that have been reported; the symptoms seem identical.

The patient generally struggles against inhalation; then, in about two minutes, and often in much less time, a sudden pallor is observed with or without convulsion; the pulse is lost, and death takes place. After death, the lungs have been found congested, just as in M. Gosselin's experiments; hence the assumption that asphyxia is the cause, but there was not a single symptom of asphyxia in the sense that the term is generally employed. The cause of death seems to be the direct action of chloroform on the fibres of the heart, perhaps weakened by disease. In order to produce such an effect the dose must be concentrated, which would necessarily cause a spasm of the glottis, and feeling of suffocation, which prevents the patient from inhaling.

The heart has been found filled with fluid, or semi-coagulated blood, which is just what might be expected. Every dissecting-room student knows, to his great inconvenience, that all the large

veins, the venæ cavæ, etc., contain fluid blood for a long time after death. If this be drawn towards a relaxed heart which cannot propel the blood, it becomes distended; and there is no more reason why it should coagulate firmly here than in the veins. It is not necessary to assume that the blood is "poisoned" to explain such an effect. In some instances the left ventricle has been found empty; caused, probably, by the contraction of tissue—the *rigor mortis*—which occurs after death. A powerful dose of chloroform can destroy even this last trace of muscular irritability. (See the late Mr. Barlow's experiments: *Medical Gazette*, vol. xlvii. p. 713).

Death from Chloroform seems to commence at the heart. To accomplish this, the dose must be concentrated; if pure chloroform, not sufficiently diluted with atmospheric air, were conveyed to the lungs and thence to the heart, less than a drachm would paralyse it. The immediate effect would be spasm of the glottis, sense of suffocation, and resistance of the patient; but if this be overcome, and the inhalation be persevered in, chloroform rapidly overcomes the spasm, and enters the lungs with fatal rapidity. In order to avoid such a risk, chloroform ought to be given much more gradually, and in a greater state of dilution; its effect can then be better observed, and the dose, if necessary, increased; the finger, *which should never leave the pulse*, will mark the heart's action; but, inasmuch as the reflex nerves are influenced before the ganglionic, all the signs given by them, diminished irritability, stertor, etc., will present themselves *before* the pulse is affected; consequently, unless from some unforeseen cause, no accident can occur.

A longer time might be required for the administration of chloroform—longer than might be convenient in an operating theatre; but this objection could easily be removed by adopting the practice sometimes followed, that is, to commence the inhalation in time before the intended operation, to do so in a different apartment, and, when the patient is prepared, to have him or her brought into the theatre for the purpose intended.

This, however, is a digression from our proper subject; it applies to chloroform in the practice of surgery. The vapour

need never be given to such an extent in the practice of midwifery; and, as we shall presently prove, may be administered without the slightest risk or danger.

Deaths occurring several hours, or some days, after the inhalation, are obviously the result of other causes. It is impossible for chloroform to produce so distant an effect. It does not combine with nor alter the blood; it evaporates from it most rapidly; and therefore to suppose that it can cause death long after it has disappeared from the system, seems to be, to say the least of it, rather incomprehensible.

Having thus briefly explained the nature and anæsthetic properties of chloroform, we are prepared to consider its obstetric use.

LECTURE XXXIV.

ANÆSTHESIA (*continued.*)

THE OBSTETRIC USE OF CHLOROFORM will be best understood by considering its influence as progressive—one of degrees or stages. The first stage is that in which consciousness is retained, sensation is diminished or lost, motive power impaired. The second is the stage of transition, the dream before sleep or before waking; it may be a stage of stimulation or excitement, of rambling or incoherency. The third stage is that of profound sopor, the patient is quite unconscious, incapable of motion, perhaps in a stertorous sleep.

The first degree is generally sufficient in ordinary cases of labour.

The second is but transitory, and it is always desirable to avoid its continuance. This may be done either by withdrawing the vapour altogether, which restores consciousness, or increasing the dose, by which means the vapour attains—

The third degree, in which sopor is induced. In obstetric practice it is never necessary that sopor should be so profound as

in surgery, because surgical operations require that the patient remains perfectly still. This is not essential in midwifery; if sleep supervene it is tranquil, not stertorous.

The *Influence on the Parturient Woman* is nearly as follows. If chloroform be inhaled gradually by a woman in labour, the immediate effect is a diminution in the intensity of the pains; she is perfectly conscious and self-possessed, and is delighted to feel that her extreme suffering is relieved. "She is in heaven" (to adopt her own language); still she suffers pain during the contractions of the uterus, but in the intervals between them is perfectly at rest; there is no lingering pain, no sense of soreness after the pain has ceased; she is disposed to sleep, and if she should not, she remains at least tranquil until the next pain; its return is again relieved by chloroform as before, but not removed. Thus chloroform may be given, at intervals, for a long time without any other effect than, as it were, blunting the pains.

If the dose be increased, or if the smaller dose be so frequently repeated as to cause an accumulation of the vapour, she complains of a tingling sensation through the arms and legs: if holding at the time a towel or sheet, the arm has less power, and drops. She may speak of unusual sensations, vertigo, palpitations, although the pulse is perfectly tranquil; and may have a disposition to dream. At this point some are frightened and refuse to inhale, others are delighted with their sensations; and, again, others will exaggerate their pains, and as they come on cry out more loudly than before chloroform was given; these exclamations, as they subside, merge into incoherency. If chloroform be then removed, so that its effects pass off, she has no recollection of the pain which caused her expressions of anguish; if, on the other hand, chloroform be continued, the incoherent talking becomes inarticulate muttering; she has less power of motion, the pains are sometimes suspended, and when they return she bears down with them: she seems to be asleep in the intervals, but if the eye-lids be touched winking is excited, and she may ramble about some topic of her dreams. At this transition stage it is very desirable not to make a vaginal examination,

still less to perform an operation: the mind is not sufficiently master of itself, and ideas may be excited which it is desirable to avoid. This is not necessarily the case; on the contrary, we believe it very seldom happens; but such cases have been related, and when they do occur, it must be at this stage that such effects are observed. Operations cannot be performed, because the woman becomes restless and unmanageable. A little more chloroform is necessary, and then sopor succeeds; she feels no pain, and is quite unconscious of anything that is done. At this degree the eye-lids may be touched without winking—the pupils are drawn upwards, there may be stertor, and if so, chloroform should be withdrawn. This state may be continued with safety during any ordinary operation, and is extremely useful if it should be severe, as in some cases of turning and perforation. A forceps operation may also require this extent of anæsthesia, but not necessarily so.

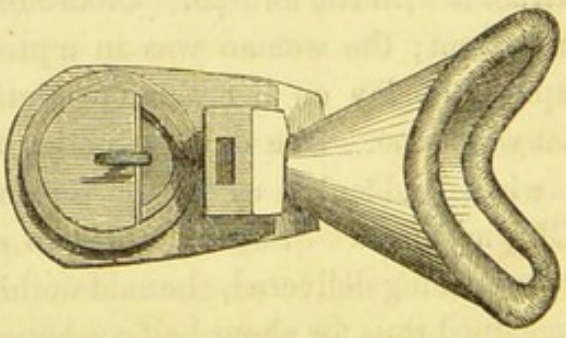
In the second degree, when the reflex system begins to manifest its influence, it has been stated that occasionally the exclamations of the patient are rather exaggerated than controlled; so also, when profound sopor is induced, it sometimes happens that she cries out, as if suffering from pain, and yet, when consciousness returns, is not aware that she did so; she has no recollection of pain: she will tell you she had none. We were once called to a case of difficult labour in which this occurred. It was the first child, and the woman had suffered very severely for twenty-four hours. The head was arrested in the pelvis, and it was necessary to extract it with the forceps. Chloroform was administered to its full extent; the woman was in a profound, but not stertorous, sleep. She lay on her side, perfectly unconscious of anything that was done. She did not notice the first efforts at extraction; when suddenly, as the forceps was pulled, she exclaimed: "Oh! my back." She did this two or three times; but, as the child was being delivered, she said nothing, and seemed asleep. She remained thus for about half-an-hour, during which time the placenta was separated, and the bed settled. When she awoke, she was very much astonished to find her troubles over. She did not know when the child was born, said she suffered no

pain, and when told that she had exclaimed loudly during the operation, she could not believe it.

This fact has been observed by others, and an explanation of it attempted. It is needless to do so: it is sufficient for our purpose to notice it as evidence that, when a patient is under the influence of chloroform, her expressions are no measure of the amount of pain which she really endures. In the transition stage, she sometimes exclaims when there is no pain, and is silent when there is. A lady in this state bore the expulsive pains when the head was being delivered, without complaint, and yet cried out, or rather moaned, after the child's birth, at regular intervals, as if the pains were going on.

The *Mode of Administering Chloroform* varies with different practitioners, according to the effect that they desire to produce. If complete sopor be required, the vapour is inhaled by the mouth and nose. A handkerchief may be folded in a conical form, and a sponge placed in it containing chloroform; this may be applied to the mouth and nose, not closely at first, but gradually brought nearer and nearer, watching the effect, until both are quite covered by it. In this manner chloroform may be made to exercise its full power, and it is here that inattention may do so much mischief. For instance, if the sponge containing chloroform be applied to the mouth and nose too closely at first, so that pure or very slightly diluted chloroform enters, it produces

Fig. 136.*



* Fig. 136. Chloroform inhaler.

cough, and a sense of suffocation; the patient resists; but if her opposition be overcome, the sponge kept in place, and the vapour still inspired, she becomes at once powerless; the glottis is relaxed, and if the vapour is carried in any quantity to the heart, death may take place. This could not occur, if the inhalations were slower—more gradual. Inhalers are also used, which are applied to the mouth and nose, and are so contrived as to admit atmospheric air to enter freely with the vapour. We have been in the habit of using an inhaler that is applied only to the mouth, which seems to me the safest mode of administering chloroform that can be adopted, although not the best, if the full power of the vapour is required. Chloroform may be given either to lull the pains without disturbing the consciousness of the patient, or to remove all pain by inducing sleep. The first mode is applicable to ordinary cases of labour; the second is used in some severe obstetric operations. The inhaler to which we allude accomplishes the first object perfectly, because the vapour which enters the lungs is so much diluted with atmospheric air that its power is greatly weakened, nor, until the inhalation has been continued for some time, does it cause anything like sopor. This may be understood, if we reflect that the nostrils are the channels through which respiration is chiefly carried on. Respiration may go on perfectly and easily while the mouth is shut. If, then, this vapour be inspired by the mouth, double the quantity of air enters through the nostrils, precedes its entrance into the lungs, and shields the cells from its too powerful influence: hence a very small volume of chloroform, just sufficient to lull sensation, is received into the circulation. If the inhalation be repeated at short intervals, this quantity will gradually accumulate, and thus slowly induce sopor. The following case will explain this.

A lady had been confined with her first child: she suffered very severely with her pains; so much so that, when we arrived at the house, her exclamations were loudly audible the moment we entered. When the pain had ceased, there was an interval of rest, and just as she began to move uneasily (the monitor of the next pain), some chloroform was given through the inhaler; the

pain soon came, but she did not cry out as before; she moaned with it, grasped the inhaler, moved about uneasily, and when it ceased was equally surprised and delighted with the relief she experienced. So she went on for some time, inhaling just before a pain. At length, as the head arrived at the outlet, she was more under the influence of chloroform. She lay asleep in the intervals, sometimes muttering; the pain roused her, she moaned, and as it ceased she relapsed into a kind of doze. As the child's head was passing over the perinæum (a time when the pains are always more severe), she did not mind it; an expulsive effort and a slight groan were the only indications she gave. The child was born, she remained asleep, the placenta was expelled by pressure on the fundus uteri; she moaned, but was scarcely disturbed; while she was in this state, the bandage was applied, and the bed settled. In about a quarter of an hour she gradually recovered consciousness, and said she knew quite well every pain she had, but did not know exactly when the child was born; she thought she felt it, but was not sure. In this instance my patient remained perfectly collected and conscious for about two hours from the first inhalation; in the next hour sopor was more manifest in the intervals after pain, and in the fourth, when the child was born, the pains themselves were scarcely noticed, the vapour slowly accumulated with each succeeding inhalation, and the symptoms of the first stage gradually merged into the third.

The *Quantity of Chloroform* required on the sponge when used in this manner varies from a drachm to two drachms. We were in the habit of using a drachm by measure, but soon found that so much escaped by evaporation, that this quantity had little effect; it was therefore increased, and its strength tested by a different method. The vapour was generally inspired before administering it: if the quantity used be not sufficient it produces no effect, if otherwise, it feels very slightly pungent, and excites cough, precisely as the inhalation of ether, but in a less degree. By this means, also, impure chloroform may be detected, being much more pungent, and causing more irritation. The inhaler may be applied to the mouth, just before the pain commences, and con-

tinued so long as it lasts; but the moment the pain ceases, it should be removed, and only re-applied on its return.

It is sometimes advisable to fan the patient when the inhaler is withdrawn, in order to disperse any chloroform that may remain about the mouth and face; because, being much heavier than atmospheric air, it does not ascend rapidly, consequently more may be inhaled during the intervals of the pains than the exhibitor is aware of; so also the position of the patient may make a difference in the effects. When she lies in the usual position, on her side, the inhaler is either on or below the level of the mouth, and she inhales only so much as she can inspire; but if she lie on her back, and the inhaler be applied from above downwards, more vapour passes into the lungs than would be drawn by the act of inspiration, if the positions were reversed. *The inhaler should never be applied in the intervals of the pains.*

The *Time when the Patient should commence Inhalation* depends very much on the circumstances of the case. We generally select the conclusion of the second stage of labour; that is, when the head of the child is descending upon the perinæum; because then the pains are generally intolerable, and the perinæum yields more readily under chloroform than without it. If, however, previously to this, the pains be so acute that the patient is evidently unequal to her suffering, chloroform may be administered without hesitation.

There is one condition of the cervix uteri, in which we have given chloroform with great advantage in the first stage of labour. The neck of the womb is sometimes caught and greatly compressed between the head and the pelvis. The pain is excruciating; the action of the uterus is often deranged or suspended; the woman cannot endure her agony, and her strong apprehensions interrupt the pains. Let her have chloroform, and she becomes tranquil; the action of the uterus returns regularly, and the dilatation is soon completed. Under such circumstances we have given chloroform when the mouth of the womb was not opened more than a sixpence, and were gratified to find the dilatation advance most rapidly. But if the parturient woman do not suffer so acutely (and many do not), if she can bear her

pains well, and labour be making a regular and satisfactory progress, there is no occasion to use chloroform *in such a natural labour*.

The sense, however, in which this term "natural labour" is commonly used, embraces within its meaning cases of the greatest difficulty. It is true that the expulsive efforts of the uterus are successful, the child is born without the aid of instruments, and within the prescribed period of twenty-four hours; but such is the agony which the patient experiences within that time, that the exhaustion of the patient—the mental depression—the diminished energy of the vital forces which follow—predispose more to a slow and troublesome recovery, if she escape more serious attacks, than any other cause.

We have known this intensity of pain to cause convulsions. We were requested by a medical friend to see a patient of his in labour of her first child. He described her pains as being most intense; she was scarcely able to endure them: that morning, in the middle of a paroxysm of anguish, she was seized with a convulsion, which assumed the epileptic character; several fits followed, and in fact superseded the pains. He became alarmed, and requested our assistance. We found the neck of the womb thinly spread over the head of the child, and forced down almost to the outlet—*the mouth of the womb was not the least open*—the woman was then conscious, and complained very much while the examination was being made. We never met with so much irritability of the cervix; and, fearing another fit, we withdrew the finger.

It was agreed to let her inhale chloroform when the paroxysm was approaching, which had a most beneficial effect: the convulsion was arrested, and the pain returned, which she bore patiently. Thus, in place of every uterine contraction being marked by a paroxysm, they returned at long intervals—she had only three or four in the following twelve hours. At this time the head arrived at the outlet, and a still-born child was removed by the forceps. In all such cases, where the pains that accompany the first stage of labour are greatly aggravated, chloroform is invaluable.

The *Same Dose of Chloroform given in precisely the Same Manner, produces Different Effects on Different Constitutions.* With some, the first inhalation gives instant relief, and if continued, soon produces sopor. With others, the inhalations may be frequently repeated before any effect is perceived. Some cannot take it without being excited: they ramble, and soon become incoherent. Others experience the most delightful sensations. When chloroform acts promptly, the inhaler should be applied only at lengthened intervals, merely to lull, but not remove the pains. If slow in its action, it may be inhaled also by the nostrils; this mode of increasing its power may induce sopor, but this is preferable to the uncertainties of the smaller dose, which scarcely relieves the patient. If it cause excitement, it is better to withdraw the vapour altogether, unless indeed the sufferings are very intense, and then it is advisable to induce sopor.

Pure chloroform causes no inconvenience during its inhalation, when given in the gradual and cautious manner we have mentioned. If violent cough or spasm, or sense of suffocation be excited, chloroform is given either too rapidly or it is impure. Impure chloroform often excites great bronchial irritation; the impurities arise from the presence of alcohol and formic acid. M. Mialhe adopts the following very delicate test of the presence of alcohol.

Place some distilled water in a tube or glass, and drop on it a small quantity of chloroform; the greater part sinks immediately to the bottom of the vessel, owing to its great density—a small quantity floats by repulsion, but may be made to fall in small globules by agitation. If the chloroform be pure, it remains at the bottom of the vessel: but if it contain only a small portion of alcohol, the globules acquire a milky opacity. Litmus paper determines the presence of acid. A simpler and much more convenient test—one that is at least quite sufficient to excite suspicion, is to rub the palms of the hands with chloroform; if the odour be fragrant it is pure—if pungent, the contrary.

The *Action of the Uterus under Chloroform* is not generally interrupted. The uterine contractions are governed by the reflex or excito-motor and the ganglionic nervous systems. The latter

is never influenced, and will always maintain them. The former requires the full dose to disturb its power; a moderate dose has no effect at all on the reflex nerves—nay, it may rather irritate than control their power. The uterine contractions are sometimes increased under the influence of chloroform, and labour makes a more rapid progress. It is true, this may arise from the removal of the great disturber of uterine action, mental anxiety, and dread of pain; but it may also be explained by excitation of the excito-motor nerves rousing up the uterus to increased action. If, however, the action of the uterus be suspended because these nerves are getting under the influence of chloroform, the effect is only temporary, because the ganglionic system restores the contractions: while the very fact that the reflex system is thus affected, renders the passages much more yielding and dilatable than before.

But in many cases, where the pains have been suspended, we have great reason to doubt that chloroform had anything to do with this result. We attribute this suspension to another cause, which has quite as great an influence over the true spinal system as chloroform. Mental emotions exert this power: it is well known that nothing interrupts uterine action more than sudden shocks or great dread. The experienced practitioner is well aware of the importance of caution in the kind of conversation going on in the lying-in chamber: a sombre look or an unguarded word may excite the fears of his patient, and interrupt labour; nay, a vaginal examination sometimes stops the pains, because the patient is taken by surprise—his very entrance into the apartment will cause a delay in the return of the next pain. It is not surprising, therefore, that if he prevail upon his patient to inhale some chloroform, a new medicine, said to be most dangerous—which sometimes has caused sudden death—which even the doctors themselves are not agreed upon using, but, on the contrary, which some condemn in no measured terms,—it is not wonderful if a patient, whose mind is thus prepared, should find the first inhalation of chloroform to stop her pains. We are satisfied that such is the case in some instances from the very contrary

effect taking place in other cases from precisely the same cause.

Some patients dread their pains much more than either chloroform or its exhibitor; they have previously struggled against them, and their fears have caused a suspension of the pains, but the moment when chloroform is inhaled, and the patient experiences its soothing influence, the pains return with increased force, and labour, that may have continued inefficiently for hours, is rapidly concluded.

The *Inhalation of Chloroform in Severe Obstetric Operations* is similar, but in a less degree, to what is required in surgical operations. For this purpose the sponge and folded handkerchief answer perfectly well. There are a great variety of inhalers: one of the simplest is that contrived by Dr. Fleming, of Dublin. "It consists of a small glass capsule with a partially overlapping border, and having a stem attached to it. This capsule is somewhat oval in shape, its long diameter being two and a half to three inches, and its depth sufficient to contain a sponge of commensurate size. Around the neck of the stem of the capsule is attached another sponge, so scooped and trimmed as to have a shape to include the mouth and nose, and so porous as to admit the free access of atmospheric air. This sponge should be about three inches deep in its inferior wall, in its upper about two, and by securing the capsule nearer the upper than the lower wall, an inclined aspect is given, which is most important."

Dr. Fleming has altered the glass capsule. "The stem in place of being solid is tubular and of a size to admit the top of the finger underneath where it is trumpet-shaped, whilst, on its upper portion, it is bevelled out on a plane below the rim of the capsule, so that the chloroform sponge may rest upon it, and the air play over it when in use according to the will of the surgeon." (*Fleming on Chloroform*, pp. 28. 29). The small sponge, which Dr. Fleming calls "the chloroform sponge," contains about a drachm of chloroform when filled, and thus the quantity is regulated.

When chloroform is administered by any of those inhalers which concentrate the vapour, the quantity used should never

exceed a drachm, and even then its effect should be closely watched, lest the undiluted vapour should enter the lungs. This can hardly occur without some notice, because of the spasm of the glottis it excites; but if this warning be neglected, and the vapour still applied, notwithstanding the struggles of the patient, the glottis will soon be in an opposite condition, and the vapour enter too freely. This neglect, we suspect, has been the cause of death in more than one instance. The inhaler, which is applied to the mouth only, is by far the safest of these instruments, because the quantity of vapour which passes into the lungs is so very small, and so much diluted, that no sudden accident can happen; and, as it is administered gradually, its increasing power may be observed.

Advantages of Chloroform. The advantage of chloroform in obstetric practice consists, not alone in its *power of controlling the intensity of suffering* to which the parturient woman is too often unnecessarily exposed, but in *promoting a more favourable recovery*. Since the publication of Mr. Travers' valuable work on *Constitutional Irritation*, the profession acknowledge the danger that sometimes results from intense pain. Patients have died of the shock of an operation. It is denied, however, that the pains of labour, be they ever so intense, produce any shock to the constitution; we believe this to be utterly untrue. We know nothing that predisposes more to troublesome consequences than long-continued and severe pain, especially with delicate women. Their recovery is always slow; and, while in this depressed state, if a morbid poison be within reach, they are sure to absorb it. The experienced practitioner knows well the risk of constitutional exhaustion, which nothing promotes more than intense pain. The following case may serve as an illustration.

A poor woman had been a patient of University College Hospital during the years 1849, 1850. She suffered from dysmenorrhœa, stricture of the cervix uteri, and very narrow os tincæ. She was highly hysterical, and all the usual means failed to give her relief. At length we divided the stricture; she got better, and we lost sight of her. She returned, however, in

1852, pregnant, to apply for assistance in her approaching confinement.

She received a letter for attendance, and we committed her to the charge of two very intelligent and experienced gentlemen. More careful inquiries were made about her; and it appeared that she was the servant of an old gentleman who had ample means at his command, and there was strong reason to suppose that he had a most confidential interest in her present situation. Why she applied to the hospital as a pauper was explained to us by the fact, that this gentleman had the reputation of being a miser; so we at once determined that he should pay for her. She was informed that the hospital was for those only who were destitute; that under the circumstances we could not take charge of her, but that if she made her own arrangements with her medical attendant, we should give our services in the same manner as we at first intended, if they were required. She did so, and her confinement commenced January 10, 1853. During that day, labour pains, or what were supposed to be such, returned at intervals. She was highly irritable and impatient; she could not endure these pains, and sent nearly a dozen times for her medical attendant. To relieve her anxiety, he sent for us. We found that true labour pains had not yet commenced, so she was given a full anodyne.

January 11 was spent in a similar manner. She got some sleep; but in the morning the same teasing pains returned, and continued throughout the day. Chloroform was suggested, but she would not hear of it. The anodyne was repeated.

January 12. The first true dilating pains commenced with great severity; the mouth of the womb opened a little, but was very rigid and unyielding; leeches were applied with relief, and were followed by some advance in the dilatation; but again it remained stationary. She became very impatient after suffering, threw herself about the bed, was constantly moaning, whether the pain was on or off, the only difference being the increased loudness of her exclamations during the contractions of the uterus: she would do or take nothing.

January 13. The os was more dilated. We saw her at night,

in consultation with her medical attendant. She was greatly exhausted, the dilatation was nearly completed, and the head was entering the pelvic cavity. We again advised her to inhale chloroform; she consented, and received immediate relief. She bore her pains quietly, labour made a favourable progress, and she was delivered on the following morning. After the birth of the child, the placenta was retained, but without hæmorrhage. We were again sent for, and, finding it adherent, removed it. She was then bandaged and the bed arranged: she was perfectly tranquil, her pulse good, and we left her much more comfortable than we had expected.

We were greatly surprised that evening (January 14) to receive from her medical attendant an urgent summons to see her. He found her so faint, at his last visit, that he thought she was dying. When we saw her she was gasping, with a pulse (140) scarcely to be felt. There was no trace of hæmorrhage; the uterus was well contracted; there was nothing to explain this unexpected catastrophe. She made attempts to tell us something, but failed, and soon afterwards expired. As she had been left by her medical attendant in so satisfactory a state, the strictest inquiries were made as to anything that might have occurred between his visits. All we could learn was this. The old gentleman had paid her a visit that evening. Some altercation (it was supposed about the fee) took place; the woman fainted, assistance was sent for, and such was the result. Knowing the great amount of pain she had gone through, being in constant pain for four days, more or less, we concluded that it caused a great amount of constitutional exhaustion, and that she was unable to sustain a shock, which otherwise would only have produced its usual amount of irritation. This case may be compared with another, in which constitutional exhaustion was produced in a different manner, but was followed by the same result.

About twenty years ago (1834), a poor pregnant woman walked a considerable distance to the Dublin Lying-in Hospital. When near it, she was suddenly seized with the pains of labour—dropped down—and was delivered in the street. She was carried to the hospital, and received immediate attention. Nothing dan-

gerous occurred, but her alarm was very great: after some time it subsided,—she slept—and nothing unusual happened until the following day.

On that morning, a patient was brought into the same ward in which she lay, to be delivered. She occupied the next bed to her, and was extremely boisterous. The woman seemed to give no attention to the disturbance. She lay quite quietly; but in the course of the day she felt faint, and complained of being overcome by her neighbour's cries. The woman who caused this was fortunately delivered, and thus all further annoyance was removed, but this patient did not recover from the effect that it produced on her. In the evening, she was seized with an alarming syncope, and died in three hours. A *post mortem* examination was made, and nothing was found to explain the cause of her dissolution.

In both these cases, the obvious cause of death was the shock given to the constitution previously exhausted; and had the former patient taken chloroform when first recommended to do so, we are satisfied this catastrophe would not have happened. because, the moment she received relief, labour proceeded most rapidly, and the assigned cause certainly would not have produced so severe a shock as it did in her then exhausted state.

This case is quoted more at length because it clearly demonstrates the effect of long-continued and severe pain on the constitution. We might quote several to prove how much the recovery of the patient is promoted by the removal of severe pain. Experience teaches that a favourable recovery is the rule after the administration of chloroform. It was so in the first case in which we employed it, and has been so ever since.

Another advantage applies to cases of difficult labour *when the mouth of the womb or the passages are unyielding.*

We attended a lady in her first confinement, with whom the os uteri was extremely rigid, so much so, that the whole cervix was forced down into the pelvis before the least dilatation took place: the waters escaped at the commencement of labour. We were apprehensive of inflammation of the cervix and increased delay; the more so because, when the mouth of the womb at length

dilated, it did so unequally, the posterior lip expanded, leaving the anterior still before the head. Chloroform was given in the usual manner; and several unsuccessful efforts were made to remove this impediment, by pressing back the anterior lip. We then cautiously introduced the forceps, and, acting with the pains, succeeded in getting the head beyond it; but when the head reached the perinæum, it was so unyielding that we were obliged to use increased caution: at length it gave way gradually, and when the head fully occupied the vulva, the forceps was withdrawn altogether. The head remained for nearly an hour before it was expelled, and the funis being tightly round the neck, the circulation was so long thus interrupted that the child was still-born.

But throughout this severe labour there was not a trace of inflammation either in the os uteri, vagina, or perinæum. The patient recovered most rapidly, and was out in less than three weeks. In this instance, the lady was of a mature age, and the case may be contrasted with another, which shows how rapidly an unyielding perinæum sometimes relaxes under chloroform.

A young girl, scarcely sixteen, was taken in labour with her first child, which most unfortunately was very large. She had been forty-eight hours in labour; the head was in the cavity of the pelvis, but could not get farther. The perinæum was not in the least dilated: it was very difficult to make even an examination. Still we had no choice but to apply the forceps, if possible. The first attempt was unsuccessful, because she made so much resistance; however, chloroform was given, and when she was under its full influence, a second trial was made. The perinæum, which was the chief difficulty, soon gave way, and we were able to conclude the labour much more rapidly and with less difficulty than we had anticipated.

This case is the most remarkable example with which we have met; but in numerous instances we have found the difficulties which the perinæum presents completely overcome by chloroform, to say nothing of the intolerable anguish being removed which the patient usually suffers at this stage of the labour.

An advantage also arises from the *progressive course of its action upon the nervous system*. There is an order in its action

which is worthy the attention not only of the accoucheur, but also of the surgeon. We have explained that the sentient nerves precede the reflex, and the latter the ganglionic, in yielding to its influence. Hence it is quite possible so to regulate the dose as to affect the sentient nerves only, and not the rest; pain may be relieved, if not removed, and the intellect remain undisturbed.

Sopor is not essential for the relief of pain. Any one may put this to the test by adopting a very simple experiment. If a small quantity of chloroform (say half a drachm) be dropped on a sponge, which is placed in a folded handerchief and held before the face at a short distance, the vapour may easily be inhaled. Two or three inhalations may be taken—just sufficient to communicate a feeling of warmth—and if the face or hand be then pinched, the person will scarcely feel it, although perfectly awake and in possession of his senses. The same experiment may be better performed with the inhaler that we use; there is less waste of chloroform, and there can be no error with regard to distance, when inhalations are thus taken by the mouth.

The obvious conclusion from these experiments is, that the risk from chloroform may be altogether avoided, and yet the patient receive a considerable amount of relief. In the practice of midwifery, the pains of labour can be assuaged and rendered tolerable without inducing sleep; and in the practice of surgery, it appears to us that many minor operations may be performed with equal safety.

The Disadvantages of Chloroform arise sometimes from want of sufficient experience in the administration of the vapour; sometimes from constitutional peculiarity.

Sickness of the Stomach has been caused by it. Dr. Snow has observed this when it has been given for surgical operations. He attributes this irregular effect to a neglect of the condition of the stomach at the time when chloroform is inhaled. "If taken immediately after a meal there is increased liability to vomiting; and, on the other hand, it is not advisable to inhale after a long fast; for, when sickness has occurred in this condition, it has been in some instances of considerable duration, and accompanied with more than usual depression."

Headache is another consequence of its use, which sometimes, but we believe rarely, occurs. There are, however, certain conditions of the constitution in which the inhalation of chloroform has been attended with troublesome symptoms. We cannot speak from our own experience, but have been informed, that in dentistry hysterical women have been seized with fits, and men of robust constitutions with temporary delirium in the transition stage from anæsthesia to sopor. Dr. Snow has observed with epileptics, that a paroxysm may take place as the patient is becoming unconscious. Such consequences have been observed when the full dose of chloroform is given for operations either in dentistry or surgery, but we have not met with them in midwifery, and do not think that they are likely to occur when a moderate dose is given, because loss of consciousness is not required; a small dose is sufficient to relieve pain; the transition stage need never arrive, and if it should happen that peculiar idiosyncrasies, which will not tolerate chloroform, present themselves, any irregular effect is perceived in sufficient time to prevent accident. Hence it is an important rule *never to give a full dose of chloroform in the first instance.*

The Objections to Chloroform are now giving way to questions as to the comparative merits of æther and chloroform, and the best modes of administration. The Boston Medical Society have taken great pains to investigate the effects of chloroform and æther, and have arrived at the conclusion that the accidental deaths from chloroform are sufficient to prove the superiority of æther, where no death has taken place. We shall not enter into this general question; we have not in midwifery accidental deaths sufficient to prove anything of the kind; but with regard to the convenience and advantage of chloroform as compared with sulphuric æther, the following case will be the best illustration.

Some years ago we were engaged to attend an American lady, the daughter of an eminent physician in Boston; and then, as now, there was a strong prejudice against chloroform. We were requested to use sulphuric æther, and some of the best was sent from Boston. As soon as labour had advanced towards the completion of the first stage, and the pains were becoming power-

ful and difficult to bear, æther was administered through an inhaler. In about an hour the odour of æther became strong in the room, and, as its administration was continued, increased to such an extent as greatly to inconvenience every one; the nurse in attendance seemed to suffer most, as she found it extremely difficult to keep awake. We were also slightly conscious of its soporific influence, and felt that this inconvenience alone would be an objection to which chloroform is never liable; but along with this the extreme pungency of the vapour, the excitement it causes in the patient, and the difficulty of administering it so as to avoid the escape of the æther, are sufficient to decide the question in favor of chloroform so far as the practice of midwifery is concerned.

We have placed before you the properties, the effects, and the obstetric uses of chloroform; and if you please to avail yourselves of its influence, we submit for your consideration the following rules for its administration.

Rules for the Administration of Chloroform. 1. Let the chloroform be pure. If rubbed on the hands, the smell should be fragrant, not pungent like sulphuric æther. If inspired from the inhaler, there is a sense of warmth in the mouth, a fruity flavour, no pungency; if the strength of the vapour be sufficient it will excite slight cough, but if impure, the cough is irritating. Let the sponge of the inhaler be placed in warm water, and then wrung perfectly dry. About thirty minims may be poured upon it, which is sufficient in the first instance.

2. When labour has commenced, do not interfere so long as the patient bears her pains well; if she be not teased with short, very severe, and inefficient pains, chloroform need not be given. If, on the contrary, the severity of the first stage be such, the anguish of the patient so great, that pain is evidently a cause of protraction, chloroform may be given with great benefit.

3. Always commence with a small dose, about thirty minims; if it agree with the patient no inconvenience is caused, but she will generally complain that it is doing no good; the quantity may then be increased until, on inhalation, the exhibitor finds he cannot take a full inspiration without cough.

4. In the second stage of labour, chloroform may be given when the head is approaching the perinæum, or before then, if the pains become intolerable. This may be known not merely by their greater intensity while the uterus is in action, but also by the restlessness of the patient in the intervals. She is watchful, dispirited, still crying, but in a more subdued tone, from pain and a feeling of soreness.

5. When the head arrives at the perinæum, chloroform may be given in a fuller dose, if it have not already accumulated. The perinæum yields more easily under its influence, and the severity of the pain is controlled without any loss of force.

This rule applies especially to cases in which powerful forcing pains are acting against the perinæum at the hazard of its laceration.

6. When operations are necessary, if they be not severe, as, for instance, some forceps operations, chloroform may be given in the same manner as in natural labour; but always after the instrument is applied. If they be severe, the chloroform may be given as in surgical operations, but not to the same extent. Hence an assistant is necessary, who is quite conversant with the properties of this anæsthetic. It is obvious, that the same person cannot operate and simultaneously give the full soporific dose of this agent.

7. The inhaler should be applied to the mouth, just before the pain commences, two or three full inspirations taken, and the moment the action of the uterus ceases it should be withdrawn. The inhaler should never be applied in the interval between the pains, and if used in the middle of a pain, the cries of the patient blow away the vapour, and no relief is given.

8. When inhalation has been continued in this interrupted manner for some time, if any alteration be observed in the countenance or manner of the patient; if the face be flushed, or bloated, or tinged with a slight lividity; if she ramble, or become hysterical, let the inhaler be withdrawn, and the face of the patient fanned. Wait until the pains return to their original severity before renewing the inhalation, when it is probable that these symptoms will not return.

9. In some instances, the patient is very intolerant of her pains; and, if chloroform be given to relieve them, she becomes hysterical, crying, perhaps, louder than before it was inhaled. In these cases it is better to induce sopor, which may easily be done without stertor. For this purpose a sponge and folded handkerchief applied to the nostrils is preferable to the inhaler. Whenever sopor is brought on, the closest attention should be given to the countenance—observe the irritability of the eyelids; to the respiration—notice its frequency, and especially stertor; to the pulse—mark its strength. The handkerchief should always be held at a distance at first, and be gradually brought nearer, but the sponge should never be applied quite close to the nostrils.

10. There should be the freeest circulation of air in the apartment: and if, after delivery, there should be any feeling of faintness or nausea, ammonia in effervescence will relieve it.

By ordinary caution and attention to these rules, chloroform may be administered with *perfect safety* in the practice of midwifery. The practitioner who ventures upon its use will soon be satisfied of its *great advantage*, not only in very severe cases, but even in many of the ordinary cases of natural labour.

We would only ask him, in conclusion, to disregard the idle rumours with which he may be surrounded; to disengage himself from preconceived notions about an agent that he has not examined; but, as is his duty, to study the properties of the anæsthetic proposed to him; to try *by experiment* whether the statements respecting it are correct; and, in fact, to *judge for himself* "whether these things are so."

Third Division.—Lactation, together with Post-Partum Inflammations and Fevers.

LECTURE XXXV.

CONVALESCENCE AFTER PARTURITION.

Hitherto our attention has been directed to the phenomena that present themselves during the development and birth of a new being. The dormant uterus is then roused into activity, and exerts a powerful influence over all the vital functions; becoming, as it were, a centre of action to which all the energies of the constitution are directed. When the ovum is matured, and the child is prepared to leave its temporary resting-place, a new series of phenomena are observed in the struggle between the enormous expulsive power of the uterus and the resistance opposed to it. We have already pointed out the manner in which the balance is preserved between these opposing forces, the mechanism by which difficulties are overcome, and the high degree of constitutional disturbance that is sometimes excited by those efforts. In the whole of these phenomena, you might perceive a progressive series of operations, of which the last and greatest was parturition: the powers of the female constitution reached their climax of effort in the delivery of the child. We have now to consider the changes that take place when that object is accomplished—when the cause of so much constitutional excitement is suddenly removed.

General View of the Phenomena of Convalescence.—The activity of the nervous and circulatory systems, that were at their maximum of intensity, is now reduced to a minimum. The pulse sinks; a rigor may be observed more or less distinctly: the

patient either complains of feeling cold or is actually shivering; she experiences also a certain amount of depression; she feels exhausted, and occasionally a slight temporary wandering gives more distinct evidence of the exhaustion of nervous power. The first twelve hours that elapse after the delivery of the parturient woman are essentially a period of repose; and if, by good management, the patient be left undisturbed during that or even a much shorter interval, if she obtain a sound and refreshing sleep, the rapidity with which the constitution is restored is surprising: the mother has forgotten all her sorrows, is cheerful, disposed to talk, and, so far as her own feelings are concerned, she could get up and go about as well as before her delivery. In the next interval—say twenty-four hours—a slight change may be observed: a new function, that of lactation, is becoming active, and its influence on the vital functions is manifested sometimes very distinctly. The circulation, which before was below par, now rises again to the inflammatory standard. The paroxysm of a kind of natural fever is present, going through its stages of rigor, interval, and sudor. There is a certain amount of thirst, and perhaps slight headache. If there be no interruption to the healthy fulfilment of this function, these symptoms disappear as the full secretion of milk is established, and no further constitutional change may be observed. If we turn our attention from lactation to the uterus—from functional to local symptoms—we here also observe appearances that mark important changes going forward. The uterus is now preparing to resume the size which it had previously to conception, to return to its ordinary function of menstruation, and to withdraw itself from that sphere of nutrient activity in which it had been engaged. We have therefore to consider the volume of the organ, the permanent contraction of its fibres, the rapidity of interstitial absorption that takes place. The internal surface of the uterus, especially that part to which the placenta had been applied, is well compared by Cruveilhier to a large open wound. From this surface a discharge takes place, at first grumous, then greenish yellow, thick and oleaginous, and lastly thin and serous, when (about the tenth or twelfth day) it ultimately disappears. The wound is then

healed, and the mucous membrane is nearly restored to its original character.

This outline of what takes place between the period of delivery and convalescence is sufficient to render intelligible the principles to which we should adhere in the management of the patient, as well as the source of those derangements that may interrupt, if not prevent, her recovery. We may divide the progress of convalescence into three periods: first, *the interval between parturition and lactation*—between the birth of the child and the commencing secretion of milk; secondly, *the period during which the function of lactation rises to its highest point of activity*, until it is fully established; and, thirdly, *the period occupied in restoring the uterus to its condition* previous to conception. Many interruptions to the proper fulfilment of these vital actions occur, and give rise to every variety of derangement; each of which become objects of our attention and treatment, and therefore require to be carefully studied.

First Period.—*Dangers of Over-Excitement.* In this period, immediately after delivery, the cause of disturbance is generally found in the errors of those who are immediately about the patient. It is a period of constitutional depression after a very exalted degree of functional activity, one in which the most perfect repose of the system is required, and where, if sleep be procured, it is no poetic fantasy to call it "Nature's sweet restorer." You readily, therefore, understand the mischief that may result if this be interfered with, if the patient be allowed no repose, and be kept in a constant state of excitement. You can perceive why it is that the accoucheur has to complain sometimes of the well-intentioned but too officious kindness of friends, when he finds, on his visit, that his patient has not slept, that her pulse is quick, that she complains perhaps of some headache, and is thirsty. These premonitors of a more decided febrile paroxysm are unnoticed by the bystanders or the ignorant attendant, but cause, too often justly, the greatest alarm to the experienced practitioner: he knows, when reaction takes place, that along with it these unfavourable precursors will develop themselves more perfectly, and place his patient in a very different position

from that which she now seems to enjoy. He can foresee impending danger in that which is looked upon only as a temporary inconvenience by those who have not experience to guide them.

Besides excitement of this kind, another error in management may be committed of a perfectly opposite character; the nurse may very judiciously expel all intruders, and so far succeed in keeping her patient quiet, who would enjoy the repose necessary for her, if, unfortunately, the nurse herself had not a strong prejudice in favour of making her "clean and comfortable": that is, she is not satisfied with the temporary arrangement of the bed that had been made on the birth of the child; all the soiled sheets and bed-clothes must be removed, her patient's dress must be changed; and, after all this is done, the nurse consoles herself in the belief that she must sleep comfortably. But in every step of this process there is danger, either immediate or remote. The patient cannot be moved about in this way without disturbing the abdominal bandage that was to secure and support the uterus. If the patient leave the horizontal posture—and she is often allowed to sit bolt upright—the blood again accumulates in the uterine veins, and the surrounding fibres readily yield to this distension when the stimulus of external and equable pressure which the bandage supplied is removed. Blood is consequently poured into the cavity of the uterus, and this, if it go no farther, exposes the patient to a very severe attack of after-pains; but it may flow away, and produce a most violent and dangerous flooding. Your patient is thus exposed to the risk of her life at a time when every moment is of the highest value, and you are probably an hour's distance from her. Or, again, if the patient escape this serious accident, another and an equally unpleasant derangement may be induced by the same cause. A delicate woman is much more susceptible of nervous irritation at this than at any other period. If her rest be disturbed, or her sleep put astray, she remains wakeful and unrefreshed; presently the senses become more than usually excited; the noise of her infant, although from another apartment, disturbs her; light is exceedingly unpleasant to her: nevertheless, although the nurse carefully darkens the room and closes the bed-curtains, the patient

does not sleep; even if she should dose, it is but momentary—the slightest whispering awakes her. After some hours she complains of headache, and, just as the lacteal secretion is becoming active, it is arrested by the presence of an irregular nervous fever; rigors occur at unequal intervals; headache is increased; the pulse is frequent and irregular; and sometimes delirium may be observed. A derangement of this kind may not be subdued for weeks, and may have its origin in no other cause than a little want of knowledge in the management of the patient immediately after her delivery. We have known a patient drawn down to the bottom of the bed, then up again, now to one side, then to another, in this process of changing the bed-clothes, who afterwards presented a most alarming train of nervous symptoms that we feared might terminate in confirmed mania; and all this because the nurse insisted on making her "comfortable."

Too Early Application of Child to Breast. The same evil may be produced in a different manner, by applying the child to the breast before there is any milk in it. Women who have given birth to their first child are slower in the secretion of milk than those who have had several children; and it sometimes happens, in obedience to a popular rule, that the child is applied to the breast as soon after delivery as it can be prepared for the purpose. When the woman is strong and healthy, the practice is salutary; but if she be of an irritable temperament, it is very mischievous; no milk being secreted, the child soon becomes fretful, and the over-anxious mother equally so: several fruitless attempts are made to make the child take the breast; the child cries; the mother becomes impatient, sits up in bed, and after many unsuccessful efforts, is obliged to resign from mere exhaustion. A scene like this often ushers in a train of most serious and troublesome symptoms, that have sometimes ended in puerperal mania.

Errors in Diet, also, may be very easily committed. We have stated that after the patient has had a refreshing sleep, she feels perfectly well: she can eat and enjoy whatever may be given to her. There is, therefore, the greatest possible temptation to allow her to indulge in improper food: this mistake is the more

likely to be committed, because no ill consequence *immediately* follows the indiscretion, nor will the mischief become apparent until reaction sets in; but when the pulse begins to increase, and the milk to form, the natural febrile paroxysm is superseded by one of a more serious character; or, if there be the least tendency to inflammation, it will show itself in a most aggravated form, because of the activity of an over-excited circulation.

For these reasons, you will perceive the importance of securing to your patient undisturbed repose after her delivery. If she be of an irritable temperament, an anodyne may be advisable for this purpose. When this important object is gained, caution is necessary to avoid any indiscretion in diet. Toast and tea, barley-water, gruel, are examples of the class of dietetics to which, as a general rule, she must be confined. The exceptions are women of feeble constitutions, who require a more nutritive diet.

Second Period.—This is marked by an increase in the force and frequency of the pulse, a slight rigor, some thirst, and perhaps slight headache: the breasts are becoming distended. If the previous management of your patient have been judicious, and no morbid causes of derangement be in action, she will pass safely over this hazardous period. The distension of the breasts and the natural fever that accompanies it, are relieved chiefly by the child. When the milk flows freely, the febrile symptoms subside, and the function of lactation is established. But a very slight cause will derange this natural process. Improper food, for instance, is a frequent cause of disturbance; reaction may become excessive. In some cases, the patient has a severe rigor followed by profuse perspiration—the milk-fever of authors. In other instances, the formation of milk is too rapid, although not accompanied by such marked symptoms of fever: the breasts, however, are tensely distended and painful, and present to the infant a firm unyielding surface: it cannot grasp the nipple sufficiently to fulfil its duty of suction, the mammæ are not relieved, and the danger of local inflammation at once presents itself. In a third class of cases, the lacteal secretion may be suspended or suppressed—a more ominous symptom, because it

indicates a disordered action of a much more serious character than either of the preceding. The excited circulation is drawn towards some other centre than the mammæ, and the absence of milk is only the precursor of some deeper-seated inflammation, if not of puerperal fever itself. Thus you can understand the reason why so much caution is necessary previously to lactation, and why the experienced practitioner is so solicitous that this function be safely established.

Causes interfering with Lactation. If the child be healthy, and able to draw the breast—if the mother be properly managed previously—this object is generally successfully accomplished; and the fulfilment of a duty, the most grateful to the female mind, will rapidly promote your patient's restoration to perfect health. But how many drawbacks, independently of those already alluded to, will prevent this! Both local and constitutional causes may throw impediments in the way of success. The nipple may be ill-formed, too small or too large, or perhaps flattened by the fashionable corset so completely as to form a depression in place of a prominence. The child, therefore, cannot seize it. Or it may happen, that the extremely delicate integument that covers this erectile structure is very irritable and easily inflamed, consequently it will not yield to the traction of the child: it gives way at the base of the nipple—fissures are the result, that bleed readily, and in place of a comfort and enjoyment, the nursing of the child becomes to the mother the greatest source of anguish and distress. Again, there are cases of a different kind; the breasts and nipples are well formed, nevertheless the milk will not flow, because the fine lacteal ducts are not free to transmit it. They are plugged with a thick tenacious secretion that the child has not sufficient suction-power to extract and remove. All these are merely local causes that interfere with lactation; but the impediment may exist in the constitution of the patient. We have already alluded to excessive reaction, the milk being secreted more abundantly than the child can manage. The constitution may, however, be in an opposite condition to this: there is scarcely any reaction, the milk is secreted scantily, and what is extracted contains but

little nutrition; the infant, therefore, is never satisfied. After having obtained what it can it may sleep, exhausted by its efforts to draw the breast; but it is only a momentary doze: the child soon wakes up, becomes feverish, constantly crying, and ravenously hungry: the mother has no further supply, her very anxiety contributing to arrest the secretion; and thus difficulties of no ordinary character oppose themselves to your wishes. There are also certain constitutions where there is no deficiency of milk in the breasts—the fault is not the quantity but the quality; the milk is abundant but does not satisfy the child, or possibly it may produce a considerable amount of irritation: the child has scarcely taken a sufficiency, when it is again ejected from the stomach; or if this precaution of Nature should not take place, there is every evidence of irritation in the passage of the milk along the intestines; an exhausting diarrhœa may place the infant in extreme danger of its life, or it may be exposed to all the torments of colic: its wild screams, that cannot be appeased, proving the agony that it is enduring. Thus you may perceive why it is that the second period is of such critical importance to your patient's health, and such a source of anxiety to the practitioner. You may also learn that, although as a general rule it is most desirable that every mother should nurse her child, there are many, too many, exceptions where this grateful office cannot be fulfilled, and where this duty must be delegated reluctantly to another, or the infant be supported by artificial imitations of its natural food.

In the various preparations that are offered as substitutes for milk, and in the hard names that are given them, there is a culinary skill displayed that almost rivals Soyer himself. "Farinaceous food," "tops and bottoms," and "tous les mois,' are only a small part of the delicacies meant to supersede the bland and nutritious fluid that nature designed for the infant stomach. Like other delicacies, also, they frequently excite a considerable amount of disturbance in the digestive organs. We are not, however, about to discuss the management of infants; but for the mother's sake it would be desirable to avoid these

sources of irritation, and if she cannot herself nurse, to give the child in charge of the best nurse you can find for it.

In the management of these cases, we shall consider first the constitutional, and then the local causes.

When the Flow of Milk is Excessive, we have two objects to accomplish—to reduce the force of the general circulation, and to prevent the effects of local distension. The former object is best carried out by nauseating doses of tartarised antimony, and also by saline aperients: both may be combined. The local distension is efficiently relieved by warm fomentations, skilfully managed so as to maintain an equal temperature around the distended breast to that degree which is most grateful to the patient. Along with this, gentle frictions with warm oil over the surface are useful in promoting absorption of the excess of milk. When the distension and consequent irritation are relieved, the milk that had been arrested will frequently flow quite freely: if it be slow in doing so, the India-rubber suction-bottle may be used with advantage; or what is still better, if practicable, another child older and stronger than the infant may be applied to the breast, which will soon reduce the distension. If it should happen that the lacteal ducts are obstructed, even this method may fail, because a more perfect exhaustion is required to free them. For this purpose women are frequently employed "to draw the breast-strings," as it is called, which they generally do very efficiently; their stronger power of suction removes these plugs, and the milk then flows without difficulty. As soon as this excessive distension is overcome in the first instance it does not generally return, if caution be used in the diet of the patient.

When the Flow of Milk is Deficient, you have a far more difficult case to manage; because the desire of the mother to nurse her infant is too frequently strong in proportion to her inability to do so. She is unwilling to resign her little charge to the care of another, and you are called upon to prevent this necessity. In this dilemma it is generally advisable to feed the infant artificially, through a sucking bottle, so as to satisfy it and prevent its restlessness. It may then be given to the mother at

longer intervals than usual; twice perhaps in the day, and once at night, so as to allow the milk that is slowly secreted to accumulate. The artificial food of the infant should approach as near to human milk as possible. If expense be no object, asses' milk is the best to give it. If otherwise, cows' milk may be diluted with water, or very thin barley-water, in the proportion of two parts of milk to one of water; or the curd of cows' milk may be removed by rennet, making rennet-whey; some sugar must be added, because cows' milk contains more curd and less sugar than human milk. Your patient will require a more nutritious diet than can usually be given after parturition; even stimulants are sometimes necessary; broth, soup, or meat may be given; and with caution, warm negus. It is here that the virtues of caudle shine so conspicuously. It is very essential also, that the mother be secured sufficient rest. These patients are particularly restless; an anodyne is therefore frequently required. The combination of camphor with opium or morphia, æther, or spirits of ammonia, with liquor opii sedativus, will be found useful. Perfect silence must be especially maintained in the lying-in chamber: the noise of the infant, or even the whisperings of the nurse, are sure to rouse the patient, and if so there is a great risk that the anodyne may act only as a stimulant, and keep her awake the whole night. In this treatment of the patient by good diet, stimulants, and anodynes, the bowels are very likely to be locked up; and if so, there is a great risk of further derangement. Purgatives are therefore necessary, but not of the hydragogue class. Castor oil, the aloes and myrrh pill, or any of the warm aperients, may be given. Enemata are highly serviceable if the intestines be sluggish: the fœtid enema, with or without turpentine, will be found useful; and we have occasionally derived advantage by giving at the same time the preparations of iron. We have found the phosphate of iron in half-grain doses, with a single grain of the compound colocynth pill, taken twice or three times a day, more efficient than treble the quantity alone. By such means you may possibly succeed in enabling your patient to nurse; but as it is very doubtful, the strictest attention should be given to any symptom that would

indicate constitutional exhaustion: headache, or neuralgic pains after nursing, watchfulness, irritability of temper, loss of appetite, any or all, may result from inability to maintain the function of lactation. Their appearance should be carefully observed, and considered sufficient to prohibit any further attempts. Of course if the milk disagree with the infant, this is equally an objection: under such circumstances, however, the mother will much more willingly resign her office than when the question concerns her own strength of constitution only.

Fissured Nipples. The local cause that chiefly interferes with nursing, is the extreme tenderness of the nipple—the fissures, or "sore nipples," that are the result of inflammation. If attention be paid to the breasts before parturition, if the active capillary circulation about the nipples be controlled by astringents, weak brandy, tincture of myrrh, and such like, being daily applied to them, there is less risk of accident afterwards. This process of "hardening the nipples," as it is called, is often quite successful. It may, however, fail, or may not have been tried. As soon as the child is applied to the breast it causes great pain: inflammation follows, and a fissure is the consequence. From the moment this happens, your patient's miseries begin: every time the child is applied, the wound is opened and bleeds; the inflammation increases, the nipple swells and becomes painful, even when the child is not drawing it; but the pain is intolerable when it does so; and thus a very slight inflammation in the commencement may be so aggravated as to require weeks before it is quite subdued.

The *treatment* of sore nipples is the treatment of simple inflammation; and the first and most essential point to effect is the prevention of the fissure. It is here that the intelligence of the nurse is of the most assistance to you. It is not usual for the practitioner to examine the nipples of his patient from day to day, although there is no reason why he should not do so, if he have the least reason to suspect inflammation; but it is the nurse's duty to apply the child to the breast; she has the opportunity of daily, of hourly observation: if there be any great pain and unusual swelling and redness of the nipple, she is the first to

perceive it, and may give timely notice to prevent the lesion that otherwise would take place. If, therefore, the nurse be intelligent, you are informed what is the condition of the nipple, and in this first stage a mild astringent may arrest it. We have found alum-whey useful as a lotion; the curd that is thrown down may be applied as a poultice to the nipple; the child should be applied as seldom as possible, and before doing so it would be well to guard the nipple with a circular piece of adhesive skin, having a hole in the centre, just sufficient to leave the orifices of the lacteal ducts uncovered. This will diminish the irritation of the infant's gums, and render the operation of nursing more tolerable: a fresh poultice may afterwards be applied, and thus the fissure prevented. Legroux has employed for this purpose a compound consisting of collodion, castor oil, and oil of turpentine. These, when united, form a liniment which is quite adhesive, and dries more slowly than collodion alone. While it is yet soft, gold-beaters' skin may be placed over it, and thus an artificial skin is formed which must be perforated to allow the milk to be drawn. Zinc shields are also useful, the moisture from the nipple forming an imperfect oxide, which allays irritation. If, however, the fissure take place, and the nipple be excoriated, the child should not be put to the breast. A broad bandage may be applied, and the breast from time to time gently rubbed with warm oil; the milk will thus flow freely, and over-distension be avoided; the tendency to inflammation being also subdued, the fissures will more readily heal: but in order to hasten the healing, nitrate of silver may be used in solution, in the proportion of ten grains to the ounce: a slight eschar is formed, which, when it separates, leaves a sound cuticle. Nipple-shields are also used, which are intended to enable the mother to nurse notwithstanding the excoriation. In other words, the child is to draw the nipple through the shield, which, it is supposed, prevents all irritation. Very fortunately, in most instances, the infant either cannot or will not suck in this ingenious manner, and therefore the shield is so far useless; but if it could, so far from irritation being prevented, it would be considerably increased: the act of suction still opens the wound, and draws it

against the inner surface of the shield, which certainly does not contribute to allay the irritation.

Depressed Nipples are extremely troublesome, and render the chance of nursing almost hopeless. They may be drawn out by the suction bottle so as to enable a strong infant to seize and to maintain its grasp; but the attempt more frequently fails; the nipple gradually falls back into its former place, while the infant is moving about its mouth to seize it. Cases of this kind, as well as those where the nipples are ill-formed, oblige the practitioner to forbid the reluctant mother making any further attempts to nurse her child. The secretion of milk, must, therefore, be prevented. The mode of doing so varies according to the constitution of the patient; if she be of a full plethoric habit, the saline purgatives, with nauseating doses of tartarised antimony, may be given with advantage; some milk should be drawn from the breasts, and a bandage applied over them, so as to maintain a firm and equable pressure, and thus promote absorption of the remainder: if there be much distension, warm fomentations and warm frictions will be found extremely serviceable. Delicate women, or those in whom the circulation is not very active, do not require very strong aperients nor tartarised antimony. Sometimes cold applications, as the acetate of lead lotion, spirit lotion, or, if you please, eau de Cologne, will be found sufficient for the purpose, a broad bandage being applied as in the former case. If not, a mild aperient, the potassio-tartrate of soda for instance, with a low diet, will certainly succeed.

Third Period.—It is necessary that you should have a clear apprehension of the condition of the uterus after the delivery of the child. First, the *contraction of the uterine fibres* is becoming permanent, and a state of permament contraction, not unlike the *rigor mortis*, is the evidence that their functions have ceased. Secondly, *absorption* is going forward with unusual rapidity. In ten or twelve days the uterus is reduced to one-half or one-third of its size immediately after delivery. Thirdly, the *mucous surface* is undergoing equally rapid changes; the residue of the ovum is being thrown off; the extremities of the large vessels, that project from the surface where the placenta

had been attached, are again shrinking to their former size; and the tide of blood which for so many months had been flowing towards this membrane, is now ebbing fast away from it. Fourthly, the *vagina* is also contracting itself with great force, and the abundant secretion that had been flowing from it is now gradually ceasing and returning to its original state. We have, therefore, to consider, under their several heads, the symptoms that present themselves while this change is going forward, especially those that require our aid in the way of treatment.

After-pains frequently present themselves while the uterus is contracting: they are generally severe, and depend upon different causes. They also occur more frequently with women who have had many children, than with those who have given birth to their first-born.

Coagula collecting in the uterus very commonly cause after-pains: blood, when poured slowly into the cavity of the uterus coagulates, distends the parieties of the uterus, and excites spasmodic contractions. If this happen soon after delivery, the patient experiences pains as severe as labour-pains: the agony sometimes endured is even greater than that of ordinary labour-pains, and relief is urgently called for. In some instances, this may be promptly afforded by using a steady pressure over the fundus of the uterus; the irritation excites a more powerful contraction; the coagulum is expelled, and the patient is relieved. This method, however, can only be adopted within from four to six hours after delivery, so long as the alternate contraction and relaxation of the uterus has not altogether ceased: the contracted fibres of the cervix and lower portion of the body will then yield to the more powerful action of the fundus, and allow the clot to pass. But at a later period this is not the case: the permanent contraction of these fibres cannot thus be overcome, and, if too much irritation be used, inflammation of the uterus may be the result. When this period has passed, therefore, it is better not to make such attempts, but rather to endeavour to effect the same object in a different manner. For instance, a warm stimulant cathartic enema often does so; the action of the intestines is excited, and by sympathy the action of the uterus.

The same straining efforts that expel the fæces expel the clot, and relief is experienced soon after the motion; if not, a full anodyne, in combination with chloric æther, and the local application of hot fomentations, will generally succeed.

Flatus in the intestines also gives rise to severe after-pains. This cause may generally be recognised and distinguished from the former by a careful examination of the abdomen. When coagulum is present, the uterus is generally large, prominent, and exceedingly painful on pressure; every other part of the abdomen is free from pain, and generally soft, if not flaccid; but when flatus is the cause, the abdomen is tympanitic: the uterus cannot be felt, and the slightest touch gives intense pain. This very character, however, is a valuable means of distinguishing the pains so produced from those of inflammation. A slight pressure causes great pain; but if it be increased, the pain diminishes until it quite disappears: if after this the hand be suddenly withdrawn from the abdomen, the pain instantly returns with increased violence, so that we have known the patient scream with the agony which this simple act produces. When inflammation is present, which is also accompanied by tympanitis, the greater the pressure the greater the pain.

The best remedy for these pains is turpentine. Three drachms of turpentine, and the same of castor-oil, may be given by the mouth, or a terebinthinate enema may be administered; we have observed that the patient generally obtains relief before it takes any purgative effect, as if the turpentine acted as a sedative. If the pains continue after the bowels are relieved, the diffusible stimulants, chloric æther or ammonia, with opium, will generally disperse them.

Both these causes of after-pains come into operation most frequently with women who have had many children; and for an obvious reason. The muscles of the abdomen have been so weakened by frequent pregnancies, that they give no support to the intestines when the uterus leaves the abdomen; consequently, they become over-distended with air, and tormina are the result; so also the uterus is deprived of that equable pressure which it is so necessary to maintain. It yields more readily to the distension

of coagula; and, in place of expelling them, allows them to accumulate and produce after-pains. Another kind of after-pain, however, is occasionally observed, which may happen after a first labour just as well as any other.

Neuralgic Pains of the Uterus sometimes give rise to very severe suffering after delivery. This cause may be distinguished from either of the former—by the natural feel of the abdomen, which is soft and free from pain; and by the size of the uterus, which is very little increased. It feels unusually firm under the hand, and is exceedingly painful when pressed upon. We have applied to these pains the term "neuralgic" as best expressing their character; but we would not wish to imply by this term an essentially nervous affection; on the contrary, we are rather disposed to look upon it as a form of uterine inflammation, very different certainly from those forms that occur after parturition, and which are more commonly described, but still a variety that is well worthy of attention. During pregnancy it is met with, and there receives the name of rheumatism of the uterus. In the unimpregnated uterus it is found in a form of dysmenorrhœa. The inflammation is essentially chronic, and only rendered acute when an increased flow of blood is determined towards the uterus. Its seat is in the fibrous structure.

The *treatment* of these neuralgic after-pains differs from that of either of the former; in fact, you are called upon to treat a peculiar form of uterine inflammation. They are best relieved by opium; and the previous application of a few leeches to the uterus makes it more efficient.

The *Lochia* is the discharge that flows from the uterus and vagina while the mucous membrane is returning to the condition in which it was previously to conception. The character of the discharge will indicate whether the changes that are going forward are healthy or otherwise. At its first appearance it is sanguineous: the dark grumous blood oozing from the uterine veins gives it that character. It then becomes greenish yellow, thick and oleaginous; and lastly, is thin and serous. It may retain the sanguineous colour too long, and it may be brighter than is safe for the patient: the vessels have not sufficiently

closed; and so long as this is the case, there is always a risk of *hæmorrhage* taking place, if caution be not used. While this appearance continues, therefore, the patient must be kept quiet, and as much as possible in the horizontal position. Ergot of rye, in small doses, frequently repeated, might be given with advantage; and, in anæmic constitutions, the tincture of sesquichloride of iron, or the phosphate or sulphate of iron, is very useful. These remedies will assist in checking the discharge; but all may be rendered ineffectual if the patient be allowed too much indulgence. Improper food, sitting up in bed, or moving about, may convert this discharge suddenly into hæmorrhage.

The thick oleaginous appearance may become *purulent* or *muco-purulent*. When this happens, it indicates pre-existing inflammation in the vagina or neck of the uterus. The inflammation is not acute, and therefore may not give rise to any more prominent symptoms that would attract attention. Nevertheless, it exists, and its presence is of importance, because of its ultimate consequence. Your patient may so far recover her health as to be able to get up and go about without much inconvenience. This discharge, however, continues, and may continue for months, until some new change is observed. She is supposed to recover perfectly from her confinement, and your duties to be fulfilled; but these new symptoms, a pain in the back and loins, a sense of weight and bearing down, give rise to anxiety; and the continuance, or perhaps the increase, of the purulent discharge, forms as it were the connecting link between these symptoms and the previous confinement. Thus, the whole of her present distress is attributed, perhaps justly, to that period. There is the suspicion that something happened then that should not have happened, or something was done that should not have been done; and it is just possible you may get the credit of not having fulfilled your duties at all, and of being the cause of all the present mischief. You will admit, therefore, that a purulent character in the lochial discharge is of sufficient importance to demand your closest attention. It is necessary to ascertain the cause of it. Is its source in the vagina, or in the cervix of the uterus, or in the cavity of the cervix? All these queries can only be answered by

an examination of the parts themselves. Such an examination, however, cannot be advantageously made during the lochial period. It is only when this time has passed over, and the discharge has assumed more distinctly the character of leucorrhœa, that it may be required. The cervix of the uterus should then be carefully observed, to ascertain whether it may have been torn: if so, fissures will be found in it, which may be inflamed, and perhaps ulcerated. The cavity of the cervix also should be noticed, especially if a thick viscid mucus be adhering to it. Lastly, the vagina requires attention: there may be abrasions on its surface, or a slough may have separated, leaving an ulcer behind, or it may be generally inflamed, the inflammation being of a subacute character. All or any of these causes will give rise to the secretion of pus; and, unless they be at once removed, may increase, and expose your patient to months of protracted suffering long after her delivery. You will perceive, therefore, that the lochial discharge requires observation; and if, from your inquiries, you should have the slightest suspicion that it is not healthy, you should no longer take second-hand reports about it, but examine for yourself.

Lacerations of the Perinæum are unfortunately the too common accompaniments of labour. It very seldom happens that the fourchette escapes being torn; but this will give you no trouble. The integument may also give way, and a rent of different degrees of extent may be formed. It may engage the cellular structure alone; it may pass down to the sphincter of the rectum, or go even through the sphincter, and throw the rectum and vagina into one cloaca. You can readily judge what a serious accident this would be, and to what misery it would expose your patient. It occurs, however, very rarely, and can hardly take place without extreme neglect, or carelessness in the management of the patient during the expulsion of the child. When it happens, there is no remedy for it but to attempt to re-unite the wound by the interrupted suture. This means cannot be applied immediately after delivery, nor so long as there is any risk of the extension of the inflammation through the vagina to the uterus. When, however, this danger is removed, and the

vagina and perinæum have contracted nearer to their natural size, this operation may be performed. Partial lacerations are, however, more frequent. It is better to allow the torn margins to heal by second intention, and not, as in the former case, to attempt to re-unite them. At first sight, these lacerations appear much more extensive than they really are, because the perinæum is so much stretched by the passage of the child. When contraction, however, takes place, the wound gradually shrinks, until a rent apparently of some inches may not really exceed the quarter of an inch. You cannot, therefore, so well judge of the effect of the injury until this contraction has taken place. While the edges are healing, they should be protected from the irritation of the discharges by applying between them a piece of lint covered with cerate or zinc ointment. The patient should also remain on her side rather than on her back. There is generally no difficulty in healing these lacerations: we have to consider rather their subsequent effect. The most common consequence is the tendency to prolapsus of the womb. The powerful support which the healthy perinæum gives to the pelvic viscera is now destroyed; and the weight of the womb, still large, presses down on to the vagina, which, unsupported, readily yields: and thus prolapsus uteri is established. In order to avoid an accident of this kind, the patient should remain longer in the horizontal position than usual, so as to avoid bringing the weight of the enlarged womb on the vagina. After the tenth day (the usual time for the cessation of the lochia), astringent injections should be used, to increase the contraction of the vagina as much as possible; and lastly, when the patient is allowed to go about, it would be advisable to use some mechanical support to the uterus for a short time. There is a great variety of uterine bandages. Some press on the abdomen from above, as well as on the perinæum from below; others are applied merely to the perinæum. You would, of course, select only the latter. A well-made bandage, that fits closely about the hips, and having a perinæal pad attached to it, is a great support and comfort to the patient when she first moves about. This may be discontinued after some time.

Lacerations of the perinæum are of frequent occurrence. Those requiring operation are few, and require time to determine its necessity; we would caution you, therefore, against assuming that an operation is required because the perinæum is torn, and that the sooner it is done the better. On such a principle the surgeon would perform many very skilful operations which were perfectly unnecessary, and not a little dangerous.

LECTURE XXXVI.

POST-PARTUM INFLAMMATIONS.

Inflammation of the uterus and its appendages is a frequent consequence of parturition. A severe labour gives rise to a certain amount of congestion in the vagina and cervix of the uterus. The passages are in the condition in which a very slight cause would light up inflammation. The labour itself, and too often the management of it, give rise to many causes of injury; and inflammation is the result. Again, it often happens that the treatment which is essential either at the delivery of the patient, or immediately afterwards, becomes a cause of inflammation. You may be obliged to pass the hand into the uterus to turn the child, or to remove an adherent placenta: some injury may be done to the cervix or to the cavity of the uterus. If the patient suffer from severe hæmorrhage, the cold that is applied to the vagina and about the uterus, the different modes of exciting the uterus to contract—such as the introduction of the hand, or the injection of cold water—all are causes that excite inflammation in the body of the uterus when reaction takes place.

The forms which inflammation may assume are as various as the causes that produce it. Inflammation may be confined to the vagina and mucous membranes of the uterus; it may engage the body of the uterus, the ovaries, and the peritoneum; the veins of the uterus may be its seat. The inflammation is generally acute, but it may be chronic; and lastly, its character may be sthenic or phlegmonous, asthenic or typhoid. Acute post-partum

inflammations may be divided into *sthenic* and *asthenic*; and in order to simplify the symptoms, it is better to confine your attention to inflammation, as it affects separately the different tissues of the generative organs.

Sthenic Inflammation of the Vagina. This form is generally met with after severe labour with the first child. The vagina is less disposed to yield to the pressure to which it is exposed; there is a greater degree of congestion; and if delivery be delayed, inflammation is a very likely consequence. It is not, however, protraction alone that excites it: inflammation is more frequently produced by the very means that we adopt to shorten labour. It is here that the use, or rather the abuse, of instruments becomes so mischievous. It is in this condition of the vagina, that examinations often repeated with the exploring finger are calculated to do much injury. If the perinæum happen to be torn during delivery, which is highly probable, the wound becomes an exciting cause of inflammation.

The *Symptoms* are chiefly local. The patient complains of a great degree of soreness at the vulva; the urine is retained, which is perhaps the first symptom that attracts attention; the lochial discharge is more than usually offensive; and the patient can get little rest. If an attempt be made to pass the catheter, the pain is excruciating if it should not pass at once into the urethra; and hence, in a case of this kind, this apparently simple operation becomes an *experimentum crucis* of the tact and experience of the practitioner. The cause is obvious: the vulva being inflamed, the nymphæ, the vestibule, the orifice of the urethra, and especially the clitoris, all are exceedingly tender: the characters of the trumpet-shaped opening of the urethra are altogether lost; the parts surrounding the orifice are so swollen that they almost obliterate it, leaving only a pin-hole opening not easily discerned. Hence the inexperienced practitioner, being at a loss to find it out by touch, may make very tedious and painful attempts to pass the catheter, and fail. The urine, however, must be withdrawn: assistance is sent for, and the catheter is then passed at once. Now this awkwardness is never forgotten—we might almost say, is never forgiven; and, therefore, if you wish to avoid one cause

of those exposures that sometimes reveal incompetency, you will endeavour to educate your sense of touch on this as on other points of practice, and learn, by frequent examination of the urethral orifice in ordinary cases of labour, its exact situation and relations. The pulse is generally frequent and resisting. The abdomen may be perfectly free from tenderness, the uterus bears pressure without inconvenience, the iliac regions may be without pain, but this frequent pulse is a certain index that inflammation nevertheless exists; and the probability is that it has its seat in the mucous membrane of the vagina.

Terminations. Sthenic inflammation of the vagina may terminate in resolution without any injury or abrasion of the passages, or it may be followed by abrasions and superficial ulcerations of the mucous membrane, or may end in slough. The last is the only serious result, because the seat of the slough is usually unfavourable. When the head of the child is passing through the brim into the cavity of the pelvis, the points that receive the greatest pressure are the extremities of the conjugate axis; the head is pressed strongly against the os pubis and the promontory of the sacrum. The urethra, which lies between the head and os pubis, is sometimes so bruised that slough and fistula are the consequence. Hence may be established one of the most unmanageable and distressing affections to which the female can be exposed—a constant *stillicidium urinæ* through the vagina. A slough at the opposite point, the promontory of the sacrum, is usually within the cervix uteri, which may thus be very much weakened. When the slough separates, and the surface heals, this portion of the cervix is greatly thinned, causing no further immediate injury, but in a future labour exposing the uterus greatly to the risk of laceration. So also the vagina, at its junction with the cervix, may become gangrenous; and this can scarcely occur without the neighbouring tissues also being involved in the inflammation. The reticulate cellular tissue between this portion of the vagina and the peritoneum may become inflamed, and produce those extensive suppurations that are described as pelvic abscesses; or the peritoneum itself may be engaged. Thus a termination of vaginal inflammation in slough must always be looked upon as serious.

The *Treatment* of phlegmonous inflammation of the vagina is essentially antiphlogistic. Warm emollient enemata, warm fomentations to the vulva, and injections into the vagina of warm decoction of poppies, will contribute very much to allay the distress which the patient experiences from the great tenderness of the passages. Mercury may be also given moderately, so as to prevent the extension of the inflammation, but should not be used to the degree of causing salivation. If the urine be retained, the catheter should be passed every six hours, until the inflammation is sufficiently subdued to enable the bladder to act without assistance. As soon as this takes place, warm fomentations may be omitted, and cold astringent injections substituted; liquor plumbi, in the proportion of a drachm to a pint of distilled water; the alum lotion, ten grains to the ounce; or the infusion of catechu, may be used with advantage. By such means inflammation of this sthenic character will generally subside without difficulty; but when it has passed away, and the lochia have ceased to flow, it will be necessary to make a careful examination of the cervix uteri and vagina with the speculum, in order to detect any lesions that may be left.

Asthenic Inflammation of the Vagina is a far more serious result of labour: the whole vagina is quickly engaged in the inflammation, which sometimes extends to the uterus. Its tendency is to terminate rapidly in gangrene; which is not confined as in phlegmonous inflammation, to a point or a small space, but spreads over a larger surface. Thus an extensive slough has thrown the rectum and vagina into one; large portions of the mucous membrane of the vagina have been separated, and sometimes even the whole of it has been detached and thrown off. If the patient recover from such consequences, she is still exposed to the risk of further mischief. The new vaginal surface may heal most unfavourably: adhesions sometimes take place between the opposite walls of the vagina, so as to obliterate the canal, or bands of lymph may pass from one side to the other. In some instances the vagina becomes quite contracted in the centre, forming a kind of stricture; and thus, if the patient become again pregnant, and labour take place, new difficulties oppose them-

selves to delivery, of a character still more dangerous than those that may have previously existed. The vagina and the uterus have been torn during labour, in the effort to overcome this stricture.

The *Causes* that give this character to the inflammation are those that produce constitutional depression or that alter the healthy condition of the blood—foul air, bad diet, mental anxiety, etc.; or the direct absorption of some morbid poison, which has the same effect. Here, as elsewhere, when the blood is in this state, inflammation assumes the form of erysipelas, and rapidly passes into gangrene.

The *Symptoms* that mark asthenic inflammation are the foul, dark, and offensive lochial discharge: there is a certain amount of tenderness and soreness in the vulva and vagina, but not to the same degree as exists in phlegmonous inflammation. The typhoid irritative fever that attends the inflammation is very characteristic. The rapid pulse, dry furred tongue, burning surface, and sallow aspect, are the common characters of this fever, whether the cause be in the vagina or the uterus; but we have observed that, when the vagina is thus inflamed, pimples appear about the lips, and soon become pustules that form dark crusts; and thus, besides the usual sordes about the teeth and gums, the mouth is sometimes encircled by a chain of these pustules in different degrees of maturity. When this inflammation is the result of the direct absorption of some morbid poison, the accompanying fever is more distinctly that which we shall have again to describe as "puerperal fever," and must be considered separately; but there may be erysipelatous inflammation of the vagina without puerperal fever.

The *Treatment* of asthenic inflammation is the reverse of that of the sthenic form. The patient requires support throughout; bark, wine, and opium, are essentials; depletion and purgatives, at least such as act strongly on the intestines, should be avoided. Stimulants, also, are necessary; camphor, ammonia, and the æthers, may be given cautiously in the cases where there is a great depression of the vital powers. Quinine is at present the favourite mode of administering bark, and when it is selected it

may be given in wine; but in these cases we are inclined to go back to the older preparations, to give the infusion of cinchona, in combination with the compound tincture of cinchona, to which you may add a neutral salt—the potassio-tartrate of soda, for instance—that will act mildly as an aperient. When the inflammation is subdued, your cares are not concluded. The sloughs that have taken place in the vagina are either detached or in process of separation: attention must, therefore, be given to the manner in which the denuded surfaces heal. So long as the slough is adherent, and the discharges dark-coloured and offensive, antiseptic injections should be assiduously used; camphorated spirit is sometimes selected, but the solutions of the chlorate of soda, or chlorate of potash, are preferable. When the slough is detached, equal care should be paid to the healing surfaces, lest adhesions should take place that may be the foundation of future mischief. It would be well to pass a small cylindrical speculum daily, as far as the os uteri, and touch the abraded surfaces lightly with a solution of the nitrate of silver (ten grains to the ounce): a solution of alum in the same proportion may also be injected into the vagina three or four times in the day. The introduction of the speculum for this purpose must be made with great caution and gentleness; the surface of the vagina is, necessarily, extremely tender; portions of the mucous membrane are destroyed, and hence this passage is very easily injured. With proper care, however, the speculum may safely be used, and it is essential to do so in order to prevent unfavourable union taking place.

Inflammation of the Lining Membrane of the Cavity of the Cervix Uteri is generally of a chronic character, and may be recognised by the appearance of a viscid mucous discharge, either mixed with the lochia or continuing on their decline. It may be the result of lacerations of the cervix uteri or of the mucous membrane itself that lines the cavity.

The *Symptoms* are seldom so severe as to interfere much with the patient's recovery. She is generally able to get up and go about in the usual time, only she complains of a dull aching pain about the loins and over the sacrum, increased by the upright

position and by exercise, relieved by rest; she speaks also of a whitish substance (the collections of viscid mucus) passing from the vagina.

The *Treatment* cannot well be undertaken until the lochial discharge has ceased, and this viscid mucus only remains. A solution of nitrate of silver may then be applied to the surface every fourth or sixth day, the bowels kept open by tonic saline aperients, and the patient kept perfectly at rest. By such means the inflammation will gradually subside.

Inflammation of the Lining Membrane of the Cavity of the Uterus seldom occurs alone. Either the fibrous structure of the uterus becomes engaged, or the inflammation extends to the uterine veins. It may, therefore, be taken in connection with inflammation of either of these structures, the former producing phlegmonous or sthenic inflammation of the uterus; the latter phlebitis.

Inflammation of the Fibrous Structure of the Uterus is generally the consequence of severe labour, especially if it be much protracted. It may also be the result of accidental causes; as sudden exposure to cold air, cold applications to the uterus, direct injury either from instruments or too rough manipulation.

The *Symptoms* generally appear when re-action takes place; that is, about forty-eight hours after delivery. The pulse continues frequent, about 100, and full. There is tenderness on pressure on either the left or the right inguinal region, more generally the left: the fundus uteri feels rather larger and firmer than usual. If it be slightly touched, the patient does not complain; but if firmly compressed, the pain is very great: the lochial discharge is suppressed, and the milk may not be secreted. If the inflammation be not subdued in the first instance, rigor, thirst, and other evidences of symptomatic fever will present themselves, and the danger to the patient will be increased, because such inflammation is seldom stationary: the neighbouring tissues soon become engaged, and when it extends to the peritoneum, the nature of the case is completely altered.

The *Treatment* should be prompt. If the slightest tenderness should be felt in either inguinal region, accompanied by a quick

pulse, recourse should be immediately had to local depletion. Twelve or twenty leeches may be at once applied, followed by warm fomentations; the bowels may be relieved by warm enemata, and mercury, if necessary, administered. Blue pill with extract of henbane, mercury with chalk, or calomel and opium, can be given, according to the severity of the symptoms. If the peritoneum become involved, the proportion of opium must be increased, or opium may be used exclusively.

The success of this treatment depends entirely upon your promptitude. The inflammation may be easily subdued when the first slight tenderness is felt in the inguinal region; but if this stage pass unnoticed, or be misunderstood, the inflammation will rapidly extend itself to the peritoneum, or it may engage the subperitoneal tissue. It is not advisable to give very active purgatives in this form of inflammation, lest the irritation of the intestines should be communicated to the uterus, and counteract your object. It sometimes happens that the bowels will not obey the stimulus applied to them; a precautionary effort of Nature which, if it be misinterpreted, and should lead to the use of more powerful cathartics, may do infinite mischief : a violent diarrhœa may be the result, accompanied by tenesmus, and a renewal of the inflammation in a more aggravated form. It is for these reasons that warm emollient enemata, that act as fomentations, are to be preferred while the inflammation is active; but when it is subsiding, mild aperients may be given with advantage.

Inflammation of the Peritoneum is generally a consequence of inflammation of the uterus: metro-peritonitis is, perhaps, the most frequent form of inflammation that we meet with after labour. It may be partial, confined to the immediate neighbourhood of the uterus; or general, and engage the whole peritoneum. The former will, however, rapidly merge into the latter, unless it be arrested in its first stage.

The *Symptoms* that characterise this inflammation are sufficiently distinct. Locally, the tenderness of the uterus, and in either iliac region, is greater than in simple metritis: slight pressure causes much pain, which becomes intolerable if the pressure be increased. That portion of the abdomen about the

seat of the inflammation is swollen and puffy, so as to render the outline of the uterus very undefined. The pulse is quick, wiry, and incompressible; the countenance anxious; the tongue rather dry, with a white fur in the centre, the edges and point red: there is great nausea, and sometimes vomiting. If the inflammation be not at once subdued, it very rapidly spreads over the whole abdomen, the swelling of which becomes general, accompanied by great tenderness over the surface: the pulse is still more contracted and wiry, and the countenance more expressive of intense suffering. Vomiting is now incessant; the inspirations are laboured, and any effort at inspiration is very distressing: hence the patient lies on her back, having the knees drawn up and the thorax raised, so as to prevent as much as possible the pain that inspirations produce: thus they are never completed, but are cut short by a rapid expiration, sometimes accompanied by cough. The bowels are constipated, and the skin is dry, with the exception of irregular partial sweats about the face and neck. These symptoms seldom continue beyond twelve or twenty-four hours, but, if the inflammation be not controlled, are succeeded by those of constitutional exhaustion. The abdomen becomes perfectly tympanitic, but sometimes loses its acute tenderness; the pulse is extremely rapid, 150 or 160, and feeble; the countenance is cadaverous; vomiting is no longer convulsive; a greenish fluid is discharged from the stomach, with little or no effort; violent diarrhœa sets in; the extremities are cold, and the surface is more or less covered with a greasy perspiration. Such symptoms soon close the scene.

The *Treatment* that is usually adopted is free depletion, followed by purgatives and mercury. We have great reason, however, to question the propriety of this practice carried to its full extent. The value of depletion is unquestionable; but mercury requires caution, and purgatives are positively injurious, because, by exciting the peristaltic action of the intestines, newly formed adhesions are disturbed, and the inflammation is renewed. Nature endeavours to guard against this, as you will find by the constipation that often resists even active purgatives. Mercury is useful as an antiphlogistic; but too often, as the inflammation

subsides, an exhausting and fatal diarrhœa succeeds, which is the result of the irritation it produced. So long as the neighbouring tissue, the peritoneum, is actively inflamed, the mucous membrane is, as it were, unconscious of the injury caused by the remedy; but as soon as the peritonitis yields, the mucous membrane feels its influence, and diarrhœa follows. We are much more disposed to recommend the free use of opium. It has the advantage of allaying the high degree of nervous irritation which is the necessary consequence of inflammation affecting a membrane in such intimate relation with the vital organs, and perhaps arrests the progress of the inflammation much more by the removal of this great disturbing cause than by any direct antiphlogistic effect. Opium is especially indicated in peritonitis following rupture of the uterus; because there is a great amount of constitutional shock mixed up with the inflammation, and in this respect it is analogous to peritonitis from perforation of the intestine, rupture of the bladder, etc.

In *idiopathic inflammation* of the peritoneum depletion is necessary, but not to the same extent as in puerperal fever; local depletion, for instance, timely applied, is more serviceable than general depletion: twenty or thirty leeches collected over the point where tenderness is first observed, produce a more decided effect than taking blood from the arm. Mercury may be given, but with caution; the moment the gums become tender, or other constitutional effects are noticed, it should be withdrawn. Do not seek to salivate. Opium we would chiefly depend upon; it may be given to any extent short of narcotism. From ten to twenty minims of Battley's sedative solution, taken every second hour, give great relief; you must, however, closely watch the effects on the patient. Purgatives must be altogether discarded; they will not act when inflammation is active; as it subsides, the bowels act of their own accord. Fomentations, hot bran poultices, and such means, are generally applied to the abdomen. We prefer the vapour-bath, if it can be obtained; the steam-apparatus that has been contrived for patients suffering from Asiatic cholera would answer the purpose remarkably well. By this means the temperature is equalised, and the inconvenient pressure of poultices, etc., on the abdomen is avoided.

The *Pathological Appearances* of inflammation of the peritoneum are worthy of attention, because it appears to us of some importance that they should not be confounded with those morbid changes in the peritoneum which are the result of puerperal fever. We have had the opportunity of observing the peritoneum in different stages of inflammation, when patients died from ruptured uterus, six, twelve, twenty-four hours, and sometimes a week after the accident. The morbid appearances may be grouped into two classes, corresponding to the two stages of the inflammation. In the first group we find the peritoneum highly injected, the arterial capillaries traversing the intestines in red lines, surrounding them like bands; the cavity of the peritoneum filled with straw-coloured serum, sometimes rendered brown by admixture with blood; a glutinous lymph unites the intestines to each other, and the intestines to the uterus. If you separate these parts from each other, the lymph is drawn out into strings, like melted glue, or they may break off more like the slighter adhesion of thick mucilage. If blood be poured into the peritoneum, as in rupture of the uterus, a green tinge is often given to the surfaces with which the blood comes into contact. These appearances may be observed when death takes place within twenty-four hours after inflammation sets in; but if the struggle be more prolonged, the morbid alterations very much depend upon the immediate cause of death. The inflammation may give way, to a certain extent, to the strength of the constitution or to the treatment; but a violent diarrhœa carries off the patient. On the other hand, the constitution may yield to the inflammation, and the patient sink from exhaustion. The second group of appearances are not, therefore, always alike. In the former case the intestines are generally found strongly united to each other and to the uterus by lymph: they are not so highly injected, and the quantity of serum is less than in the first group. In the latter, the characters are more like those of puerperal fever. The intestines have rather a livid hue, from the injection of the venous capillaries; the serum is mixed with the peculiar creamy exudation that we call non-plastic lymph, which gives it a lactescent appearance; the intestines are often covered with the

same lymph that lies upon and between them. In the coils of the intestines it is most abundant; and masses of this so-called lymph are often found in these situations, the central portions dissolved into a purulent-looking fluid contained within a thin outer layer of lymph like the cyst of an abscess: thus these collections may be easily mistaken for abscesses. These morbid changes seem to be the result, not of inflammation, in the sense in which it is generally understood, but of an altered state of the blood. Serum and adhesive lymph are the products of the former: this creamy exudation, which is not adhesive, seems to be the effect of the latter. We shall have again to refer to it when speaking of puerperal fever, which always produces it in large quantity.

Inflammation of the Subperitoneal Tissue is generally observed at a period rather later after delivery than the preceding inflammation: it may occur about the twelfth or fourteenth day, and is often only the extension of an inflammation previously existing in the uterus. The patient may have had an attack of metritis, which, being incompletely subdued, terminates in inflammation of this tissue; more commonly the uterine appendages are the seat of inflammation that extends to this structure, by which they are abundantly surrounded. Being, therefore, generally a consequence of some preceding inflammation, it appears later, sometimes as late as the second or third week after delivery. Hitherto this form of inflammation has been but little understood: it was only when it terminated in serious mischief, in the formation of extensive abscesses, that it received any attention; and thus, under the name of "pelvic abscess," we find descriptions of it and its consequences given by Lever, Bell, Dogherty, and Churchill. It is necessary, therefore, to recall to your recollection the anatomical relations of the subperitoneal tissue, to render intelligible to you the course its inflammation will take. The uterus is an organ liable at any time to variations in its size and position. In order to admit of this mobility, the peritoneum is much less intimately united to it below than at the fundus; the folds of the peritoneum, also, that are known as the broad ligaments, are not closely applied to each other, and are readily

removed from the Fallopian tubes and ovaries which they enclose. A fine reticulate tissue is interposed everywhere between the peritoneum and this portion of the uterus and its appendages. It may be traced, although with difficulty, to the fundus, and forms part of that fine cellular tissue that accompanies the large vessels into the abdomen: it descends into the inguinal ring, under the name of "fascia propria." The effect of inflammation on this structure is the rapid production of pus; which, if it be not circumscribed, or do not soon escape, will accumulate and form those extensive abscesses that are described by different writers. Thus a large abscess is found surrounding and obliterating the ovary, or pus may be observed burrowing beneath the pelvic fascia, and again, it may take the line of the iliac vessels, and make its way into the abdomen along the psoas muscle: an abscess of this kind has sometimes been confounded with psoas abscess. Inflammation of this tissue may therefore be attended with very serious consequences, and, coming on insidiously after a previous inflammation that had been subdued, may blight the most flattering hopes of recovery.

The *Symptoms* that characterise it require a watchful attention, because they are frequently disguised by the more prominent symptoms of the antecedent inflammation. Thus it may happen that an attack of metritis seems to yield; the uterus is free from pain on pressure; the abdomen is soft; the patient complains only of inability to move, which she attributes to weakness rather than to pain; the pulse continues frequent; and a slight rigor may have taken place. If these symptoms pass unnoticed, the increasing weakness of the patient chiefly attracts attention: the rigors may return, followed by irregular perspiration; the patient sleeps badly, and may complain of pain in passing her motions; sometimes a diarrhœa sets in, under which she may sink. If the pus find its way to the surface, either in the groin, or the hip, or in the neighbourhood of the rectum, the case is tolerably clear, because the local symptoms are so obvious. The abscess may burst into the vagina or rectum, and be thus discharged: but if it take the course of the iliac vessels, and pass into the abdomen, the case is hopeless. Our most important

object, therefore, is to detect this inflammation, if possible, in its early stage, when there are few symptoms to guide us; and it is here that a careful vaginal examination is of so much importance if we have the least suspicion of its existence. The inability, therefore, of the patient to move, the continued frequency of the pulse, and especially the occurrence of a rigor, should not be lost sight of. A vaginal examination should be at once made: the uterus will generally be found displaced, and less moveable than it ought to be; the *cul-de-sac* of the vagina, behind the os uteri, may be pressed forward, and present a tumour like the retroverted uterus; or the superior wall between the bladder and uterus may be pressed down towards the opposite side, contracting the space in the vagina. The patient generally complains of pain as the more swollen parts of the vagina are touched; and you may sometimes detect at the most prominent point a doughy œdematous feel—the next step to fluctuation. If these signs be detected early, the patient has a favourable chance of recovery, unless there should be some extraneous cause, as the absorption of a morbid poison, in operation to prevent it.

The *Treatment* of this form of inflammation must be directed to retard, if possible, the formation of pus; and if you cannot succeed in this, to prevent at least its accumulation. If, therefore, any fulness be felt in the vagina, or irregularity in the position of the uterus, it is better at once to apply leeches through the speculum, in the neighbourhood of the os uteri; and to foment the pelvis carefully, both by fomentations applied externally, and by warm injections into the vagina and rectum. If the patient be able to move without distress, the warm hip-bath will be very useful; but if motion cause pain it is better to omit it: mercury with opium may be given moderately. Mercury with chalk and Dover's powder form a good combination—from three to five grains of each may be given every third hour. If these means fail to arrest the inflammation, and rigors take place; if the vagina become fuller, the uterus more fixed, and other evidences of the formation of pus be present, it is necessary to support the strength of the patient, because the quantity of pus that accumulates is almost in direct proportion to her weak-

ness: bark, wine, opium, and a more nutritious diet are essential. The pointing of the abscess into the vagina should be looked for; because, if the abscess gain an exit for its contents, the patient has a very favourable chance of recovery if a proper treatment be carefully pursued. The great danger of these cases is, that it may not do so, but pass into the abdomen.

Inflammation of the Uterine Veins is occasionally met with after labour. It may be the consequence of severe labour; but the causes most likely to give rise to it are accidental. It sometimes follows violent floodings: the means used to arrest hæmorrhage, the extreme refrigeration used, both externally and internally, afterwards excite violent reaction and inflammation of these veins. The absorption of putrid matter, such as the residue of a decomposed ovum, or the fragments of a putrid placenta, will also excite inflammation; but as this cause may be better classed with the absorption of morbid poisons generally, we prefer considering it in connection with that subject.

The *Symptoms* of this form of inflammation are typhoid in character. A rigor occurs about the time when the milk should appear; no secretion takes place; the pulse is rapid and unsteady; the tongue dry; the countenance drawn, and rather sallow; the surface hot, without perspiration; the patient is watchful, and sometimes incoherent; the lochial discharge is very offensive. As the inflammation proceeds, rigors return at irregular intervals; the pulse increases in frequency; the tongue becomes furred; sordes form about the teeth; the countenance is more sallow and shrunken; the eye glassy; and the patient muttering in delirium; the whole surface is yellow and burning, presenting petechiæ; profuse sweats sometimes burst out upon it. The lochial discharge is dark and putrid, and portions of the mucous membrane of the vagina may separate in a state of slough. If the inflammation be not subdued, the patient sinks rapidly in two or three days from its commencement; but if it yield to treatment, it generally terminates by metastasis, that is, some distant part becomes inflamed as the uterine phlebitis subsides; and this inflammation is generally critical: thus the axilla, the leg, the groin, the buttock, may be the seat of inflammation that usually

terminates in the formation of pus, and, when it is discharged, the patient soon recovers.

The *Pathological Appearances* of phlebitis are sufficiently characteristic. The cavity of the uterus is generally covered with a greenish sordes, which is easily scraped off; the fibrous structure is more friable than usual, and may be softened in some parts. On its surface, especially where the placenta had been attached, the uterine veins may be observed to project in little prominences. If these be examined, the openings of the veins are found contracted, and their coats somewhat thickened; and if the veins be exposed, their surface is red and velvety: they are frequently plugged with putrid coagula, and sometimes are filled with pus: small collections of pus are occasionally met with in the substance of the uterus. The peritoneum may not present any morbid change beyond a duller and less glistening appearance, and some tinge of lividity.

Treatment. There is no form of inflammation that prostrates the vital powers more completely than phlebitis; the treatment is, therefore, chiefly stimulant. Unless in the very commencement of the attack, antiphlogistics cannot be employed; moderate local depletion, aperients, and mercury may then be used with advantage; but at a later period, opium, wine, and stimulants are indicated. The character of the lochial discharge should be carefully attended to: weak solutions of chlorate of soda or of potash may be injected into the vagina to correct the fœtor of the discharge, and to prevent the extension of sloughs. If the inflammation subside, bark should be given freely. In the use of stimulants some caution is necessary: they should not be carried to excess, but should be given moderately, their effect, especially on the pulse, being watched. If they act beneficially, the pulse becomes more steady, fuller, and softer; presently its rate will decrease: if they be injurious, the pulse rises in frequency, is more contracted, and *seems* feebler: when such effects are observed, stimulants should be discontinued, as they only rekindle inflammation.

LECTURE XXXVII.

PHLEGMASIA DOLENS.

PHLEGMASIA ALBA DOLENS is the popular name given to a disease which occasionally appears after parturition. It received this name because a leading feature of the complaint was a general swelling of the leg, which became greatly enlarged, of an elastic hardness, and perfectly white; the swelling being preceded as well as accompanied by pain in a greater or less degree. The term may be translated "The white painful inflammation."

The disease may present itself at any time between the second and twentieth days after delivery. In some cases it has appeared even at a later period.

SYMPTOMS.—These vary extremely. Sometimes they are so mild as to be marked only by a slight rigor, headache, quick pulse, perhaps nausea and sense of faintness. The limb then begins to swell, and assume its well-known characters; but without pain, unless the lymphatic glands or the veins be pressed. In other cases, there is more severe constitutional disturbance; the patient is irritable, with great thirst, furred tongue, rapid pulse, and complains of severe pains round the loins and down the thighs, often resembling cramp. The inguinal region soon becomes tumid, and the swelling rapidly extends down the limb; so that in a day or two it is greatly enlarged, tense, shining, and elastic; the pain then diminishes, but the limb remains immovable and perfectly white. In some instances the swelling commences at the ankle or ham, and extends upwards. The lymphatic glands are extremely tender, and red lines of lymphatics may be observed traversing the limb; the veins feel hard and knotted like whip-cord, are tender when pressed upon, and roll

from the finger. The temperature of the limb is also increased; and it is sometimes painfully hot. In these cases the secretion of milk and the lochia are generally arrested. The patient gets very little sleep; she spends a restless night, and is often bathed in a clammy perspiration.

This stage may last for ten days or a fortnight, when the constitutional disturbance gradually subsides, the pulse falls from 140 to 100, 90, etc., until it arrives at its natural standard; the tongue becomes clean; the milk *may* return, but this is not certain; the lochial discharge generally returns, being at first very offensive, but gradually assuming its natural characters. The swelling of the limb diminishes, so that it is no longer elastic but pits on pressure; the tenderness of the veins and lymphatics has disappeared; and the proper size of the limb is nearly restored, but not its power. The patient has but little control over it; she moves it with difficulty, and may remain lame for months, even for years, after the attack.

Some cases are even less fortunate; the disease may run a more rapid course. Irregular rigors, a rapid and unsteady pulse, perfect loss of rest, may indicate a highly irritative fever, which may terminate in death.

One limb (the left) is most usually engaged; sometimes the right. Occasionally both limbs are affected simultaneously; but more commonly the attack is transferred, as it were, from one to the other.

This disease is not usually fatal, but it too frequently leaves traces of permanent disorganisation—a thickening of the cellular tissue, varicose veins, and incurable lameness. Suppuration rarely occurs; but when it happens, it is generally in the fine reticulate cellular tissue surrounding the veins, and takes the form of pelvic abscess.

Causes. The causes of this disease must be considered before its treatment. Formerly the profession could only speculate on the subject; but now, guided by pathological researches, they are arriving at the truth, but still slowly and with difficulty.

The earliest speculators held the doctrine of metastasis. Mauriceau supposed that phlegmasia dolens was owing to a

reflux upon the lower extremities of certain matters, which should have been evacuated by the lochia. Puzos, Levret, and several others, held that the milk left the breasts and went to the limb, which was a "*depôt du lait.*" The milk certainly left the breasts in the majority of instances; and the leg was immensely swollen and as white as milk; hence the very simple explanation which held its ground to a later period than we might suppose. Dr. R. Lee mentions a case in which a very celebrated London accoucheur, not many years ago, was so strongly impressed with the truth of this metastasis, that he ordered the infant to be kept to the breasts night and day, lest the milk should make its way to the thigh. (Lee, *Diseases of Women*, p. 148). The more scientific part of the profession, however, discarded this explanation. In 1784, Mr. White, of Manchester, supposed that the disease depended upon obstruction or some morbid condition of the lymphatics. Mr. Frye, of Gloucester, supposed that they were ruptured; Dr. Ferrier, that they were inflamed; and in 1800, Dr. Hull, of Manchester, considering this doctrine inadequate to explain the facts, supposed that the blood-vessels were also engaged, and that the proximate cause of the disease consisted in an inflammatory affection, by which serum and lymph were effused abundantly into the cellular tissues, thus producing the swelled leg; and that "all the textures—muscles, cellular membrane, lymphatics, nerves, glands, blood-vessels—become affected."

Such were the speculations on the subject; each suggestion—and some very near the truth—being adopted according as it had suited the leading symptoms observed. Pathology was then only in its infancy; no examination of morbid appearances was made, or if made, not understood.

In 1817, the late Dr. Davis opened an inquiry into the subject. A patient of his died of phlegmasia dolens; he obtained the assistance of Mr. Lawrence, and made a most careful examination of the limb after death. Mr. Lawrence thus described the morbid appearances.

"The femoral veins from the ham upwards, the external iliac, the common iliac veins as far as the junction of the latter

with the corresponding trunk of the right side, were distended and firmly plugged with what appeared a coagulum of blood. The femoral portion of the vein, slightly thickened in its coat, and of a deep red colour, was filled with a firm bloody coagulum, adhering to the sides of the tube so that it could be drawn out. . . . The trunk of the profunda was distended in the same way as that of the femoral veins; but the saphena and its branches were empty and healthy. The substance filling the external iliac and the common iliac portions of the vein was like the laminated coagulum of an aneurismal sac—at least with a very slight admixture of red particles: the tube was completely obstructed by this matter, more intimately connected to its surface than in the femoral vein, adhering indeed as firmly as the coagulum does to any part of an old aneurismal sac; but in its centre there was a cavity containing about a tea-spoonful of thick fluid of the consistence of pus of a lightish brown tint and pultaceous appearance. The uterus, which contracted to the usual degree at such a distance of time from the delivery, its appendages and blood-vessels, and the vagina, were in a perfectly natural state. There was not the least appearance of vascular congestion about the organ, nor the slightest distension of any of its vessels, its whole substance was on the contrary pale, and the vessels everywhere contracted and empty." (Davis's *Obstetric Medicine*, p. 901).

We have detailed the substance of this report rather at length, because it embraces all the leading characters of the disease, and determines the time when its nature was first understood. Six years afterwards (May 1823), Dr. Davis brought forward a paper on the subject in the Medico-Chirurgical Society; and just previously M. Bouillaud related several cases and dissections in which the crural veins were obliterated (*Annales de Médecine, Tome* ii., January, 1823.) The inference from these dissections was that "the white leg" was the result of inflammation of the crural veins.

In 1829, Dr. R. Lee published a paper in the *Medico-Chirurgical Transactions*, to prove that the uterine veins were also concerned; and that the inflammation extended from them to the crural veins.

For some time the doctrine, that phlegmasia dolens was only a form of phlebitis, held its ground; but later researches have shaken, if not displaced it. Difficulties presented themselves which could not easily be explained. Inflammation affecting such leading veins as the crural and iliac, and producing such remarkable changes of structure, was attended by comparatively mild symptoms, very different from those which inflammation of the veins elsewhere is known to present. When death took place, it was preceded by the irritative fever of exhaustion rather than the typhoid fever of phlebitis. The course of this supposed inflammation was most irregular; one portion of a vein being nearly blocked up with coagula, the next being perfectly healthy, and the next portion again being in a similar condition to the first.

These doubts led to further and most interesting researches. Hasse, Virchow, and the German pathologists, laid the foundation for the inquiry. Mr. H. Lee, Dr. Tilbury Fox, and Dr. F. W. Mackenzie, followed it up. The German pathologists doubted this so-called phlebitis. Mr. Henry Lee has pointed out that the thickening in the coats of the vein, supposed to be the result of inflammation, is caused by the coagulation of the blood and the changes which it subsequently undergoes. He has proved that it is extremely difficult to excite inflammation in the lining membrane of a vein; and that if the blood be excluded it cannot be done. "An animal had some pus injected into its brachial vein, and was killed on the third day. The vitiated blood had at the time of the experiment been prevented lodging in the vessel by mechanical pressure in the course of the circulation. On examining the vein after death, its lining membrane was found of its natural, smooth, polished, and lubricated appearance" (*Pathological and Surgical Observations*, p. 95.) Again, in order to prove that the supposed analogy between the lining membrane of veins and serous surfaces does not exist so far as inflammation is concerned: "The left jugular vein of a donkey was exposed, and two ligatures placed upon it at an interval of something less than four inches. The vein was opened for about an inch near the centre of the exposed portion, and all the blood it contained carefully removed. The cavity of the vessel

included within the ligatures was now filled with wadding." The wound was then closed; and "immediately after the completion of the operation, a small portion of cotton-wadding was carefully introduced into the peritoneal cavity . . . The animal was killed at the expiration of forty-four hours. On opening the abdomen, the peritoneal cavity was found to contain a considerable quantity of serum. The coats of the vein were found somewhat thickened for some distance below the seat of the operation. . . . On slitting open the vein, some loose fibrine of a greyish white colour occupied the cavity below the cotton wool. Portions of this could be separated with the slightest force from the lining membrane of the vein which was left of its natural, smooth, polished, and lubricated appearance." (*Op. cit.* p. 98.)

Thus Mr. Henry Lee has proved that the lining membrane of a vein is extremely difficult to inflame. Dr. Mackenzie has given this experiment the strongest support. He performed a series of experiments to prove "how far the doctrine advanced by Gendrin and other French pathologists was correct; which attributed the obstruction met with in phlebitis to the exudation of lymph and the formation of pus in the interior of veins consequent upon internal irritation." The blood being excluded from the veins in different instances, solutions of bichloride of mercury, of nitrate of silver, and of sulphate of zinc, were employed to irritate the lining membrane. "But in every case in which the readmission of blood was prevented, it was found that no such obstruction had taken place. *There was no effusion of lymph or formation of pus in the interior of these veins*, and they were throughout either entirely empty, or at all events perfectly pervious." (*Transactions of the Medical Society of London*, 1862, pp. 216—217). Dr. Mackenzie also performed a series of experiments by injuring and irritating the external coats of veins, and has proved: "That inflammation of the veins thus excited (in their external coats) is not disposed in a healthy animal to extend itself indefinitely, but, on the other hand *is strictly limited to the immediate seat of such irritation or injury.*

"That the external coats of veins very readily re-act under the influence of irritating causes, being in these cases morbidly

vascular, covered with inflammatory lymph and adherent to the surrounding tissues.

"*That such re-action and external inflammation may occur without giving rise to any corresponding inflammation of the lining membranes; for in these cases the latter was healthy, and the vein consequently pervious or at least free from any inflammatory exudation or obstruction.*" (*Op. cit.* p. 216.)

Thus, then, it is clear, that the changes observed in the cavity of those large veins cannot be attributed to inflammation of the lining membrane, still less to inflammation of the uterine veins, which consist only of the lining membrane. Hence the propriety of naming this disease "phlebitis" may well be called in question. The cause of the appearances exists not in the vein but in the blood itself, which is proved to have a strictly conservative force. Dr. Mackenzie has shewn that, if the walls of a vein be injured (mechanically) and the blood be healthy, coagulation takes place; and conversely, if the walls be sound, but the blood injured from pus or morbid matter, coagulation also occurs. This coagulation may be produced quite independently of the vein. The rapidity with which coagulation is caused by the admixture of pus is well shewn by Mr. H. Lee. "Some blood was drawn from a healthy horse and poured into three vessels capable of containing three ounces each. The blood in the first vessel was allowed to remain as a standard of comparison. To that in the second vessel was added some viscid matter from an indolent tumour in the horse's neck: to that in the third, some pus from a chronic abscess. The contents of the third vessel (blood and pus) began to coagulate in three minutes, the mass was firm in four. In eight minutes the contents of the first and second vessel had become firm." (*Op. cit.* p. 119).

When coagulation in the vein is thus produced, the coagulum undergoes further changes. The blood has the power of separating from itself a fibro-albuminous element without the intervention of any membrane, and independently of any inflamed surface. Through this medium, the coagulum becomes adherent to the sides of the vein (as in the old aneurismal sac); and if it be attached to the whole circumference, the inner portions

become softened and broken down. "A complete cylinder of fibrine may in this way be formed in the interior of a vein through which (when the fluid portions of the coagulum are removed) the blood will circulate." (Lee, *Op. cit.* p. 101).

If the morbid matter escape in this manner, coagulation may again take place and the same process be repeated; but if it be retained, inflammation takes place, not in the vein but in the external tissues. Mr. H. Lee states "The surrounding areolar tissue will become inflamed, loaded first with serum, and then with lymph and pus, before the coats of the vein have taken on any similar action. The visible appearances of inflammation in either case extend *to* the lining membrane, not *from it.*" (*Op. cit.* p. 100). Hasse, who believed the lining membrane of veins as irritable as serous surfaces, was still aware that it was slow to inflame; and he explains the surrounding inflammation on the principle of endosmose and exosmose. "The internal membrane of the veins," he says, "re-acts upon the application of irritant substances almost as quickly and intensely as the serous membranes. In this respect, doubtless, the vascular substratum plays the principal part; *the lining membrane yielding merely to the alternations of endosmose and exosmose,* and not suffering any organic change until a later period. In this respect, it will appear not unworthy of notice that those portions of the venous system which are composed exclusively of the internal membrane of veins with a very scanty provision of surrounding cellular tissue like the corpora spongiosa" (and uterine veins) "are very rarely and never extensively the seat of true inflammation." (*Pathological Anatomy,* p. 11).

A conclusive experiment on this part of our subject was performed by Dr. Mackenzie, who vitiated the blood with lactic acid in place of pus, "because it represents the principal constituent of an important animal excretion, and is also well known to be present in an excessive and abnormal proportion in many diseases; during the progress of which, phlegmasia dolens is known to supervene." Dr. Mackenzie ligatured the left femoral vein of a dog, and injected *half-an-ounce* of lactic acid (containing 15 per cent.) with an equal quantity of water into it towards the

heart. The animal breathed heavily, had frequent gulpings, efforts at vomiting, tenesmus convulsions, and died in half an hour.

"*Dissection.* The iliac veins of the left side, from the femoral up to the cava, and a considerable extent of the cava, were found obstructed by what appeared to be a firm coagulum; and on opening these vessels, this was found to be closely adherent to their lining membrane. After a short time, however, this apparent coagulum began to contract, and in doing so separated itself from the veins, exuding at the same time a serous fluid from its interior. This contraction proceeded until the coagulum which had previovsly filled the entire cavity of the veins, now occupied but a small tract of their interior. The coats of the veins which had been obstructed *were perfectly healthy; no morbid redness, no vascularity or opacity was anywhere observable; and the lining membrane to which the coagulum had been adherent, was perfectly smooth, white, shining, and free from any trace of inflammation.*" (*Op. cit.*, p. 220.)

So far, therefore, as the pathology of phlegmasia dolens is concerned, we cannot look upon it as inflammation of either the crural, iliac, or uterine veins, but rather as the result of blood-poisoning in different degrees. We have still, however, for our consideration, the facts that obstruction to the nervous circulation, simply and independently, will only cause œdema in the limb, but not phlegmasia dolens.

Dr. Tilbury Fox has given his attention to this part of the subject, and in a valuable paper (*Transactions of the Obstetrical Society*, vol. ii.) has pointed out the important share which the lymphatics have in producing the effects observed. Assuming with Zimmerman and Virchow "that the lymphatics were the agents in introducing fibrine into the general blood-currents," he proceeds to say: "If there be any relation between the lymphatic fibrine and the cellular tissue, it is easy to understand how obliteration of the lymphatics may give rise to the peculiar character of phlegmasia dolens, on account of the retention of the fibrinous material in the tissues, the cellular especially, which is so rich in lymphatics." (p. 207). "The cellular tissue itself seems

to be hypertrophied, the lymph also gelatinising in its interstices."

Thus an obstruction in the lymphatic circulation will cause the lymphatic fibrine to accumulate in the cellular tissue and skin, giving it that elastic character and white aspect perfectly different from œdema.

That obstruction in the venous and lymphatic circulations will produce the white swelling called phlegmasia, without any inflammation, is proved by its occurrence in cancers and tubercle; and some tumours where the obstruction arises from external pressure, a slight contamination of the blood will produce the same effect. Dr. T. Fox relates a remarkable case in proof of this. "A lad aged 12 years was getting over a bank, and was bitten by an adder in the fleshy part of the thumb. He felt at once faint, and directly his arm began to swell. I [Dr. T. Fox] saw him soon afterwards. In so little time as twenty minutes after the receipt of the bite, the arm was appreciably swollen; *there was no pain at any time.* The next day, the case presented *a perfect and complete specimen of phlegmasia dolens.* There was not the least pyresia, no tenderness, no pain, *no red lines running up the arm,* nothing indicative of the least inflammatory action. The boy did well, although his arm was enormously swollen at one period" (*Trans. Obstet. Soc.*, p. 211).

Thus we think it is proved, that the first effect of a poison on the circulation, is obstruction, both of lymph and blood; the latter causing œdema, the former the characteristic "white leg." The second effect, when the quantity is greater, is inflammation of the lymphatics directly, of the veins indirectly: that is to say, it is the tissues surrounding the veins which become inflamed, not the veins themselves. If the amount of morbid matter be further increased, the coagula are dissolved; the poison circulates; and diffuse inflammation may probably be the result—or puerperal fever.

Hence the disease may be strictly considered as the result of blood-poisoning; and, as diffuse inflammation now receives the name pyæmia, to indicate its cause, so this might be called "toxæmia," for the same reason. But the old term "phlegmasia

dolens," is sufficiently expressive and avoids theory; we think it far preferable to "phlebitis." whether chronic or obstructive, which certainly involves a discussion. We have endeavoured to place before you the facts which lead us to doubt the propriety of the term; and have felt it our duty to do so, because in former lectures we had adopted it in common with the profession.

Treatment. We shall now consider the principles upon which the treatment must be conducted. We are not about to treat inflammation, but to obviate the mischief of poisoned blood, or rather to assist Nature in doing so.

The course to pursue depends very much upon the degree to which the blood is vitiated. A very active absorption is going on after delivery; the uterus and vagina are rapidly contracting in their size; the surface of the uterus where the placenta was attached is covered by small coagula and by the *debris* of the placenta, which may become decomposed; coagula may also remain in the vagina. These are generally thrown off safely, but any cause which may stimulate absorption may prevent this. Thus hæmorrhage after labour has been frequently the cause of phlegmasia dolens; low diet, or any other cause of exhaustion, may do the same thing; and a small portion of morbid matter may be taken up into the circulation, giving rise to phlegmasia in its mildest form. In such cases it is necessary to strengthen the constitution. Quinine, iron, soup, even wine, may be required: and at the same time we should endeavour to remove, if possible, the poison by acting moderately on the bowels, but not so as to purge the patient. The limb should be bandaged carefully, and warm frictions used daily. This tonic treatment must be continued throughout, and, in the course of a week or ten days, the swelling will subside and the form of the limb be restored.

A more formidable case, however, may present itself, in which there may be inflammation of the lymphatics, preceded by severe neuralgic pains and great constitutional disturbance. In such cases, there is much more reason for anxiety; and a careful inquiry should be made as to the probable cause. Irritation of the surface of the uterus in removing an adherent placenta; the effects of a severe labour in exciting inflammation in the vagina

and uterus; a diet too stimulating, leading to a similar effect, have all been assigned as sufficient for the formation of pus on the surface of the vagina or uterus and its absorption. But we are inclined to hesitate in receiving this explanation of the effect, because cases of severe labour followed by inflammation without phlegmasia are so frequent, and cases of removed placenta so numerous, without any such result, that such an explanation must excite a doubt. On the other hand, phlegmasia dolens of this severe character has followed natural and easy labours, where there was no inflammation, and the placenta was safely expelled. We have therefore to look for causes beyond these; and we suspect that they will be found much more frequently among epidemic influences than is generally supposed. It is safe, however, to act upon that principle; and, in the case now before us, to secure a perfectly free ventilation in the apartment, to have the dress and bed clothes frequently changed, and to have a solution of chlorine sprinkled through the room. For the same reason, emetics promptly given, and followed by a full dose of calomel to act on the bowels and excite the flow of bile, may arrest the disease by removing the poison from the blood.

But if these remedies fail, we must seek to conquer the effect of the disease on the constitution. For this reason, tonics are essential: quinine, iron, the mineral acids, and ammonia, have all been given with advantage. Quinine and acids may be combined, and often are so; but we prefer the combination with an aperient. Quinine, compound colocynth pill, and extract of henbane—a grain of each—taken every third or even every second hour, will be found beneficial, not only in strengthening the constitution, but also in procuring healthy evacuations. The motions in these cases are generally very offensive; and an improvement in this respect is a most favourable symptom.

Dr. Mackenzie speaks favourably of hydrochloric acid, which he gives boldly. The plan he adopted "was to direct one ounce of dilute hydrochloric acid to be taken daily in a quart of barley or plain water sweetened with syrup of ginger, and flavoured with lemon peel." (*Op. cit.*, p. 267). This practice was adopted as the best antiseptic to a poison which could not be removed.

The sesquicarbonate of ammonia, "in full, concentrated, and frequently repeated doses," given in a little fresh infusion of senna, is also recommended on the same principle.

In addition to these means of combating the constitutional effects of the poison, its local effects must not be lost sight of. The high degree of pain, the general nervous disturbance, as well as the lymphatic inflammation which actually exists, indicate depletion. But caution is necessary here. The removal of much blood increases absorption; and a large bleeding is not necessary to overcome such an inflammation as this. A few leeches to the lymphatic glands will generally be sufficient. These should be followed by an anodyne application; poppy fomentations may be employed with benefit, but sometimes the pain is so severe that they fail. A liniment of camphor and chloric æther will have more effect, and even turpentine may be used as a sedative: the counter-irritation produced is soon followed by the absence of pain. The nervous disturbance may be controlled also by morphia and chloric æther given in composing draughts.

If by these means, actively carried out, you succeed in arresting the disease; if you find the pulse to diminish in frequency. and the limb to pit on pressure, a bandage must be carefully applied from the foot up the whole limb; and when it is removed, friction must be carefully used before it is re-applied. By this means, the size of the leg will be reduced; but your patient may not be able to move. There may be paralysis of the limb; or perhaps pelvic abscess in process of formation. In the latter case, the pulse continues at a high standard (90 to 100); the patient has frequent perspiration, especially at night; and, as pus accumulates, she complains of a bearing-down pain, increased when she passes a motion; sometimes the same effect is produced in attempting to pass urine: this may even be retained, and perhaps, when the catheter is being passed, the cause may be for the first time discovered, the walls of the vagina being pressed prominently forward by an abscess. It is generally found in the *cul-de-sac* behind the cervix uteri, pushing it forward like a tumour; but it may pass down as far as the peritoneum will allow between the rectum and vagina, and between the

bladder and vagina, thus pressing towards each other the anterior and posterior walls of the vagina, so as nearly to close it.

In these cases, bark and ammonia may be given with advantage: a nutritious diet and wine are also necessary. The warm hip-bath and warm-water injections both into the vagina and bowels will give relief, and enable you to open the abscess, which should be done as soon as possible.

Paralysis may be the result of inflammation of the sheath of the nerves; and if so, it will cause permanent lameness. If it be only discovered when the phlegmasia has disappeared, it is too late for remedy; the mischief is done. It is by watching carefully the symptoms during the attack, that you will recognise an inflammation of this serious character. The continuance of the neuralgic pains down the limb, which generally subside when the swelling has increased, will excite suspicion, and must be at once actively met by cupping over the sacrum; or, if this cannot be done, over the sciatic nerve; counter-irritation by blisters is also necessary. If you succeed, the pain is at once relieved; but every thing depends upon promptitude.

A third form of the attack sometimes presents itself, where phlegmasia dolens follows puerperal fever. From this fever the patient slowly recovers; when, on the tenth or twelfth day, the limb begins to swell. The puerperal poison is here at a minimum, just sufficient to manifest the general characters of the fever, and to cause obstruction in the circulation. We do not find phlegmasia dolens to be the ordinary attendant on this terrible scourge; the poison is too powerful, it dissolves the coagula, circulates through the vessels, prostrates the constitution, and presents those symptoms, too frequently fatal, which have astonished and bewildered the practitioner.

The presence, therefore, of phlegmasia dolens after puerperal fever may be considered as an evidence of the mild character of the fever. But there are cases where the fever and phlegmasia accompany each other, and these are generally fatal. The symptoms are of a typhoid character, commencing with rigors that occur from time to time, followed by partial sweats, a dry brown tongue, sallow aspect, incoherency, delirium, a very fœtid

lochial discharge, and great prostration. The white swollen limb may exhibit some patch of dusky redness on its surface; or a deposition of pus may take place at some distant point. We thus perceive the effort to circumscribe the poison failing, and its circulation giving rise to symptoms resembling puerperal fever. Such cases may occur where no epidemic puerperal fever exists; but if it be present, cases of phlegmasia dolens seldom escape the poison, and will exhibit the symptoms of the fever along with the special character of the disease.

LECTURE XXXVIII.

PUERPERAL FEVER.

Puerperal Fever is the next subject of our attention, and one surrounded with difficulties of no ordinary character. Whether we consider the opposite opinions that have been entertained respecting it; the contradictory experience of every distinguished practitioner; the frequency of its occurrence; or its frightful fatality, we must look upon puerperal fever as the most important and at the same time the most difficult question we have to discuss.

Puerperal fever, in the sense we understand it, is a disease of casual occurrence. It often appears quite unexpectedly, and disappears just as suddenly; its duration in any single case varies from two to five days, but it is sometimes more rapid, and, again, may be more protracted. It generally pursues a most destructive course, and is attended by a mortality that always excites the utmost alarm: the peritoneum is the tissue chiefly *but not exclusively* engaged. The causes that produce it; the manner of its progress; and its effect on the animal tissues, are all in obedience to the same laws that govern diseases which result from the absorption of morbid poisons—as typhus fever, erysipelas, Asiatic cholera, or plague.

History.—The history of puerperal fever may be said to commence little more than one hundred years ago. Previously to 1746, it was never distinctly described; it had been described as inflammation of the uterus (Plater); and under the name of "child-bed fever" was included every form of fever and inflammation to which the parturient woman is liable.

Strother (1716) was the first who adopted the name of "puerperal fever" in place of "child-bed fever"; but it is quite uncertain whether it was meant to express what we now understand by the disease, or whether it was equally comprehensive as the former term "child-bed fever."

In 1746, Malouin gave the first accurate account of it, and faithfully described the frightful epidemic that then appeared in Paris, especially at the Hôtel Dieu, *so fatal that scarcely one woman recovered.* He says, "The disease usually commenced with a diarrhœa; the uterus became dry, hard, and painful; it" (the abdomen?) "was swollen; the lochia had not their ordinary course; then the women experienced pain in the bowels, particularly in the situation of the broad ligaments; the abdomen was tense; and to all these symptoms were joined pain in the head, and sometimes cough. On the third or fourth day after delivery, the mammæ became flaccid. On opening the bodies, curdled milk was found on the surface of the intestines; a milky serous fluid in the epigastrium; *a similar fluid was found in the thorax of certain women;* and when the lungs were divided, they discharged a milky or putrid lymph," (*Mémoires de l'Académie des Sciences,* 1746).

In 1750, this fever re-appeared in Paris and Lyons with equal severity. At that time an account of it was published by Doulcet, who treated it by emetics, saved several patients, and like many others, supposed he had discovered a specific.

Tenon continues the account. He says: "This terrible disease has shown itself at different epochs, and its returns have been more frequent than ever; it reappeared" (in Paris) "every winter from 1774. . . . . It has come to prevail more and more, and *to be as it were naturalized.*" Tenon gives an account of the disease as it appeared in 1774; and from that period to 1816.

Seven out of every twelve women who were delivered were seized with the disease.

Such was the progress of this disease in Paris; at first returning after long intervals, then more frequently, and ultimately becoming an annual infliction. Its appalling fatality may be estimated from the fact that, while the average mortality in London is about 1 in 150, and in Lying-in Hospitals varies from 1 in 70 to 1 in 100, the mortality at the Hôtel Dieu and the Maternité was 1 in 20, sometimes 1 in 13 (*Rapport fait au Conseil Général des Hospices*), chiefly caused by puerperal fever. The mortality in the great Vienna Hospital, to which we shall again refer, was as high as 1 in 10, and even 1 in 6 cases.

The first distinct epidemic in London seems to have been equally fatal. It appeared in 1760; but, in consequence of the absence of any accurate records, it is impossible to say what was the exact mortality. Every effort was made to conceal the truth. "A gentleman," says Mr. White, "on whose veracity I can depend, informs me that he attended a small private lying-in hospital in London in the latter end of May, June, and the beginning of July, 1761, during which time puerperal fever was very fatal there. That to the best of his recollection they lost about twenty patients in the month of June. That during the month he himself delivered six women in a short time in the hospital of natural births, and they all died. He was so shocked that he desired the gentleman who had the care of the hospital to deliver some who should next be in labour, which he did; but they met with no better fate. *They buried two women in one coffin to conceal their loss.*" (White's *Treatise*, p. 165).

In 1768 it returned; when Denman's essay appeared, recommending depletion on the first onset of the attack, and tartar emetic to cause vomiting afterwards.

In 1770, the fever appeared in the Westminster (now the General) Lying-in Hospital, which had been erected in 1765. "Out of sixty-three women delivered, nineteen had the disease, and thirteen died." (Mackintosh's *Essay*, p. 4.) Dr. Leake, who was the attending physician, described the fever in his *Diseases of Women*, and considered that its cause was inflammation and gangrene of

the omentum. Dr. Hulme then presided over the City of London Hospital, and claimed to be the originator of this discovery. He published (1772) a very excellent essay, in which he gives an accurate account of puerperal fever as it then appeared, and the *postmortem* appearances observed. He generally found the omentum inflamed, and frequently black and gangrenous. Hence he considered inflammation of the kidneys and omentum to be the cause of the disease. But he was aware that he had to deal with a disease not exactly analogous to ordinary inflammation; that some change in the blood took place which totally altered its character. He therefore observes: "But the most capital point of all yet remains. I mean, to cut off *the purulent fomes, the chief cause of the disease* (as the dissections seem to indicate), and to restore the tainted omentum and intestines to somewhat of their perfect state." (Hulme's *Treatise*, p. 86). We learn from Dr. Joseph Clarke (*Medical Commentaries*, 382), that the mortality in the Westminster Hospital was about one in four cases; in the British Lying-in Hospital, one in 14½. The cause of the great mortality in the former, now the General Lying-in Hospital, York Road, has been since discovered; and, by proper means to secure a perfect drainage and ventilation, the fever has almost disappeared.

In 1773, the fever showed itself in the lying-in ward of the Royal Infirmary of Edinburgh, of which Professor Young gives the following melancholy account: "It began about the end of February, when almost every woman, as soon as she was delivered, or perhaps about twenty-four hours after, was seized with it, *and all of them died*, though every method was used to cure the disorder."

In 1788, the fever appeared for the fourth time in the Dublin Lying-in Hospital since its institution (1757). "Seventeen were attacked and fourteen died." (*Med. Comm.* 1790). Since then, it has returned to that Institution at intervals varying from one to seven years.

With regard to London, Dr. John Clarke states: "In the years 1787 and 1788, the same year in which the disease seems to have been prevalent in Dublin, it was also exceedingly general

throughout the whole of this country; but more especially in London, and in hospitals, and made wonderful havoc among the lying-in patients." (*Practical Essays*, p. 110). Dr. Clarke found it quite a different disease than any that he had been accustomed to meet, and describes its first incursion in the following terms: "The first case I met with was in the month of July, 1787, in which I was astonished to observe the rapidity with which it ran its course, and the very extraordinary manner in which women were destroyed by it." (*Op. cit.* p. 119).

In 1789 this malady visited Aberdeen, where it continued until 1792, and gave rise to an excellent treatise by Dr. Gordon, who introduced a new, bold, and then a most successful practice. He describes the fever as not being confined to the town of Aberdeen, but extending to the suburbs and contiguous country, *where it proved as fatal as in the heart of the city.* It was not peculiar to any constitution or temperament, but promiscuously seized upon women of all constitutions and temperaments; for the strong and the weak, the robust and the delicate, the old and the young, the married and the single, those who had easy and those who had difficult labours, were all indiscriminately affected" (Gordon, *Treatise*, p. 2). "It prevailed," (he says) "principally among the lower classes of women . . . *but women in the higher walks of life were not exempt when they happened to be delivered by a midwife or physician who had previously any patients labouring under the disease*" (p. 3). Dr. Gordon considered it as an inflammation, but of the erysipelatous type. He advocated strongly a bold and *early* depletion, taking twenty or twenty-four ounces at once; and, if necessary, soon afterwards ten more. "When I took away," (he says) "only ten or twelve ounces of blood from my patient, *she always died;* but when I had the courage to take away twenty or twenty-four ounces at one bleeding in the beginning of the disease (*i.e.*, within six or eight hours after the attack), *the patient never failed to recover.* After the bleeding, it was my practice to bring on a diarrhœa; which, when excited, I found necessary to continue through the whole course of the disease till it was entirely conquered." (*Op. cit.* p. 77, 78, 80, 85).

Between 1809 and 1812 puerperal fever visited Leeds and its

vicinity with great severity. Mr. Hey, son of the eminent surgeon, gives this account of it: "For some time after the commencement of this dreadful malady, *it proved fatal in every case that came within my knowledge;* and though a few patients afterwards recovered under the treatment which my father and I had formerly found successful in the puerperal fever, yet the success was very small, till the method hereafter described was fully adopted." (Hey's *Treatise on Puerperal Fever*, p. 2). Mr. Hey at once perceived the difference between this new disease and inflammation of the uterus or peritoneum. "He was alarmed by *the extreme rapidity* with which the disease ran its course and by its constant fatality, unlike anything which had ever been known in Leeds." In one case, the fever went through its course in eighteen hours. Mr. Hey's treatment first consisted of active purgatives, by which a diarrhœa was established. The first fourteen cases he details were treated in this way; but he saved only three of them. Dr. Gordon's practice of copious depletion was then tried, with even more boldness than its originator attempted. "When I was called at an early period, I seldom took away less than twenty-four ounces of blood at first, unless some peculiar delicacy of the constitution or an excess of the previous evacuations forbad it; and if the delay was protracted to eight or ten hours, or the symptoms were unusually severe, a large quantity to the extent of thirty or forty, and in one instance more than fifty ounces, in proportion to the urgency of the symptoms and loss of time. . . . If the pain and soreness of the abdomen are not removed or even materially alleviated in six hours, the bleeding ought to be repeated: nor should a considerable degree of faintness, nor even a deliquium, make us suppose that further bleeding is either unsafe or unnecessary" (p. 10). Mr. Hey thus describes the result of this practice: "I have now to add that after the ninth case (the fifteenth in my practice) in consequence of which I determined to use bleeding in addition to purging, of thirty-three patients of whom we attended, only three died; the last twenty-six recovered in uninterrupted succession" (pp. 160—168). Mr. Hey's work appeared in 1815.

Dr. Armstrong published his *Facts and Observations* in 1819. He describes the fever which occurred in Northumberland and Durham in 1813. This complaint generally set in about twenty-four or thirty hours, and seldom later than four days, after delivery. It did not seem to depend upon difficulty of labour, "for in most women in whom it occurred, parturition was remarkably easy, and the placenta was separated after a proper interval without any more than usual pain." The complaint, when not arrested, generally ran its course in a few days. "Soon after death, the bodies became rather livid and very offensive to the smell, and the abdomen immensely distended." No *post mortem* inspections were permitted; and consequently Dr. Armstrong had no opportunity of knowing what morbid changes took place.

"In all, forty-three cases occurred from January to October, 1813; when it ceased. After this number, forty were witnessed by Mr. Gregson and his assistant Mr. Gregory; the remainder having been separately seen by three accoucheurs" (p. 11), thus was proved the fact previously observed by Dr. Gordon, that this scourge selected particular accoucheurs as its introduction. It followed their practice with fatal strides. He remarks as a diagnostic symptom of this fever, the peculiarly offensive character of the evacuations, being "dark, slimy, fœtid, and unexpectedly large. Indeed, excepting that they are commonly mixed with hard pieces of scybala, they have neither the ordinary smell, consistence, nor colour of natural fæcal stools, but seem composed for the most part of some excrementitious matter, somewhat like dirty yellow paint, thrown out in a considerable quantity in the course of this disease" (p. 27).

Dr. Armstrong strongly confirms the observations of Clark, Gordon, and Hey, as to the rapidly fatal progress of the disease. "*It is certain from indubitable facts, that it sometimes destroys as rapidly as plague itself.*" He found that a diarrhœa coming on in the first stage, sometimes carried off the disease; whereas, on the contrary, costiveness was always an unfavorable circumstance, increasing in no inconsiderable degree the difficulty of cure; on the contrary, a diarrhœa in the last stage was a most formidable

symptom. The treatment adopted by Dr. Armstrong was in principle the same as that of Gordon and Hey. His account of the first case in which it was tried is sufficient to explain it. "Twenty-four ounces of blood were immediately drawn from a large orifice, so as to induce fainting; one scruple of calomel in mucilage given immediately afterwards; and two ounces of strong infusion of senna, containing two drachms of sulphate of magnesia, ordered to be taken every hour, till copious evacuations were procured. The attendants were directed to allow the patient barley-water, acidulated with lemon-juice, for a common drink and diet, and to withhold the smallest portion of solid food or stimulating liquids. In about four hours the medicine began to operate, and several copious, dark, fœtid stools were discharged. From that time considerable relief was obtained, and a regular perseverance in purgations, with mucilaginous drinks, and a small quantity of weak chicken broth, completed the cure in five days" (p. 92). Of forty-three cases in which this treatment was adopted, only five died.

As an exception to this plan, and to ordinary puerperal fever, Dr. Armstrong describes what he calls "a peculiar congestive disease, ushered in either by sensations of chilliness, or by paleness and oppression without such sensations; but in both cases the vital powers are so prostrate that no regular re-action takes place, as in common fevers: so that the surface remains cool throughout, or there are merely short, partial, and irregular flushes of heat. *The shock in some instances is so great that the secretions are all suspended, and the patient sinks with rapidity*" (pp. 182-183).

The *post mortem* appearances were equally exceptional with the symptoms. "In such cases dissection does not reveal, so far as my examinations have extended, any of the usual remains of inflammation, that is to say—there are no adhesions, no effusions of coagulable lymph, no formation of pus, no internal gangrene from arterial fulness; and the only morbid appearances have been an unusual accumulation of blood in some part of the venous system, without any of those vermilion tints of the capillary arteries, which denote the previous existence of inflammation" (p. 184).

It was just such a case as this that first directed Dr. Mackintosh's attention to puerperal fever. In 1808, a woman, the wife of a soldier in the Royal Artillery, was seized with the fever at Woolwich. "She shivered about eight hours after delivery, and continued to sink, having pain in the epigastrium and tumefaction of the abdomen, with diarrhœa. Coldness over the whole surface of the body preceded her death, which followed in a few hours. On opening the abdomen, there was great tumefaction from flatus, the uterus was ill contracted, but it contained no coagula: and I [Dr. Mackintosh] may here remark that there had been no previous hæmorrhage. There were two or three dark-coloured patches on the intestines, and the veins of the different viscera of the abdomen were so distended with blood, as to force the idea on our minds that the blood of the whole body was concentrated in them." (*Mackintosh's Treatise*, p. 34). Dr. Mackintosh published his Treatise in 1822, and so convinced was he that puerperal fever and peritonitis were the same thing, that even this case did not shake his belief. He endeavoured by a kind of *lucus a non lucendo* argument to demonstrate, that the absence of symptoms and morbid appearances was a proof of the intensity of the inflammation, so intense as to prostrate the powers of the constitution. On this principle, he advocated depletion and purgatives, where Armstrong would not venture, because he supposed that he was thus relieving the constitution of the weight of an intense inflammation. Dr. Mackintosh found a warm opponent in Dr. Hamilton; a controversy sprang up, and as in too many instances, a discussion commencing with argument finished in the personalities of a dispute.

From 1792 to 1822, a period of thirty years, the doctrines and practice of Gordon, Hey, Armstrong, and Mackintosh, more or less prevailed. They were opposed, it is true, by Hamilton and others; but the evidence of success was strongly in their favour, and their practice was generally adopted. Such was the state of opinion, when Dr. Gooch turned his attention to puerperal fever. He had the most ample opportunity for observation at the General Lying-in Hospital. He soon found he had to deal with a very fatal disease. When he saw the patients after it had

been going on for two or three days (no unusual circumstance among out-patients), he seldom or never saved them. Within the Hospital he saw them earlier, and adopted Armstrong's practice. "It was soon clear that bleeding and purging did more good than any remedies we had tried, and our success in the treatment of this disease was decidedly increased" (p. 44). By following the treatment of Dr. Gordon, Dr. Gooch found that, provided he saw the patient within a few hours after the attack, he could generally arrest the disease.

However, notwithstanding his strong convictions in favour of this practice, cases afterwards came under his notice that excited his suspicions that at least there were some exceptions to bleeding and purging. Dr. Gooch was frequently called into consultation on cases where this practice failed; but one (Case xiii.) that he saw from the beginning to the end of the attack, will explain his difficulty.

The patient was a lady whom he had attended in several previous confinements. Her labour was very quick; she was quite well on the second evening, and on the following morning took the usual dose of salts and senna; it operated violently, and was followed by diffuse pains and tenderness of the abdomen, with rapid pulse. She could neither turn in bed nor bear pressure on the abdomen; but her skin was not hot, nor the pulse hard. Dr. Gooch gave twenty minims of Battley's sedative solution, to be repeated every two hours for three doses; the pain was easier, but the pulse was still rapid. Dr. Gooch wished a consultation to decide about blood-letting; "the prevalent state of medical opinion on the subject determined us to use it" (p. 78). It was carried to faintness, four cups and a half being taken. Twelve leeches were next applied to the belly, and these were succeeded by the usual fomentations of scalded bran, and an opiate. The following morning two drachms of sulphate of magnesia were given every four hours. The patient became much worse, and died in less than forty-eight hours from the commencement of her symptoms.

"In all these cases the striking circumstances were the rapidity of the disease, and the absence of morbid appearances

in the peritoneum after death, although during life, the whole surface of the abdomen had been painful and tender, and the pulse had been rapid as in puerperal fever. Death came on like faintness; the patient got weaker and weaker every hour and then died (p. 80). This case has certainly not the characters of true puerperal fever. The tenderness and swelling of the abdomen might be explained by the irritation of medicine which caused such violent purging: she might have been bled and purged to death without any fever existing. This seems to be probable, because Dr. Gooch quotes the experience of Dr. Dalrymple of Norwich, and of Mr. Hingeston, who record cases that were attended by pain and tenderness of the belly, with a rapid pulse. "The pain remitted; the skin was moist, and the pulse full and compressible. Most of them were cured by keeping the abdomen covered with a large, thin, hot linseed poultice, and giving ten grains of compound powder of ipecacuanha, repeated until the pain was gone. If the bowels were constipated, a purgative was previously given; if they were not so, the purgative was postponed till the pain was gone" (p. 82). It would have been desirable to know whether the usual dose of salts and senna had been given in the first instance, because these cases look much more like intestinal irritation than true puerperal fever; but still it possessed an epidemic character.

Dr. Gooch's paper met an able expositor in Dr. Ferguson, who published a most valuable essay on puerperal fever. He describes an epidemic attack similar to that of Dr. Gooch.

"In the year 1827, and part of 1828, this form of malady was very frequent, and I had repeated opportunities of pointing it out to the pupils of the General Hospital, with whom it obtained the name of 'false peritonitis'" (p. 11.) "In the epidemic winter of 1827 and 1828, this form was so prevalent along the banks of the Thames, that being worn out with incessant calls to visit the patients at their own houses, I directed the matron of the hospital to send, in the first instance, to all complaining of abdominal pain, two doses of Dover's powder, each containing ten grains, one to be taken immediately, the other in four hours; when, if notwithstanding the symptoms should persist, they were directed to

send for me. After this, I think I had no occasion to visit one in five of those afflicted, as they did not require any other treatment" (p. 16.) Puerperal fever cannot thus be cured by two such doses of Dover's powder. It is clear, therefore, that this epidemic might be called "false puerperal fever." Dr. Ferguson's valuable paper, however, first started the doctrine that we shall hereafter consider—that this fever is, strictly speaking, a blood-disease. He embodied its causation in three propositions. 1. The phenomena of puerperal fever originate in a vitiation of the fluids. 2. The causes which are capable of vitiating the fluids are particularly rife after childbirth. 3. The various forms of puerperal fever depend on this one cause, and may readily be deduced from it.

The treatment by depletion and purging received a check, and an opposite course was adopted. Dr. Copland was appointed consulting physician to the Queen Charlotte's Hospital, in 1823. He describes in a letter to Dr. Ferguson the disease that broke out there.

"The disease was malignant, and often ran its fatal course in twenty-four hours from the first appearance of the symptoms. It was characterised by remarkable rapidity, softness, and weakness of the pulse; by great pain, distension and tenderness diffused through the abdomen: by a clammy offensive perspiration of the whole surface; by complete indifference to the child, to the result of the disease, and to everything else; by a moist, flabby, broad, mucous state of the tongue, and by relaxed bowels; milk being secreted, and the lochia abundant, and sometimes offensive. On dissection, copious serous or sero-albuminous or an almost sanious effusion was found in the peritoneal cavity—sometimes also in the pleural and pericardial cavities. The tissues were generally softened and easily lacerated; but the uterus presented in this form of the disease no other lesion than more or less softening, as observed in other abdominal organs, and even in the heart itself." (*Ferguson*, p. 284).

The treatment ultimately adopted by Dr. Copland for this malady was boldly stimulant. "Immediately upon the appearance of the symptoms of the malady, a bolus containing from

eight to sixteen grains of camphor, from ten to twenty grains of calomel, and from one to three of opium was given, and repeated in four, five, or six hours. The dose of camphor was very rarely less, and but seldom above that named, and the interval between the two doses sometimes only three hours, but never longer than six. The dose of opium in the second and subsequent boluses, was regulated according to the effect of the first. Soon after the second bolus were given, about half-an-ounce of spirits of turpentine and an equal quantity of castor oil was given on the surface of some aromatic water; and if these did not operate fully on the bowels within three hours, the same medicines in double and triple quantity were administered in enemata. The bolus just mentioned was still continued at the same intervals, or after five or six hours from the exhibition of the second or preceding one. Very soon afterwards, and generally subsequent to the administration of the turpentine draught and enema, a large piece of flannel folded several times and sufficient thus to cover the whole abdomen was directed to be wrung as dry as possible out of very hot water, to be instantly freely sprinkled with spirits of turpentine, and applied over the abdomen,—to be closely covered by wash leather or a dry cloth, and to be kept thus applied for some time, or renewed until erubescence of the surface of the abdomen was produced.

"The success of the above treatment in the malignant form I found to be almost complete *for scarcely a case terminated fatally* in which it was early resorted to" (p. 287).

Thus far we have spoken of puerperal fever as an essential disease varying in its character and most destructive in its results. We have now, however, to present a different view of this subject; we have to consider it not as an essential disease but symptomatic of some local inflammation. We can no longer speak of it as "peritoneal fever," but as fever symptomatic of peritonitis; a typhoid or a dynamic puerperal fever only indicates puerperal phlebitis.

Pathology, as we have stated, had been in its infancy. It was now arriving at maturity, and claimed the dignity of a science; and inasmuch as the true character of diseases of the heart, lungs,

liver, stomach and other organs were only known by the morbid appearances after death: the same rule was applied to puerperal fever. Dance, Dugès, Tonnellé, and indeed we might say the French School generally, have viewed puerperal fever as only symptomatic of some previous inflammation existing in some one or other of the uterine tissues. Tonnellé made 222 dissections, and took great pains to point out from *post mortem* inspections the comparative frequency of the different morbid lesions.

He found the following results from his inquiries:—

Alterations of the uterus and appendages	197 cases
Peritonitis	193 „
Combined lesions of the uterus and peritoneum . . .	165 „
Peritoneum alone affected	28 „
Uterus alone	29 „

The term puerperal fever is discarded; and all the varieties which this disease presents are attributed to metritis, metro-peritonitis, peritonitis, or uterine phlebitis.

Tonnellé has been followed by Drs. Lee, Churchill, and several others who adopt his views. In this mode of reasoning, however, it must be borne in mind that, like statistics, the truth of the conclusion depends upon the perfect accuracy and *completeness* of the facts; and that the slightest error in the elements of the argument may lead to a conclusion very wide of the truth. The certainty of pathology in determining the nature of organic diseases is beyond dispute; but, when it is applied to fevers, to evanescent poisons, to blood-diseases, the light afforded by it is not so clear. Broussais erred in this respect; we shall again examine whether Tonnellé has not made a similar mistake.

This history is, we trust, sufficient to prove the following special points in regard to the characters of this terrible malady:—

That, like typhus, like small-pox, like cholera, its incursion and departure may be dated.

That its appearance and progress have been marked by a rapidity so fatal that every experienced practitioner from Clarke,

Gordon, and Armstrong, to Gooch and Ferguson, has recognised a disease quite different from ordinary puerperal attacks.

That it has varied extremely in its intensity; sometimes, like Armstrong's "congestive disease" and Mackintosh's "latent peritonitis," killing the patient in a few hours without leaving a single trace of inflammation; and again flitting along that seat for epidemics, the south bank of the Thames, so lightly, that it was arrested by a few doses of Dover's powder—this treatment being found sufficient to save the patient.

That cases of the disease, in every respect similar in character, have been saved by a treatment based upon the most opposite principles. It is only necessary to compare Hays' and Armstrong's practice of bleeding *ad deliquium* and purging, with Copland's use of camphor and turpentine, to demonstrate this.

These facts prove this disease to be something more than a local inflammation; and therefore we cannot help thinking that the terms "puerperal peritonitis" "puerperal phlebitis" etc., as applied to this disorder, are calculated to lead you away from a knowledge of its true character.

LECTURE XXXIX.

PUERPERAL FEVER (*continued*).

In tracing the history of the malignant disease that has been the object of our attention, some account of its symptoms and its effects upon the constitution has been unavoidable. A brief outline, also, of the treatment adopted by the different distinguished physicians who have given us their experience of it, has also been necessary: nevertheless, at the risk of repetition, we must enumerate more precisely the symptoms of this disease, and the morbid changes which it produces, in order to determine, if possible, what puerperal fever is, and especially to decide upon the principle on which we should conduct our treatment.

Hitherto we have spoken of puerperal fever in the singular number: and the term "fever" has been used in preference to "inflammation." In both respects we are conscious of assuming the truth of questions in dispute: we shall have to return to these propositions, and to discuss whether this disorder be one fever or many fevers, or, in fact, whether it be a fever at all; but at present, in order to define the disease we mean, we must describe to you its characteristics.

Symptoms.—The symptoms of puerperal fever are observed to commence generally about forty-eight hours after delivery; sometimes they appear within twenty-four hours; and cases have been recorded in which they have been observed even before delivery. The manner in which it attacks the constitution varies exceedingly; but when the disorder takes sufficient time to develop its true characters, a rigor is first observed, sometimes only slight, more usually distinct and severe. This may or may not be followed by perspiration, but is always succeeded by a sense of oppression at the præcordia, and peculiar expressions of alarm, despondency and suffering, that unite in forming a very characteristic feature of the malady. Vomiting generally takes place, and what is discharged is often very offensive. The skin is dry and hot, but in more aggravated cases the surface, and especially the extremities, are cold; the pulse ranges from 120 to 140 beats; it may be wiry and resisting, but much more commonly is soft, small, and compressible. Simultaneously with, or subsequently to the rigor, pains in the abdomen are complained of; their seat is referred to the uterus or its neighbourhood, over which the patient cannot bear the least pressure: the uterus itself is often enlarged, and hence the reason why these pains have been so often confounded with after-pains, and much valuable time consequently lost. Sometimes, however, the pain commences in the epigastrium, and the patient experiences great distress from violent shooting spasms through the scrobiculus cordis and lower ribs. These pains are soon followed by a general distension of the abdomen, and a diffused tenderness over the surface, often so acute that the slightest pressure causes intolerable anguish; the patient cannot bear the weight of the

bed-clothes, nor can she respire without agony: breathing becomes, therefore, quick and short, each inspiration being interrupted by the epigastric pains, and maintaining no correspondence with the pulse; hence the patient seeks by position to relieve her distress — she lies on her back, the head and thorax raised on pillows, the legs drawn up, and the hands folded on the breast, feebly endeavouring to support the bed-clothes; a short cough frequently terminates the inspiration. A diarrhœa may occur at this stage, the evacuations being dark, frothy, and very offensive. This is rather a favourable indication than otherwise. The tongue is usually moist, having a curdy whiteness in the centre, or a yellowish fur-like cream; a red line may sometimes be observed running down the centre, but is often absent: there is generally great thirst, but the drink is often thrown back as it is swallowed. The patient may complain of headache, having a dull pain over the eyebrows; but the intellect is clear, and she is very observant of your countenance and movements in investigating her symptoms. The countenance is pallid, having a slight lividity around the sunken eyes and angles of the mouth; occasionally a hectic flush, or a more defined crimson patch will appear. We have not observed much alteration in the lochial discharge; in some instances it was suppressed at first, and returned again; in others, it continued as before. The secretion of milk is usually arrested, although there are many exceptions. These symptoms mark the first stage of the disease; they are the evidences of the struggle of the constitution to resist the attack; they may continue twenty-four or forty-eight hours, when they are succeeded by those that proclaim defeat.

The symptoms that indicate the failure of the powers of life to continue the contest form the second stage. The surface and extremities become cold; the countenance more livid; the tongue perhaps clean; the pulse 160, small and feeble, but sometimes full, soft, and very compressible. The tenderness and tension of the abdomen diminish, and in some instances are quite removed; vomiting takes place without effort, a green stream often flowing from the mouth; and there may be diarrhœa of a similar

character. The intellect remains clear to the last; and the relief which the patient experiences from her previous sufferings, which she naturally attributes to the treatment, often excites a belief in her safety when she is actually within the grasp of death. A clammy and offensive perspiration bursts out, partially on the surface; respiration becomes gradually less hurried; and death closes the scene.

Such are the characteristics of the fever as it has come under our own notice; and the description agrees with that given by Hulme, Leake, J. Clarke, Armstrong, Mackintosh, Lee, and Copland. We may fairly assume, therefore, that all are speaking of one and the same disease—one which the majority of these writers confess to be different from the puerperal affections which they were in the habit of observing.

There are many causes which modify the intensity of the disorder. The power of the constitution to resist the attack varies; but, independently of other causes, the time when the patient is seized seems to exert an important influence. As far as our observation has given us the opportunity of forming an opinion, the first incursion of the fever seems to be the most violent: its intensity is then at its maximum, and diminishes with its progress. The patients who were first attacked presented comparatively few symptoms of the first stage; they merged at once into the stage of depression: while those affected at a later period exhibited the symptoms of the first stage only, and in a milder form. Thus two classes of cases were observed, deviating from that described into opposite extremes. The one class presented symptoms of collapse throughout: the countenance was pallid and almost livid; the eye dull and glassy; the surface cold; the tongue clean, moist, and cooler than usual; the abdomen either tympanitic or only tumid, and in either case generally free from pain; the pulse was very rapid, 150, 160, 180, but in one instance it was as low as 90; respiration was oppressed and hurried from the commencement of the attack, which usually began with twitches in the side and epigastrium; vomiting and diarrhœa sometimes took place, but the contents of the stomach and intestines were discharged without effort: a clammy offensive

sweat broke out partially over the surface; and the patient sank in twenty-four, thirty-six, or forty-eight hours. These cases are analogous to Armstrong's "congestive disease," to Mackintosh's "intense peritonitis;" and presented characters which impressed Dr. Collins and ourself strongly with its resemblance to Asiatic cholera. The other class exhibited symptoms which the history of a single case will sufficiently illustrate.

A small delicate-looking woman was delivered in the Dublin Lying-in Hospital of her second child, after two hours' labour. She was in the ward first attacked by the fever, in which two women had just been seized, and both died within forty-eight hours. She had the usual rigor, followed by pains shooting through the sides and back into the abdomen; there was some inclination to vomit; the bowels were free; the abdomen was tumid rather than tympanitic; the lochia natural; the countenance was slightly sharpened: the tongue moist and white; the pulse 104, rather soft. Two dozen leeches were applied to the abdomen, followed by the warm bath; and calomel with ipecacuanha, two grains each, were given every second hour. A profuse diaphoresis broke out during the day, followed by a diarrhœa, which continued during the night, several green and frothy evacuations having passed. The next day, the tenderness of the abdomen was removed; the gums became spongy; the pulse 100. On the following night she was again bathed in a copious perspiration during her sleep, which was not disturbed. From this time the symptoms gradually disappeared, and she was dismissed well in about three weeks.

In point of time, this case is an exception to the observation we have made, as it occurred when the fever first appeared, and was committing its ravages to a fearful extent; but as an exception it rather proves the rule, because at this period it stood alone amid a vast preponderance of fatal cases: as time passed on, such examples were more frequent, and became numerous towards the conclusion of the epidemic. These latter cases also presented another remarkable difference from those first attacked; the symptoms in both were, or at least appeared to be, equally intense, but the early cases generally died, while those occurring later, although apparently similar, often recovered. We can only consi-

der these varieties of puerperal fever as differences in degree, but not in any essential characters; they are grades of the same disease varying in intensity, but in nothing else.

Erysipelas and Puerperal Fever.—We have mentioned to you that erysipelas accompanied puerperal fever; and thus, in the garb of erysipelas, this pestilence frequently assumed another and an equally fatal form, presenting a different group of symptoms from those we have described.

The *symptoms* of erysipelas also commence with rigors, which return irregularly, and are followed by headache more or less severe; the pulse varies from 100 to 140, and is often soft and vibrating; the tongue is covered by a thick creamy fur that soon grows dry in the centre, and, as the disease advances, becomes brown; the gums are covered with sordes; the surface is dry, hot, and yellow; the countenance shrunken and jaundiced; the expression perfectly listless; the abdomen is often quite free from pain, soft, and not distended; in other instances pain is produced by slight pressure over the uterus, and especially the ovaries; this pain also shifts its position. Again, there are cases in which the abdomen becomes suddenly distended and very painful: vomiting sometimes takes place; diarrhœa is generally present; the lochial discharge may be suppressed, but often is not interrupted; the milk is not secreted. The patient begins to wander, is excited, and delirium follows—violent, perhaps, at first, but soon subsiding into a low muttering. She lies perfectly prostrate; twitchings through the voluntary muscles, and coma, precede death.

In the progress of these symptoms, local inflammation frequently takes place, having its seat in the buttock, in the joints, in the cellular tissue of the orbit or of the extremities; diffused inflammation, with extensive suppuration, has been observed in all these situations. Nor is it confined to the external surface: the internal organs often present similar morbid changes; thus the lungs, the liver, the spleen, the kidney, even the heart, and constantly the uterus and ovaries, have been the seat of purulent deposits.

The group of symptoms that depend upon disturbance of the nervous function form the most remarkable feature in this malady,

as distinguishing it from that which we have previously described. The muttering delirium and subsultus tendinum observed here are not present in true puerperal fever: the frequent absence of abdominal pain in erysipelas, and its fluctuating character when present, are also worthy of attention.

We shall not now stop to inquire whether erysipelas, as it thus manifests itself, and puerperal fever, are one and the same disease. We prefer, for the present, that you should consider them distinct disorders: but, as a connecting link between them, and in order to trace their relationship, we shall direct your attention to that form of attack described by Drs. Gooch and Ferguson—the second variety of peritoneal fever of Gooch, a variety of the first form of puerperal fever of Ferguson—one in which the abdominal pain is transient, as contrasted with that where it is permanent. "Of two patients attacked by abdominal pain," says Dr. Ferguson, "it will, in the majority of cases and at the commencement of an epidemic, be very difficult to ascertain which is the slighter, which the severer malady. In both, the intensity of anguish—the seat of pain included between the pubes and a line drawn from the superior crest of one ilium to that of the other—the precursory rigor, followed by the hot fit—the time of attack, from the first to the fifth day after parturition—are all the same, and neither the pulse nor the degree of fever distinguishes the one from the other. The action of remedies, however, shows their distinctive characters: the transitory form being readily relieved by such agents as lull pain; while the other requires such as are used to quell pure inflammatory action. The transient abdominal pain passes into the second or permanent kind; but in some epidemics it forms the principal character of the common malady, and I have never seen one in which some of these did not occur" (*Essays*, p. 11). Dr. Gooch details cases in every respect similar, exhibiting intense pain of the abdomen, which was quite tympanitic, a rapid pulse, hurried breathing, some vomiting, and great anxiety. They were relieved by opium and fomentations, but injured by depletion and purgatives: and in them, after death, the peritoneum was found quite natural, without serous or sero-purulent effusion, without adhesion or any of the usual indications of inflammation. Is this erysipelas of the

peritoneum, the traces of inflammation disappearing after death just as the blush of erysipelas leaves the integument? or is it erysipelas of the mucous surface of the intestines, causing flatulent distension of the abdomen, and the distressing anguish of colic? If treatment be a test of the character of a disorder—and we think it a good one—the treatment recommended by Gooch and Ferguson for this affection is that which is the best suited for erysipelas, and most assuredly one that is quite unavailing in the disease which we have described as puerperal fever. The *post mortem* appearances also indicate an essential difference, to which we shall have again to refer.

Effects of Puerperal Fever in Modifying other Diseases.—The presence of an epidemic aggravates every form of disease that comes within the sphere of its influence, however remote that affection may be from the essential characters of the epidemic itself. When typhus fever is present, every form of fever assumes a typhoid character. When cholera made its appearance, every irritation of the intestines was disguised by symptoms resembling cholera; and thus we find that the presence of puerperal fever aggravates considerably the danger of affections which, if it be absent, are seldom fatal, just as the presence of erysipelas gives an unhealthy aspect to the most trifling inflammation or the slightest sore. Such seems to us to be the effect of puerperal fever on some disorders that are met with, which at other times are usually curable.

One of these is the *Gastro-intestinal Fever* already briefly alluded to. When a case of gastro-intestinal fever occurs in the epidemic season, it presents very different characters from those which are usually observed: it assumes a typhoid form, and, although more within the reach of treatment, it is sometimes as dangerous as puerperal fever itself. This disease lasts from a week to fourteen or to twenty-one days: the prevailing constitutional symptoms are of a typhoid type. The symptoms commence with a rigor, followed by a transient peritoneal tenderness that seldom lasts, and is always easily removed by moderate local depletion; the pulse is quick; the tongue is furred in the centre, and red at the margins and tip, and it afterwards grows dry and

brown, as in typhus. The skin is dry, hot, and of a dirty sallow colour. There is generally nausea; sometimes vomiting; and always diarrhœa, which is excited by the least irritating substances. The evacuations are exceedingly offensive, and dark-coloured. There is great irritability, and occasionally slight delirium, with considerable prostration and tremors through the limbs. The patient gets little rest, being disturbed by hallucinations. This fever, when fatal, generally, merges into typhus; but its more usual course is to assume a remittent form, the exacerbations coming on generally in the evening. It is this disease which has been described by Dr. Butter (1775) as "the remittent form of puerperal fever," and is Dr. Ferguson's "second form of puerperal fever, with gastro-enteric irritation."

Puerperal Mania is another disorder that may be similarly modified. On the same day that a case of typhus fever was admitted into the Dublin Lying-in Hospital, and about ten days before puerperal fever broke out, a case of puerperal mania occurred which presented the following symptoms. On the fourth day after her labour, which occupied about fifteen hours, nothing unusual taking place, the patient was observed to be extremely nervous and irritable. She complained of no local pain, but was seized in the course of the day, with dyspnœa, accompanied with a severe pain in her chest. The pulse was 120. She was bled, and given tartar emetic. The blood was not buffed; vomiting was very easily excited; a fetid enema readily acted on the bowels, which discharged a large quantity of flatus. The following night she slept well; in the morning she complained of some pain at the epigastrium, and was restless. The restlessness increased during the day, so that she constantly tossed herself about the bed, and was with difficulty prevented from getting up. That night she had no sleep, became *quite delirious*, but still, when asked a question, answered collectedly. The pulse rose to 160; respiration became quick and irregular, the cheeks being occasionally puffed out; the evacuations from the bowels were more frequent, dark, and offensive, of the consistence of gruel. She had also some vomiting. Tenderness of the abdomen was now first perceived, and in the evening this part became

suddenly quite distended. From this time the change was remarkable. The extremities were cold and clammy; the face was collapsed, covered with a greasy perspiration; the pulse was almost indistinct; delirium still continued; she was more restless, constantly talking, and making feeble efforts to leave her bed: vomiting returned, what was ejected being quite grumous and offensive. After this she gradually sank, and died on the third day, about sixty hours from the commencement of the attack. The *post mortem* inspection shewed in the abdomen the usual sero-purulent effusion of puerperal fever; but there was also great congestion of the vessels of the brain, and some effusion into the arachnoid, which was in some parts of a pearly whiteness.

This case, therefore, admitted of two interpretations. It was either a case of puerperal fever, the arachnoid being first engaged, the peritoneum subsequently; or it was a case of puerperal mania, modified and rendered fatal in consequence of the epidemic that was then approaching. We are inclined to adopt the latter opinion; because the attack of puerperal fever did not commence until ten days afterwards, and during its progress no similar case was observed, which would be very unlikely if this first case were to be considered an example of that epidemic. In its characters it bears a close analogy to Dr. Ferguson's "third or nervous form of puerperal fever,"—a form that he admits is "by far the most rare of all the various kinds of puerperal fever. . . . . Those" (says Dr. Ferguson) "in whom the nervous character is the sole, or at least the most prominent part of puerperal fever, exhibit all its symptoms in all its irregularity and inconstancy. There is painful and sudden abdominal tenderness, which subsides with extreme rapidity. There are a rapid pulse, great restlessness, and mental uncertainty and agitation, together with shifting functional disturbances of various organs; sighing, tremors, cramps, sudden and death-like sinking, and as sudden re-appearance of strength. With these there are, nevertheless, from the beginning of the attack, unequivocal marks of deep injury to the nervous system. The faculties and feelings are strangely disturbed, and the terror which the patient expresses,

or the furious delirium which often ushers in the attack, soon gives way to fatal coma, or to sudden syncope." (*Essays*, pp. 25—26).

Phlegmasia Dolens is also a disease greatly modified and rendered much more fatal by puerperal fever. We have stated to you that it is not generally a fatal disease. It sometimes happens, however, that the effort to circumscribe the poison fails; it circulates with the blood, and a fatal phlegmasia is the result. This may happen when no puerperal fever exists; but is sure to occur if that disease be present.

In the previous detail of symptoms, we have not adopted any of the divisions of puerperal fever usually made; our object has been rather to bring before your attention that disease which the great majority of writers agree in calling puerperal fever; in the description of which the earliest and the latest observers perfectly coincide. The intensity of the disease varies in its degree; but in every material point its character is uniform: so far, therefore, we are speaking of one essential disorder. When it is present, however, other diseases are found to accompany it, which are often, we might say generally, classed as forms or varieties of puerperal fever. In such a sense the disease is not uniform, and in this sense we have spoken of its protean character; but we would wish you, in our inquiry into its nature, to separate in your mind the malady itself from its companions. Thus we have erysipelas appearing so constantly together with it—in the same place, at the same time, and under the same circumstances—as to create a doubt whether they are not one and the same disease; an opinion that is greatly strengthened by the fact, that each will reciprocally communicate the other disorder. Then, those affections which we have just named as being modified by puerperal fever, assume many of its characters, and bear a strong resemblance to it. These, however, must be distinguished from puerperal fever, such as we have described it; and for this purpose we prefer a different classification from those more usually adopted. We would propose to you a three-fold divisions: First, that which may be considered *par excellence* the *Puerperal Disease or Fever;* secondly, *Erysipelas;* and thirdly,

Puerperoid Diseases. We shall not now discuss the propriety of classing these disorders in such a manner; it is sufficient for our purpose to separate the disorder that possesses all the essential attributes of the malady, from those diseases which are of a more mixed character—affections that retain the leading feature by which they are named, but still present strong similitudes to the prevailing malady.

Pathology. The morbid appearances of puerperal fever are extremely various. The most intense degree of the disease may present no morbid change beyond venous congestion. The peritoneum is perfectly free from effusion, either of serum or lymph, the only alteration being that the colour is dull and the aspect of the intestines livid; the uterus and, with the exception of some dark points in the ovaries, the appendages are unaffected; the large venous trunks are generally distended; and the spleen is enlarged and softened.

In other cases, that present precisely the same symptoms as the former, considerable serous effusion takes place through the tissues: that in the peritoneum is of a dusky colour, and very abundant; lymph, or what resembles lymph, is found on the surface of the intestines; it is of the same dusky appearance, is not adhesive, and when removed from the intestine exposes a violet-red surface; the uterus is infiltrated like a wet sponge; the subperitoneal tissue is also filled with serum, which partly escapes and is partly retained, giving the tissue a jelly-like aspect.

In a third series of cases of puerperal fever, the peritoneum is filled very abundantly with sero-purulent fluid: flakes of creamy lymph are found on the intestines, frequently forming a fringe along their margin; the folds are filled with the same, dissolved, and resembling pus: the uterus and liver are frequently covered with it, and the pleura is often found in the same state as the peritoneum. The lymph is quite different from the adhesive or plastic lymph. When raised from the intestines, it leaves a smooth, dark-red surface. The uterus, its internal surface, its veins, etc., may be quite unchanged. In some instances, however, the uterus is softened; the veins contain pus, and are sometimes lined with lymph of the same character as that in

the peritoneum. When this pus is wiped away, the lining membrane of the vein is pale and smooth. The substance of the uterus may be infiltrated with this kind of pus. In one case, a section of the uterus resembled the section of a phthisical lung. The ovaries are generally softened, surrounded with pus, and sometimes obliterated. The tissue of the peritoneum is also softened, and separates easily from the intestines or uterus. This condition was particularly remarkable in Drs. Leake's and Hulme's cases: the omentum was pultaceous, dark, and putrid-looking—an appearance that led them to believe it was the cause of the disease. The intestines are usually distended with gas; but they may be unchanged in this respect. Such are the appearances presented in cases of extreme severity, where there is little or no pain, great prostration, and no symptom that could be described as inflammatory.

In other cases, where the symptoms are more progressive, and the constitution has a certain power of resistance, the morbid appearances are of a more inflammatory character. Adhesive lymph is mixed up and confounded with that which we have described; the surface of the intestine is rough when the lymph is removed from it, and the intestines, the uterus, and the omentum, are often united with tolerable firmness. In both varieties, the intestines are encircled by lines of injected capillaries. In the former class of cases the colour is a dark-red or violet hue; in these it is more florid. The uterus is generally increased in volume; the lining membrane is thickened, softened, and easily scraped off: its surface has a mottled appearance, partly dark red, partly green. The veins, especially in the neighbourhood of the broad ligaments, are usually filled with pus; and when so, it seems to be deposited there, because the vein itself presents no other evidence of inflammation.

These are the leading morbid products of puerperal fever, from which you will perceive that its effect on the tissues varies with the intensity of the disease. When it is at a maximum, no alteration beyond venous congestion is observed. When it is still great, but less in degree, an abundant effusion of serum takes place, and layers of dusky lymph are formed on the intestines;

but this lymph possesses none of the properties of that which is produced by inflammation; it resembles more the fibrine of the blood deposited in a lymph-like layer upon the intestine. In other cases of the same kind, this lymph or fibrine has a purulent aspect; it is yellow, creamy, and, when dissolved, resembles pus; if mixed with serum, it has a lactescent appearance—the sero-purulent fluid of authors. This deposit is not confined to the peritoneum, but is found also in the pleura, and even in the lining membrane of the uterine veins.

When the constitution struggles against the incursions made upon it, we find, combined with the appearances just described, evidences of inflammation both in the peritoneum and in the uterus: some adhesive lympth is thrown out, which unites the different parts together. Another remarkable feature in the pathology of this disease, is the tendency that exists to softening of the tissues: the peritoneum, the uterus, the liver, the ovaries, are all more or less softened; the ovaries sometimes seem dissolved, the spleen and liver are quite friable; in fact, scarcely any of the tissues escape this destructive process.

Erysipelas produces a different series of morbid appearances. The cellular structure, the veins, the mucous membranes, are chiefly affected; abundant deposits of pus are met with, and the softening of the tissues amounts to putrescency. Pus of a more decided character is found, not only in the veins, but in the substance of the uterus, where small abscesses are formed. It is observed also in the hypogastric veins and absorbents; in the ovaries, forming large abscesses; in the liver, in the spleen, abundantly in the lungs; and we have seen an abscess even in the substance of the heart. It is found in the intermuscular cellular structure, and especially around the joints. The loose cellular tissue at the back of the orbit is often its seat; and large abscesses are frequently observed in the fine reticular tissue between the peritoneum and the uterus. The mucous membrane of the vagina may be in a state of slough, and that lining the uterus covered with a putrid sanies: the substance of the uterus is partially softened, black, and friable, and the odour extremely offensive. Such are the effects of erysipelas; but along with

these the appearances of puerperal fever are so combined, as to confuse us greatly in our attempts to separate one disease from the other. In some cases sero-purulent fluid and lymph are found in the peritoneum; the intestines are distended with flatus, and streaked with lines of injected capillaries. The true characters of each may, however, be recognised in less complicated cases; and then we find in puerperal fever that the chief morbid changes are in the serous membrane; while in erysipelas the mucous surfaces, the veins, and cellular tissue, are principally engaged. The peritoneal fever of Gooch was remarkable for the absence of any morbid alteration in the peritoneum, notwithstanding that all the symptoms pointed to it as the seat of the disease: hence the question arose, Could this be erysipelas in a serous membrane presenting itself in a new form, but preserving its evanescent character?

In gastro-enteric fever, mania, and phlegmasia dolens, the morbid changes in each are characteristic of the disease, but are in a similar manner mixed up with the appearances of puerperal fever.

Such is a brief outline of the pathological anatomy of this disorder.

LECTURE XL.

PUERPERAL FEVER (*continued*).

NATURE OF PUERPERAL FEVER.—What, then, is puerperal fever? Is it a common term, applied to the various forms of inflammation met with in the puerperal state—to peritonitis, phlebitis, metritis, etc.? Or is it an essential disease distinct from these? These questions are very important, because on the truth or falsehood of the answers given to them, depends the leading principle which must govern our treatment. In order, then, to arrive at some conclusion respecting the nature of puerperal fever, and to free the question from many of the complications that surround it, let us first, by a process of negation, determine

what puerperal fever is not. Are puerperal fever and puerperal peritonitis one and the same disease? If we can maintain the negative of this proposition, and can prove that puerperal fever is not puerperal peritonitis, we shall make an important step towards simplifying this inquiry. Some of the greatest difficulties that encumber the subject, arise from the opposite views that are held on this point. The confusion of terms—and, we might add, the confusion of treatment—that constantly present themselves, have their origin in no other cause than our uncertainty with regard to this important question.

Puerperal Fever not Peritonitis.—We hold that *puerperal fever and puerperal peritonitis are distinct diseases;* that one may exist in the absence of the other; and that, although inflammation of the peritoneum most frequently forms part of the disease which we name puerperal fever, this special inflammation stands to it in the relation of an effect to its cause. Puerperal fever differs from peritonitis in the mode of its attack, in its symptoms, in its morbid appearances, and we think, in its treatment. Whenever inflammation takes place in the peritoneum, it is always traceable to some obvious cause. A difficult and protracted labour is followed by inflammation of the womb, which extends to the peritoneum. The extreme refrigeration used to check hæmorrhage may be followed by peritonitis. If the patient be exposed to sudden draughts of cold air, or be overheated and has improper food, these also become exciting causes, and inflammation of the peritoneum may be the result. But when there is no such obvious cause—when a patient, after a most favourable delivery, and notwithstanding the most judicious management, is seized with symptoms of peritonitis, such an unexplained attack, quite contrary to our ordinary experience, affords a just ground for suspecting that the disease which we now see, is different from that inflammation we have been accustomed to observe. We may further conclude, that the essential difference between the two inflammations exists in some unknown cause that is in operation in this latter case, where no manifest cause of seizure is present. This conviction is strengthened, when we find, without any apparent reason, the most intense severity in

the symptoms. In ordinary cases, inflammation of the peritoneum occupies some days in its progress before it arrives at a fatal termination; in this instance the patient may be at once prostrated by the attack, and death take place within twenty-four hours. The symptoms of peritonitis may be present, but they are those of the second stage—the stage of collapse. The inflammatory symptoms, or those of the first stage, are absent, as if they had not time to develope themselves because of the intensity of the seizure. Hence then, an inflammation that comes on, as it were, of its own accord, without any provocation, that runs an unusually rapid and fatal course, cannot be considered an ordinary inflammation. The manner of its approach demonstrates that it has a special character; and thus far we may assert, that the peritonitis of puerperal fever and puerperal peritonitis are not the same inflammations. But we may have puerperal fever without a single symptom of peritonitis, without a single morbid change in the peritoneum: that is, the patient may be seized with a rigor, with some tenderness in the uterus or in the abdomen, and before the commencing inflammation becomes manifest, she may sink into a state of collapse—the tenderness may disappear, and after death the peritoneum may be found pale and unaltered. Such has been observed in the very worst cases of the disease, the nature of which we are now discussing; and they afford incontrovertible evidence that inflammation of the peritoneum, or indeed of any other structure, is not an essential element of puerperal fever. The late Dr. Mackintosh ingeniously argued that these cases were only peritonitis in its most intense form, accompanied by extreme congestion in the venous circulation; that the oppression on the nervous system was so great as to destroy all sensation of pain—all activity of function; that consequently, there was no tenderness—no effusion—none of the ordinary evidences of peritonitis. Hence he insisted upon the importance of free and bold depletion to relieve this condition, and argued that, when the oppression was removed, the latent inflammation would become manifest. The reasoning was ingenious; but the practical test of its truth—depletion—proved its fallacy. Loss of blood was found only to

hasten a fatal termination; and every writer of any authority cautions his reader against depletion in these cases. Even Dr. Armstrong, the warmest advocate of the lancet, and who names this "the congestive disease," speaks with great hesitation about bleeding. He compares a case of this kind to surgical cases "when the nervous system has sustained some great shock from an accident. The skin becomes universally cold, the blood retires from the surface into the interior, and the heart's action is extremely oppressed. *Under such a state of things, it is an admitted principle in surgery not to bleed immediately; and indeed, when it is done, death is often the consequence*" (Armstrong, p. 187).

Distinction in Symptoms. The symptoms of peritonitis, and of puerperal fever accompanied by inflammation of the peritoneum, do not precisely correspond. They agree in the diffused pain and general distension of the abdomen; the stomach is equally irritable in both cases; the patient is watchful and anxious. But they differ in many respects. For instance, in peritonitis, the bowels are constipated often to such a degree as to resist the strongest purgatives: in puerperal fever, diarrhœa may be one of the first symptoms that usher in the abdominal tenderness. The pain in peritonitis generally commences in the neighbourhood of the uterus, and takes a certain time to diffuse itself over the abdomen: in puerperal fever, the pain frequently commences in the neighbourhood of the diaphragm, shooting through the ribs and epigastrium in violent stitches, and then spreads over the abdomen. The pulse in peritonitis is inflammatory, increasing with the inflammation, subsiding as it is subdued: in puerperal fever the pulse is febrile, observing periods of increase and decrease independent of local symptoms: nay, when these have disappeared under the influence of treatment, the pulse may still remain at its former rate quite unaltered. This fact deserves particular attention; because it proves that the pulse, and not the local symptoms, is the surest evidence of the state of the patient. The countenance is not exactly the same in each case. In peritonitis, anxiety and suffering are chiefly expressed: in puerperal fever despondency is combined with them, and

gives the countenance a peculiar and characteristic expression that is not easily described. Headache is not generally observed in peritonitis, although a frequent symptom of puerperal fever. Thus the symptoms, which in both diseases seem to resemble each other, will be found, on a closer examination, not to agree, but to present sufficient points of difference to distinguish one from the other. If you require a diagnostic symptom, we should direct your attention to the influence of inflammation on the intestines. Pure inflammation of the peritoneum at once suspends their action, and produces constipation; that inflammation which belongs to puerperal fever has no such effect—on the contrary, diarrhœa is often one of its earliest symptoms.

Distinction in Morbid Appearances. In peritonitis, all the arterial capillaries are highly injected, hence the intestines are streaked with bright red lines of capillaries that encircle them: in puerperal fever the venous capillaries predominate, hence the livid hue of the intestines, and the dusky red colour of the patches and streaks on their surface. In peritonitis, the lymph which is poured out is adhesive, uniting the different parts like glue; if removed from the surface of the intestine on which it is deposited, the strings of this lymph are broken across, and the surface is rough; the quantity of serum poured out is not great, and, being lodged in the cavity of the pelvis, may at first escape observation. In puerperal fever, that which we call lymph is not adhesive; it is much more abundant than adhesive lymph, covering the fundus of the uterus, the intestines, the liver, the diaphragm; it is found also in the pleura; its colour varies from a dusky brown to a pale yellow; it may be peeled off the liver, the intestines, or the uterus, quite easily; the surface from which it is taken is smooth, and that of the intestines is of a dark red colour. The quantity of serum is equally profuse; and this substance being dissolved in it, gives it a lactescent appearance like pus; hence it is called sero-purulent fluid. Thus, when the abdomen is opened, a large quantity of this fluid always escapes. It will be objected that this sero-purulent fluid is also met with in peritonitis. This is perfectly true; but it is necessary to note the stage of the inflammation in which it is observed. We

have never met with it unless in the second stage of the attack. When a patient died in the first stage, there was none of it. We conclude, therefore, that in the former instance (the second stage) such effusions only occurred when the constitution was sinking under the attack; but in the latter, when death took place from a different cause, the effusions noticed were the true products of inflammation. In puerperal fever, the greater the intensity of the seizure, the less the chance of meeting anything like lymph. In the most intense forms no effusions at all may take place. In a degree less intense, a large quantity of serum, coloured brown by blood, is found in the peritoneum and throughout the tissues: the lymph poured out is of the same colour, having no adhesion to the surface on which it lies, as if the fibrine of disorganised blood had been deposited there. In the next degree, the same kind of lymph or fibrine is found, of a yellow colour, with a quantity of sero-purulent fluid. And lastly, in those cases in which the constitution for a time struggles successfully against the fever, some adhesive lymph will be met with, mixed up with a larger quantity of what we have just described. You will perceive that in protracted cases of either disease the morbid appearances most nearly resemble each other; but that, in cases which are quickly fatal, the distinction between them is quite sufficient to enable us to separate one from the other.

It appears to us, then, that neither in the manner of the attack, nor in the symptoms, nor in the morbid appearances, are puerperal fever and peritonitis perfectly alike. We shall presently show you that there is a difference, also, in the treatment. We are not justified, therefore, in calling one disease by the name of the other; and it appears to me just as absurd to call puerperal fever, attended with inflammation of the peritoneum, puerperal peritonitis, as to name every case of pure peritonitis that is met with after delivery puerperal fever. The importance of this distinction will be admitted, if we reflect on the serious mistakes that may arise, and which, in fact, have arisen from such confusion of terms. If, on the one hand, we call puerperal fever peritonitis, we deceive ourselves in the belief that we are

only treating an inflammation, which, although severe, perhaps fatal, differs in no respect from peritonitis in the non-puerperal state or in the male. Our treatment, therefore, may fail because it is misdirected; and the disease that we so name may spread rapidly to other cases, because no precautions are used to prevent the diffusion of an inflammation that we believe is not essentially infectious. On the other hand, to call peritonitis puerperal fever is to sound an alarm most unnecessarily, and may be the means, perhaps, by injudicious treatment, of losing a patient who otherwise might be saved.

Uterine Phlebitis distinct from Puerperal Fever. In place of being commonly met with, we believe uterine phlebitis to be a rare disease. We have already quoted evidence (p. 634) sufficient, we trust, to prove that the uterine veins are very difficult to inflame; if they were very susceptible of inflammation, uterine phlebitis would be the consequence of every severe labour, especially where the child perishes and becomes putrid. The putrid *débris* of the placenta, pus, and such like irritants, would soon light up inflammation in these veins if they were so irritable as they are supposed to be. We have witnessed numerous cases of puerperal fever, in which the uterine veins were chiefly engaged; but very seldom indeed have we met with cases of true uterine phlebitis.

The history of one case will be sufficient to illustrate its true characters. Some years ago, we were called to a case of flooding in Tottenham Court Road, in which it was necessary to use refrigeration, injecting cold water into the womb, etc., to arrest the discharge. We succeeded; but on the following day the patient complained of headache, and had a severe rigor. On the third day the tongue was dry and furred; the pulse 120. On the fourth day, the tongue was almost black with sordes: the skin was burning hot and jaundiced; the pulse 140. There was no secretion of milk. Partial sweats broke out over the surface; and the patient was delirious.

The treatment pursued gradually subdued these symptoms; but as she was recovering she complained of great pain in the left leg. A swelling was observed in the gastrocnemius muscle,

which soon increased, and became extremely painful. It was evident that a deep-seated abscess had formed; it was opened, and a large quantity of pus was discharged. She then recovered.

This case presented all the characters of phlebitis so well described by Mr. Arnott; but they were altogether different from those of the so-called phlebitis of puerperal fever.

The morbid appearances of the veins in puerperal fever do not indicate inflammation. The uterine veins, especially in the broad ligaments, are very commonly filled with a purulent-looking fluid, but if this be wiped away, the coats of the vessels are pale, smooth, and of their natural thinness. This fluid is found spreading through a number of them; and often lies outside their coats. The uterus has sometimes been so completely infiltrated as to resemble a wet sponge more than any thing else. But this is no proof of phlebitis.

The question may be asked, Where is the essential difference between these cases? The essential difference seems to us to consist in the presence of a new element in puerperal fever, not met with in ordinary inflammation of the veins. When inflammation is set up in any of the tissues, it is a reparative process to circumscribe a disease, and to prevent its extension. This is strikingly the case in inflammation of the veins, where the circulation of pus would cause so much mischief. We have already pointed out the effect on the veins if pus enter the circulation—coagulation of the blood, *external* inflammation, and, if it reach the capillaries, the formation of abscesses to expel it.

So also in peritonitis, *adhesive* lymph is thrown out uniting the different surfaces in order to limit the mischief. But when puerperal fever is attended by these so-called inflammations, the process is altogether different; it is destructive of the tissues engaged. In the peritoneum the lymph is not adhesive, inflammation is never circumscribed, and the peritoneum is sometimes softened to such a degree, as to appear gangrenous, as Hulme and Leake have testified. In the womb, a similar process of softening may take place; and in the veins a purulent-looking fluid is diffused without limit. It is deposited more or less in

all the tissues. Thus then the essential difference between these inflammations and puerperal fever is the same as exists between union and disunion, between building up and taking to pieces, between preservation and destruction.

Having thus endeavoured to prove what puerperal fever is not; it remains for us to enquire what this malady really is. In discussing this part of the question, we can only point out the path that appears to us to lead to the truth; if we cannot succeed in finding it, something at least is gained if we avoid wandering into error.

Characters of Puerperal Fever as a Zymotic Disease.—We consider puerperal fever to be the result of a poison, and its symptoms as manifestations of its action on the constitution. We think it will be found to obey in every respect those laws which the late Dr. Thomas Williams has so admirably demonstrated as common to all poisons.

Assuming, then, that puerperal fever belongs to the class of zymotic diseases and obeys their laws, we shall find—1. That it is an uniform disease. 2. That it selects a tissue for its seat. 3. That it has a certain and definite action. 4. That the action of the poison is modified by the dose, and by the temperament and constitution of the patient. 5. That it has a certain period of latency. 6. That it is generated by the same laws of incubation as exist in other epidemic diseases.

1. *It is an Uniform Disease.* The best descriptions of puerperal fever in the present day differ in no essential particular from the accounts handed down to us of the malady that raged a hundred years ago. Then, as now, it appeared suddenly, and its presence completely changed the scene. It followed a most destructive course, seizing upon all alike, and causing such devastation as to excite a panic equally in the minds of the profession and of the public. Its disappearance was just as sudden and unexplained as its advent. Such is the manner of its approach and departure in the present day; and in this respect it resembles typhus, yellow fever, cholera, or plague. When the poison is present, the most trifling cause, which would have no effect at any other time, will excite its action;

and further, it will by its influence modify pre-existing diseases.

2. *It selects a Tissue for its Seat.* We know that this law prevails with all poisons. Arsenic acts on the stomach; digitalis on the heart and kidneys; opium, strychnine, and several others, on the nerves. So, also, the poison of typhus seizes on the glands of the small intestines; cholera on the whole gastro-intestinal mucous membrane; diphtheria on the fauces; influenza on the pulmonary mucous membrane; scarlatina and measles on the skin.

The seat of puerperal fever is the serous membranes and those analogous to them. The peritoneum is chiefly engaged, because absorption goes on much more rapidly here than in other serous membranes. During pregnancy, the peritoneum is stretched to its utmost extent. After delivery, it rapidly returns to its original dimensions; and therefore is much more easily exposed to the absorption of any poison. Besides this the uterus and vagina are undergoing the same rapid changes; and quickly convey any poison to the serous membranes in immediate relation to them. The peritoneum is therefore most commonly affected; but the pleura and the synovial membranes do not always escape; and we believe that the arachnoid is sometimes the seat of the poison.

3. *The Definite Action* is on the blood. The quantity of fibrine is increased, the quality deteriorated. A profuse exudation of *morbid* fibrine takes place, which has none of the properties of healthy organisable lymph. It is not adhesive; it dissolves into a creamy substance, which when fluid resembles pus, and has been found abundantly in cases where there was not a single symptom of peritonitis. This poisoned fibrine has been found coating the uterus, the intestines, the spleen, the liver, without adhering to them. Creamy fringes border the mesentery; yellow dissolved fibrine is met with in the folds of the intestines, looking like abscesses; the fluid mixing with the effused serum gives it a lactescent appearance—the "abundant milky serum" of authors. Exudations are not met with in the veins; because, not being adhesive, they are carried along by the circulation;

but dissolved purulent-looking fibrine is met with abundantly, not only in the open mouths of the sinuses, but throughout the uterus, giving it, as we have stated, the appearance of a wet sponge filled with pus. Sometimes soft coagula close the sinuses; and occasionally, but very rarely, a vein may be closed by a firm plug of fibrine, just as true organisable lymph is sometimes met with in the peritoneum.

In both instances, the evidences are those of a feeble and fruitless effort to limit the action of the poison.

4. *The Action of the Poison is modified by the Dose as well as by the Temperament and Constitution of the Patient.* Puerperal fever selects its victims. In the same hospital, and in the same ward, it will not extend from bed to bed, but is found scattered in different directions. When, from any cause, nervous energy is impaired, the poison is freely absorbed. In hospitals, seduced women are always an easy sacrifice; but even among the affluent, powerful secret causes of mental depression may act with as much force, and expose them to its influence. Such causes are generally unknown to the physician, and he is puzzled and disheartened by the result; nevertheless, their existence is certain, and must always be appreciated.

The most important feature, however, of this law, is the manner in which the characters of the malady are modified by the quantity of the poison absorbed. When it is in excess, the patient may die of puerperal fever, without any other symptoms than a fluttering pulse and cold livid surface. Death takes place so rapidly, that there is not time to set up the specific action of the poison. There is an absence of the usual symptoms called inflammatory, and sometimes also no morbid appearances. On the other hand, the dose of the poison may be so small, and its action so feeble, that true inflammation makes the effort to arrest it, and the case may really be peritonitis, phlebitis, or arthritis.

The contradictions in opinion and in treatment among authors, may perhaps be explained by this law. Those who meet the milder forms of the fever, describe and treat it as a local inflammation; whilst those who witness the plague in its full intensity, stand aghast at symptoms, which no theory of inflammation could explain.

5. *The Fever has a certain Period of Latency.* It is very difficult to determine the interval between the absorption of the poison and its action. In the Dublin Lying-in Hospital, a case of typhus was brought in by mistake, and immediately dismissed. Puerperal fever appeared in forty-eight hours afterwards, although the Hospital had been free from it for a year before. So also, in cases where the poison seemed to have been communicated directly at the time of delivery, it did not manifest its action until forty-eight hours had elapsed. This probably may be its period of latency; but as yet we have not sufficient evidence to determine it accurately.

6. *It obeys a Law of Incubation, and is generated in the same manner as other Zymotic Diseases.* The same causes that generate typhus fever—imperfect ventilation, foul air, an epidemic constitution in the atmosphere—will produce puerperal fever; but besides this, the direct absorption of putrid matter will do so. Drs. Routh, Arneth, and Semelweiss, have pointed out the effect of cadaverous effluvia in exciting and increasing to a frightful extent this fatal malady (*Med.-Chir. Trans*, vol. xxxii.). Those in the habit of dissecting, know how difficult it is to remove the smell of the dead body from their hands. They may be washed again and again, and yet the smell remains. This proves the tenacity of the effluvium. These physicians have shewn that it acts as a poison when absorbed by the vagina. In the Vienna Hospital, this cadaveric poison was communicated by the pupils who came from the dissecting-room to attend labours. They did not use sufficient precaution to prevent contamination; and puerperal fever was the result. In the Paris Hospital it has been produced in a similar manner. The Maternité is near the great *abattoir* Montfaucon, and the presence or absence of puerperal fever seems to depend on the way the wind blows. The Hospital is safe so long as its direction is towards Montfaucon; but when the current is reversed, puerperal fever begins.

We have had a strong and rather dangerous illustration of the influence of decomposed animal matter in generating this poison. We were once called to see a woman in severe labour. Inflammation of the uterus was just commencing; the child was dead

—the bones were loose—putrefaction had commenced. The head was perforated, and with much difficulty extracted. In two hours afterwards, we were again sent for to remove an adherent placenta. The right arm was first introduced, then the left, and a putrid placenta taken away. On the following day, some pimples appeared on both arms, and became pustules in a few hours; and one of them especially was surrounded by a livid base, having all the characters of the malignant pustule, such as has been observed among the slaughterers in the South of France. It was cut through by Mr. Liston, and cauterized, which prevented further mischief. Exactly at the time when these pustules appeared, symptoms of puerperal fever were noticed in this patient, of which she died on the fourth day.

Thus we have an addition to the chain of evidence so ably brought forward by Dr. Ferguson, to prove that "the phenomena of puerperal fever originate in a vitiation of the fluids, and that the various forms of puerperal fever depend on this one cause, and may be readily deduced from it." The decomposition of the animal tissues will generate the poison of puerperal fever, aud vitiate the blood.

But the sudden incursion of the fever which sometimes takes place, the devastation committed, and its equally prompt disappearance, present characters that such causes will not sufficiently explain. We must look for causes among epidemic influences; and hence, when we find typhus in the fever hospitals, erysipelas in surgical hospitals, or any other epidemic prevalent, it is then that puerperal fever will visit the lying-in wards or lying-in chamber—the harbinger of death.

Two Morbid Poisons may co-exist in the same Constitution. This is not a law, but a well-known fact of some importance. Measles may be the companion of whooping cough; erysipelas and syphilis are found together; erysipelas and typhus are met with in the same patient. It need not, therefore, create confusion, if erysipelas and puerperal fever accompany each other; if we find extensive sloughs in the passages, and morbid fibrine in the peritoneum. It seems to us, however, that erysipelas rather precedes and follows puerperal fever, than accompanies it. In

the Dublin Lying-in Hospital, where an experience of this disease had been most accurately formed, erysipelas preceded puerperal fever, disappeared when the latter was in full operation, and returned on its decline. Erysipelas was then prevalent in the Surgical Hospitals; and it is probable that it was taken up by the passages when inflamed, and that this poison excited the puerperal poison. Evidence has now increased, sufficient to prove that erysipelas will excite puerperal fever; and conversely, that puerperal fever will excite erysipelas. But this does not prove that these poisons are identical; each has its specific and definite action; and although one will produce the other, they are not the same. Dr. Gooch, in his highly practical paper on puerperal fever, describes cases with quick pulse, tympanitic, and extremely tender abdomen, with great prostration; but in the *post mortem* examinations of those who died, although the "intestines were found enormously distended with air, there was neither redness, adhesion, nor effusion of any kind;" the peritoneum was pale and colorless. Dr. Gooch calls this puerperal fever; we cannot perceive here any of its true characteristics, but, if we might assume that erysipelas may attack serous membranes, the difficulty would be removed. It would explain the tympanitic abdomen, the prostration, its epidemic character, and the absence of any traces of its existence after death. It might also render intelligible, why patients were killed by depletion, and cured with Dover's powder—a medicine which has never yet succeeded in arresting true puerperal fever. This, however, is only guessing at a cause,—rather an useless occupation. The fever is not puerperal; and just as we have typhus and typhoid fevers, so this might be called *puerperoid fever*.

The last question in reference to this part of the subject is: —*To what Class of Animal Poisons should Puerperal Fever be referred?* Is it a contagion like plague; infectious like typhus; or epidemic like cholera? The evidence of Dr. Gooch, of Dr. Routh, of Dr. Semelweiss, is too strong to allow us to escape from admitting its contagious character. Dr. Gooch has quoted several instances in which this plague has haunted some unfortunate practitioner from case to case, destroyed all his patients, and ruined his practice. We have already alluded to the manner in

which this poison was communicated in the Vienna Hospital, by students coming from the dissecting-room. The poison of decomposed animal matter was brought *into contact* with the passages by the hands of the students; and thus the puerperal poison was either absorbed or called into action.

This seems to establish its contagious nature: but there are negative arguments against this opinion derived from opposite facts. Those in attendance on patients afflicted with this fever, have failed to communicate the disease. Obstetric physicians go from their lying-in-hospitals into private practice without spreading the fever. Practitioners who meet with it in their circle of practice, do not of necessity spread the malady; although there are some melancholy instances to the contrary.

Negative arguments are always weak; and here especially. If a poison be contagious, it by no means follows that it must always be communicated. If this were the case, measles, whooping-cough, and such like contagions would become universal soon after they appeared in a district. There are many causes, whether constitutional or accidental, which may promote or resist the absorption of a poison. Plague is the most contagious of all poisons; even plague has been resisted, and so may other contagions; but this is no proof that they are not contagious.

Treatment. — The treatment of puerperal fever must be considered in reference to the views we have placed before you. We have endeavoured to prove from its history, its symptoms, its morbid appearances, and its nature, that it is the result of a poison, and must be treated as such. To treat it as a local inflammation of any of the tissues is a most dangerous mistake. It is dangerous, because, the character of the disease as arising from contagious poison being lost sight of, this peritonitis or phlebitis may be communicated from patient to patient; inflammations are not contagious, and no precautions are used, being, as it were, unnecessary. It is dangerous, also, because the treatment to combat an inflammation utterly fails when it attempts to control a poison; the mortality, therefore, is increased beyond what it might be. It is dangerous in another sense; to call puerperal fever peritonitis or phlebitis, is like calling typhus fever gastritis or enteritis. The poison is dis-

guised under a false name; and the means necessary to prevent its extension are not employed. The reports of the Registrar General are unavoidably inaccurate, because puerperal fever is returned to him as only so many local inflammations. The treatment, therefore, must be considered in two points of view; the *Prophylactic* treatment, or the means of preventing its extension; and the *Remedial* treatment for the purpose of removing it.

The *Prophylactic Treatment* is the same for all these maladies so far as cleanliness, perfect ventilation, frequent changes of dress and bedding are concerned; but, with regard to puerperal fever, *chlorine* seems to have a specific effect. Many years ago, Dr. Collins used it freely in the Dublin Lying-in-Hospital, in cleansing and fumigating the wards. He almost expelled the fever. Dr. Semelweiss has recently adopted it with great advantage. We have stated the manner in which puerperal fever was communicated by the students. Dr. Routh gives a most interesting account of the means used by Dr. Semelweiss to prevent this. "He recommended all the students frequenting the division (the labour-wards) not to handle dead animal matter, or, if they did, forbad them to make any examination until the following day. In the second place, he directed all students who attended the practice of the division *to wash their hands in a solution of chlorine prior to and after every (vaginal) examination made on the living subject*" (*Med. Chir. Trans.*, vol. xxxii.). The result of these precautionary measures was that the deaths, which had been from thirty to seventy each month, fell to seven in a month.

These facts prove that chlorine is not only a deodoriser, but a disinfectant. This suggests some important questions. Is the smell a proof of the vitality of the poison? If the smell be removed, is the poison destroyed? We have already alluded to the tenacity of the cadaveric effluvia. The student well knows that the ammoniacal odour, if he be not cautious, may accompany him even in his amusements as well as in his studies; he, therefore, employs every means in his power to avert such a catastrophe. Chlorine will do so; and Dr. Semelweiss has proved that it will do more—it will destroy the poison. If the view be

correct that chlorine is a disinfectant as well as a deodoriser, it has a very important relation to puerperal fever, which is always accompanied by a peculiar odour. To those who attend lying-in hospitals, the effluvia of the lying-in ward are well known; but the odour of puerperal fever is different. It is faintly acid—difficult to describe, but easily recognised by those who are accustomed to this malady. We believe that it is equally tenacious with the cadaveric odour, and that it will accompany the practitioner, unless he be strictly on his guard against it. Chlorine will destroy it, and the mischiefs which it may cause.

Other agents may be employed for the same purpose. *Proto-sulphate of iron* is also valuable, because of its power in fixing ammonia. We have therefore, in these agents, a powerful means of arresting a contagion in the outset, which if neglected, will destroy many lives.

Ventilation also plays an important part. Much of the mischief caused by puerperal fever has arisen from our ignorance of the principles of ventilation. The Continental Hospitals are remarkable instances of the neglect of these principles; their mortality varying from one in thirteen, to one in twenty. Some of our own hospitals were liable to a similar objection. The General Lying-in Hospital, built on the marsh of the Thames, had at one period a great mortality from puerperal fever; but the successful efforts which have been since made to secure perfect drainage, have almost expelled that fever from that hospital. Imperfect sewerage is not, however, confined to hospitals. The sewerage of the metropolis is now occupying the public mind; and when we learn that there are a multitude of cesspools carrying out their "fœcal fermentations" with an activity which the best ventilation will not remove, it is not surprising, therefore, that puerperal fever should be found scattered through London, or met with even in houses where one could hardly expect it. Ventilation must be strictly attended to; but you must not trust to it alone. Chlorine must also be sedulously employed to prevent danger.

To change the dress and bed-clothes frequently is also necessary; and in doing so the whole surface may be carefully sponged with a weak solution of hydrochloric acid and warm

water. By this means much may be done to render your remedial treatment effective.

The *Remedial Treatment* has been a warm subject of dispute, chiefly arising from the different views of the disease that have been advocated. We shall not trouble you with the controversy, because it appears to us that these differences may be easily reconciled. A poison has entered the circulation. What is the best way to remove it?—and if we cannot do so, how can we best support the constitution against its influence? The treatment, then, resolves itself into *evacuants* and *stimulants*. Depletion, emetics, purgatives, diaphoretics, and diuretics belong to the former; camphor, ammonia, and turpentine, to the latter class.

Evacuants. Depletion was employed by Gordon, Hey, Armstrong, and Mackintosh, with striking success. It was carried to twenty, thirty, or even to fifty ounces: and they all tell us not to fear the feeble pulse and apparent prostration of the patient. Such depletion as this would kill a patient prostrated by peritonitis: their success can therefore be explained only on the principle, that this depletion is an evacuant, removing so much poisoned blood, and trusting to the constitution to recover itself from the exhaustion produced. This remedy is beneficial, therefore, not as an antiphlogistic, but as an antiseptic; and if we act on this principle, the questions we have to decide are—Can the patient bear the treatment? Can the constitution recover itself? We believe that these questions will admit of no general answer. If the dose of the poison be excessive, causing a cold surface and trembling pulse, depletion is inadmissible, because there is no power of reaction. If it be sufficient to excite the characteristic peritonitis, depletion may be very serviceable, *if adopted at the proper time*—that is, immediately on the occurrence of a rigor, vomiting, a diarrhœa, or any symptom giving the first notice that the patient is seized by the fever. But, at a later period, when the poison has been some time in action, depletion is a very questionable practice; because the constitution has not the same elasticity, and absorption is increased by the loss of blood.

Purgatives act as evacuants. Nature endeavours to remove

the poison by this means. A diarrhœa is often the first symptom. When purgatives, therefore, are used, it must be on the principle of establishing a diarrhœa. Armstrong gave a scruple of calomel, followed every second hour by a full dose of salts and senna. The evacuations which followed were at first very offensive; but gradually improved, until they resumed their natural appearance, and the patient recovered. A scruple of calomel is a large dose; but Dr. Copland gave the same quantity; and in India, in the treatment of cholera and dysentery, it was constantly given. It would seem, therefore, that when the constitution is under the influence of a poison, nervous irritability is as it were paralysed, and requires a powerful dose to excite the action of the intestines. Dr. Armstrong used sulphate of magnesia; but we think chloride of sodium would be preferable. In a sufficient dose it is equally purgative, and there is the chance that chlorine may enter the circulation.

Emetics were among the first remedies discovered for the treatment of this disease. In 1782, Doulcet at once checked the progress of this distemper by the free use of emetics. The hint was given him by Nature herself. One of his patients who had been just attacked made several efforts to vomit; he gave her a large emetic, which proved salutary. He continued to give her emetics; and she recovered. This practice was repeated in every instance with such remarkable success, that Doulcet supposed he had found a specific. A second visitation afterwards presented itself, and Doulcet's specific was found of no use. Richter, Tonnellé, and Cruveilhier also found emetics in some cases very useful.

This practice, then, fails in some instances and succeeds in others. Can any reason be assigned for this difference of success? Dr. Ferguson, we think, has given the best explanation. Emetics are efficient "when the violence of the malady has fallen on the liver especially, and when there is early nausea and spontaneous vomiting." In other words, when nature points to the stomach as an evacuant, take the hint, and carry the principle out.

Diaphoretics have been administered with great advantage

and for this purpose antimonials are preferred. Boer used an unknown preparation extensively in the Vienna Hospital. Dr. Gooch supposed it to be "Kermes' mineral"; Dr. Ferguson, "James's powder." Dr. Denman also found great benefit from the use of tartar emetic, acting both as an emetic and in increasing the action of the exhalants.

Diuretics have received very little attention in the treatment of puerperal fever; yet, as evacuants, we believe them to be very efficient. In some cases, we have found the free use of nitrate of potash of great value, and are inclined to think it well worthy the attention of the profession. Its action may be explained on the same principle as emetics—the infection of the blood being relieved through the kidney in place of the liver; but in adopting this practice let the urine be your guide, and if it is passed frequently, is scanty and loaded, diuretics will be serviceable.

Such are the evacuants used to carry off this poison. The question to decide is, Can the patient bear the evacuation? On this there is the greatest difference of opinion. We have endeavoured to point out that, in the extreme, the ataxic form, depletion cannot be used, but Mackintosh insists that it can and ought. We only mention this to shew the extremes to which opinions reach on important points of practice. No general rule can be applied to all cases. Each must be specially considered, and *the character of the epidemic carefully studied.*

Stimulants. If evacuants cannot be used we can still have recourse to stimulants; but, in doing so, they must be boldly carried out. We have mentioned Copland's practice of giving eight to sixteen grains of camphor every four hours; using turpentine with castor oil in the same decided manner; and we have no hesitation in agreeing with Dr. Copland, "that there is certainly no remedy so efficacious as a decided use of turpentine."

In reflecting, however, on the principle upon which these stimulants were so beneficial, it appeared to us that something was due to their anæsthetic character—to the relief of pain experienced by the patient; that the exhaustion caused by pain

being thus removed, the stimulant action became more efficient. If this were true, might not chloroform be useful? We tried it in some cases, with the following results.

In 1855, we were called to see a woman who had been seized the day before with puerperal fever. The abdomen was extremely painful, and the extremities cold; the pulse 150. We did not think she would live until next day. Thirty minims of chloric æther and twenty of laudanum were given every second hour to relieve the pain. The following day, the pain had been completely removed, and she was comparatively comfortable; but there was no change in the pulse. She, however, rallied so far as to continue in this easy state for nearly a week; but the poison had done its work: the vital powers could not recover themselves, and she sank after a protracted struggle. Subsequently, two other cases came under notice. In the first, the woman had been *two days ill.* She was propped up in bed, suffering intense pain, and gasping with painful respirations. The same means gave her immediate relief; but she was too far gone to have any hope of saving her. In the second case, this treatment was carried out so successfully that the woman recovered.

In these cases it appears to us that chloroform relieved the pain, and so far prevented nervous exhaustion; while opium acted as a *stimulant* to nervous power.

We do not wish you, however, to adopt or to be led by theories, but rather by facts. We have endeavoured to place before you the principles upon which your treatment should be founded. This seems to us preferable to laying down and advocating any special course, which might very possibly fail of success. The only general rule we can lay down is that of Sydenham, "To study the constitution of the year," and we might also add, "of the place."

LECTURE XLI.

PUERPERAL MANIA.

PUERPERAL MANIA is one of the most distressing of the disorders that follow parturition. It may last only a few days, or may continue for months; it may be promptly fatal, or require even years before the patient is restored. The derangement cuts off the patient from all intercourse with her friends, and necessarily excites feelings of the most painful anxiety. In those cases where death rapidly takes place, the anguish of those most deeply interested in the patient's welfare may be more easily imagined than described.

CAUSES.—The causes of puerperal mania are necessarily very obscure. They may be divided into *Predisposing* and *Exciting* causes.

Predisposing Causes. These will be better understood if we consider the intimate relation that exists between the mind and the uterus during gestation and parturition. The mind is then much more susceptible to emotions; a shock produces a more powerful effect than at any other time. Delicate women, when pregnant, often manifest an unusual irritability of temper; they are watchful, and sleep little: so also, during parturition, they sometimes become incoherent; and, although it is but for a moment, such symptoms give evidence of the powerful influence which the function of the uterus exerts over the cerebrum.

The predisposing causes are those that produce constitutional exhaustion, more especially a loss of nervous power. For instance, the constitution may be unequal to the demand made upon it by gestation, and the sympathies of the vital organs are exaggerated to extreme irritation: if the stomach be chiefly engaged, violent

vomiting is the result; if the function of the liver be disturbed, there is jaundice; if the brain, great irritability of temper, capriciousness, and occasional aberrations, are sometimes observed, even before the period of parturition arrives. When this process is concluded, the disturbance of the cerebrum more distinctly manifests itself. In many of these cases, a hidden predisposing cause may be in operation which it is impossible to investigate. Great mental depression and anxiety, or any cause that acts powerfully on the mind predisposes to such attacks. Pregnancy and parturition produce, in feeble habits, a certain degree of exhaustion with which the cerebrum sympathises; some powerful mental emotion is acting upon this organ at the same time: it can no longer sustain itself, and the mind gives way.

The *Exciting Causes* are those that make a new demand upon the constitution when in this exhausted state: for instance, when the mother first nurses her child, or after she has continued to do so for some time, when the secretion of milk begins to fail. A mental shock is an exciting cause under any circumstances, sudden frights have caused puerperal mania even in women who were strong and healthy.

Symptoms.—The symptoms of this melancholy disorder are too varied to allow any uniform description of them; but the simple fact that they all agree in testifying to a complete aberration of the intellect, is sufficient to prove its nature. The mental derangement manifests itself with some within twenty-four or forty-eight hours after delivery, just when the milk ought to fill the mammæ. The patient exhibits an unusual solicitude to nurse her child; it is applied to the breast—no milk flows—the infant, of course, is dissatisfied and cries out lustily, the mother is equally so, and bursts into tears: soon afterwards, rambling and incoherent expressions, with constant wakefulness, incessant talking, and restlessness, give evidence of the approaching attack. In other instances, some cause that at another time would have no effect excites the disturbance. Dr. Gooch mentions the case of a lady, who, after a previous confinement, had "brain-fever," and came up to town for her next confinement, in order to have the advantage of his skilful attention. "She had a short easy

labour, a good supply of milk, nursed her child, and continued to do well for so many days that her friends concluded all danger was over." Not so, however; on the tenth day, the shop of a pianoforte maker in Oxford-street caught fire, and a piece of burning matter fell within her sight. Dr. Gooch saw her about two hours afterwards: "she was not herself; her manner was agitated; on being questioned about her feelings, she kept silent for some time, and then answered abruptly; her pulse was quick, and her manner odd and unnatural." She remained wakeful the whole of that night, sent again for Dr. Gooch, asked him: "did he not observe that a glorious light came from her temples, and shone about her head"; the mania was confirmed, "she thought she was the Virgin Mary" (Gooch, *Diseases of Women*, p. 104). This lady soon recovered, and in about three weeks returned to the country quite well. In this case the connection between the exciting cause—a burning faggot, and the luminous hallucination, is obvious.

In some cases the symptoms present themselves gradually from the commencement; the pulse remains quick after delivery; the night following the patient is restless, her manner is peculiar, she is very irritable, scolds the nurse about the merest trifle, insists upon nursing her child, and then suddenly changes her mind and sends it away. These symptoms gradually merge into incessant talking, then into incoherency, and ultimately confirmed mania. A much more distressing, because more dangerous, chain of symptoms sometimes present themselves. The pulse gradually increases in frequency; delirium sets in soon after delivery; the patient remains in this irrational state throughout the attack, which, we might say, *always* terminates fatally; sometimes a lucid interval precedes death: it lasts but for a moment, the aberrations again cloud the mind, and she soon sinks.

Prognosis.—The most important symptom, as a guide to our prognosis, is the pulse. If the pulse be regular, or only moderately excited, the patient will recover; but if it be frequent, and especially if its rate increase, a fatal result may be predicted. The period also, at which the derangement occurs, makes a difference in the opinion that is formed of it. Gooch well

observes, that "mania soon after delivery, is more dangerous to life than melancholia beginning several months afterwards." We should wish, however, to confine your attention to the attacks that may take place soon after delivery; those that happen after the patient has recovered from her confinement, do not belong to our present subject. What does this difference in the condition of the circulation indicate? The presence of inflammation of the brain or its membranes? We believe no greater mistake has ever been committed, than adopting with unfortunate haste the affirmative to this last question; the active antiphlogistic treatment that has been used only hastened the fatal termination it was intended to prevent. Puerperal mania is essentially a disease of exhaustion; the loss of power may not extend beyond the cerebrum; the circulation and the other vital functions may remain undisturbed; or it may happen that the constitution generally feels the effect, and the frequency of the pulse give evidence of the excitement. Besides this cause of increase in the action of the heart, there is another and a most dangerous one, that should be carefully looked for, that is the presence of puerperal fever. It is quite possible that the arachnoid, rather than the peritoneum, may be the serous membrane chiefly engaged, and if so, the result may be readily conjectured. Thus then, the pulse, as Dr. Gooch first pointed out, is a most valuable guide to assist us in determining the character of this disorder.

Treatment.—This must be governed by the kind of case with which we have to deal. We know of no general rules that you must follow; any that might be laid down rather apply to what should not be done than what you are to do. In this sense, depletion cannot be employed; there may be an occasional exception, but it rather proves the rule. In those cases where the circulation is undisturbed, the treatment consists in the removal of every disturbing cause, and controlling by opium the cerebral excitement. We have already pointed out (p. 432.) the influence of this medicine, when the uterine nerves are exhausted from extreme hæmorrhage so that they do not obey the stimulus applied to excite contraction of the uterine fibres. Here, also, it appears to us that opium acts as a stimulant to the exhausted power of the

cerebrum; and hence in its administration, the dose first given must be cautiously repeated until sleep is procured; but it is essential, before giving it, that every accidental cause of irritation should be removed. Thus the state of the bowels is of the first importance; when the brain is in the least degree disturbed, they are always more or less deranged. Sudden jaundice has been the consequence of a shock; and so also the action of the intestines becomes extremely irregular long before mania absolutely presents itself. Therefore active cathartics that stimulate the bowels should be administered. A full dose of calomel may be given, followed by castor-oil or the senna draught. If the patient cannot be persuaded to take medicine by the mouth, an enema of assafœtida and turpentine will answer the purpose. In some cases also, where the pulse is so full and bounding that you are disposed to bleed, tartar emetic in half grain or grain-doses may be easily disguised and given to the patient. This cause of irritation having been removed, opium may then be administered. The patient should be kept as much as possible secluded from her most intimate relatives or friends. The room darkened, but at the same time a free circulation of air maintained in the apartment. By cautious management, the patient may be restored to herself; but it should be always borne in mind, that a very trifling exciting cause may recall the aberration. It is therefore better that she should not nurse her child, even when it is in her power to do so.

When the pulse is frequent and increasingly so—when the derangement amounts to a continued delirium—the case is hopeless: it is one of the forms of puerperal fever, the more fatal because of the serous membrane that is chiefly engaged.

APPENDIX.

COMPARATIVE VIEW OF LABOURS AND THEIR RESULTS.

THE following tables give a comparative view of labours and their results in four great obstetric institutions, viz.:—The Maternity Charity of London, derived from the reports of Dr. F. Ramsbotham; the Lying-in Hospital of Dublin, from the reports of Dr. Collins, Drs. Hardy and M'Clintock, and Drs. Sinclair and Johnston; the Maternité of Paris, from the tables of Mesdames Boivin and La Chapelle; and the Lying-in Hospital of Vienna, reported by Dr. Arneth.

In forming these tables, some difficulties arose from the manner in which these several reports are arranged. For instance, in some, natural and preternatural labours are classed together: in others all the exceptions to natural labours are accurately given, but the results, especially the mortality in natural labours, are not stated. Again, the maternal mortality is altogether omitted from the French reports. Puerperal fever and its results are obliged to be omitted, because of the confusion in the terms under which it is described; some naming it puerperal fever, some peritonitis, etc. Wherever, therefore, an omission occurs, it is marked with (—). The body of facts, however, accurately given, is sufficiently large to form a just estimate of obstetric practice.

The general results from these reports are stated in a separate table (II, p. 701). In this table, the first column of figures represents the total number of cases in which observations have been made in regard to the special points; and in the same manner, the first column in the mortality division contains the aggregate of the cases in reference to which record has been made of the mortality. The differences observed in the numbers contained in the first columns arise from omissions in the reports: for instance, the total number of natural labours given is 170,336; but the mortality is stated in reference to 17,726 only; and so on with regard to the use of the various instruments, preternatural presentations, etc. The notes appended to the tables will explain the cause of other irregularities that may be observed in the numbers.

The author cannot conclude, without returning his warmest thanks to Dr. Routh for the kind assistance he has rendered him in forming these tables.

TABLE I. LONDON AND DUBLIN.

		Dr. Ramsbotham, 48,996 Cases, in 22 years.					Dr. Collins, 16,414 Cases, in 7 years.					Drs. Hardy and M'Clintock, 6,634 Cases, in 3 years.					Drs. Sinclair and Johnson, 13,748 Cases, in 7 years.				
		Total Cases.	Mothers.		Children.		Total Cases.	Mothers.		Children.		Total Cases.	Mothers.		Children.		Total Cases.	Mothers.		Children.	
			Living	Dead.	Living	Dead.		Living	Dead.	Living	Dead.		Living	Dead.	Living	Dead.		Living	Dead.	Living	Dead.
	Natural Labours..	48,160	—	—	—	—	*15297	—	—	—	—	5,852	5,836	16	—	—	11,874	11,807	67	—	200†
Difficult Labours.	Forceps	73	70	3	56	17	24	20	4	16	8	18	14	4	10	8	200	189	11	172	28
	Vectis	—	—	—	—	—	3	—	—	—	—	16	16	—	7	9	—	—	—	—	—
	Crotchet	60	54	6	—	60	7	64	15	—	79	52	44	8	—	52	130	104	26	—	130
Preternatural Labours.	Breech	1,220	—	—	967	253	242	241	1	169	73	101	98	3	64	37	258	252	6	174	84
	Feet	158	—	—	—	—	127	127	—	65	62	38	37	1	20	18	127	122	5	68	59
	Shoulder				60	98	40	36	4	20	20	26	24	2	14	12	42	39	3	14	28
Complex Labours. Haemorrhages.	Unavoidable	82	—		32	50	11	9	2	6	5	8	5	3	5	3	24	18	6	11	13
	Accidental	159	—		74	85	13	11	2	12	1	29	25	4	18	11	81	77	4	42	41
	Between Birth and Placenta	—	—	66	—	—	64	57	7	55	16	31	26	5	27	5	26	24	2	23	4
	After delivery of Placenta	—	—		—	—	43	39	4	38	5	26	24	2	23	3	33	31	2	32	5
	Retained Placenta	268	—	—	—	—	66	60	6	56	14	28	18	10	20	9	57	53	4	46	15
	Convulsions.....	43	40	3	35	18	30	25	5	14	18	13	10	3	7	6	63	50	13	46	23
	Ruptured Uterus And Vagina.....	8 1	—	9	—	9	34	2	32	2	32	9	—	9	1	8	17	1	16	—	17
	Inverted Uterus..	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	1	1	—	1	—
	Prolapsed Funis ..	—	—	—	—	128	97	97	—	24	75	37	37	—	12	25	98	95	3	44	54
	Twins	536	—	—	—	7	240	233	7	422	58	95	92	3	171	19	233	227	6	418	48
	Triplets.....	3	—	—	—	1	4	4	—	12	4	1	—	—	—	—	1	1	—	—	3
	Boys	25,629	—	—	—	—	—	—	—	—	—	3,551	—	—	3,291	260	7,177	—	—	—	—
	Girls	23,909	—	—	—	—	—	—	—	—	—	3,151	—	—	2,944	207	6,756	—	—	—	—
	Both Sexes	49,538	48,776	220	46,815	2,723	16,662	—	—	—	—	6,702	6,569	65	6,235	467	13,933	—	—	—	—
	All cases of Labour	48,996	48,776	220	46,815	2,723	16,414	—	—	—	—	6,634	6,569	65	6,235	467	13,748	13,595	153	—	200

Not stated, marked by a — . * This number is obtained [illegible] MADAME BOIVIN. From 1794 to 1815.

		20,357 Cases.					22,243 Cases.				
		Total Cases.	Mothers.		Children.		Total Cases.	Mothers.		Children.	
			Living.	Dead.	Living.	Dead.		Living.	Dead.	Living.	Dead.*
	Natural Labours	19,810	—	—	—	—	20,801	—	—	20,034	773
Difficult labours.	Forceps	96	—	—	73	23	77	—	—	59	18
	Vectis	—	—	—	—	—	—	—	—	—	—
	Crotchet	16	—	—	—	16	12	—	—	—	12
Preternatural labours.	Breech	373	—	—	—	—	492	—	—	421	59
	Feet	238	—	—	—	—	307	—	—	263	46
	Shoulder	86	—	—	60	10	118	—	—	70	38
Complex Labours. Hæmorrhage.	Unavoidable	8	—	—	5	3	12	—	—	5	7
	Accidental / Between Birth and Placenta / After delivery of ditto	3	—	—	—	—					
	Retained Placenta	—	—	—	—	—	—	—	—	—	—
	Convulsions	17	—	—	14	3	8	—	—	6	2
	Ruptured Uterus and Vagina	1	—	1	1	—	—	—	—	—	—
	Inverted Uterus	—	—	—	—	—	—	—	—	—	—
	Prolapsed Funis	38	—	—	29	9	26	—	—	16	10
	Twins	154	—	—	—	—	279	—	—	—	—
	Triplets	3	—	—	—	—	2	—	—	—	—
	Boys	—	—	—	—	—	11,445	—	—	—	—
	Girls	—	—	—	—	—	10,798	—	—	—	—
	Both Sexes	20,517	—	—	—	—	22,243	—	—	21,276	837
	All cases of Labour	20,357	—	—	—	—	22,243	—	—	21,276	837

* These numbers in Mad. Lachapelle's table, do not nclude deformed or premature children.

TABLE I (*continued*). VIENNA.

		Dr. Arneth. 2nd Klinik. 1847 to 1849. 6,527 Cases.					Dr. Klein, quoted from Dr. Arneth. 1st Klinik. 35,417 Cases.				
		Total Cases.	Mothers.		Children.		Total Cases.	Mothers.		Children.	
			Living.	Dead.	Living.	Dead. c		Living.	Dead.	Living.	Dead.
	Natural Labour	6,080	—	—	—	—	33,658 d	—	—	—	—
Difficult Labours.	Forceps	45	38	7	25	21	730	—	—	—	—
	Vectis	—	—	—	—	—	—	—	—	—	—
	Crochet	4	2	2	—	4	53	—	—	—	—
Preternatural Labours.	Breech	113	110	3	76	37	583	—	—	—	—
	Feet	59	56	3	38	21	193	—	—	—	—
	Shoulder	32	32	—	22	20	133	—	—	—	—
Complex Labours. Haemorrhage	Unavoidable	9	8	1	3	6	11	9	2	—	12
	Accidental	—	—	—	—	—					
	Between Birth and Placenta .	10	—	—	—	—	—	—	—	—	—
	After delivery of Placenta ..	74	63	11	64	10					
	Retention of Placenta	31	26	5	—	—	—	—	—	—	—
	Convulsions.....	13	9	4	7	6	—	—	—	—	—
	Ruptured Uterus or Vagina..	3	—	3	—	—	—	—	—	—	—
	Inverted Uterus.....	—	—	—	—	—	—	—	—	—	—
	Prolapsed Funis.....	33	32	1	19	14	55 f	—	—	—	—
	Twins	81	77	4	81	41	325	—	—	—	—
	Triplets	—	—	—	—	—	4	—	—	—	—
	Boys.....	3,398	—	—	3,280	118	—	—	—	—	—
	Girls	3,210	—	—	3,184	106	—	—	—	—	—
	Both Sexes	6,608	6,400	127	6,364	244	—	—	—	—	—
	All Cases of Labour	6,527	6,400	127	6,364	244	35,417	—	—	—	—

c These cases include children who died within nine days after birth.

d This number is obtained by subtracting the sum of difficult and

TABLE II. GENERAL CONCLUSIONS.

N.B.—The conclusions are not always deduced from the same number of Cases, as the same Plan of arrangement is not adopted by every writer herein quoted. In all cases, however, the largest number compatible with a harmony of facts have been selected.

		Relative Frequency of Presentations and Accidents.			MORTALITY.					
					Mothers.			Children.		
		All varieties of Labours and Accidents.	Special Presentations and Accidents in ditto.	Proportn. per 1000.	Special Presentations or Accidents.	No. of deaths in ditto.	Proportn. per 1000.	Special Presentations or Accidents.	No. of deaths in ditto.	Proportn. per 1000.
	Natural Labours..	170,336	161,532	948·3	17,726	83	4·6	32,675	1,119	34·2
Labours.	Forceps.....	170,336	1,263	7·4	360	29	80·5	533	123	230·7
	Vectis	36,796	19	·05	16	0	—	16	9	562·5
	Crotchet	170,336	406	2·3	325	57	175·3	406	406	1000·0
Labours.	Breech	170,336	3,382	19·8	714	13	8·2	2,426	543	223·8
	Feet	121,340	1,089	8·9	351	9	25·6	658	206	313
	Shoulder	121,340	477	3·9	140	9	64·2	344	428	372·0
Hæmorrhages.	Unavoidable	124,086	153	1·03	63	14	222·2	153	92	601·3
	Accidental	85,792	282	3·2	123	10	81·3	282	138	489·3
	Between Birth and Placenta	43,323	131	3·02	121	14	115·7	121	25	206·6
	After delivery of Placenta	43,323	175	4·04	176	19	107·9	175	25	142·8
	Retained Placenta	92,319	450	4·8	182	25	137·3	151	38	251·6
	Convulsions.....	134,919	187	1·3	162	28	173.4	187	76	406·4
	Ruptured Uterus..	92,319	71	·7	72	69	958·3	69	65	927·5
	Inverted Uterus ..	62,744	2	·003	2	1	500·0	1	0	—
	Prolapsed Funis ..	91,413	384	4·2	265	4	15·09	329	187	568·3
	Twins	170,336	1,943	11·4	649	20	30·8	1,185	173	73
	Triplets.....	163,809	18	·009	5	—	—	8	8	333·3
	Boys	98,148	51,200	521·6	—	—	—	6,949	378	54·3
	Girls	98,148	47,824	487·2	—	—	—	6,361	313	49·2
	All cases of Labour	—	—	—	—	—	—	98,148	4,477	45·6

CASES IN THE LYING-IN HOSPITAL, DUBLIN,

From 15th March, 1745, to 31st Dec., 1861.

MASTERS.		Total Number of Patients admitted.	Received into the Chronic Wards. (Opened 1836.)	Went out not delivered.	Delivered in the Hospital.	BOYS born.	GIRLS born.	Total Number of Children.	Women having Twins and more.	Children died.	Children still-born.	Women died.	ASSISTANTS.
Received into old Hospital	...	3975	...	...	3975	2101	1948	4049	74	372	138	45	
From 8th Dec., 1757 (present Hospital opened), to 31st December).	1757	55	...	...	55	30	25	55	...	6	3	1	
BARTHOLOMEW MOSSE,	1758	455	...	1	454	255	207	462	8	54	21	8	
Founder and First Master.	1759	413	...	7	406	228	192	420	13 (1 had 3)	95	22	5	
(Died in office, 16th February, 1759.)	1760	571	...	15	556	300	260	560	4	116	35	4	
	1761	537	...	16	521	283	249	532	11	104	29	9	
	1762	550	...	17	533	279	266	545	12	106	33	6	
SIR FIELDING OULD,	1763	519	...	31	488	274	224	498	10	94	29	9	*Mr. William Collum.
Second Master.	1764	610	...	22	588	287	308	595	7	83	28	12	*Mr. Henry Rock.
	1765	559	...	26	533	288	251	539	6	94	25	6	
	1766	611	...	30	681	324	261	585	4	111	18	3	
	1767	695	...	31	664	373	301	674	10	125	29	11	
	1768	689	...	34	655	362	302	664	9	154	47	16	
WILLIAM COLLUM,	1769	675	...	32	642	350	301	651	9	152	38	8	Mr. William Linley.
Third Master.	1770	705	...	35	670	372	305	677	7	107	37	8	*Mr. Thomas Kelly.
	1771	724	...	29	695	370	341	711	16	102	44	5	*Mr. Frederick Jebb.
	1772	725	...	21	704	368	344	712	8	116	32	4	Dr. Edward Foster.
	1773	727	...	33	694	367	344	711	17	136	31	13	
	1774	709	...	28	681	357	334	691	10	132	29	21	Mr. A. M'Dowell.
	1775	752	...	24	728	364	378	742	14	122	27	5	Mr. J. Halahan.
FREDERICK JEBB, M.D.,	1776	833	...	31	802	418	407	825	22 (1 had 3)	132	39	7	Mr. Thomas Naghten.
Fourth Master.	1777	872	...	37	835	452	395	847	12	145	35	7	Mr. Thomas Costello.
	1778	961	...	34	927	476	460	936	9	127	39	10	Dr. Charles Fitzgerald

	1779	1064	...	53	1011	550	476	1026	15	146	59	8	Mr. Deane Swift.
	1780	967	...	48	919	499	441	940	21	115	41	5	
	1781	1079	...	52	1027	598	447	1045	18	121	38	6	Mr. Henry Jebb.
	1782	1021	...	31	990	549	458	1007	17	127	57	6	*Dr. Jos. Clarke.
HENRY ROCK, M.D., *Fifth Master.* (Died in office.)	1783	1230	...	63	1167	632	553	1185	17 (1 had 3)	91	72	15	Mr. J. Forde.
	1784	1317	...	56	1261	643	641	1284	23	76	68	11	*Dr. T. Evory.
	1785	1349	...	57	1292	711	610	1321	28 (1 had 3)	87	75	8	Dr. O'Donnell.
	1786	1396	...	45	1351	716	656	1372	21	51	101	8	
	1787	1418	...	71	1347	705	670	1375	28	59	95	10	Dr. J Beatty.
	1788	1533	...	64	1469	725	670	1396	25 (1 had 4)	55	72	23	*Dr. F. Hopkins.
	1789	1497	...	62	1435	745	705	1450	17	38	84	25	Mr. Henry.
JOSEPH CLARKE, M.D., *Sixth Master.*	1790	1610	...	64	1546	813	766	1579	32 (1 had 3)	61	88	12	*Dr. J. Pentland.
	1791	1671	...	69	1602	842	782	1624	22	75	87	25	Dr. Maxwell.
	1792	1701	...	70	1631	858	806	1664	31 (1 had 3)	65	83	10	
	1793	1811	...	64	1757	941	845	1786	28 (1 had 3)	68	71	19	
	1794	1595	...	52	1543	835	744	1579	34 (3 had 3)	70	60	20	
	1795	1585	...	82	1503	827	719	1546	42 (1 had 3)	72	57	7	Mr. Connor.
	1796	1684	...	63	1621	857	788	1645	23 (1 had 3)	67	83	10	Dr. Geoghegan.
THOMAS EVORY, M.D., *Seventh Master.*	1797	1738	...	26	1712	908	840	1748	35 (1 had 3)	41	97	13	Dr. Wolseley.
	1798	1674	...	70	1604	845	789	1634	29 (1 had 3)	47	103	8	*Dr. S. B. Labatt.
	1799	1620	...	83	1537	829	748	1577	38 (1 had 3)	53	84	10	
	1800	1907	...	70	1337	965	899	1864	27	51	116	18	
	1801	1804	...	79	1725	864	894	1758	31 (1 had 3)	37	111	30	
	1802	2018	...	33	1985	1055	957	2012	25 (1 had 3)	27	124	26	Dr. H. Ferguson.
	1803	2065	...	37	2028	1065	1000	2065	35 (2 had 3)	74	186	44	Dr. J. Breen.
THOMAS KELLY, M.D., *Eighth Master.* (Resigned office.)	1804	1980	...	65	1915	1013	936	1949	34	54	119	16	Mr. A. Johnston.
	1805	2227	...	57	2220	1239	1031	2270	50	51	138	12	Dr. M'Cabe.
	1806	2519	...	113	2406	1247	1204	2451	45	43	151	23	
	1807	2603	...	92	2511	1306	1249	2555	44	50	145	12	
	1808	2763	...	98	2665	1375	1334	2709	42	49	149	13	Dr. Armstrong.
	1809	2969	...	77	2889	1493	1442	2935	45 (1 had 3)	45	165	21	Dr. J. C. Douglas.
	1810	3016	...	162	2854	1546	1350	2896	42	54	179	29	Dr. Stott.
FRANCIS HOPKINS, M.D., *Ninth Master.*	1811	2720	...	159	2561	1363	1250	2613	52	50	169	24	Dr. T. Ferguson.
													Mr. Show.
Forward		75046	...	2622	74728	39437	35095	74532	1308 { 18 had 3 / 1 had 4	4777	3185	758	

CASES FROM THE LYING-IN HOSPITAL, DUBLIN—*continued.*

MASTERS.		Total Number of Patients admitted.	Received into the Chronic Wards. (Opened 1836.)	Went out not delivered.	Delivered in the Hospital.	BOYS born.	GIRLS born.	Total Number of Children.	Women having Twins and more.	Children died.	Children still-born.	Women died.	ASSISTANTS.
Forward	. .	75046	...	2622	74728	39437	35095	74532	1308 { 18 had 3 / 1 had 4	4777	3185	758	
	1812	2822	...	146	2766	1498	1316	2814	48	45	137	43	Dr. Charles Frizelle.
	1813	2568	...	84	2484	1363	1178	2541	59 (1 had 3)	74	125	62	Dr. Newport.
	1814	2601	...	93	2508	1313	1230	2543	35	86	139	25	
	1815	3200	...	125	3075	1586	1524	3110	35	54	172	17	
	1816	3425	...	151	3276	1683	1631	3314	38	56	145	18	*Dr. Charles Johnson.
SAMUEL B. LABATT, M.D.,	1817	3657	...	184	3473	1858	1665	3523	50	79	260	32	Dr. Robert Shekleton.
Tenth Master.	1818	3801	...	262	3539	1883	1694	3577	38	69	270	56	Dr. Thomas M'Keever
	1819	3556	...	359	3197	1657	1585	3242	45	58	269	94	Mr. Luke Whitestone.
	1820	2674	...	216	2458	1331	1154	2485	27	37	214	70	
	1821	3052	...	203	2849	1548	1352	2900	48 (3 had 3)	46	205	22	
	1822	2764	...	189	2675	1427	1294	2721	46	43	138	12	*Dr. Robert Collins.
JOHN PENTLAND, M.D.,	1823	2709	...	125	2534	1379	1242	2621	37 (3 had 3)	40	153	59	Dr. John Gordon.
Eleventh Master.	1824	2729	...	183	2446	1277	1189	2466	20	29	158	20	Dr. J. Nicholson.
(Died in office.)	1825	2934	...	194	2740	1376	1392	2768	28	25	175	26	Dr. H. Darley.
	1826	2712	...	72	2440	1287	1181	2468	28	17	153	81	
	1827	2722	...	172	2550	1349	1232	2581	31	37	178	33	
	1828	2002	...	146	2856	1496	1406	2902	46	28	153	43	*Dr. E. Kennedy.
ROBERT COLLINS, M.D.,	1829	2254	...	113	2141	1085	1084	2169	28	12	129	34	Dr. Jon. Labatt.
Twelfth Master.	1830	2369	...	81	2288	1174	1141	2315	27	13	132	12	Dr. W. O'B. Adams.
	1831	2252	...	76	2176	1114	1115	2229	47 (2 had 3)	23	147	12	Dr. E. W. Murphy.
	1832	2308	...	66	2242	1179	1099	2278	33 (1 had 3)	22	146	12	
	1833	2202	...	64	2138	1101	1067	2168	29 (1 had 3)	22	132	12	
	1834	2076	...	52	2024	1075	964	2039	16	16	119	34	Mr. W. W. Campbell
	1835	1945	...	43	1902	968	957	1925	23	20	54	34	Dr. H. L. Dwyer.
EVORY KENNEDY, M.D.,	1836	1887	...	77	1810	924	911	1835	25	16	71	36	Dr. Herdman.
													Dr. Thwaites.

Thirteenth Master.	1837	1954	61	60	1833	931	925	1856	23	6	110	24	Dr. James Isdell.
	1838	2360	176	58	2126	1113	1037	2150	24	11	109	45	Dr. Robert Johns.
	1839	2161	172	38	1951	993	988	1981	30	4	103	25	
	1840	1726	168	37	1521	772	765	1537	15 (1 had 3)	6	85	26	
	1841	2213	132	56	2025	1022	1027	2049	23 (1 had 3)	10	108	23	
	1842	2362	125	66	2171	1164	1033	2197	29	25	128	21	Dr. S. L. Hardy.
CHARLES JOHNSON, M.D., F.R.C.S.,	1843	2417	90	139	2188	1046	1172	2218	30	14	173	22	*Dr. A. H. M'Clintock.
Fourteenth Master.	1844	2422	113	133	2176	1194	1090	2114	37 (1 had 3)	28	137	14	*Dr. John Denham.
	1845	1615	119	85	1411	732	697	1429	18	14	82	35	Dr. H. J. Sibthorpe.
	1846	2281	125	131	2025	1079	968	2047	22	31	123	17	
	1847	2140	99	308	1703	954	778	1732	28 (1 had 3)	32	112	47	
	1848	2063	102	145	1816	959	881	1840	30	27	143	35	
	1849	2256	91	102	2063	1089	1017	2106	39	51	137	38	Dr. George Johnston.
ROBERT SHEKLETON, M.D., F.R.C.S.,	1850	2093	72	41	1980	1054	959	2013	33	58	159	15	Dr. E. B. Sinclair.
Fifteenth Master.	1851	2172	68	34	2070	1085	1012	2097	33 (1 had 3)	53	142	14	Dr. L. Atthill.
	1852	2084	72	49	1963	1018	985	2003	34	48	137	11	Dr. W. B. Jennings.
	1853	2045	80	59	1906	978	934	1912	29	48	150	17	Dr. Geo. Montgomery.
	1854	2063	66	54	1943	996	950	1946	36	55	176	37	
	1855	1200	104	36	1060	529	539	1068	17	23	90	35	
	1856	1803	144	56	1600	868	759	1627	25 (1 had 3)	53	116	25	Dr. B. G. Guinness.
A. H. M'CLINTOCK, M.D., F.R.C.S.,	1857	1718	156	53	1509	733	753	1537	28	55	91	33	Dr. J. A. Byrne.
Sixteenth Master.	1858	1334	177	72	1084	568	536	1104	14 (3 had 3)	36	76	30	Dr. H. S. Halahan.
	1859	1679	179	111	1389	742	670	1412	23	43	97	21	Dr. W. Kennedy.
	1860	1684	181	99	1404	730	703	1433	29	49	146	26	(*Died in office.*)
	1861	1364	180	40	1135	585	569	1154	19	53	95	59	Dr. J. R. Kirkpatrick.
JOHN DENHAM, M.D., L.R.C.S., *Seventeenth Master*, in esse.	1862	...	...	...	...	...	...	...	...	...	...	...	
		193876	3059	8360	182997	96302	88384	185737	2863 { 38 had 3, 1 had 4 }	6670	10184	2352	

Proportion of Males and Females born—about 12 Males to 11 Females.
„ Children dying in the Hospital—about 1 to 28.
„ Children still-born—about 1 to 18.

Proportion of Women having Twins and more—about 1 to 62.
„ Women dying in Child-bed—about 1 to 80.
„ Women having three and four children—about 1 to 4,500.

IS THERE AN UTERO-PLACENTAL CIRCULATION?

THIS question has been so surrounded by difficulties, not less from opposing arguments than from contradictory facts, that we have found it necessary to consider the subject in an appendix or to omit it altogether, because it would have occupied too much space in the lectures as at present published.

In them we have endeavoured to point out the nature of the utero-placental circulation, that the curling arteries of the uterus pour their blood not into "venous capillaries," but into what Weber has called "a system of colossal capillaries"—that is to say, into a fine reticulate spongy structure formed by the dissepiments of the venous membrane which surrounds the fœtal vessels on every side. From this structure the blood passes into the uterine veins or sinuses.

If such be the fact, we should be able to inject the placenta from the uterine arteries.

The contradictions, however, on so simple a question of fact cannot but excite surprise. The Hunters left most valuable preparations to demonstrate its truth. Dr. Robert Lee, who at first disputed their authority, afterwards acknowledged that vessels did pass from the uterus to the placenta. Bonami, in presence of Cazeaux, injected the placenta from the uterine arteries; and Professor Dalton (*American Med. Monthly Journal*, July, 1858) was several times able to fill the placenta with air blown into the uterine veins. Yet we have, on the other side, Dr. Meigs, who denies the existence of utero-placental vessels; M. Ch. Robin, of Paris, who asserts the impossibility of injecting the placenta from the uterus; and lastly, Dr. Madge (*Lancet*, vol. i., 1856, p. 204), who, from experiments, states that no injection can be made to pass from the uterus into the placenta. To determine this point, we have had the opportunity of having a placenta completely attached to the uterus injected by Dr. Sharpey (*vide* plate II.). All the vessels which would admit the injection to escape elsewhere were tied, and colourless size was injected into a leading artery. While the injection was passing, the placenta was observed to swell. The umbilical vein was injected with vermilion; and when some time afterwards the placenta was examined, the red fœtal vessels were observed surround-

ing the colourless size in every direction. The colourless spaces thus seen must be the spongy structure, establishing the fact of a direct communication between it and the uterine arteries. We have also been able to blow air into the placenta as Professor Dalton had done, and therefore our experience is conclusive on the affirmative of this question.

Bonami's injections, witnessed by Cazeaux, are accurately given.

"An injection was first made of the venous system of the uterus through the iliac vein and one of the veins of the ovaries. The substance of which it was composed was varnish coloured with red lead.

"The second injection, made up of spirits of turpentine coloured with indigo, was thrown into the uterine arteries from the inferior extremity of the aorta. Ligatures had been previously placed on all vessels capable of transmitting liquids to the abdominal parts.

"The uterine cavity having been next opened at some distance from the attachment of the placenta, the fœtus having been separated from its membranes, a blackish liquid was squeezed from the vessels of the cord, which was nothing but blood. Injections were immediately made into the vein and one of the umbilical arteries, of linseed oil coloured with white wax and yellow ochre.

"These injections having been made with the utmost prudence, a careful dissection revealed and established the following.

"We perceived, in the first place, *very distinctly on the fœtal surface of the placenta, the red liquid injected into the uterine veins.* But by what channel had the injection penetrated so far? That is the point in question to investigate. In separating the placenta with care, *it is very easy to see* that a sufficiently large number of little vessels appear at the internal surface of the womb, traversing the inter-utero-placental tissue which we have described, and plunge into the tissue of the placenta. These are the arteries and veins, easily recognised by different coloured injections.

"1. *The Arteries. Their number is considerable*—more numerous towards the centre of its interior than in any other portion, though we still find some of them, but very much diminished in size, at two centimeters from the circumference of the placenta. Their capacity is very small; they have a diameter varying from two millimeters to one half a millimeter. They take on in a very sensible manner a spiral arrangement. *Their course is oblique.* They almost always creep along to the extent of a centimeter—sometimes more before they direct their terminal extremity towards the anfractuosities of the placenta, and evidently pene-

trate into the tissues even of the placenta. On the uterine side they are evidently continuous with the uterine arteries. Lastly, they have very few ramifications, and these rarely anastomose with each other.

"2. The *Veins* which pass from the uterus towards the placenta through the inter-utero-placental membrane, *have not the same arrangement as the arteries.* The veins have a calibre almost equal to that of the arteries. Sometimes they are a little larger, some of them have a diameter of from four to six millimeters. The characters by which it was possible to distinguish them from the arteries were of the last importance in the piece under examination. These were penetrated by liquids thrown into the uterine venous system; they were rectilinear; their very numerous ramifications frequently anastomose with each other and form vast plexuses on the parietes of the cells.

"These plexuses penetrate the uterine surface of the placenta at all points, and, on the other side, the dissection exhibited to the naked eye their terminations in the great uterine veins." (Dr. W. Read's *History and Treatment of Placenta Prævia*, p. 62).

Dr. F. W. Mackenzie (*Assoc. Med. Journal*, Dec. 1853), removed an uterus with placenta partially attached from a poor woman who died of hæmorrhage, and at University College, under the superintendence of Dr. Sharpey, made the following observations:—

"The uterus, which had been cut off somewhere above its orifice, was first carefully inverted, and several loose adherent coagula removed from its interior. It had the appearance of being very exsanguineous; and from the surface from which the placenta had been detached *the ramifications of the utero-placental arteries could be plainly seen,* but free from any plugging or coagula. About a fifth of the placenta was still adherent.

"In the next place, the vessels along the cut surface of the uterus were secured by ligatures placed along the line of its division, and the hypogastric and ovarian veins were also secured by ligature. An injecting pipe was now fixed in one of the hypogastric arteries, and some defibrinated blood steadily injected. . . . The blood escaped freely from the orifices of the utero-placental arteries which had been torn across by the separation of the placenta; none escaped from the torn utero-placental veins, nor did any pass away from the placenta. The injection was continued for some time, but with no variation in the results. . . .

"In the next place, the opposite hypogastric artery was injected; and in this case it was found, as in the other, that blood escaped

freely from the orifices of the torn utero-placental arteries, but none passed out of the utero-placental veins, *whilst in this case a small quantity escaped from the surface of the placenta contiguous to that which was still adherent.* The injection was repeated several times with the same results."

Thus, then, in addition to the evidence of the Hunters, of Weber, of Goodsir, of Dr. Robert Lee, we have the injections of Bonami, of Mackenzie, and of the Author, all proving that the uterine arteries pour their blood into the placenta from whence it passes into the uterine veins.

Yet Dr. Meigs of Philadelphia, in an account of the examination of the uterus of a lady who died pregnant, which was injected, remarks: "Neither I, nor those gentlemen present, upon the most minute and careful search, aided by good lenses, could verify the existence of even a single vessel passing from the womb to the placenta. Much of the injection was effused into the cellular meshes of the placenta" (*Obstetrics*, p. 207).

How did it get there? In the language of Bonami, that is the question to investigate. What Dr. Meigs calls "effusion into the cellular meshes of the placenta" was the injection passing from the arteries into the spongy structure; and although Dr. Meigs might not be able to trace those arteries (perhaps because of their obliquity) as clearly as Bonami and Mackenzie had done, yet the very fact of the injection entering the placenta proves the question in dispute.

The extreme difficulty of detecting vessels passing from the uterus directly into the placenta led not only Dr. Meigs, but Velpeau, Mr. W. Adams (*Med. Gazette*, 1847), and, at first, Dr. Robert Lee to deny the connection; but this difficulty is no proof that they do not do so, it is rather an evidence of imperfection in the mode of examination.

Dr. Madge, having examined the uterus of a woman who died in convulsions, and from whom the child was removed by the Cæsarian section, injected the umbilical vein with warm water, coloured, until it returned by the umbilical arteries; and then, "having made an opening at the external surface of the uterus corresponding to about the centre of the placenta, and having found a large artery, threw into it an injection consisting, for the sake of its running freely, of a small portion of yellow wax melted in olive oil. After injecting as much of the oil and wax as it was possible to get in, that part of the examination was left until the next day." Dr. Madge further observes:—

"On very carefully lifting the edge of the placenta, and raising its substance for a few inches from the internal surface of the

uterus, using at the same time a powerful magnifying glass, I found that, instead of having torn through arteries and veins leaving large open mouths, which have been supposed to be a fruitful source of uterine hæmorrhage, *there was really nothing of the kind to be seen.* The placenta appeared to be in opposition with the uterine decidua. . . . It must be remembered that the uterine decidua as yet remained perfect. Finding a little bulging at a certain part, about an inch from the border of the placental attachment, I made a small incision, and immediately a portion of the injection, which I had thrown in at the back of the uterus, made its appearance. On the following day, the injection having hardened, I dissected the uterine substance from without to within: I found the injection in several parts, but the greater portion was deposited in lumps about the size of filberts, on the uterine decidua." Dr. Madge goes on to describe the arrangement of the vessels of the uterus that "the inner third is made up entirely of a net-work of sinuses without any larger arteries and veins than those necessary for the nutrition of the parts in which they are found. These are small vessels, or continuations of them, and therefore still smaller that pass through the uterine decidua. They are similar to the vessels of new tissues, mere minute canals as imperfectly organized as the tissues they are intended to nourish. All this goes to prove, that fluids do not pass from the mother to the child directly by means of blood-vessels; and also that there are no uterine arteries and veins the rupture of which can give rise to what we call uterine hæmorrhage" (*Lancet*, vol. i. 1856, p. 204).

We can only refer to the evidence we have given as a proof to the contrary. The uterine decidua, the walls of the uterus, and its network of sinuses, were all examined and described by Dr. Madge, but not a word is said about the placenta itself. It is necessary to know whether there might be what Dr. Meigs calls "an extravasation of the injection into the meshes of the placenta." These experiments of Drs. Madge and Meigs are not sufficiently clear to counterbalance the weight of evidence which has been accumulated in proof of an utero-placental circulation.

Dr. Wm. Read, of Boston, who has written a most valuable essay on the history and treatment of Placenta Prævia, seems inclined to adopt the views of Dr. Meigs. He says, "If it cannot be proved that the maternal blood enters the placenta, it settles the question at once, without the necessity of determining the two-fold nature of the placenta itself. And if it does enter the placenta, it is also difficult to perceive how the maternal blood

can circulate through it: unless we suppose that the maternal portions of the placenta, both arterial and venous, have grown from the division and subdivision of the comparatively few and small utero-placental arteries and veins which pass from the uterus to the substance of the placenta, and is in the strictest sense a continuation of them" (p. 69). Dr. Read, like Dr. Meigs, does seem to recognise or acknowledge the peculiar character of the circulation in the placenta, which has no parallel in any other part of the body, because its function is altogether different from that of the general circulation. The law, therefore, that applies to arteries and veins elsewhere, which Dr. Read points out, does not of necessity apply to the present case.

The purpose of the circulation is not alone to supply materials to the parts through which the vessels pass, but essentially and chiefly to afford nutriment to the fœtal vessels. The blood in the cellular structure of the placenta bears the same relation to the capillary fœtal vessels, that the air-cells in the lungs do to the pulmonary capillaries.

The placenta has been compared to the lungs and to the gills of the fish; air in the one case and water in the other performing the same office as blood in the placenta. It must be viewed, therefore, as a special circulation; and it is not necessary to assume that the spongy structure must consist of divisions and subdivisions of vessels in order that such a circulation should be carried on. Dr. Meigs puts the argument in this form: "I cannot conceive that blood once poured out into the placental cells can ever again go back into the course of the circulation, because it is undeniable that blood once escaped from the contact of the 'endangium' (Burdach's term for the living membrane of the veins), dies and becomes coagulated, which indeed is the same thing as its death. To say that the blood is extravasated into the placental cells, is to say that it is extravasated or dead. There can be, therefore, no such physical condition" (p. 71).

There is a slight assumption in this argument of Dr. Meigs, that the lining membranes of the veins do not extend to the placental cells. It has, on the contrary, been clearly demonstrated that, when the veins arrive at the placenta, the lining membrane is continued and expands to form what Goodsir calls "the great cavity of the placenta," traversed in every direction by innumerable dissepiments of the same membrane, which gives the structure its spongy or cellular character. That blood should circulate in such a tissue is quite consistent, then, with the law laid down by Dr. Meigs.

The arteries and veins have been clearly seen and described

by Bonami, as they enter and emerge from the placenta. He has also injected the spongy structure, as we have done. Dr. Mackenzie has observed the fluid he injected escaping from the surface of the placenta. We have no hesitation, therefore, in stating that an utero-placental circulation is fully proved to exist.

If this be admitted, we have next to inquire into the source of hæmorrhage in placenta prævia. What takes place when, by its dilatation, the mouth of the womb is torn from its attachment to the placenta? The arteries and veins of the uterus are torn across, and the openings where they communicated with the spongy structure are exposed. The bleeding may take place from the arteries, from the veins, from the placenta, or from all three together.

Dr. Mackenzie's experiments bear on this question. They go to prove that the chief source of flooding is directly from the uterine arteries, not at all from the sinuses, and but slightly from the placenta. In such an experiment, some allowance must be made for the physical fact that fluids always seek the easiest course; and if any accidental cause prevented the entrance of the blood into the uterine veins or placenta, the force would be directed entirely on the arteries, whose lifeless coats could no longer offer any opposition to the transmission of blood.

Now, the coagula which may have existed, as well as the contracted state of the womb, might be sufficient to prevent fluid from entering the veins, more especially as their relation to the arteries is not the same as elsewhere. With regard to the placenta, some had passed and was observed to flow, but the same difficulty applies to it: coagula in the spongy structure might prevent the fluid from passing in that direction, which could so easily flow away through the arteries.

Dr. Mackenzie's interesting experiments do not, therefore, seem to us sufficient to establish the fact which he wished to prove. If the arteries were tied so as to imitate the contraction of their torn coats—if this were possible—it could then be determined whether the uterine veins or the placenta allow most of the fluid to pass, which might settle the question so long disputed.

It seems to us, however, to be highly probable that the uterine arteries have a larger share in these hæmorrhages than is generally supposed. The separation of the placenta from the mouth of the womb opens all the sources of hæmorrhage—arteries, veins, and placenta. The bleeding from the arteries is supposed to be checked by the contraction of their coats; that from the veins by the contraction of the uterus; that from the placenta by coagulation in the spongy structure. The dilatation

of the mouth of the womb is the contraction of its fibres, and therefore, as it expands, every exposed portion of the veins is compressed by the uterus. So long, therefore, as the contractile power of the uterus remains, hæmorrhage from the sinuses is *ab initio* under its control.

The contractile power of the arteries may be sufficient to arrest a moderate hæmorrhage, but we are not so sure that it can resist the molimen hæmorrhagicum, the torrent that is directed to the uterus in consequence of the discharge; and if this be true of the broken arteries on the surface of the uterus, it has still stronger force when applied to the arteries entering the placenta, because there is no contraction there, and if the blood flows through them with increased force it may be sufficient to wash away all the coagula in the spongy structure, and produce those frightful floodings which are unfortunately too frequent.

It seems to us, therefore, highly probable that the arteries, not only through the placenta but from the uterus, are a leading source of hæmorrhage in these cases.

The case of inverted uterus in which Dr. Lever removed the placenta, and the woman died from the gush that followed, is dwelt upon to prove that the sinuses are the chief source of hæmorrhage ; but in that case the uterus was relaxed, and whenever it is relaxed the sinuses will bleed; but the case is rather an exception. Dr. Radford, and, before him, Mr. Kinder Wood, several times removed the placenta from the inverted uterus without the least hæmorrhage taking place ; thus showing the power of the contracted uterus to arrest the discharge from those sinuses.

Besides this, the direction of the blood is toward the heart; and just in proportion as blood is deficient, the greater is its tendency in that direction to maintain the action of the heart, so that there is comparatively much less force exercised to overcome the contraction of the uterine fibres than that of the arteries.

TABLE OF CASES OF CÆSAREAN SECTION.

Place.	Total Cases.	Mothers.		Children.		Observations.
		Living	Dead.	Living	Dead.	
Great Britain.	58	11	46	35	25	
America	12	8	4	6	4	Two results not reported.
Europe.....	409	158	251	237	110	Dr. West's Table.
Total.....	479	177	301	278	139	

British Cases.

No.	Year.	Practitioner.	Cause.	Duration of Labour.	Mothers.		Childrn.	
					L.	D.	L.	D.
1	1737	Mr. R. Smith	Mollities ossium	7 days	..	1	..	1
2	1739	Mary Donnelly ...	....	12 „	1	..	..	1
3	1740	Dr. White	....	...	..	1	..	1
4	1769	Mr. Thompson ...	....	24 hours	..	1	..	1
5	1773	Dr. Young	Rickets.	...	..	1	..	1
6	...	Mr. A. Wood	....	...	..	1	..	1
7	1774	Mr. Chalmers	....	12 „	..	1	1	
3	1774	Mr. John Hunter .	Mollities ossium	...	..	1	1	
9	1774	Dr. Cooper	....	2 „	..	1	1	
10	1775	Mr. W. Whyte ...	Ditto	...	..	1	..	1
11	1777	Mr. Atkinson	Ditto	3 „	.	1	1	
12	...	Mr. Clarke	....	8 „	.	1	..	1
13	1793	Mr. Barlow	....	5 „	1	..	..	1
14	1794	Dr. Hull	Ditto	12 hours	..	1	1	
15	1795	Dr. Hamilton, Jun.	Ditto	2 days	..	1	1	
16	1798	Dr. Hull	Ditto	10 „	..	1	..	1
17	1798	Mr. Kay	.. .	3 „	..	1	1	
18	1799	Mr. Wood	Ditto	...	..	1	1	
19	1800	Mr. John Bell.....	....	...	..	1	1	
20	1801	Mr. Dunlop.....	Ditto	...	..	1	1	
				Forward.	2	18	10	10

Authorities.

Case.
1 Smellie, vol. iii., p. 422.
2 Edinburgh Essays, vol. v.
3 Hull's Defence, p. 67.
4 Medical Observations, vol. iv.
5 Manuscript Lectures, by Dale.
6 Hamilton's Outlines.
7 Do. Do.
8 Medical Observations, vol. v.
9 Do. Do.
10 Hull's Defence.

Case.
11 Hull's Defence.
12 Mem. Med. Society, vol. iii.
13 Medical Records, p. 104.
14 Hull, p. 172.
15 Hamilton's Outlines.
16 Hull, p. 162.
17 Do. Do.
18 Mem. Med. Society, vol. v.
19 Medico-Chirurgical Transact., vol. iv.
20 Appendix to Hull's Translation.

BRITISH CASES—*continued.*

No.	Year.	Practitioner.	Cause.	Duration of Labour.	Mothers.		Childrn.	
					L.	D.	L.	D.
				Forward	2	18	10	10
21	...	Mr. Wood	....	...	..	1	.	1
22	1817	Barlow and Cost..	....	...	..	1	1	
23	1820	Dr. Radford	Mollities ossium	34 hours	..	1	..	1
24	1821	Dr. Radford*	Ditto	...	..	1	..	1
25	1821	Barlow & Dugdale	....	...	..	1	1	
26	1821	Henderson	....	...	..	1	1	
27	1825	Dr. Radford†	Ditto	8	..	1	2	
28	...	Dr. Radford	....	53 „	..	1	..	1
29	1826	Dr. Crichton	....	6 days	..	1	1	
30	1827	Mr. Knowles	Ditto	30 hours	1	..	1	
31	1829	Dr. M'Kibbins ...	Exostosis	...	..	1	..	1
32	...	Mr. Ward‡	....	...	..	1	..	1
33	1833	Mr. Greaves	....	...	1	..	1	
34	1834	Dr. Montgomery...	Fibrous tumour	...	..	1	..	1
35	1841	Mr. Ross	....	...	..	1	1	
36	1843	Dr. Elliot	....	...	,	1	..	1
37	1843	Mr. Goodman and Dr. Radford.....	Mollities ossium	5 days	1	..	1	
38	1840	Mr. Whitehead§...	Ditto	...	..	..	1	
39	1843	Mr. Braid	....	...	..	1	..	1
40	1843	Baily and Hardy‖	....	...	..	1	2	
41	1845	Mr. Lyon.....	....	...	..	1	1	
42	...	Dr. Wright¶	....	...	1	..	1	
43	1847	Mr. Skey.....	Rickets	...	..	1	1	
44	1849	Dr. Radford	Mollities ossium	...	1	..	1	
45	1849	Mr. Campbell.....	....	...	..	1	1	
46	1850	Mr. Nimmo.....	....	...	..	1	1	
47	1850	Dr. Sannerman ...	....	...	..	1	..	1
48	1850	Dr. West.....	Ditto	...	..	1	1	
49	1850	Dr. Oldham.....	Ditto	...	..	1	..	1
				Forward	7	41	30	21

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Case.
21 Medical and Phys. Journal, p. 346.
22 Barlow's Essays.
23 Edinburgh Med. Journal, vol. 4, p. 67.
24 Do. Do.
25 Merriman and Churchill, p. 367.
26 Do. Do.
27 British Medical Journal, p. 45. 1856.
28 Ranking, vol. x., p. 212.
29 Edinburgh Journal, 1828.
30 Trans. of Prov. Assoc., vol. iv., p. 153.
31 Do. Do. 1831, p. 352.
32 Lancet, vol. ii., 1832–40, p. 28.
33 Lancet, 1833, p. 148.
34 Dublin Journal, vol. vi., p. 418.
35 Edinburgh Monthly Journal, 1842.

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36 Churchill's Midwifery, p. 331.
37 British Obstetrical Record, vol. i.
38 Medical Gazette, 1841, p. 940.
39 Ranking, vol. vii., p. 330.
40 Do. Do.
41 Edinburgh Med. Journal, Dec., 1845.
42 Lancet, vol. ii., 1839–40, p. 28.
43 Ranking, vol. v., p. 293.
44 Do. vol. x., p. 212.
45 Do. vol. x., p. 330.
46 Edinburgh Monthly Journal, 1850.
47 Lancet, July, 1850.
48 Med.-Chirur. Trans., vol. xxxiv., p. 61.
49 Do. Do. p. 89.

* The child's head caught in the contracting uterus caused its death. † Twins.
‡ One of six cases quoted by the Lancet from "L'Experience," but the details not given.
§ Mother died, on the thirty-second day, of hip-joint disease. ‖ Twins.
¶ Quoted by Lancet from "L'Experience," vol. ii., p. 28. 1839–40.

BRITISH CASES—*continued.*

No.	Year.	Practitioner.	Cause.	Duration of Labour.	Mothers.		Childrn.	
					L.	D.	L.	D.
				Forward,	7	41	30	21
50	1851	Dr. Oldham.....	Scirrhous tumor	...	1	..	1	
51	1853	Dr. Waller	Fibrous tumour	...	..	1	1	
52	1854	Dr. Simpson*	Mollities ossium	...	..	1	..	1
53	1856	Mr. Humphry.....	. ..	...	..	1	..	1
54	1856	Mr. Thornton	....	...	1	..	..	1
55	1858	Dr. Greenhalgh ...	Ditto	...	..	1	1	
56	1858	Mr. Hawkins	Rickets	1 hour	1	..	1	
57	1858	Dr. Murphy	Mollities ossium	...	..	1	..	1
58	1860	Mr. Edmunds	Cancerous mass at os uteri.	6 days	1	..	1	
					11	46	35	25

AMERICAN CASES.

1	1822	Mr. Cellin	...	...	1	..	1	
2	1847	Dr.Richmond,Ohio	...	...	1	..	1	
3	1827	Drs. Dougal and Vanvalsah†	...	...	..	1	..	1
4	1835	Messrs. Nacrede and Gibson.....	...	...	1	..	1	
5	1837	Dr. Fox and Mr. Gibson..... ..	...	...	1	..	1	
6	1845	Dr. Brodie Herdon	...	...	1	..	..	1P.
7	1843	Dr.CyrusFalconer‡	...	...	..	1	1	
8	1848	Dr.A. B. Shipman§	A tumour	...	..	1	..	1
9	1850	Mr. M. H. Jetter ..	...	...	1	..	..	1
10	1851	Dr.W. H. Merinar‖	...	...	1			
11	1851	Ditto	...	...	1			
12	1851	Ditto	...	...	..	1	1	
					8	4	6	4

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9 Do. Do. vol. xxi., p. 538.
10 Do. Do. vol. xxxi., p. 567.
11 Do., and Charleston Medical Jour. for March, 1851.
12 Do. Do.

* Mother moribund before the operation. † Uterus ruptured before the operation.
‡ A dwarf, 3½ feet high. § Patient sinking before the operation.
‖ Cases 10, 11, 12—the same patient, who was delivered successfully twice by the Cæsarean section, previous to the third operation, from which she did not recover. Nothing is said about the previous children. Case reported by Dr. F. Owen.

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