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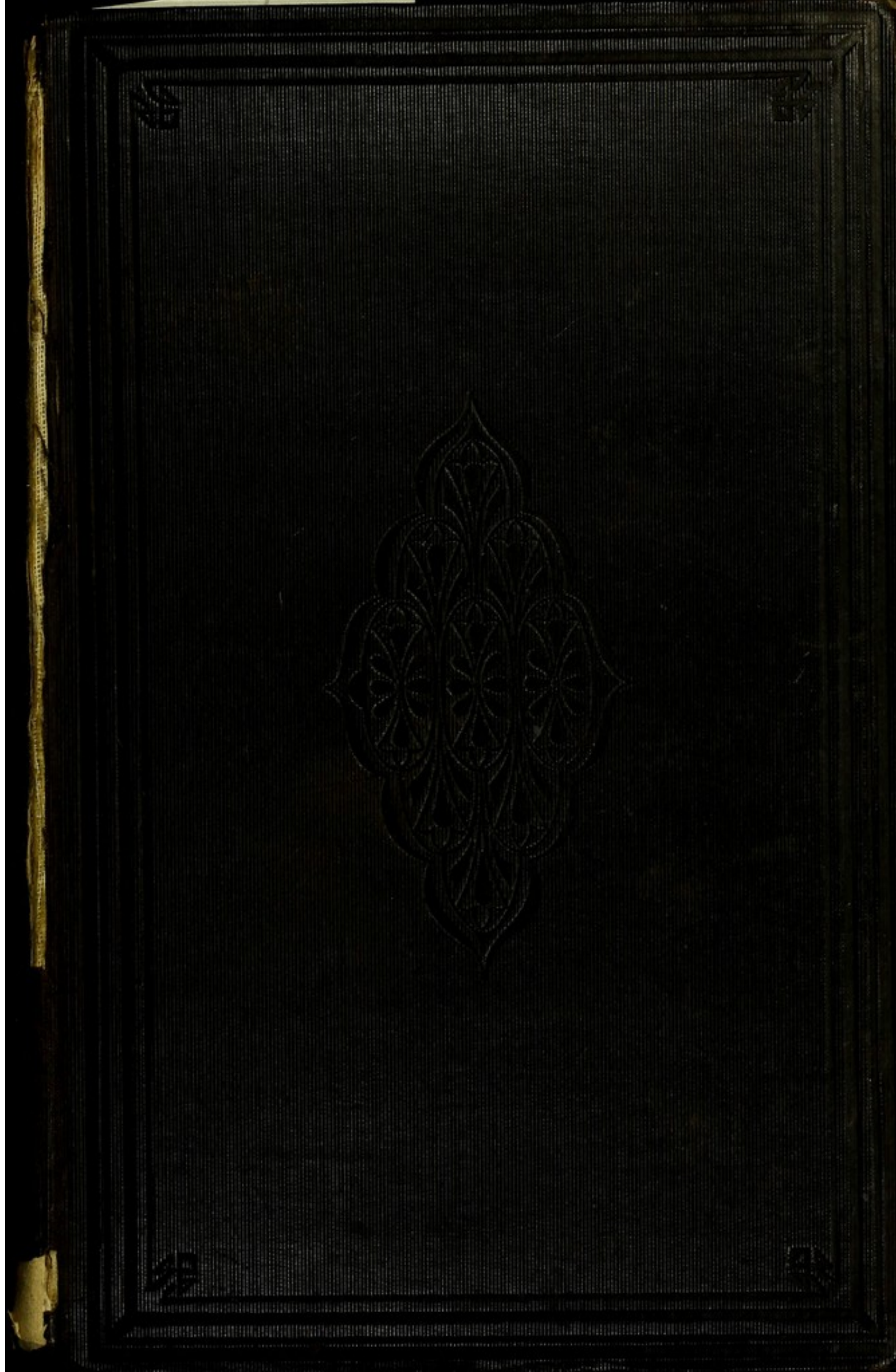
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LECTURES

ON THE

PRINCIPLES AND PRACTICE OF
MIDWIFERY.

LECTURES

ON THE

PRINCIPLES AND PRACTICE

OF

MIDWIFERY.

BY

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

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Illustrated by Lithographic Plates and Wood-cuts.

PREFACE.

THE following lectures are published, in the hope of facilitating the task of the student, who is desirous of giving his attention to the principles and practice of midwifery. The Author, like all teachers, is frequently asked by his pupils to recommend a work to read with his lectures, and has been often 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—the treatment of unavoidable hæmorrhage—the use of ætherisation in the practice of midwifery—puerperal fever—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 been induced to publish 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 already attended the obstetric classes of 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.

12, HENRIETTA STREET,
CAVENDISH SQUARE.
April, 1852.

TABLE OF CONTENTS.

the External and Internal Surfaces. The Effect produced by the Contraction of the different Sets of Fibres - Manner in which the Dilatation of the Uterus is accomplished—Use of Liquor Amnii. Order of Uterine Contractions—Wigand's views—Objections to them—Dewees' explanation of Uterine Action—Objections Different Conditions of the Os Uteri—Dilatable—Rigid—Inflamed. Influence on the Action of the Uterus - 42—59

LECTURE IV.

MECHANISM OF PARTURITION, CONCLUDED.

Second Stage of Natural Labour—Bearing Pains—Passage of the Head through the Pelvis—Positions of the Head according to various Authors—Naegele's Views—Mode of distinguishing Vertex Positions—Varieties in Face-Presentations—Characters of - not so dangerous as had been supposed —Dilatation of the Perinæum—Expulsion of the Head—Direction of the Shoulders. *Third Stage*—Separation of the Placenta—Causes of Retention —without Hæmorrhage - - - - - - 60—76

LECTURE V.

MANAGEMENT OF NATURAL LABOUR.

Premonitory Symptoms of Labour—Evidence of the Commencement of the first Stage—Character of the grinding Pains. *Obstetric Duties of the Practitioner*—When summoned to attend— Caution respecting his Patient—Objects of the Vaginal Examination in the first Stage, before the Membranes are ruptured—Signs of the first Stage being completed—Mode of preparing the Bed, and supporting the Patient - - - 77—91

LECTURE VI.

MANAGEMENT OF NATURAL LABOUR—CONTINUED.

Second Stage—Obstetric Duties of the Practitioner—Vaginal Examination—Its Objects—Support of the Perinæum—Its Intention and Mode of Accomplishment. *Third Stage*—Removal of the Placenta— Support of the Uterus —The Abdominal Bandage—Its Object and Mode of Application—Management of retained Placenta without Hæmorrhage - - 91—103

LECTURE VII.

DIFFICULT LABOURS.

Difficult Labours divided into Tedious and Laborious Labours—Causes of Tedious Labours—Over-Distension of the Uterus—Extreme Obliquity—Gradual Escape of Liquor Amnii—Hysterical Excitement—Mental Despondency—Rigidity of Os Uteri from Inflammation—Toughness of Os Uteri— Extreme Rigidity, etc. - - - - - 104—119

LECTURE VIII.

LABORIOUS LABOURS.

LECTURE IX.

LABORIOUS LABOURS.

LECTURE X.

LABORIOUS LABOURS.

LECTURE XI.

OBSTETRIC OPERATIONS—THE FORCEPS.

LECTURE XII.

OBSTETRIC OPERATIONS.

LECTURE XIII.

OBSTETRIC INSTRUMENTS.

LECTURE XIV.

PRETERNATURAL LABOURS: BREECH, FEET, KNEE PRESENTATIONS.

LECTURE XV.

PRETERNATURAL LABOURS: SHOULDER AND ARM PRESENTATIONS.

LECTURE XVI.

COMPLEX LABOURS.—GENERAL VIEW OF HÆMORRHAGES.

LECTURE XVII.

GENERAL VIEW OF HÆMORRHAGES, CONTINUED.

LECTURE XVIII.

UNAVOIDABLE HÆMORRHAGE.

LECTURE XIX.

UNAVOIDABLE HÆMORRHAGE—CONTINUED.

LECTURE XX.

PUERPERAL CONVULSIONS.

LECTURE XXI.

PUERPERAL CONVULSIONS.

LECTURE XXII.

RUPTURE OF THE UTERUS.

LECTURE XXIII.

INVERSION OF THE UTERUS.—PROLAPSE OF THE FUNIS.

LECTURE XXIV.

ETHERISATION.

LECTURE XXV.

ETHERISATION, CONTINUED.

LECTURE XXVI.

CONVALESCENCE AFTER PARTURITION.

LECTURE XXVII.

POST-PARTUM INFLAMMATIONS.

LECTURE XXVIII.

PHLEGMASIA DOLENS—POST-PARTUM FEVERS.

LECTURE XXIX.

PUERPERAL FEVER.

LECTURE XXX.

HISTORY OF PUERPERAL FEVER, CONTINUED.

LECTURE XXXI.

SYMPTOMS OF PUERPERAL FEVER.

LECTURE XXXII.

NATURE OF PUERPERAL FEVER.

LECTURE XXXIII.

PUERPERAL MANIA.

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LECTURES

ON

NATURAL AND DIFFICULT PARTURITION.

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LECTURE I.

BONES OF PELVIS AND PELVIS COLLECTIVELY.—MEASURE-
MENTS OF PELVIS AND FŒTAL HEAD.

Obstetric Anatomy of the Pelvis—Coxal Bones divided by Brim into the Iliac
or Abdominal portion and Ischiatic or Pelvic portion—Plane of Ischium—
Double Inclination—Pubic portion—the Sacrum—Keystone of Pelvis—
Hollow and Promontory of Sacrum—Coccyx. *Articulations* of the Pelvis –
Symphysis Pubis—Sacro-iliac Articulation—Sacro-vertebral Articulation.
Pelvis collectively—Brim of the Pelvis—Iliac portion of Pelvis. *Pelvic Cavity,*
with the Soft Parts—Influence of its shape on the Head of the Child. *Outlet*—
Perinæum—Object of measuring the Pelvis—Measurements of the Brim,
of the Outlet – Measurements above the Brim, of the Brim, of the Cavity, of the
Outlet—Table of Measurements of Eighteen Pelves—Measurements of the Child's
Head.

Gentlemen,

The first subject to which I shall direct your attention, 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 your particular attention. The difficulties, some-
times almost insuperable, which occur in the process of partu-
rition, arise most frequently from the disproportion that exists
between the head of the child, and the space it has to pass
through. The source of many of these difficulties is in the
pelvis; and the irregularities in its shape are often the most
frequent causes of difficult labour. Independently of this, the

B

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.

The bones of the pelvis are three: *two coxal or hip bones, and the sacrum* with its appendage *the coccyx*. In the process of ossification, the coxal bones are not completed until a later period, consequently, the older anatomists have been in the habit of describing it, as consisting of three bones—the ilium—the ischium—the pubis; but this is evidently incorrect: we shall therefore, consider them as parts of the same bone, consisting of an iliac, ischiatic and pubic portion.

The iliac portion is much the largest, and is divided into two parts, by a very well-defined line of demarcation, which is a continuation 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 attached to its internal surface, the gluteal to its external; and to 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 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
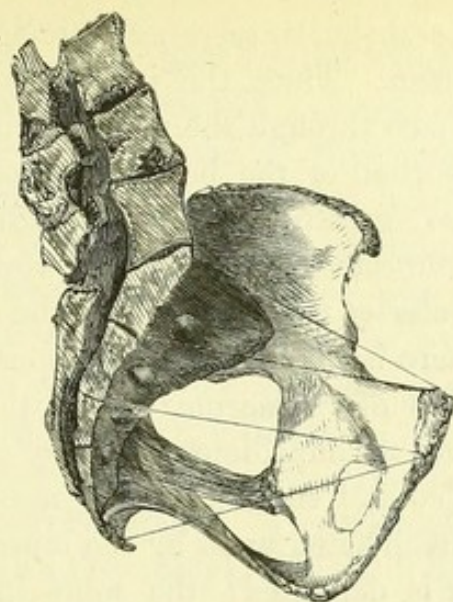
Vertical Section of Pelvis,
Showing the anterior and posterior surface of the plane of the
Ischium.—The lines represent the inclined plane of the promontory—
plane of the brim—of the cavity—of the outlet. Vide p. 12.

(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 arch of the pubis; 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 emi-
nence 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 reflections of the
peritoneum which form the broad ligaments. Thus, the inter-
nal 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
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 arch of the pubis. It presents a smooth surface,
bevelled off towards the arch ; and when the head passes from
the obturator foramen upon it, this inclination greatly assists its
exit under the arch of the pubis. *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 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 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 tubera-ischii often oppose 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 only met with, when the pelvis is surrounded by strong and constantly exercised muscles; and therefore you may expect to find them 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 tubera-ischii 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 your attention: it varies very much in different pelves; if it be too straight, the antero-posterior space of the pelvic cavity is diminished; if 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 *Promontory*

of the Sacrum, a term used by the older authors, and is a sufficient evidence of the frequent instances in which the difficulty of labour has been attributed to this projecting point. The passage round the promontory, which was supposed to be the leading difficulty, became a kind of doubling the Cape of Good Hope; and if it were well-formed, or that the head advanced beyond it, all was well. 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.

Such are the bones that constitute the pelvis. Let us now consider the manner in which they are united together, and you will perceive every provision 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 a series of concentric laminæ, the outer layers 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, you can readily perceive the risk that might occur; 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. If you examine carefully the articulating surfaces of the sacrum and ilium, you will find them 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 it, the importance of preserving the union of the sacrum and coxal bones undisturbed. When we recollect the relative position of the sacrum, the key-stone 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.

The inferior extremity of the sacrum is united to the coccyx by a fibro-cartilaginous lamina similar to the intervertebral cartilages, and is supported 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.

The superior surface of the sacrum is united to the last lumbar vertebræ, by an intervertebral fibro-cartilage, which differs from the others in being much deeper before than behind; the aspect of the two articulating surfaces are consequently oblique to each other, and the cartilage presents a broad surface anteriorly 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.

Having thus given you a detailed description of the several bones composing the pelvis and the manner in which they are united together, let us proceed to consider the pelvis collectively. You perceive that it is divided into two portions by the line already alluded to, a continuation of the linea-ileo-pectinea on either 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 lesser pelvis," "the true and 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 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—then the action of the uterus becomes irregular and inefficient, and labour is delayed from this cause alone;—if they are very upright, the uterus rises into the abdomen too much in the middle line of the body; and 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 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.

This cavity, which is destined to contain the genito-urinary organs, is bounded above by the brim of the pelvis, below by the tubera-ischii and coccyx. The smooth posterior surfaces of the bodies of the pubis with their connecting symphysis, the obturator spaces, and the ischio-pubic rami, form its anterior wall; the sacrum and ischiatic notch, the posterior boundary; and the planes of the ischium, 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, the obturator spaces occupied by fibrous membrane to which the obturator muscle is attached, having 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, the ischiatic notch is converted into a foramen by the internal sacro-ischiatic ligament which unites the sacrum to the spine of the ischium ; and beneath it a second opening is formed by the greater sacro-ischiatic ligament which passes from the sacrum to the tubers of the ischium. The larger sacro-ischiatic foramen is occupied by pyriform muscle, the thick branches of the sacral plexus of nerves which converge to form the great sciatic nerve, and the gluteal and ischiatic vessels. The smaller foramen is filled by the tendon of the obturator muscle, and 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, if you recollect the aspect which they present, their double inclination anteriorly and posteriorly, you will perceive 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 arch of the pelvis, 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 enters 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 bone: 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 either side; hence the greatest space of the brim would not be in the transverse 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 it 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 pubis and coccyx, and laterally at the tubera ischii; 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

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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.

ischia-pubic rami run downwards and backwards, both meeting at the tubera ischii, 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. If you please to class it with the mechanic powers, you may consider it a lever of the third 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.

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: its necessity will be obvious, if you reflect on the very close adaptation of the head to the pelvis. 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 is more closed in, for the purpose of supporting the weight of the viscera above it. 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 having fixed upon that as the normal standard, it was 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 it has been measured. Every impediment to the passage of the head seems to

have been referred to two sources—either irregularity of the brim, or 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 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 it is possible for the head to 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 to point out to you that irregularities in the brim and outlet are not the only difficulties met with in the pelvis. Let us first consider the axes of the pelvis. If the brim of the pelvis be supposed to be 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 an angle with the perpendicular of the body more or less acute; the angle is generally 45°, but it may be much greater; sometimes it is less. The outlet has a different axis, and 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 arch of the pubis.

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

In place of confining your attention to the measurements of the
brim and outlet of the pelvis, we would wish you to consider the
pelvis in another point of view, 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,
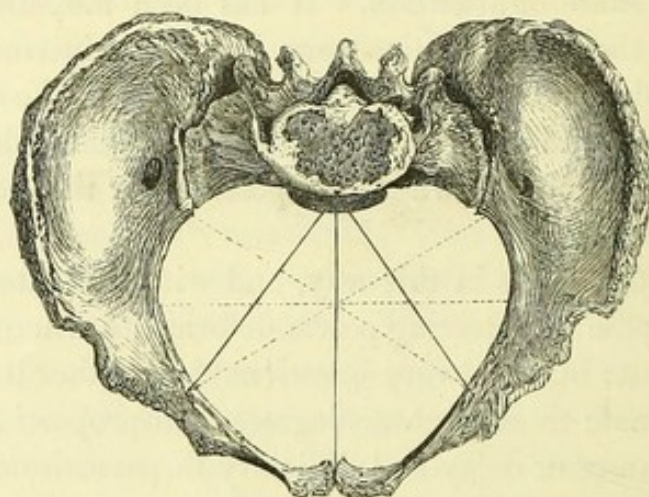
Horizontal section of pelvis made at the brim of the pelvis.—*The
superior surface* shewing the antero-posterior and lateral measure-
ments of *inclined plane of the promontory*—The dotted lines represent
the transverse and oblique measurements of the brim.

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 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 measure-
ments are taken from the same point to the pectineal eminences
on either 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
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 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. The second
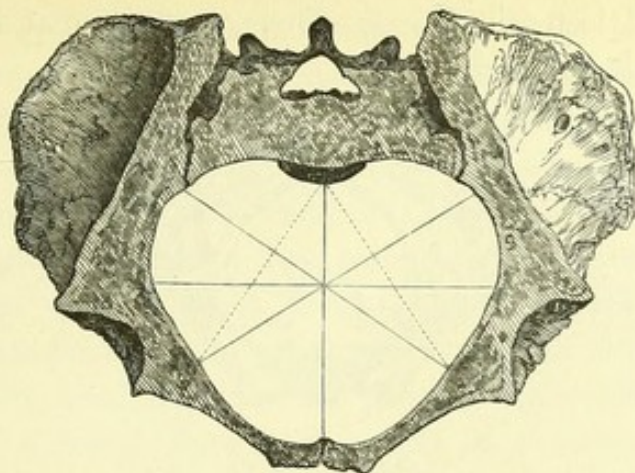
Inferior surface of same section, showing the antero-posterior, transverse and oblique measurements *of the brim of the pelvis.*—The dotted lines represent the lateral measurements of the inclined plane.

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 four inches. The transverse, from the centre of one ilium to 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.
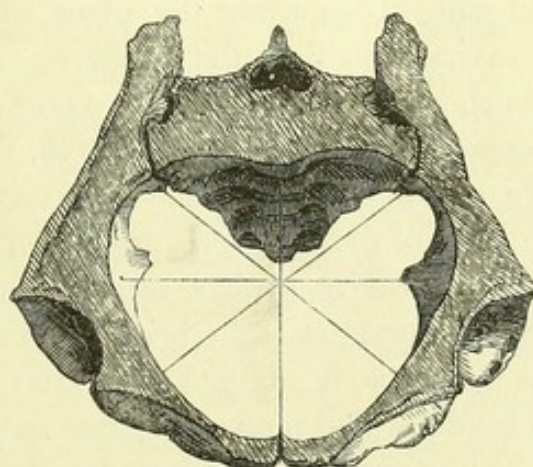
Remaining section of pelvis, shewing the antero-posterior, transverse and oblique measurements *of cavity.*

We have, then, 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 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 passes from the centre of one plane of the ischium to the other, and is $4\frac{1}{2}$ inches, 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.
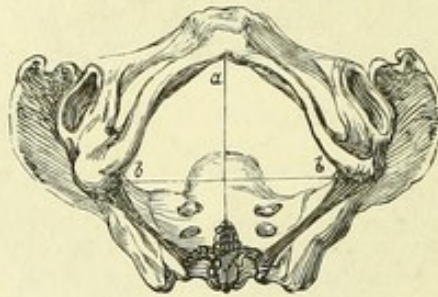
Outlet of pelvis.

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 about $4\frac{1}{2}$ inches. The transverse measurement between the tubers of the ischia lies above this, and is about the same; so that when the head is pressing through the outlet, it forms a pretty accurate circle round it.

If you study attentively these proportions, you will at once perceive how much they contribute to the rotation which has been explained to you. Comparing the plane of the brim with the plane of the cavity, you find the transverse measurement of the cavity diminished, while the antero-posterior and oblique distances are increased; you may also observe, that the oblique lines of the cavity approach nearer to the antero-posterior direction than those of the brim of the pelvis, so that 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 forwards commences, the transverse measurements of the head corresponding to the transverse of the outlet, and the longitudinal passing successively 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

* 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.

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; you have also before you
the measurements of the pelvis given by different popular authors*
The transverse space of the outlet is sometimes measured in a
different manner, in order 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 between these
is measured in degrees, which of course, gives the angle at
the 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 to
you, that, from its construction, the head must rotate first laterally,
and then in the antero-posterior direction before it is expelled:
but these 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 your attention. Before alluding to these, however, we would wish you to understand, that when we speak of the *head* passing through the pelvis,
and that in a certain direction, we do not mean you to suppose
that this is *constantly* the case: on the contrary, the head may
enter the pelvis in a different position; and that of the child itself
is sometimes reversed so that the breech or 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

* Vide Tables, No. 1 and 2, placed at the end of the Lecture.

position as uniform; the variety of these positions, and the mode of ascertaining them, will again come under our consideration in future lectures.
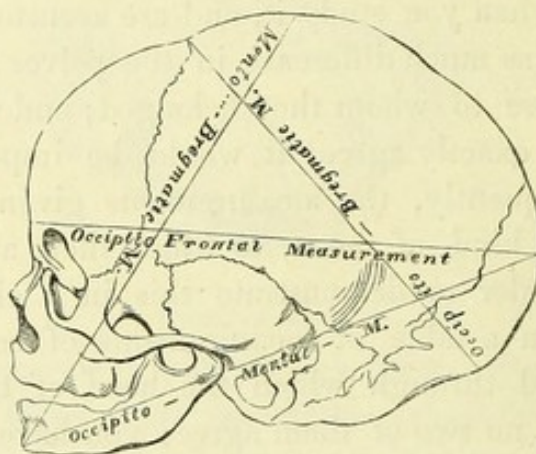
Longitudinal Measurement of the Child's Head.

Like the pelvis, so 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 "bregma" or "anterior fontanelle," this is generally about 3½ inches. Another passes horizontally from the most projecting point of the occiput to the centre of the frontal bone, above and between the superciliary ridges. This is usually 4½ inches. The third lies between the same point of the occiput and the centre of the chin. This is 5 inches.
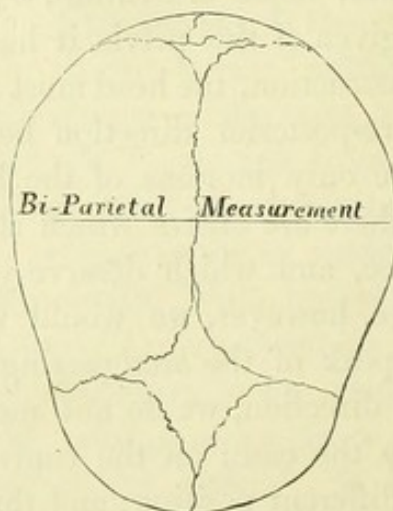
Transverse Measurement.

There are also three transverse measurements. One between the parietal protuberances, which is 3½ inches; another between the temporal fossæ, which is from 2½ 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. We have arranged them thus in a tabular form.

LONGITUDINAL.	IN.	MEASUREMENTS.	IN.	TRANSVERSE MEASUREMENTS.	IN.
Occipito-Bregmatic .	$3\frac{1}{2}$	Mento-Bregmatic . .	4	Bi-parietal	$3\frac{1}{2}$
Occipito-Frontal. . .	$4\frac{1}{2}$	Mento-Frontal . .	$3\frac{1}{2}$	Bi-temporal	3
Occipito-Mental . .	$5\frac{1}{8}$	Mento-Occipital . .	$5\frac{1}{8}$	Bi-zygomatic	$3\frac{1}{2}$-4

The shortest of these measurements 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 ischia-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 bi-parietal 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 bi-parietal 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

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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 pro-
tuberance next the pubis descends lower than that next the sacrum,
so that the bi-parietal axis lies obliquely downwards, and so it re-
mains 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 this parietal bone. By this means nature avoids the
difficulty which would often arise, if both parietal protuberances
descended in the same plane.

Thus you perceive that the head slightly rotates on its longitu-
dinal 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.

No. in Museum	No.	Inclined Plane of Promontory.*			Plane of Brim.				Cavity.†		Outlet.		Arch of Pubis.	Character of Pelvis.
		Prom. to Pubis.	Prom. to L.P.E.	Prom. to R.P.E.	Ant. Post.	Trans-verse.	Left Oblique.	Right Oblique.	Ant. Prop.	Trans-verse.	Ant. Post.	Trans-verse.		
7	1	4	$3\frac{1}{2}$	$3\frac{3}{4}$	$4\frac{1}{8}$	$5\frac{1}{2}$	$4\frac{7}{8}$	$4\frac{7}{8}$	$4\frac{5}{8}$	$4\frac{7}{8}$	$4\frac{3}{8}$	$4\frac{5}{8}$	70°	Normal (nearly).
14	2	4	$3\frac{1}{4}$	$3\frac{1}{4}$	4	5	$4\frac{6}{8}$	$4\frac{7}{8}$	5	$4\frac{1}{8}$	$3\frac{6}{8}$	4	75	"
8	3	$3\frac{7}{8}$	$3\frac{1}{2}$	$3\frac{1}{4}$	4	$5\frac{1}{8}$	$4\frac{3}{8}$	$4\frac{3}{4}$	$4\frac{6}{8}$	$4\frac{1}{4}$	$4\frac{1}{8}$	$3\frac{7}{8}$	60	Nearly normal (small).
15	4	$3\frac{6}{8}$	$3\frac{1}{2}$	$3\frac{3}{8}$	4	$5\frac{1}{8}$	$4\frac{7}{8}$	5	$4\frac{1}{8}$	$4\frac{3}{4}$	$4\frac{1}{8}$	$3\frac{3}{4}$	70	"
10	5	$3\frac{7}{8}$	$3\frac{3}{8}$	$3\frac{3}{8}$	4	$5\frac{1}{2}$	$4\frac{7}{8}$	$5\frac{1}{4}$	$4\frac{1}{2}$	$5\frac{1}{8}$	$4\frac{1}{2}$	$4\frac{6}{8}$	90	Normal.
33	6	$4\frac{1}{4}$	$3\frac{1}{2}$	$3\frac{1}{8}$	4	$4\frac{5}{8}$	$4\frac{6}{8}$	$4\frac{6}{8}$	$4\frac{7}{8}$	$4\frac{1}{2}$	4	$4\frac{3}{8}$	75	"
9	7	$3\frac{3}{4}$	$3\frac{3}{8}$	$3\frac{1}{2}$	$3\frac{7}{8}$	$3\frac{3}{8}$	$4\frac{7}{8}$	5	$4\frac{3}{8}$	$4\frac{3}{4}$	$4\frac{5}{8}$	$4\frac{5}{8}$	70	Rather small.
16	8	$3\frac{7}{8}$	$3\frac{3}{8}$	$3\frac{1}{4}$	$3\frac{7}{8}$	$5\frac{1}{4}$	$4\frac{7}{8}$	$5\frac{1}{8}$	$5\frac{1}{8}$	5	4	$4\frac{3}{8}$	80	Irregular.
18	9	$4\frac{1}{4}$	$3\frac{7}{8}$	4	$4\frac{5}{8}$	$5\frac{3}{8}$	$5\frac{1}{8}$	5	5	5	$3\frac{6}{8}$	$4\frac{6}{8}$	100	Very large.
22	10	$4\frac{1}{4}$	$3\frac{7}{8}$	$3\frac{6}{8}$	$4\frac{6}{8}$	$5\frac{1}{2}$	5	$5\frac{1}{8}$	$5\frac{5}{8}$	5	$4\frac{1}{2}$	$4\frac{1}{4}$	80	Large.
21	11	$5\frac{1}{8}$	$3\frac{7}{8}$	$3\frac{6}{8}$	$5\frac{1}{4}$	$5\frac{3}{8}$	$5\frac{1}{8}$	$5\frac{1}{2}$	$5\frac{1}{2}$	$4\frac{6}{8}$	$4\frac{6}{8}$	$3\frac{7}{3}$	60	{ Very long conjugate measurement, narrow outlet.
19	12	$4\frac{7}{8}$	$3\frac{7}{8}$	$3\frac{6}{8}$	$4\frac{7}{8}$	$5\frac{1}{2}$	5	$5\frac{1}{8}$	$5\frac{1}{8}$	$5\frac{1}{4}$	$3\frac{7}{8}$	$4\frac{7}{8}$	95	Large, and like young Pelvis.
17	13	$4\frac{1}{8}$	$4\frac{1}{8}$	$5\frac{1}{8}$	$4\frac{7}{8}$	$5\frac{1}{4}$	$4\frac{7}{8}$	$5\frac{1}{8}$	$5\frac{1}{8}$	5	4	$4\frac{3}{8}$	90	Large and normal.
6	14	$5\frac{1}{4}$	$4\frac{1}{4}$	$4\frac{1}{4}$	5	$5\frac{1}{2}$	5	5	5	$4\frac{7}{8}$	$3\frac{3}{8}$	5	90	Large and round.
20	15	$4\frac{3}{8}$	$3\frac{7}{8}$	$3\frac{6}{8}$	5	$5\frac{5}{8}$	$5\frac{1}{8}$	$5\frac{1}{8}$	$5\frac{7}{8}$	$4\frac{7}{8}$	$4\frac{7}{8}$	$3\frac{1}{4}$	45	Very large, but outlet contracted.
12	16	$4\frac{1}{8}$	$3\frac{7}{8}$	$3\frac{6}{8}$	$4\frac{5}{8}$	$4\frac{6}{8}$	$4\frac{1}{2}$	$4\frac{5}{8}$	5	$4\frac{1}{8}$	$4\frac{1}{8}$	4	75	Large, but like male Pelvis.
11	17	$3\frac{6}{8}$	$3\frac{3}{8}$	$3\frac{1}{8}$	$3\frac{6}{8}$	$4\frac{1}{2}$	$4\frac{1}{4}$	$4\frac{5}{8}$	$4\frac{1}{8}$	$3\frac{5}{8}$	$3\frac{7}{8}$	3	45	Like male P. bone very light as if diseased.
13	18	$3\frac{1}{2}$	3	$2\frac{7}{8}$	$3\frac{6}{8}$	$5\frac{1}{8}$	5	5	$4\frac{1}{2}$	$4\frac{1}{4}$	$4\frac{1}{4}$	$3\frac{3}{8}$	65	Like male Pelvis.

* 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.

	Burns.	Monro.	Ramsbotham.	Rigby.	Lee.	Baudeloque.	Cloquet.	Moreau & Velpeau.	Boivin.
	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
BRIM.									
Antero-posterior	4	4½	4	4·3'	4	4	4	4	4,4⅓
Transverse	5¼, 5½, 6	5⅛	5¼	5·4'	5	5	5·2 lines	5	5
Oblique	5⅛, 5½	5	5	4·8'		4½	4·6 l.	4½	4⅓
OUTLET.									
Antero-posterior	4, 5	5⅛			5		4,4·10 l		
Transverse	4	4⅞, 5⅝			4		4		
Oblique	4						4		
DEPTH OF CAVITY.									
Depth of Symphysis	1½				1½		1·6 l.		
,, of Sacrum	5, 6				6		4·7 l.		
,, of Plane of Ischium	3¾				3		3·6 l.		
ARCH OF PUBIS.									
Base	4								
Sides	3¼								
Perpendicular	2								
FALSE PELVIS.									
Between Spines of Ischia	10						9·6 l.		
Ditto Centres of Crista							10·6 l.		
Centres of Crista to Brim	3½						3·4 l.		
Ditto Ditto to Tubera Ischii							7		

LECTURE II.

MODES OF MEASURING THE PELVIS.

Varieties in the Pelvis. *Deviations* from the Standard Pelvis—Pelvis too large—too small—imperfectly developed—like the Male Pelvis—irregularly formed. *Deformities* of the Pelvis—the Ovate Pelvis of Infancy—the Cordiform Pelvis of the Adult—Manner in which these Deformities are produced—Influence of Gravity, of Muscular Forces—Rickets and Mollities Ossium considered as Causes of Distortion. *Modes of measuring* the Pelvis—Baudeloque's Callipers—Contouly's Pelvimeter—Boivin's Pelvimeter—Digital Measurement.

Having, in the preceding lecture, explained to you the structure of the pelvis, its obstetric characters, its normal proportions and the manner in which the head of the child passes through it, let me now direct your attention to 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 consider each class separately. 1st. 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, and therefore should be considered separately from the next class. 2nd. *The deformities or distortions* of the pelvis which are produced by disease.

The first exception, then, to the normal pelvis is that which is *altogether too large:* here is an example of it, (No 9 and 17 in the table). 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 it 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 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 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 enquiry 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 sti- mulus of the child be withdrawn: hence there is a danger of hæ- morrhage 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; which, if you are not pre- pared for, will escape your observation. Again you must recollect, that during pregnancy the abdominal vessels are more pressed upon than usual, by the addition of the uterus in the abdominal cavity; that it is the inelastic coats of the veins that yield to this pressure; and that the column of blood in the cava and large iliac veins is of necessity diminished; nevertheless the same quantity of blood as- cends through other channels to the heart. What then must be the effect when that pressure is suddenly removed? You may have a most dangerous syncope, the circulation being suspended in conse- quence 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 in- side 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 intus-susception of the intestines; the inversion of the fundus is increased; and it is ultimately forced in this state through the vagina. You perceive, therefore, that a very large pelvis is not quite so advantageous as it may appear to be.

The pelvis may be too small in proportion to the size of the head of the child. You can perfectly understand that 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; but it would 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 you will find in this, as in other instances that an accurate observation of the bones of the extremities will assist you in forming an opinion of the pelvis. Again there are instances where 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.[*]

The development of the pelvis may be arrested: pregnancy may take place before it is perfectly completed, as in young girls. In order that the effects resulting from this circumstance be made intelligible to you, it is necessary to direct your attention to the growing pelvis. If you examine the pelvis at the time of birth, you at once perceive that it 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,

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[*] Rigby's Midwifery, p. 185.

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 foss. The brim of the pelvis looks almost directly forwards, in consequence of the 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 tubers approximate, and the arch of the pubis is contracted: hence the transverse measurement of the outlet is very small, the antero-posterior equally long, and, being almost parallel with that of the brim, it resembles in this repect also the pelvis of quadrupeds. From this extreme, a gradual change goes forward, until the pelvis assumes its permanent character. Now 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, nevertheless, that 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. Compare, for instance, this pelvis, which

Child's Pelvis.   No. 12.
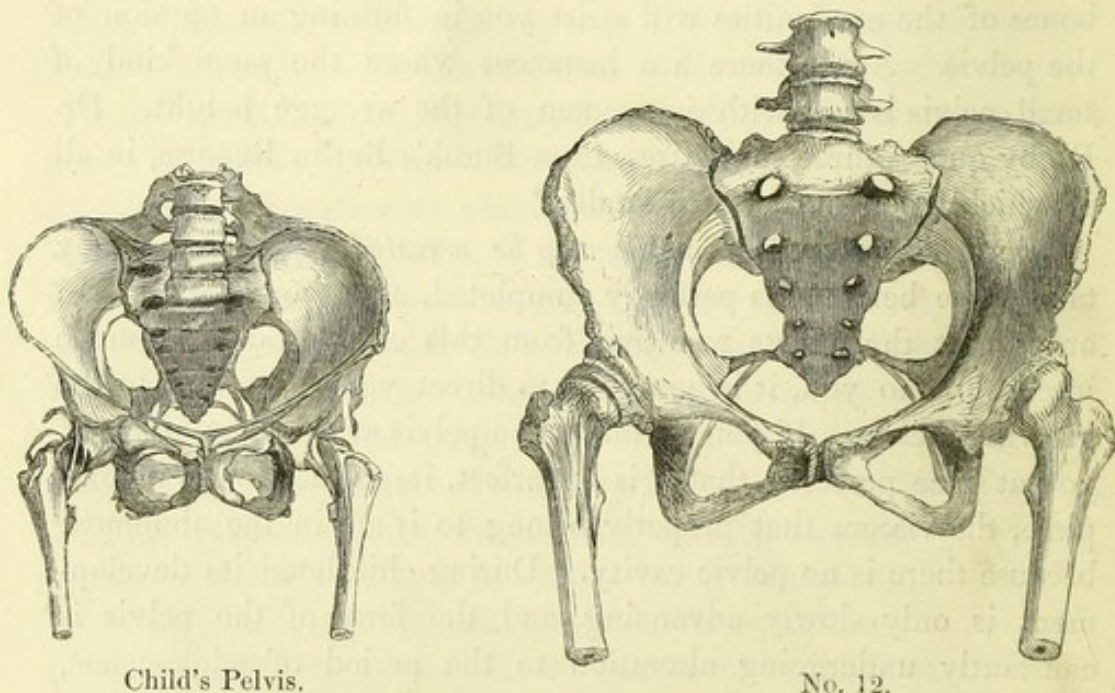
No. 12. Large Female undeveloped Pelvis compared with young Pelvis.

is rather a large one, with the young pelvis, and you will observe

the resemblance between them; the antero-posterior of the brim
($5\frac{1}{8}$ inches) longer than the transverse, the transverse of outlet
proportionately diminished, and the cavity rather shallow: yet this
pelvis is above the standard size, 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. But an arrest of develop-
ment may take place, and the growth also be retarded: you may
have in the adult woman the pelvis of the girl, with all its pro-
portions below the standard, but not irregular or deformed.
This had been pointed out by Mr. Shaw[*] some years ago; 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. It is possible such may have happened in the cases
reported by Busch and quoted by Rigby. 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 mea-
surements 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 pro-
portions. Thus the young girl, although perfectly well-formed
but pregnant at too early an age, may be the victim of a difficult
labour, simply from this cause.

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 than is generally sup-
posed, or at least than is stated, it deserves your particular atten-
tion. The contrast between these two pelves must at once strike

[*] Med. Gazette, Vol. xvi. p. 45.

your attention. This resembles the male;—
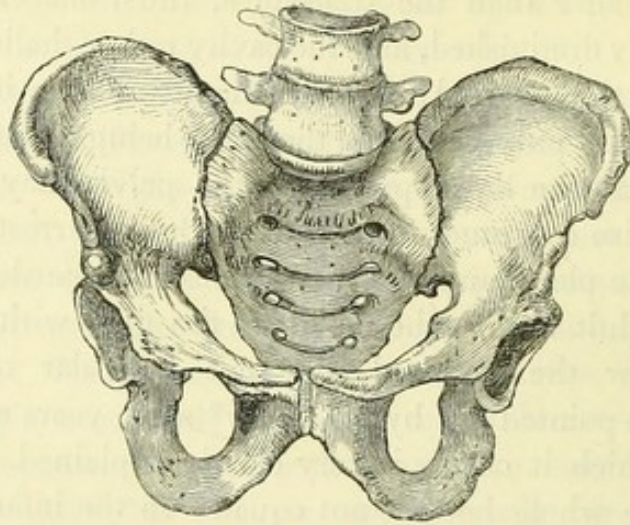
No. 17. The Male Pelvis.
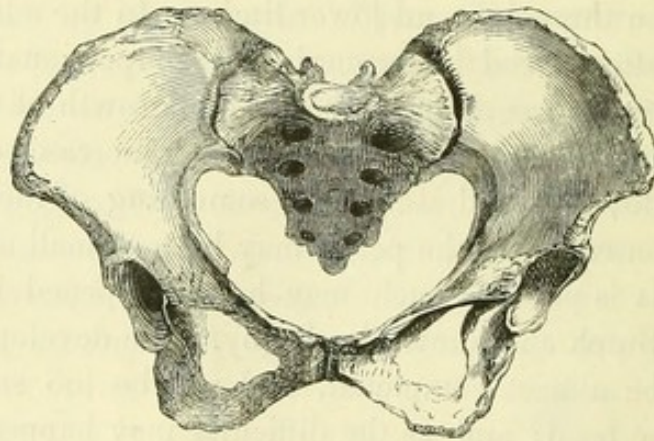
No. 18. The Female Pelvis.

this, the female pelvis. Comparing them together, you find the iliac bones of the male more upright, the crista ilii 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 60⁰ and 70⁰. The tubers 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 must be at once obvious to you, if you 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.   Apply this rule to the pelvis, and you 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 arch of the pubis is narrower and the tubera ischii 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, if you study what is written on the subject, would seem to be the only source of all the embarassments 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 your 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 are pressed against it by the head: posteriorly, the promontory of the sacrum offers no opposition; but the sacrum itself being straighter, there is less facility in the head performing the lateral rotation which has been already described to you; and this difficulty is still more increased by the convergence of the ischiopubic rami: the head is obliged to descend much lower in the pelvic cavity before it can escape under the arch of the pubis, 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 tubers and spines of the ischia are more ossified, the one thicker and rougher, the other 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 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 request you to 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 what, at first sight, might appear reasonable.

The last of the deviations in the pelvis to which I would direct your attention is, *where there is an irregularity and a want of corre-*

spondence between its different proportions. The effect produced when the ilia are too patulous or too upright, has already been explained to you. 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 it no support whatever; and it has been reverted over the pubis 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 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 the male. It is also 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 more apart, and the outlet much more open than the normal pelvis. It is almost doubtful whether a pelvis of this character may not be *slightly* diseased, and consequently that it was beginning to assume something of that shape, the extreme of which forms the distortion of rickets.

Fig. 1.

Fig. 2.
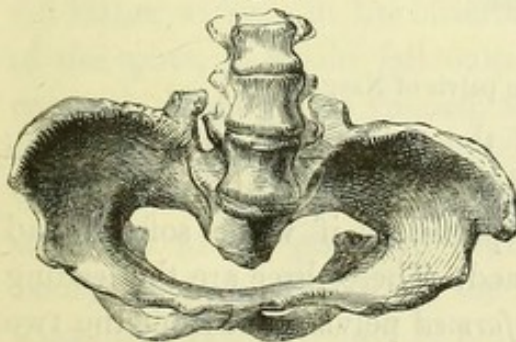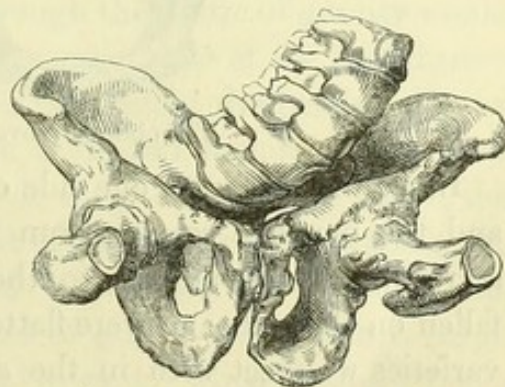
Ovate Pelvis of Elizabeth Sherwood.   Cordiform Pelvis of Elizabeth Thomson.

From these varieties in the healthy pelvis, let me now direct your attention to those which are *diseased*, and which form the second class of exceptions to the standard pelvis. A very great difference may be observed in the shapes of the distorted pelvis. In one variety (Fig. 1) you find the brim not only oval, but inclining 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; it is the extreme of the pelvis above alluded to. In another example (Fig. 2), you find the ilia 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 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 tubers of the ischia are scarcely two inches apart; and the ischio-pubic rami nearly parallel; hence the pubic angle is, in some cases, only 10°.
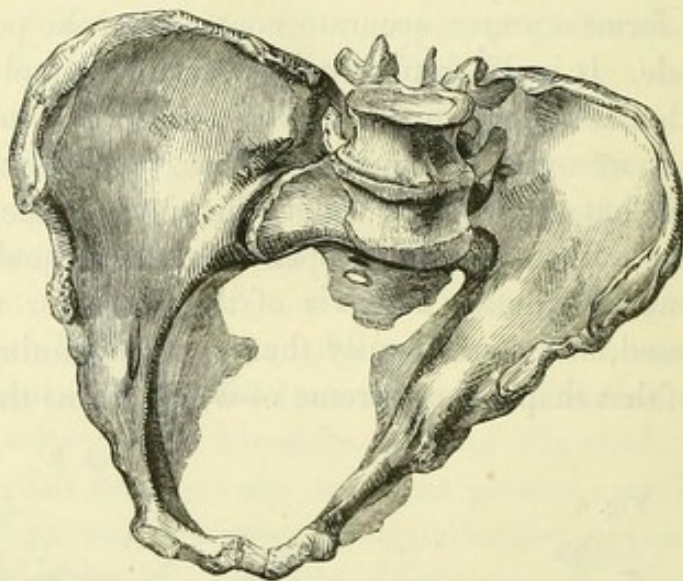
The obliquely ovate pelvis of Naegele.

In a third instance, one side of the pelvis is of its usual shape; and the opposite seems to run almost in a straight line from the sacro-iliac synchondrosis to the pubis, as if while soft, it had fallen on that side and were flattened. These three are the leading varieties we meet with in the *deformed* pelvis; but from the two former there are numerous deviations, still, however, preserving

their specific characters. The first 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. Let us first compare the ovate and cordiform pelves, and consider the reason why the shape of one differs so much from that of the other; we shall then inquire into the nature of the diseases to which these changes are attributed; and, lastly, consider the new variety of Naegele. 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 ; and it is sufficient to assume this condition of the pelvis to explain, from other causes, the different appearance of each. Let me direct your attention therefore to some of those causes.

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 either pelvis, in relation to the circumstances in which it is placed, will sufficiently explain the cause which modifies their 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 femurs 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 transversely lengthened. In this explanation, it is assumed that the spinal column preserves in either case, 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. You have here (Fig. 2) the pelvis of a child 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. 1.   Fig. 2.
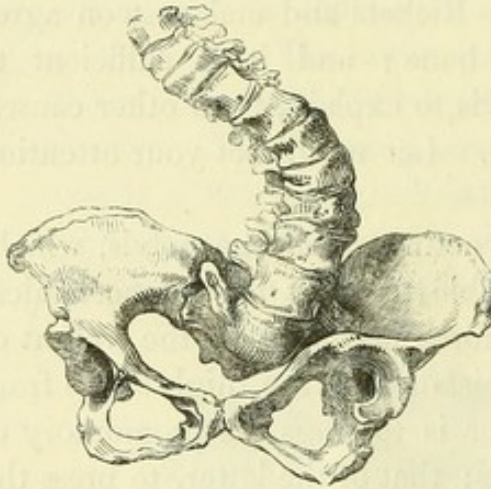
Ovate pelvis with lateral curvature of spine.
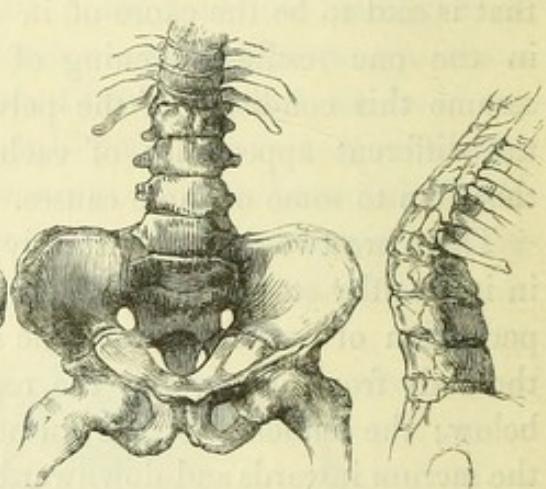
Cordiform pelvis with curvature backwards in a child.
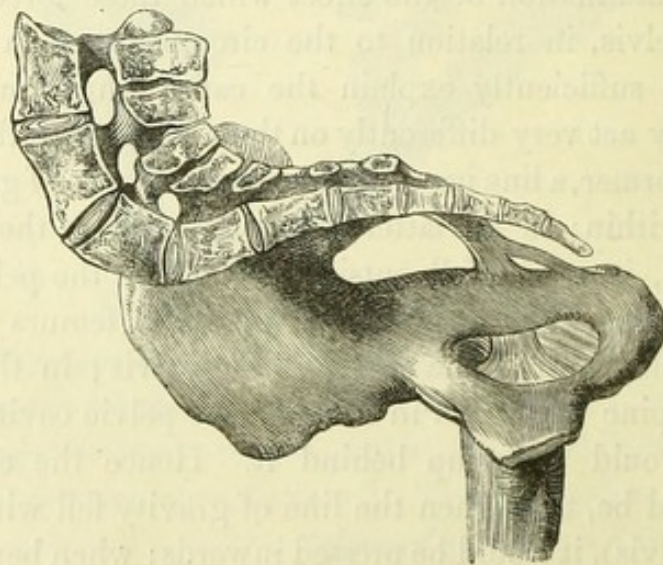
Anterior Curvature of Spine, with a singular Deformity of the Pelvis. (*Moreau*).

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. In this you see clearly that 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 pubis lies completely behind the promontory of the sacrum, almost opposite the coccyx, which nearly rests upon the tubers of the ischium. Therefore, although the distance between the pubis and sacrum, measured directly backwards, is greatly diminished, that between the 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. Let us now consider the effect of muscular forces. In the motions of the body there are two sets of muscles connected with 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 is bent nearly at a right angle by the great gluteal and pyramidal muscles, and closes 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 you may still perceive the edges of these rami more everted, and the pubic arch itself immediately beneath the symphysis, 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,

<center>D</center>

and to render it more irregular. The action of these muscles will therefore explain to you 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 and tends to separate the thigh-bones more from each other; the muscles, therefore, passing between them and the pelvis, will draw that portion of the pelvis to which they are attached outwards: hence the ischio-pubic rami are more separated, and the tubers of the ischium 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. 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 did so, in order that you might separate in your minds, the deformity of the pelvis and the disease to which the distortion is attributed, and that you might not suppose, as sometimes has been imagined, that the deformed pelvis is oval because it is ricketty, or that its cordi-form shape is the necessary consequence of mollities ossium. Let me now direct your attention *very briefly* to these diseases; and perhaps we may be able to remove another error almost as popular, that rickets is alone met with in childhood, mollities ossium in the adult. 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 effects 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 ricketty 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, you must not confound it with mollities ossium, which is a distinct and very rare disease. *Mollities ossium* is accompanied by much more urgent symptoms, startings, restlessness, pains like rheumatism, more or less through the body, and general fever; there is also a white sediment found in the urine. The disease is seldom arrested, but pursues its course more or less rapidly, until the bones are so altered that they consist only of thin shells covering a grumous liver-like substance, they bend in all directions, and may be cut through with a knife. One of the most striking cases of this kind, you will find in Professor Cooper's Surgical Dictionary, the case of Madame Suppiot. Another equally remarkable, is recorded by Mr. Solly.* If you read them with attention, and consider their true characters and the course of the disease, you may perhaps arrive at the conclusion, that a pelvis softened by *mollities ossium*, is not likely to offer a very great resistence to the head of the child. Such instances, however, have occurred when the progress of the disease has been arrested; and those *extreme cases of distortion* which have rendered the Cæsarian section necessary are generally caused by this disease. You have here an instance, in the pelvis from which this cast is taken, of the extent of the

* Med. Gazette, 1842–43, p. 510.

deformity.   The case which it illustrates, was that of Elizabeth
Thomson,* upon whom the operation was performed, by Mr.
Wood, of Manchester.†   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 au-
thorises us to consider the cordiform shape of the adult pelvis, as
an indication that mollities ossium was 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, you 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 cast 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 consider in a future part of the course; at present, we would
merely direct your 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.   Along with this, you may sometimes have a slight curva-
ture of the spine, but you must be cautious in assuming that the
pelvis is deformed because the spine deviates from its proper
direction.   Here, as in the former instances, the extremities will
be the safest indices of the character of the pelvis.

It is not necessary to dwell upon the varieties that are met with
in these two forms of distortion.   It seldom happens, for instance,
that the promontory of the sacrum projects forwards exactly in the

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* Vide p. 29, Fig. 2.   † Memoirs of Med. Society (Manchester)? Vol. 5.

middle in the antero-posterior measurement; it generally inclines to the right or left side. This has been explained by Baudeloque, on the supposition that "it is because the rickets has not equally affected all the bones of the pelvis, nor equally hurt all their junctions: and because the attitude which the child takes in walking or sitting, may change a little the direction of the compressing power which I have just mentioned."[*] This explanation seems to me quite unnecessary. If you take a softened pelvis, and try with a moderate force to press the promontory forwards in the middle line towards the pubis, you will find it much more difficult to do than to give it an inclination to either side. When the softened pelvis is compressed between opposite forces, its tendency is to become slightly twisted on itself, and therefore to alter the direction of the sacral promontory.

The next variety of deformed pelvis to which we would direct your attention, is the pelvis of Naegele, which he calls "the obliquely ovate." One side is quite normal, but the opposite is not at all expanded; on the imperfect side, the sacro-iliac synchondrosis is ossified. It might therefore be explained by supposing that absorption of bone, the consequence of disease, had taken place at that symphysis, and thus produced the deformity; but we have no evidence, in the history of these cases, of any such previous disease; the assumption is consequently gratuitous, and the pelvis still remains a problem to be solved. We are indebted to Dr. Knox, of Edinburgh, for a very rational attempt to do so, which further observations may, perhaps, render successful. Dr. K. attributes it to arrest of development at the period when the ossification of the sacrum is incomplete; that one side of the pelvis advances to completion, while the opposite remains stationary; and that in the adult pelvis you have one side perfect, but on the opposite, the undeveloped pelvis magnified, just as if the lateral halves of the full-grown and infant pelvis were joined in the middle. This view seems to be supported by the fact, that the sacrum on the affected side is incomplete; but it is right to state that that the remaining portion of the bone on that side does not shew the same deficiency of development.

The concluding subject to which I would direct your attention, is to the different modes of measuring the pelvis, and to the variety of pelvimetres: these need but a brief description.

* Baudeloque, by Heath, vol. i. p. 60.
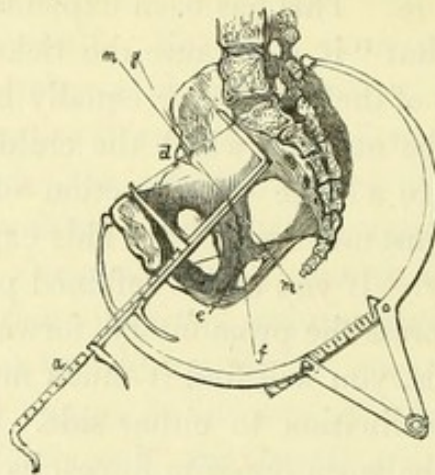
Contouly's pelvimetre is a straight, graduated rod, upon which slides a smaller one; each has an upright, just like a shoe-maker's rule, and the pelvis is measured by placing one upright against the sacrum, and sliding down the other, until it rests against the symphysis pubis; the distance between each is given on the scale. 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 you to find out. Baudeloque 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 to you 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. You are indebted to your late respected Professor Davis for a proof, that just as little reliance can be placed upon the antero-posterior. Baudeloque 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. Dr. 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. The following are his results, in which you must recollect that the soft parts being absent, an additional source

of error was removed (vide table*); you see that there is a full inch difference in the thickness of the base of the sacrum, which would be no trifling matter, if added or taken from the conjugate measurement of the brim. These two instruments are the best known and most frequently employed, especially on the continent. But there are others also employed.

The late Mdme. Boivin, aware of the objection to Contouly's pelvimetre, thought that it might be improved, and she contrived an instrument by which the antero-posterior distance was taken differently. One curved rod was passed into the rectum to the promontory. Another, sliding upon it, but capable of being raised to a given angle, was passed into the vagina; when there, it was pressed up to the pubis, and the angle formed between both rods measured on a scale, gave the antero-posterior distance. If you recollect the direction which the rectum takes, you will perceive that the rectal-rod either passed to the left side of the promontory or dragged the rectum out of its position in front of it. Much dependance could not therefore be placed upon this.

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 are pressed towards the promontory of the sacrum, and if they at all approach it,

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* In Fig. 1, pelvis, the distance was 3 inches.

,,	2,	,,	,,	$2\frac{7}{8}$,,
,,	3,			
,,	4,	,,	,,	$2\frac{5}{8}$,,
,,	5,			
,,	6,	,,	,,	$2\frac{13}{16}$,,
,,	7,			
,,	8,	,,	,,	$2\frac{3}{4}$
,,	9,			
,,	10,			
,,	11,	,,	,,	$2\frac{3}{8}$,,
,,	12,			
,,	13,			
,,	14,	,,	,,	$2\frac{1}{2}$,,
,,	15			
,,	16,	,,	,,	$2\frac{1}{4}$
,,	17,	,,	..	2

it is certain the promontory projects too much, otherwise this never could happen, as you will find, if you try the experiment on the dried pelvis, sometimes as much of the hand as the vagina will admit, is introduced; if, the sacrum below the promontory and the pubis are only touched, when the fingers are separated, it indicates sufficient space; if it be impossible to separate them, the contrary: and from the degree to which the fingers are compressed, the amount of disproportion is estimated. In some instances it was impossible to get more than two or even one finger within the pelvis.

Table of Measurements in Nine Diseased Pelves.

No. in Museum.	Num.	Inclined Plane of Promontory.			Plane of Brim.				Cavity.		Outlet.		Arch of Pubis.	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.		
23	1	4½	3	2⅞	4½	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	6/8	5/8	2	2½	3¼	3¼	3⅛	2⅞	3½	2⅝	10	Cast of Elizabeth Thomson's Pelvis, delivered by Cæsarian Section, by Mr. Wood.
27	5	3	2⅝	2⅝	3¼	5	4½	4½	3½	4½	4⅛	3⅝	70	Ovate.
28	6	2⅞	2⅝	2½	2⅞	5 4/8	4 6/8	4 6/8	3½	5	4	4⅛	85	Ditto.
29	7	2½	2½	2⅝	2⅝	5¼	4 6/8	4 6/8	3½	5⅛	4⅝	4⅝	90	Ditto.
30	8	1⅞	*1⅞	*1⅜	1⅞	4⅝	4¼	4⅜	2⅞	4⅝	2⅞	4⅜	85	Wooden Model.
31	9	1⅛	*1 6/8	*1⅞	1¼	5	4¼	4½	2¼	5	2⅔	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 promontory.

LECTURE III.

MECHANISM OF PARTURITION.

Definition of Labour—Divisions of Labours by various Authors—Division into Natural, Difficult, Preternatural, Complex—Definition of Natural Labour—Stages of Labour. Arrangement of the Muscular Fibres of the Uterus, on the External and Internal Surfaces. The Effect produced by the Contraction of the different Sets of Fibres—Manner in which the Dilatation of the Uterus is accomplished—Use of Liquor Amnii. Order of Uterine Contractions—Wigand's views —Objections to them—Dewees' explanation of Uterine Action—Objections. Different Conditions of the Os Uteri—Dilatable—Rigid—Inflamed. Influence on the Action of the Uterus.

WE are now prepared to enter on the consideration of Parturition; a subject which embraces the most important questions we have to bring before you, and which will require your most serious attention, in order properly to understand the principles of midwifery.

At the termination of the period required for the complete developement 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 respiratory life.*

There are many circumstances depending either upon constitutional peculiarities, 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, 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, as you will perceive in the table which is placed before you.

DIVISIONS OF LABOURS BY VARIOUS AUTHORS.

Natural Eutochia }	Difficult Dystochia }	with 15 subdivisions or orders.	.. ..	..	.. ..	.. ..	..	Merriman
Natural Eutochia }	Abnormal Dystochia }	with 6 subdivisions	.. .	..	.. ..	..	Rigby
Natural	Laborious	Preternatural	..	.. .	..	.. ..	.	Dewees
Natural	Unnatural with 6 orders	Complex with 6 ord	.. ..	..	..	.. ..	..	Churchill
Natural	Difficult	Preternatural	Complex	. .	..	.	..	Denman
Natural	Instrumental	Preternatural	Complex	..	..	..	..	Davis
Natural	Laborious	Preternatural	Anomalous	Flooding	..	.	.. ..	Blundell
Natural	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, quite as distinct, and is in many respects more simple and practical, than some of those before you. Denman's division is sufficient for our purpose; we propose it to you for your selection, and shall consider labour under the several heads of *Natural, Difficult, Preternatural, Complex*. Denman defines labour to be *natural*, "if the head of the child present; if the labour be completed in twenty-four hours; and if artificial assistance be not required." 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.

It is of the highest importance that you should have a clear view of the whole series of phenomena which constitute parturition; for, unless you perfectly comprehend the changes which are going forward in the uterus, and have an accurate knowledge of the means adopted by nature to accomplish her purpose, you can never understand the principles of midwifery: your practice must be empirical; and however indebted to chance you may be for success, you will always be exposed to the risk of committing

* Denman, p. 165.

some fatal mistake. It, therefore, becomes our duty to explain to you the series of operations, by which the delivery of the child is effected. We would desire, at the same time, to direct your attention to the beautiful application of mechanical contrivance employed by nature to effect her object.

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 divide the second stage into two, as you perceive in this table.

STAGES OF LABOUR BY DIFFERENT AUTHORS.

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

Of these divisions, we would propose to you 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. Denman adds to this definition, the rupture of the membranes and the discharge of the liquor amnii. This, however, renders the division imperfect, because the membranes often are not ruptured until late in the second stage, and occasionally remain unbroken when the head is expelled. This addition, is therefore unnecessary, and causes confusion.

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.

Before describing the manner in which the dilatation of the uterus takes place, it is necessary to recapitulate very briefly the arrange-

ment of the muscular fibres of the uterus, which has been detailed in a former lecture.
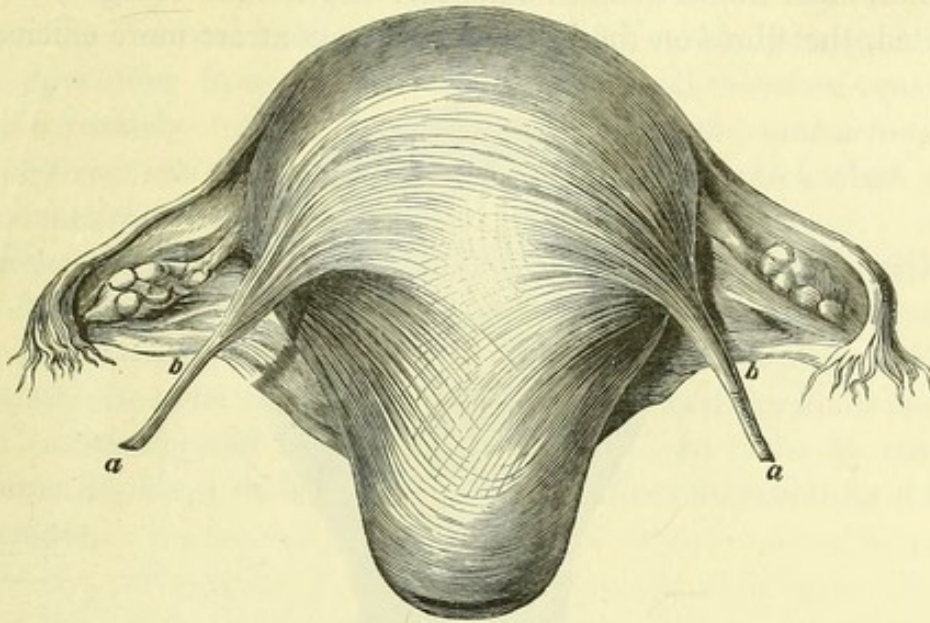
Muscular fibres on the external surface of the uterus, terminating in the round ligaments *a b.*

The fibres *on the external surface* form two broad fan-shaped muscular layers, spreading from the round ligaments over the fundus uteri. *On the internal surface*, there are three distinct sets of fibres: two of these surround the Fallopian tubes in a concentric arrangement. The third set pass circularly round the body of the uterus, and the outer fibres of the two former layers gradually pass into and intermix with those of the latter. The mass of fibres lying between the external and the internal layers have no determinate direction, but may be supposed to give increased power to those 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, as far as it has been demonstrated. Let us now consider their action. *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.
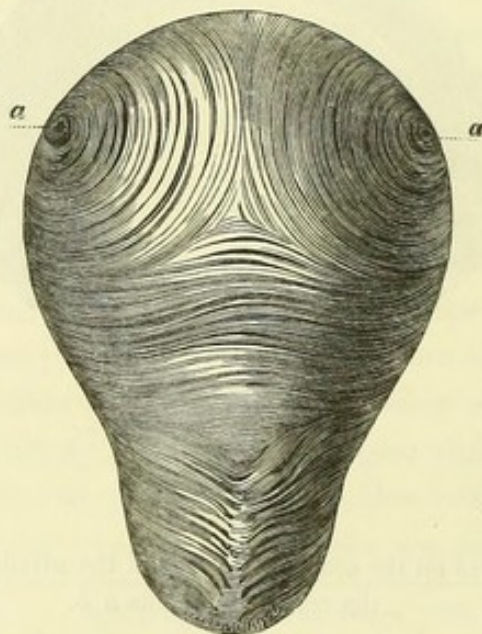
Exaggerated view of the fibres on the internal surface of the uterus: *a a*, the orifices of the Fallopian tubes.
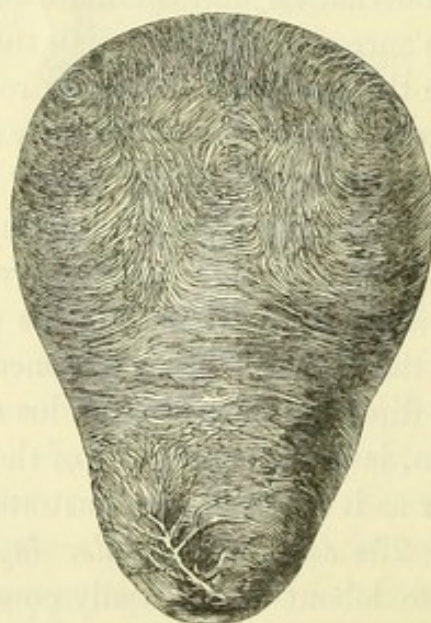
Uterus inverted, to show the *natural* appearance of the fibres on its internal surface.

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 the order observed in these contractions, to enable you to notice the deviations from it that occur. We shall therefore consider each separately. *First, the effect produced by the contractions of the different sets of fibres. Secondly, the order in which these contractions take place.*

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. In order to render this intelligible, I shall have to ask your patient attention for a few moments.
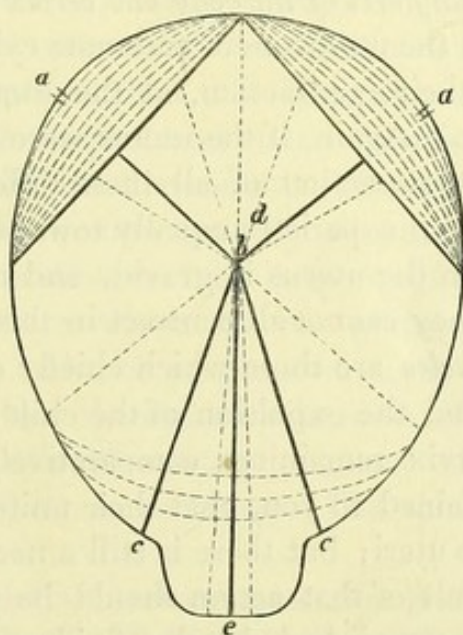
The lines *a*, *b*, represent the direction of the force of the fundal muscles: *c d*, the direction of that of the circular muscles of the body of the uterus: *d e*, the combined force of these muscles.

The dotted right 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.

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 equi-distant 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.

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.

The fundal muscles are those which chiefly effect the dilatation of the os uteri and the expulsion of the child, the fibres of the body and the cervix remaining comparatively passive.   It has already been explained to you, 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 accomplished 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 muscular bands, described by Sir C. Bell, must also have the effect of expanding the os uteri by drawing it upwards.   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 might be said to act as one muscle in dilating the mouth. The os uteri has been generally

considered to possess circular fibres, its action to resemble, in some degree, the sphincter muscles in other situations, and its dilatation to be 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 be as distinct and as easily made out as the sphincters of other hollow muscular viscera? Neither does the manner in which the os uteri dilates support this assertion. Its expansion is very gradual, it yields slowly to the power described, and 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, then, to attribute the resistance offered by the os uteri to muscular contraction. 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,

* " I have not succeeded in discovering circular fibres in the os tincæ corresponding in place and office with the sphincter 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 Gravid Uterus*, p. 27.

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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.

We would now direct your attention to the means provided by nature, to prevent the danger which might arise during this process. 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 its parietes 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 you are aware, 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 that organ. 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. You may observe this in the character of the pains during this stage. You will find, that, 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 equalizing the force employed—of dilating the mouth of the uterus without exciting irritation—the liquor amnii is of essential importance.

We shall now consider *the order* observed by the uterus in the contractions which take place. This 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 passage 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 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."* 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 re-acts against the head with the same power that it is

* Wigand, op. cit. vol. ii. p. 197.

compressed, and therefore pushes it up until the increasing contraction of the fundus forces the head down again, so that you perceive 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 commenced 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, that 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 it is muscular contraction, the evidence for which does not seem to me sufficient to establish so important a fact. Having placed before you the opinion of Wigand upon one point connected with the action of the uterus, it would be improper to omit the explanation given by another eminent authority, of the mode in which the uterus contracts. Dewees adopts a different view of the mechanism of dilatation from what has been stated to you, not a difference as to the order of uterine contraction, but as to the manner of it. Dewees assumes that the longitudinal fibres which pass from the fundus to the os uteri, are the antagonists of circular fibres passing round the body of the uterus. The contraction of the former shortens the uterus, and distends the circular fibres, which, stimulated by this distension, contract, in opposition to the longitudinal fibres; that " the effect of this compound action is to direct the body to be moved towards that part of the organ which offers the least resistance to it, and this is the small opening called the os uteri; the fibres which surround this opening and oppose its immediate dilatation gradually become weakened by the superior strength and persevering action of the longitudinal fibres; and after a

struggle of greater or less severity and duration, are obliged to yield; and in their quiescence the dilatation of the uterus consists. In the whole of this arrangement, we [Dewees] can see no necessity for the mechanical agency of the membranes acting on the circle of the os uteri like a wedge, which Dr. Denman speaks of as important to its dilatation, for every day's experience proves that the most perfect and most speedy relaxation of the mouth of the uterus takes place without any such influence."* In this explanation, Dewees has assumed what yet remains to be proved. We have no sufficient evidence that the arrangement of the fibres of the uterus into longitudinal and circular is as antagonist muscles;† and if we assume such to be the case, and that they act in opposition to each other, the effect of the collision must be communicated to the liquor amnii; but how the membranes could resist the effect of this struggle it would be difficult to understand, when we know that change of position, walking across the room, or other such trifling causes, are sometimes sufficient to rupture them, from the gravitation of the fluid alone, and therefore the greater force arising from the action of the fibres of the uterus against each other, must break them much more frequently than

* Dewees, p. 181.

† When these Lectures first appeared in the "Lancet," it had been stated inadvertently that there was no evidence of the *existence* of longitudinal and circular fibres. The mistake was not perceived until they were again revised for publication. It was not intended to deny the existence of these fibres, but the kind of action assigned to them by Dewees,—that of antagonist muscles. The description given by different observers of the situation and arrangement of the uterine fibres being dissimilar, it was our wish to confine the attention of the student to those only which were the most obvious, and which are quite adequate to explain the action of the uterus, viz., the external layers which draw down the fundus of the uterus, the concentric fibres round the orifices of the Fallopian tubes, and the circular fibres of the body of the uterus, both of which may be observed on the internal surface. The explanation we have given of their action nearly corresponds with that of Jobert, who says:—" The direction of the uterine fibres shews how they act in freeing the uterus from its contents. The longitudinal layer of fibres, which originates at the fundus, and is inserted in the neck and vagina, tends to diminish the length of the uterus, whilst the semicircular fibres, by their action, diminish its cavity in every sense."—*Lancet*, vol. i. p. 732. The semicircular fibres that Jobert alludes to, are the concentric fibres at the fundus, and those round the body of the uterus, which he states extend down to the neck. The only difference between this explanation and that given in the text, is that the circular fibres of the body are supposed to remain passive, merely resisting distension, during the passage of the child, and that the simultaneous contraction of all the fibres does not take place until afterwards, when the uterus is empty.

what we know to be the case. Besides this, Dewees' explanation
proves too much. It would make the membranes not only use-
less as a means of dilatation, but rather a difficulty in its accom-
plishment. The head of the child, directly applied to the cervix,
would overcome the resistance of the circular fibres much more
efficiently than the liquor amnii, so that the most favourable kind
of dilatation would be that which occurs when the membranes are
ruptured at the commencement of labour. It is very well known
that this does not happen; and Dewees seemed to be quite aware
of the difficulty this fact presented. He attempts to get rid of it
by another assumption, which is, that the uterus is surprised in
action by this circumstance, before the natural stimulus is given
to it. " In consequence of this, the uterus is made to embrace the
child closely, by virtue of its tonic power, and is by this thrown
into the most violent and painful contractions, very often by the
unequal surface which the child's body presents, the evacuation of
the waters preventing the lower part of the uterus from being
fully stretched, by the contractions of the body and fundus forcing
them (the waters) down against it."* But in place of the waters,
there is the large, round, and unyielding head of the child forced
down upon the lower part of the uterus, which one would sup-
pose more efficient for the purpose of mechanical distension.

We have felt it our duty to place before you those opposite
views as to the dilatation of the mouth of the uterus, lest you
might hereafter be confused by finding explanations of the action
of the uterus, supported by respectable authorities, which are in
contradiction to what we have stated to you, and which we had
passed by unnoticed. We have already pointed out the advantage
of the liquor amnii; hence you will find that the time at which
the membranes are ruptured, often makes a material difference in
the effect produced upon the mouth of the uterus. If they
are 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 are 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

* Dewees, p. 182.

force from above. This is not, however, invariable. It occa-
sionally happens, that even under these circumstances, the os uteri
becomes irritated and retarded in its dilatation.

If we have succeeded in making you acquainted with the mode
in which the uterus acts in dilating the os tincæ, and the means
provided for controlling the great power it is capable of exercising,
we would now direct your attention to the nature of the resistance
presented to it—viz., to the os uteri itself. This part of the uterus
varies greatly in its density and firmness; it consequently offers
different degrees of resistance to the fundus uteri. You will
recollect that the os uteri, during gestation, has gradually under-
gone 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 pro-
duced when the os uteri is touched. This is the most favourable
state for its dilatation; it is quite prepared to yield to the action
of the uterus, and is called, in obstetric language, *the dilatable os
uteri.*

There are, however, many exceptions to this condition, 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 per-
meable 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 con-
sequently much more time is occupied 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, which 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 opposes 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 you meet with that form of pelvis that I have described to you, as possessing many of the characters of the male pelvis. If you should, unfortunately, meet with a case of this kind, you must be prepared for difficulties from the commencement to the termination of labour, and therefore the consideration of it deserves your closest attention.

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, etc. You cannot, therefore, be too cautious in this respect. 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 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 your 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 period which is usual to effect the 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 you will find much contrariety on this point amongst obstetric authorities. At a future time, we may have to refer to this: at present we would desire to point out to you the conclusion which is deduced from this irregularity in the uterine action. It 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 are 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 IV.

MECHANISM OF PARTURITION, CONCLUDED.

Second Stage of Natural Labour—Bearing Pains—Passage of the Head through the Pelvis—Positions of the Head according to various Authors—Naegele's Views—Mode of distinguishing Vertex Positions—Varieties in Face Presentations—Characters of—not so dangerous as had been supposed—Dilatation of the Perinæum Expulsion of the Head—Direction of the Shoulders. *Third Stage*—Separation of the Placenta—Causes of Retention—without Hæmorrhage.

AT our last meeting, we considered the means by which the dilatation of the mouth of the uterus was effected; 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 to you 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 previous to their commencement, and the pain is expressed by a gradual expiration, 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, you must perceive
the obvious hazard that would arise if the adaptation of the head
to the pelvis were not exact; 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 your closest attention. It is necessary for you
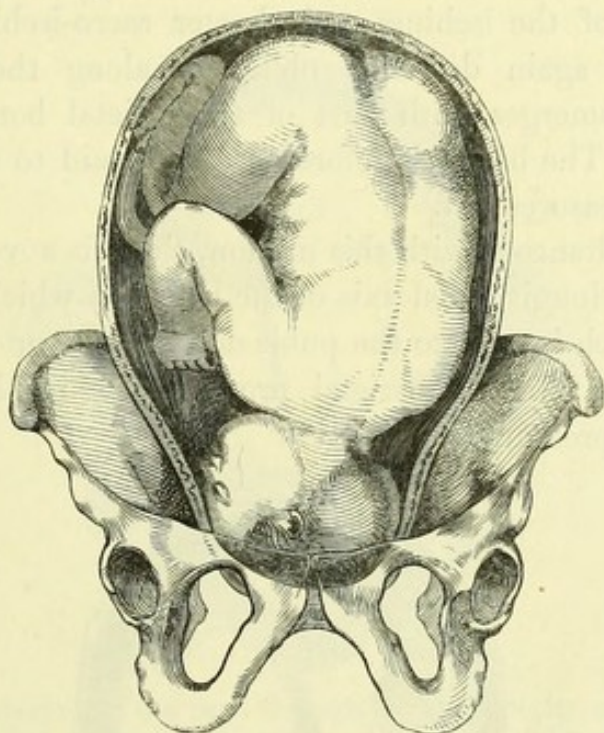
The head above the brim of the pelvis; the anterior and posterior
fontanelles being nearly on the same level.
   Note.—In order to render the relation of the head and pelvis more
intelligible, the pubic side of the pelvis is represented as being trans-
parent in this and the following views.

to understand all its varieties, not in theory only, but also to
take every opportunity to make yourself *practically* acquainted
with them.

We would urge this upon you 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 recall to
your recollection the observations which we made when describing
to you the obstetric anatomy of the pelvis; we then pointed out
to you the influence of the varieties of its shape on the progress of
the head of the child, and showed you that its passage was ac-
complished by a combination of four distinct motions harmonizing
in one effect. These we shall briefly recapitulate.

1st. When the head is above the brim of the pelvis, the forehead and occiput are nearly on the same level, 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 bi-parietal measurement.

2nd. Simultaneous with this motion, there is a very slight rotation on the longitudinal axis of the head, by which that side of the head which is next to the pubis descends lower than that near the sacrum, so that the parietal protuberance of the pubic side becomes the presenting part.
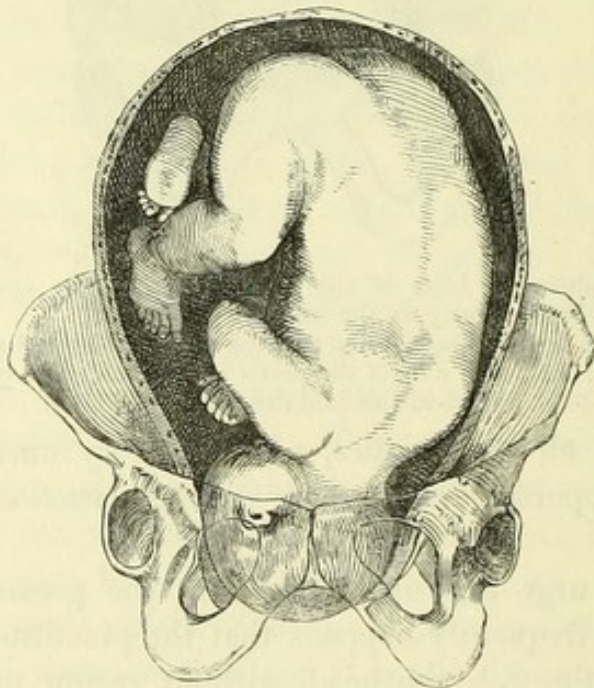
The head within the pelvic cavity. The occiput and right parietal bone being the most dependent parts, the occiput resting against the plane of the ischium and obturator space, and the ear to the right of the symphysis pubis.

3rd. 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.

4th. When the head escapes from the outlet, the occiput rests against the ramus of the 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 arch of the pubis, and the head is expelled in the conjugate axis of the outlet. According to its more usual course, it passes out obliquely.
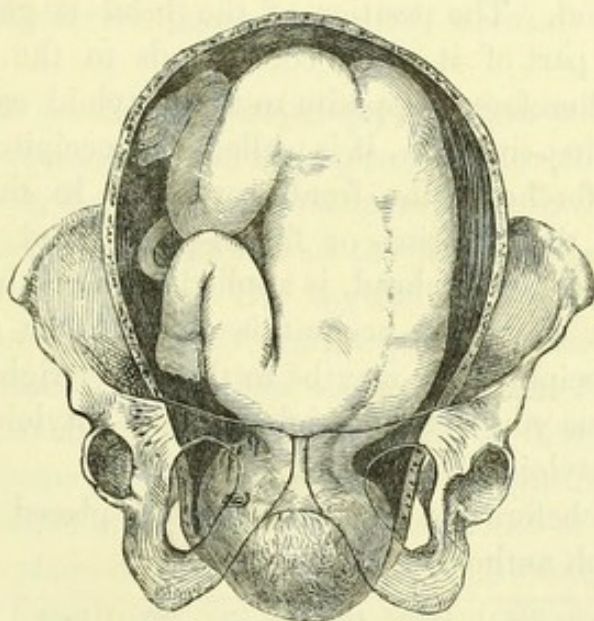
Further advance of the head through the pelvic cavity, previous to emerging from the arch of the pubis. The parietal bone, and part of the occiput presenting at the arch of the pubis—the head more in the antero-posterior direction, and the anterior again descending to the level of the posterior fontanelle.

The head, however, does not descend always in the same position, and there are accidental displacements that may 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 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, Baudeloque, however, observed the progress of the head while it was within 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 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, the fronto-cotyloid. In the same sense you may have the occipito or fronto-pubic, and occipito-iliac; when the occiput, or forehead, is applied to the pubis in place of the ischium, or when the occiput is opposite the centre of the ilium. The occiput, also, may be to the left or 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	...	..	Baudeloque, 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 of the ischium. It is then called *the first position (or left occipito-cotyloid)*. When the head is in this situation, the occiput 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 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 arch of the

pubis. 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; you should, therefore, recollect its distinctive characters, which we shall presently point out to you.

In *the second position* of Baudeloque (or right occipito-cotyloid), the occiput is opposite to the right plane of the ischium; the posterior fontanelle is, therefore, in the same relation to the right side of the pelvis that it was to the left in the first position, being anterior to its transverse axis. The sagittal suture passes obliquely backwards, from right to left; the left parietal bone is on the pubic side, and descends lower than the right. Dr. F. Ramsbotham places the transverse position of the head as first and second in the order of frequency, and considers the occiput more frequently opposite the ilium, at the right or left extremity of the transverse axis, than the plane of the ischium. If such were the case, the ear would be felt directly behind the symphysis pubis, in place of the right or left groin. It is certainly true that it is found more frequently near to the former than in the latter situation, which gives a plausible support to his opinion. Authors seem to have placed the oblique position of the head before the transverse, in frequency, from the circumstance, that in the recent pelvis the psoas muscles diminish the transverse measurement without affecting the oblique. It seems to me, however, to be doubtful, whether, in a pelvis of moderate width transversely, these muscles interfere much with the head in its progress, especially as they are always as much relaxed as possible during labour, and therefore yield to the pressure of the head. Judging from the opportunities of observation I have had, the head seems to be placed most frequently in the left oblique occipito-cotyloid position, but not so much so as to remove the ear from the neighbourhood of the pubis. In the third and sixth position of Baudeloque, the sagittal suture corresponds nearly to the conjugate measurement of the brim of the pelvis, only that in the former the posterior, and in the latter the anterior fontanelle, are opposite the pubis: these positions

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are very rare, and are omitted by Lachapelle and others, who consider *the third position (or left fronto-cotyloid)* as the converse of the first. The frontal bone and anterior fontanelle correspond to the left plane of the 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. This is Baudeloque's fourth position.

The *fourth position (or right fronto-cotyloid*—fifth of Baudeloque) has the frontal bone opposite the right plane of the ischium; the sagittal suture passes backwards, from right to left; the right parietal bone presents, and the right ear is opposite the left groin. Such are the principal positions, as they are given in the different works on midwifery. The diagnostic marks by which they are distinguished are, first, *the fontanelles.* 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 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 having four lines of sutures terminating at its angles, can 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 and 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 sutures, 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. You perceive, therefore, that it is possible to confound the one with the other, and that it requires practice

in examining by touch, in order to discriminate them in all cases. As a general rule, however, you will find the posterior fontanelle like a central point, in which three lines meet, the anterior more distinctly 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, you can by it determine the side of the pelvis where the occiput lies, and therefore you 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 you cannot so easily decide between collateral positions the first and fourth, or the second and third. It has been stated to you, that authors have not agreed as to the second position. Baudeloque 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 Baudeloque'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 Baudeloque'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 which I have arrived at 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 in nearly an equal number of cases the head entered the brim in the third position as in the second, that of those which descended in the third, the majority passed without any difficulty into the second, and were so expelled, while a very few remained in their 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 there are exceptions to it. The fourth position also passes into the first; but sometimes, although very rarely, preserves its original direction.*

From these varieties of the vertex presentation, we would now direct your attention to some deviations from them which are occasionally met with. It has been stated to you, 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, that the head becoming fixed in the pelvis transversely, its progress is thus arrested. It is essential for you to understand this cause of delay in the second stage, because it is very easily corrected; and any ignorance respecting it might lead you into 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; you readily trace out its lozenge shape, and feel the four sutures distinctly at each of the angles. The finger also passes very easily between the 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, you 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 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

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* Of seventy-four cases recently 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

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 that the head was completely wedged in the pelvic cavity.

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 right plane of the 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 both instances, 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; but I believe that they are very rarely, if ever, met with.

If we are correct in considering 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 from it towards the ilium, the forehead 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 distin-

guishing 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 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 your attention is, the *irregularity of the soft surface* which presents itself. It may seem to be very easy to determine the features of the infant; but you will not find it so. The soft cheek and the malar bone have some resemblance both to the breech and shoulder, neither can you 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. You 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 from 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." 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.

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 you will often find the head or the membranes advancing and retreating for a long time before it descends 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 the resistance of the perinæum. At length, when the head is enabled to pass down so far that the

* Collins' Report, p. 83.

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 these return with much rapidity or violence, there is a 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 the severest and most trying to the patient of any that she has 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, you are given a favour-able opportunity of confirming your diagnosis as to the position. In this, 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 corre-spond 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, by which, if care be not taken, it might be lacerated, 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 your attention to the mode in which other positions of the head are expelled, and 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 you

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 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 only continued until the chin passes under the arch, when the pressure is at once relieved.

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 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 a 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 it. It would continue for some time in this situation if left to itself, and either be gradually removed from it 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; it is therefore necessary for me to direct your attention especially to this point, in order that you may understand the principle upon which the management of this stage depends. When the child leaves the uterus, a very powerful stimulus to its action 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 discharging 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 civilized 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 ex-

plain to you, 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*, which we shall allude to 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 frictions 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 left altogether to itself, without being properly supported, there is a danger that there may be too great relaxation of the uterus; consequently, hæmorrhage and severe after-pains, from the attempts made by the

uterus to discharge the coagula formed in its cavity. This is one of the most frequent causes of after-pains. You have abundant evidence that it arises from the circumstance stated, 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 parieties being only once distended, retain a certain degree of tonic contractile power, which is altogether destroyed by frequent pregnancies.

If we have succeeded in placing before you in a clear manner the phenomena which take place in parturition, the contrivance employed by nature for the safe delivery of the child, and the principle which she seems to follow for the accomplishment of her purpose, we shall be enabled to enter upon the consideration of the management of labour, and you will have but little difficulty in determining the value of those rules which are laid down for your guidance. *The management of labours*, therefore, shall form the next subject for our attention.

LECTURE V.

MANAGEMENT OF NATURAL LABOUR.

Premonitory Symptoms of Labour—Evidence of the Commencement of the first Stage—Character of the grinding Pains. *Obstetric Duties of the Practitioner*—When summoned to attend—Caution respecting his Patient—Objects of the Vaginal Examination in the first Stage, before the Membranes are ruptured—Signs of the first Stage being completed—Mode of preparing the Bed, and supporting the Patient.

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 to you, and the treatment required to secure the safety of the patient. We would therefore direct your attention to the symptoms of labour, and to what are popularly called " the duties of the obstetrician."

During the period that 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 they are slightly paralyzed, and 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 you might suppose; 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 scybalæ 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."

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 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 has more than usual fortitude, and has 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. 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 your 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 that you are summoned to, it is advisable that your introduction be not too abrupt: caution in this respect is of still greater importance if called to a patient to whom you had 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 before her, 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 would 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 are severe, these attempts at conversation had better be dispensed with. The patient should be left in charge of the nurse, because your presence may become unpleasant to

her as a witness of her suffering, 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, the funis or hand coming down with the head, the head descending in a wrong position, or perhaps the shoulder presenting. In order to interfere with any of these complications, the labour must be more than in 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 this was likely to have taken place; and therefore a vaginal examination very early in the labour, when the pains only return 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, or suffer any very dangerous pressure, so long as the membranes are entire. We shall presently point out to you the danger of meddling too much with supposed wrong positions of the head, as well as when the hand comes down 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 might fail to detect any presentation, and even if you did, may, after all, be mistaken in the result; the hand and arm might be felt, and yet the head afterwards descend. It is certainly very satisfactory to find out that the head presents, as early as you can; but if you cannot do so in the beginning of labour, it is no proof that the position is preternatural. If you cannot, therefore, gain a decided advantage 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 this 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

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complains loudly of the least pain or inconvenience you may
cause her. You will not, therefore, find it easy to make a satis-
factory 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 ad-
vantage of being able to make the examination *perfectly*, because
the dilatation of the uterus has made some advance. Having
determined upon the proper time for making a vaginal examina-
tion, the nurse should communicate your wishes, which are now
readily acceded to: she may then place her 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 fore-finger 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*, which, 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: if
the fundus of the bladder should press into it ; advancing
slowly, *the middle finger* might then be introduced, in order that
a careful examination of the os uteri be made. One finger is not
sufficient for this purpose, unless the uterus is low in the vagina.
If it be above the brim of an ordinary sized pelvis, the forefinger,
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; know-
ledge 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
might occupy, or of the causes which might retard its progress.
The middle finger is longer, and reaches higher in the vagina:

with two fingers, also, you have a double advantage, from your 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 pubis. If the pains have ceased and the os uteri be dilatable, having the membranes lying loosely within it, you feel what seems to be the irregular folds of a flaccid bag projecting into the vagina; 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 pubis, the head firm and round; you may, however, often fail, and yet 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 take care 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 your practice, when it is so necessary to educate your 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 forefinger 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. Having accomplished this, 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 tranquillize 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 to 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, 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 are 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 sufficient 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; neither 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. You will recollect, that in order to correct this malposition, the hand and arm must be pressed up above the head, and there maintained until the succeeding pain

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

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 the double risk—1st, of increasing the irritation of the cervix uteri to a much greater degree than might otherwise take place; 2ndly, 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 may just succeed in pushing it more on the brim than it had been; and the necessary consequence is, that the head not being able to pass into the pelvis, the action of the uterus is directed more upon the shoulder. The side of the face, ear, and neck, might first be directed towards 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 the position completely changed. There cannot be a more awkward accident than to convert a natural into preternatural labour. 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 to you our reasons for objecting to submit your patient to a very early examination, with a view of unnecessarily endeavouring to make corrections. The only accident which would seem to render an early examination necessary is when the funis is prolapsed. We have stated that 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 having obtained by this every information you require, 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.

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 patient should no longer be suffered to go about the room. She must now remain in bed, which should be properly prepared for her reception. The manner of doing so is thus:—A skin of morocco-leather, or a broad piece of Indianrubber-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 something like 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.

When the second stage of labour has commenced, the patient experiences much more fatigue than 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, very 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 would 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 ten-fold 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 your 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 submitted to these inconveniencies, if you are not decided in preventing them.

LECTURE VI.

MANAGEMENT OF NATURAL LABOUR—CONTINUED.

Second Stage—Obstetric Duties of the Practitioner—Vaginal Examination—Its Objects—Support of the Perinæum—Its Intention and Mode of Accomplishment. *Third Stage*—Removal of the Placenta—Support of the Uterus—The Abdominal Bandage—Its Object and Mode of Application—Management of retained Placenta without Hæmorrhage.

IN the preceding lecture, we considered the duties you had to fulfil towards your patient when the os uteri was in the process of its dilatation, and when THE SECOND STAGE was about to commence. We explained to you the general arrangements, both as to the bed, the apartment, and the diet required by your patient during this trying stage. In continuation we would observe that from the moment of its commencement, she must receive your most sedulous attention: she cannot now be left to the nurse ; you must sit beside her, attentively observing the progress of the labour, and be prepared to act the moment your assistance is required. You have to witness a struggle of greater or less severity, in the effort of the uterus to force the head through the pelvic cavity. The bearing pains return with a regularity and strength that would seem sufficient to overcome any ordinary obstacle with rapidity, and yet the advance of the head is often slow, and its progress bears no proportion to the effort which seems to be employed. It is your duty to watch carefully the effect produced by the pains, and to sustain your patient through this severe trial with every encouragement. The proportion between the head and the 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 you must bear in

mind, that the passages are now experiencing unusual pressure; there may be, probably, some congestion and increase of tempe-rature, and this might be much increased if the vagina were 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 dis-charge, serves as a useful indication that caution is required in this respect. It had not been lost sight of by the older practi-tioners, 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 both in the interval of the pains, directing them, in the first instance, between the pubis and head, and moving them round on either 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 seems to be a want of proportion between the head and the pelvis, you have still another means of testing its degree, by examining the presenting part of the head. When it 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, is generally a sufficient proof of the amount of the 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 to you the means of distinguishing the different positions from each

other. We shall, therefore, at present only bring before your notice those positions which we are directed by some authors to alter as soon as they are found out, in order to prevent the head becoming impacted in the pelvis afterwards.

One of these cases is when the head enters the brim in the left fronto-cotyloid position. 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 un-favourable position than it had been. 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 in-stances 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 advancing, or the head may be arrested by the hand de-scending 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. 85-86) 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. Having ascertained the position of the head, and its relation to the pelvis, 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 distention. The mode of doing so, which I have been in the habit of adopting, is somewhat different from that directed by the more popular writers on midwifery. Ramsbotham and Rigby both employ the left hand to press against the perinæum, and the right is kept in reserve to make any necessary correction. Churchill and others adopt the same plan. Dr. Rigby admits that "it is awkward at first, because it requires the hand to be considerably twisted, and makes the wrist ache a good deal."

The left hand is twisted, in order that its fingers may be directed forwards toward the perinæum. Dr. Ramsbotham directs the palm of the left hand to be pressed against the perinæum with the fingers; I presume, the other way. He does not state so; but I draw the inference from his description: and if correct, it is liable to the objection of which Dr. Rigby is fully aware, and endeavours to avoid—that is, that the part of the hand which has the least acute sense of touch is applied to the margin of the perinæum, and you cannot so readily perceive its degree of distension as when the fingers lie close to it. 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 in this way employed 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. Having the left hand so employed, the right can be used to support the

* Rigby, p. 112.

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 either 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 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, it is certainly less fatiguing. The only inconvenience of this method is, that when the funis is coiled round the neck of the child, so as to make it necessary to remove it, 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 bi-parietal 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 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. When the head is passing out of the vulva, you should then direct it forwards toward the pubis; and when it is delivered, examine carefully lest *the funis may be coiled round the neck*. If such be the case, and that it is 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.

If the funis be not found 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, which 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, etc. 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 is sufficiently intelligent to understand your object. The latter plan is more convenient.

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 afterwards. When this is perfectly effected, the circulation 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. You must be careful to see the part of the funis you are dividing, lest the fingers or any 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.

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, do not persevere; it is always more advisable to wait for some time than to use too much irritation. Neither should you attempt to re-move the placenta by the funis alone. By great violence, it is true the funis may be broken, or the uterus inverted. I do not attribute to you such awkwardness; but by pulling frequently at the funis to ascertain if the placenta be separated, you may excite an irregular contraction of the uterus. 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, being nearly emptied of its contents, the lower fibres will contract first, and retain the placenta. Thus, by pulling too much 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 your attention is to preserve the uterus in that state of contraction which is so necessary to prevent subsequent hæmorrhage. We have already explained to you 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 they are exposed to, 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 your attention; because it may be made useful or mischievous according to the manner 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 it 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. Having accomplished this, 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 material 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, 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 for you 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 fulfilling this essential duty. When the bandage is applied, the folded sheet, etc. that had been placed under your 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 the 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 comfortable," and in doing so, causes so much excitement in the process of dressing her, and changing the bed-clothes, that hæmor- rhage is the result. The patient, after her delivery, always ex- periences 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.

It sometimes happens that the placenta is retained after delivery, without any hæmorrhage taking place; and although we shall have again to direct your 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 it 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,—from half an hour to an hour,—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 it should not, 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 toward 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 its 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 hæmorrhage, 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. Sometimes, also, it is produced by frictions over the anterior wall of the uterus, or rather, over the corresponding portion of the abdomen. By this manipulation, the uterus is often pushed over to the iliac fossa, where it remains in a semi-contracted state; or the anterior portion of the uterus is contracted, while the posterior, where the placenta is commonly attached, is relaxed. 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 parieties 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.

With these observations, we shall conclude the management of natural labour, and consider the further treatment of the parturient woman after her delivery in a future part of the course, when we enter upon the subject of lactation.

LECTURE VII.

DIFFICULT LABOURS.

Difficult Labours divided into Tedious and Laborious Labours—Causes of Tedious Labours—Over-Distension of the Uterus –Extreme Obliquity—Gradual Escape of Liquor Amnii—Hysterical Excitement—Mental Despondency—Rigidity of Os Uteri from Inflammation—Toughness of Os Uteri—Extreme Rigidity, etc.

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*, and to this subject we would now direct your attention. 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: but this is not the case, and you must understand this definition to be only of general, not universal application; that 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 the difficulty of sustaining his patience. There are many circumstances, therefore, besides *time*, which should be considered, in reference to difficult labour, and you must only accept the definition we have given you as one which will embrace a larger number of such cases than any other that we might propose.

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, the 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 labours*," two subdivisions—1st, That in which labour is merely prolonged beyond the average period, without being, at any time, unusually severe,—it is then called " *tedious labour*,"—2ndly, 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 upon inefficient action of the uterus, or rigidity of the passages; and as their 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.	

Such are the usual causes of tediousness in labour. We might add others which are less frequently met with; but it is unnecessary to propose to you a complicated classification. The first of these conditions, then, is: —

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 paralyzed. 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 by 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. 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 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 a few strong pains. If this

mode be not sufficient for the purpse, a broad bandage may be applied round the abdomen, and drawn towards the right side as firmly as the patient can conveniently bear.

When the uterus is inclined very much forwards, it may arise either from the pelvis being so shaped that the axis of the brim is nearly horizontal, or from weakness of the abdominal parieties; 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 pubis 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 her side, but as there is a great difference in the position which different women find most favourable to their pains under these circumstances, you will 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 parieties of the abdomen, to lie 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 theorize 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 sup-
posed 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 arti-
ficial os uteri: such an instance has been mentioned by Dewees.*
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. *The 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.

We would now direct your attention to much more important
causes of delay—viz., those which depend upon the temperament
of the patient: such as are produced by high mental excitement,
or by its opposite, great depression of mind, acting through the
constitution on the uterus.

4. *Hysterical excitement* is the first of these causes to which we
shall allude. Hysteria is one of the most frequent affections of
the female constitution. In the course of your practice, you will
meet with many instances of that highly-excitable temperament
which is associated with this disease. When these hysterical
females become pregnant, and the period of parturition arrives,
the practitioner has often to undertake the management of a case

* Dewees' Midwifery, p. 90.

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 chances 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. Scybalæ 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, narcotics, combined with the diffusible stimulants, will more efficiently control the irritability of the patient. Women of this temperament are often greatly fatigued by their own useless and impatient efforts to hasten their delivery, as well as by the length to which labour may be prolonged. In such instances, a full anodyne frequently procures some hours' refreshing sleep; after which the pains become more regular and active. If you should find that, notwithstanding such treatment, the action of the uterus is still weak and inefficient, ergot of rye may be given in moderate doses to excite it; but its use should follow the treatment previously mentioned, and only when the uterus continues to act feebly, although the nervous irritability of the patient has been tranquillized. A judicious application of these adjuvants will aid you in exciting regular and dilating pains, and will bring this stage to a favourable conclusion. If the first stage be not so much prolonged as to exhaust the patient, the second will generally terminate without much difficulty: these hysterical symptoms often disappear when the expulsive efforts of the uterus absorb the attention of the patient. Cases of this description are embarrassing to the practitioner from their tediousness, but seldom terminate unfavourably if they are 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 my 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,

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 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 some 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, 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 after, the placenta was expelled; but the pulse instantly sunk, 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 externally or internally.

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. I 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 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 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 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 sunk 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 again 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 recovered with difficulty from the effect of a labour that otherwise would have been happily concluded within the average period. Such cases may come under your notice: it is therefore necessary to recollect their characters.

They differ altogether from the former class of patients; 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 your suspicions; the tendency to chill and the coldness of the extremities will increase them, and the constant, although passive, watchfulness of your patient, will confirm your apprehensions.

The moment you perceive the nature of the case, 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 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.

The SECOND DIVISION of causes that render labour tedious, is, *rigidity of the passages.* This may exist either in the cervix uteri, vagina, or perinæum. At present we shall confine our attention to rigidity in the cervix uteri. In a former lecture, we took occasion to point out to you, that under the term " rigidity" were included different states of the os and cervix uteri, presenting different degrees of resistance. We shall first speak of those cases where *the rigidity has been induced* by some accidental cause, and secondly, consider *idiopathic rigidity.*

If the os uteri be much exposed to irritation, it is rendered rigid; the lips become swollen, hot, and tender: when these signs of commencing inflammation 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 the *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 circular fibres of the body round the child. When this happens, an additional resistance is offered to the action of the fundus. In the treatment of it, 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 tartarized 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.

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 is sometimes 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.

Again: 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, which when long pressed upon, is swollen, tender, and rigid. The

treatment of the cervix when in this state has become a kind of *vexata questio* 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 pain, and there maintained until the returning contraction of the uterus drive the head below it; while others of equal reputation deem such practice to be objectionable, and calculated rather to increase than to diminish the difficulty, by exciting more inflammation. I 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 my duty neither to draw you into controversy nor to give you too dogmatic an opinion on a question so nicely balanced by authority. I 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. My own experience, however, confirms that of Dr. Collins, and is opposed to this practice: the opportunities I have had of putting it to the test have taught me 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. I 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 me, 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. I am still, however, disposed to object to the practice of artificial dilatation of the mouth of the uterus for the former purpose. While on this part of our subject, I must apprize you of a deception which may be produced by certain states of the os uteri. 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 you will employ your time very fruitlessly if

you attempt to push back this hypertrophied portion of the os uteri.

That resisting condition of the cervix uteri, to which we have applied the term "*toughness*" (an expression 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 this stage is generally very much prolonged; but so long as inflammation is not excited, no injury is caused by the time occupied in dilatation; 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 its progress attentively than officiously to attempt to hasten it. Every care should be taken to prevent inflammation 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 what you are, or should be, always anxious to avoid—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 driven forcibly down upon the undilated os uteri: thus your difficulties are rather increased.

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.

The last kind of rigidity to which I 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 pre-liminary treatment, the frequent use of the warm bath, although an exception to ordinary rules, is found to be very beneficial. When labour begins, warm emollient enemata should be givan from time to time, and the patient placed at once under the influence of tartarized antimony. General depletion may be employed if the patient be robust; if 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 con-sequence, it appears to me, has prevented any attempt 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 I confess, in a case such as I have described to you, I should be more disposed to adopt the shorter course, in the hope of saving the child, than to wait until its death enabled me to remove it. This, however, is but an individual opinion, and needs support.

LECTURE VIII.

LABORIOUS LABOURS.

Causes of Delay in the Second Stage of Labour : Head of the Child misplaced—
Too large, and too much Ossified—Hydrocephalic—Pelvis like the Male Pelvis
—Deformed—The Ovate Pelvis—The Cordiform Pelvis—Head of the Child
above the Brim of the Pelvis—Fixed in the Brim—Arrested in the Cavity—
Characters of Arrest and Impaction of the Head.

THE causes of delay in the first stage of labour have been
detailed to you in the preceding lecture ; those which occur
in the second stage we have now to consider. The former
gives rise to labours that are called " *tedious ;*" the latter, to those
that are termed " *laborious,*" in consequence of the extreme
severity of the struggle that ensues in the effort to force the head
through the pelvis. Difficulties in the second stage of labour 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.

We shall therefore direct your attention to each separately—
1st. To the head of the child as a cause of delay ; 2nd. To dis-
proportion in the pelvis ; and having considered the management
of, and rules of practice applicable to, cases of this description,
we shall then briefly conclude with some observations on those
mechanical obstructions that are sometimes met with.

1st. *The head of the 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.*

We have already sufficiently dwelt upon the positions of the
head ; very few observations upon them as causes of delay in
labour will now be necessary. Some of these positions, as face
and face-to-pubis presentations, have been assumed as, rather than
proved to be, causes of difficulty. We have shown you 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 pubis*, you will have no difficulty in detecting the position by the rule we have laid down; neither, when it ceases to advance, is it hard to correct. 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 I say "gradually," I 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 —dangerous to the soft parts of the mother, especially to the perinæum.

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, recourse must be had to the forceps. 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. This is the most easy to correct of any of these deviations, but if it 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 that we shall speak of is when *the forehead becomes the presenting part*. In these rare cases, the forceps must be employed to extract the head. You will find it to be a very difficult operation, and one which requires great caution in the performance. These are the principal varieties of position which may cause delay in the second stage of labour.

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 me 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—1st. " That the dangers and difficulties of parturition are *greater to the mother* in male than in female births;" and 2nd. " 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. I 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 smaller. That of the female, more oblong, and the fontanelles 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 I 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. I 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 I shall beg your attention especially to that variety which possesses many of the characters of the male pelvis, and to take it in connexion 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 I shall

only direct your attention to the propositions I have 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. I am happy to have it in my power to confirm Prof. Simpson's statements by the results of my own experience in the same hospital. Having noted all those cases 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 nearly 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. From these facts, then, you may conclude, 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. We have stated that in these instances also the head is more advanced in its degree of ossification. Hence you will perceive that this cause of difficulty, dependent upon the child, embraces a very large and important class of cases.

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, I place before you the very opposite results of the practice of Dr. Collins and Dr. Lee on this point. Dr. Collins gives 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. 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.*

If it were necessary to bring forward additional proofs to convince you of the importance of educating your sense of touch so as to distinguish the different positions of the head, such instances as these would afford abundant evidence. It is obvious to you, 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 and discharge the fluid. The practice is self-evident when the cause of difficulty is understood. But when a patient is allowed to remain " too long in labour," under such circumstances, 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 much how it is situated, will be liable to those mistakes; but when, by a constant and careful attention, you acquire facility in recognising its different positions, you will at once detect the remarkable change which hydrocephalus produces in the characters you have been accustomed to notice. 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, would 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

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* 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.

turn to the difficulties presented by the pelvis; and, to prevent confusion, we shall assume that the head presents in the first position.
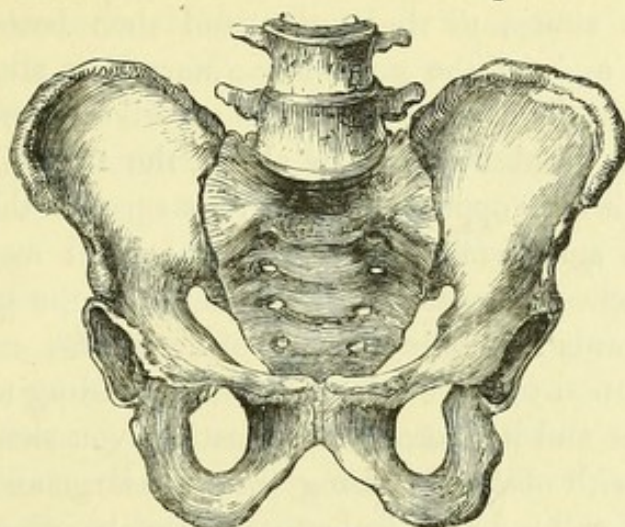
Masculine Pelvis.

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 those leading points of difference that are of practical importance; and with this view we would beg of you to consider attentively that form of pelvis which has been described as *resembling the male pelvis*, to compare it with *the pelvis deformed by disease*, and to observe the points of contrast between them. The first to which we would direct your attention, is the difference in the degree of ossification. The pelvis resembling the male is more osseous than the standard pelvis; the diseased pelvis less so. The former we shall call (for brevity) *the masculine pelvis*, and proceed to consider its especial characters. *Its weight* is greater than 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 tubera ischii 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 the standard pelvis, and becomes narrower towards the outlet. The head often passes down almost to the outlet, and then becomes *impacted*, because the arch of the pubis is too narrow to allow the occiput to escape from the cavity; it is therefore driven down still further, and becomes fixed between, or above, the tubers of the ischia. Its advance is also opposed by the resistance of the coccyx, and perhaps 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, you 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 cause of embarrassment depending on the pelvis, which is pointed out by the majority of obstetric writers. Let us, then, contrast the one with the other.

The softened pelvis has *a less deposit of bone* than the standard pelvis. The symphysis pubis is often wide and perfectly smooth; the tubera ischii small. The articulations are less resisting, and I think I might add, on the authority of some recorded cases, 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.* 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 a slight resistance to the head of the child. In that deformity which is ascribed to *mollities ossium*, in *the cordiform pelvis*, its irregularities impede the passage of the head, both in the brim cavity, and outlet.† If the head pass through the cordiform brim, it is still opposed in the cavity by the planes of the ischium,

* Fig. 1, p. 29.   † Fig. 2, p. 29.

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 former pelvis, from which it differs in the close approximation of the tubera ischii. 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 your 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. Contrasting a pelvis of this kind with the masculine pelvis, and assuming that the pelvic cavity in both presents the same apparent contraction, still 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 the child is also less ossified, you will perceive a strong contrast to the difficulties which the masculine pelvis presents under apparently similar circumstances.

It is necessary to request your attentive consideration of these differences, in order to render intelligible to you some very difficult questions connected with the rule of practice in such cases. The contrast is not confined to the pelvis alone; but, as you might naturally anticipate, 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 now point out to your notice 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 the former class of patients. You perceive, therefore, that 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, that the same treatment, if applied to both, might be mischievous to either. It is essential to point this out to you, 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 other unhealthy district, who finds the majority of his patients to be those we have just described to you, such a practitioner 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 have done irreparable mischief. 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 particulare ad universale* (as logicians have it), without exercising a just discrimination on those points of difference that I have attempted to lay before you.

Having made these general observations on the irregularities of the pelvis, as causes of delay in the second stage of labour,

permit me now to direct your attention to the manner in which the head of the child is retarded by the different causes mentioned.

The head may not be able to enter the brim of the pelvis; it may become fixed within the brim; it may pass through the brim, and remain arrested in the cavity; and, lastly, it may meet no impediment until it is almost expelled, when its advance is opposed just at the outlet.   Let us consider each in detail.

The head may not be able to enter the brim of the pelvis.—This may happen when the head is hydrocephalic, or the brim of the pelvis much deformed. In the former case, the moment it is ascertained, as we have already stated to you, 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 do so *per vias naturales ;** and therefore, the Cæsarian section, or what might be called delivery *per vias præternaturales*, becomes a question for your consideration. But the deformity may not be extreme, and yet the head be prevented entering 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 pelvi-meters. It is for this object that the profession have made many fruitless efforts, and even entered upon no little controversy, to determine the least possible space through which the child might pass. I shall not occupy your time uselessly with their discussions, but shall only point out to you the errors you must avoid. Recollect that the child must be delivered by destructive instruments, that its sacrifice is involved in the question you have to consider; and this remark applies equally to those who have the temerity to apply the forceps when the head is above the contracted brim of the pelvis. Whether the forceps or the crotchet be employed, the result to the child is the same; the only difference being, that in the former case the hazard to

* 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.

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the mother's life is greatly increased.   You must not, therefore,
place implicit confidence in the accuracy of the measurement that
you make of the pelvis, and at once proceed to operate, because
it is, or you think it is, within the space through which the head
may pass; you might be altogether deceived; and every ex-
perienced practitioner knows how often he is deceived in the
estimate he forms of the space in the pelvis, although the utmost
care may be taken to determine it.   Do not, therefore, trust to
pelvi-meters, however ingeniously contrived; rather let time and
a close attention to the symptoms which present themselves
decide your practice.   When the character of the labour is
changed, when inflammation begins in the passages, when
the premonitory symptoms of exhaustion appear, when, after a
reasonable time has elapsed (say six hours), without the head
making any progress, although the os uteri is quite dilated and
the pains have continued regular and powerful,—when any of these
conditions are met with, and you have reason to think, from an
examination of the pelvis, that the brim is too contracted, then,
but not until then, are you justified in interfering.   The simplest,
and, we might add, the most efficient pelvi-meter, 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 intro-
duced, 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 doubt-
ful 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 arch of the pubis (taken below the sub-
pubic ligament and soft parts adjoining) and the promontory of
the sacrum be only three inches, that between the superior sur-
face of the symphysis and the same point must be less than three
inches.   You may then take it as a rule, that if your 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 your 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 your 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 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. In some instances, the ischio-pubic rami are very close, and the coccyx abruptly bent; in others, having the same alteration in the coccyx, the symphysis pubis is pressed down towards it. In these varieties it is difficult to make an examination. Only one finger, generally, can be introduced, and if, with this distortion of the outlet, you find the sacrum also pressed forwards, you can hardly hope that the head will pass the brim. These modes of determining the disproportions of the pelvis are far more convenient, and (as it appears to us) are quite as efficient as the more complicated contrivances to which we have referred. But, with the exception of very extreme cases, we would again caution you not to assume too hastily, even with every evidence in this way obtained, that the head cannot pass the brim, until time and a close observation of the labour removes every doubt.

The head may become fixed within the brim.—This might 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, I would direct your 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 measure-

ment of the brim is diminished, while the 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 would 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 (vide p. 183). We would desire to impress this fact the more upon your minds, because it is necessary to discriminate between the application of the long forceps in this especial case, and its use when the head is in the same situation in other irregularities of the pelvis, and also because this kind of arrest is much more frequently described, and even figured (as you see in this plate of Smellie's), than those which we believe to be more commonly met with. When the head is thus fixed in the brim, its long axis corresponds exactly to the transverse measurement. The bi-parietal space is compressed between the sacrum and 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.
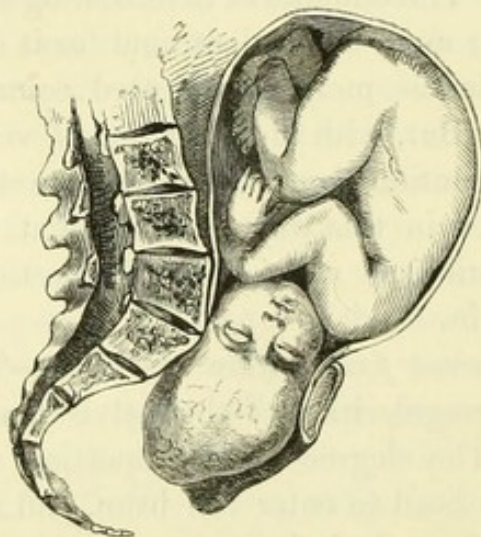
Head fixed in the brim of the pelvis.—(*Smellie.*)

The head may pass through the brim, and remain obstructed in the cavity.—This division embraces the largest number of, and the most important, cases you have to consider. It is to this that the observations apply which we have previously made, in re-

ference 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 to do so, 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, the cause either does not depend upon disproportion in the pelvis, or, when disproportion exists, it 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 in 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 the former case, 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. In the latter instance, 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, it becomes less in size, softer, crepitant, and œdematous, while the serrated edge of the suture may be felt still more distinctly.

Having given this explanation of the terms which are commonly employed to signify the different degrees of disproportion, and having pointed out to you the characters by which they may be known, we shall proceed, in the next lecture, to consider the management of those cases where the head is delayed in the pelvic cavity.

LECTURE IX.

LABORIOUS LABOURS.

Symptoms of Inflammation—Of Exhaustion—Treatment—Different Degrees of Disproportion in the Pelvic Cavity—Case in which the Head moves very slowly through the Pelvis—Opposite Opinions as to its Management—Discussion of the Question—Attempt to determine it by Statistical Results.

In the preceding lecture we pointed out to you 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, those 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 is possible, the circumstances that justify artificial assistance, and the nature of the aid that is called for. You will recollect, that, in speaking of the second stage of natural labour, we directed your 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 might follow, if not prevented by a judicious treatment. It is therefore necessary, in all such cases, that you watch very closely any alteration in the symptoms that accompany the struggle, in order to foresee the approach of danger, and to

* Page 60.

enable you 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 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, thus leading to *rupture of the uterus* itself. Each of these consequences, although differing in degree, is equally to be avoided. It is therefore important to observe the earliest symptoms of inflammation.

Another cause of danger is *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; and when it occurs, the shock of 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. Beside 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 which should be guarded against by every precaution, and one 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 the more necessary to point out this to you, 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 has had even momentary sleep. If the difficulty be still insuperable, they may either again cease, or continuing, may produce inflammation of the passages. When this 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. Beside 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 slightly collapsed ; there may be a distinct rigor, but more usually there is but a slight chill. Locally, the vagina becomes hot and tender, the mucous secretion ceases ; it is therefore dry, 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 the uterus. 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 similar appearances 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 sed., 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 we have alluded to. Both cases demand from you an equal attention; but you perceive it must be directed to a different object. We shall therefore briefly detail to you those premonitory symptoms that indicate the approach 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 tranquillized; 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. I have expressly stated a *moderate* dose of opium, because the case now under our consideration is that in which the same medicine has produced the most opposite effects, according to the dose administered, and, consequently, it has sometimes been discarded, because it has been misapplied. The object which it is intended to accomplish by opium, is to subdue the nervous irritation which

precedes exhaustion, and to restore, by rest, the energy of the uterus. The effect produced by too large a dose may be to paralyze all nervous power, and thus at once to cause uterine exhaustion. You must therefore exercise proper caution in the use of it; twenty to twenty-five minims is generally sufficient for the purpose. After a temporary rest has been thus produced, if the uterus still continues 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.* It is also necessary

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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 transmission 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—

1st. The period after administration that its action commences.

2d. Its effects on the maternal pulse (when any), and how soon evident.

3d. Its effects upon the fœtal heart (when any), and how soon produced.

4th. 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 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 pro-

to be careful to avoid the use of *secale cornutum*, if the delay in this stage arises 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 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, when cautiously administered, is useful, however, 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.

duced, 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 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 unfavorable 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

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 !

Having given you 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 to you 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; only it will 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: you may have a still greater disproportion, in which there is 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: you have occasional instances in which 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; it must be destroyed before it can be brought into the world. In extreme cases of this kind, 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 through the pelvis, if nature be allowed time for the purpose, you would not, of course, interfere with her; although I 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 pro-

fession 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 pubis, you may use the forceps to deliver the child, and I 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. Burns devotes the greater part of a chapter* to prove the impropriety of delay under such circumstances, and advocates the application of the forceps in cases of arrest, or rather of slow progress of the head, because " in such cases then we may experience much evil from trusting too long to nature, but add little to the sufferings of the patient, and nothing to her hazard, by instrumental aid."† He applies the same principle to cases of impaction, which we shall presently consider. The evil he dreads is uterine exhaustion, if this second stage be much prolonged. In this view he has the support of the late Professor Hamilton, who equally dreaded delay. Dr. Campbell also gives a similar opinion, but more guardedly expressed. " It may, however, be repeated, that while the delivery is advancing, and the patient continues free from unfavourable symptoms, the use of the forceps is to be abstained from altogether. *But whenever the progress is slow and imperceptible*, and the subordinate means already recommended have failed to accelerate the transit of the foetus, the case should be watched, and *this instrument applied with very little delay after the passages are prepared*."‡ Other names might be added to this list of advocates for interference in the case supposed. But let us turn to the other side, and you will find the eminent names of William Hunter, Osborne, and Denman, opposed to this practice. Dr. Osborne would wait until exhaustion had actually taken place — a maxim for which he has been very severely, and I admit very justly, criticized. Dr. Denman's fifth aphorism states, " It is meant, when the forceps are used, to supply with them the insufficiency or want of labour pains; but *so long as the pains continue*, we have reason to hope they will produce their effect, and *shall be justified in waiting*."§

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* Burns, chap. vi. p. 428. † Ibid., p. 434.
‡ Campbell's Midwifery, p. 281. § Denman's Aphorisms, p. 12.

When the pains cause the head to advance, although very slowly, they are producing their effect; and the case therefore comes within the limits of the aphorism. Dr. Collins observes, " Let it be carefully recollected at the same time, that so long as the head advances EVER SO SLOWLY, the patient's pulse continues good, the abdomen free from pain on pressure, and no obstruction to the removal of urine, interference should not be attempted, *unless the child be dead*."* Dr. F. Ramsbotham's third rule on this point is, " If the head advance at all, and be not impacted, provided the strength and spirits are good, there is seldom need to interfere."† Dr. R. Lee's name might also, I think, be added, as being favourable to this rule of practice.

I shall not, gentlemen, so far trespass on your patience as to ask you to unravel with me this tangled web of contradictory experience. It is sufficient if I convince you of the difficulty of the subject, and if it induce you to give a patient attention to the only mode that I can adopt to draw a legitimate conclusion— that is, to derive it as nearly as possible from facts, without reference to opinions. I think this may be done. Bearing in mind that the great and leading principle to be observed in these difficult cases is, to preserve both mother and child, if possible, from injury, I think it is in our power to compare the results of cases where the forceps has been applied with those where it has been withheld, and thus determine the practice which presents the greatest success. We shall first direct your attention to the following tables of operative midwifery, derived from reports given by British and foreign practitioners; you will find in them the total number of cases given by each, the number of forceps operations, and the results to mother and child when they are given.

COMPARATIVE VIEW OF FORCEPS OPERATIONS AND PERFORATIONS.

BRITISH REPORTS.

Date.	Place.	Name.	Total Cases.	Forceps	Deaths Children.	Deaths Mothers.	Perfo- rations.	Deaths: Moths	Total Opera- tions
1781 ..	London ...	Dr. R. Bland	1,897	4	—	—	8	—	12
—	Ditto	Dr. Merriman ..	2,947	21	6	—	9	—	30
1828 to 1843	Ditto . ..	Dr. F. Ramsbotham	35,745	49	11	3	38	6	87
1787 to 1793	Dublin .	Dr. J. Clarke ...	10,387	14	—	2	49	16	63
1826 to 1833	Ditto	Dr. Collins	16,414	24	8	4	79	15	103
1835 to 1837	Ditto ...	Dr. Beatty	1,182	9	4	—	3	—	12
1835 to 1840	Ditto ..	Dr. Churchill	1,640	3	1	—	12	1	15
1832 to 1835	Ditto ..	Dr. Murphy	5,699	14	5	1	29	6	43
			75,911	138	35	10	227	44	365
	London . ..	Dr. R. Lee	—	55	38	9	127	23	182

* Collins' Report, p. 18. † Ramsbotham's Obstetric Medicine and Surgery, p. 309.

FOREIGN REPORTS.

FRENCH.

Date.	Place.	Name.	Total Cases.	Forceps.	Deaths. Children.	Deaths. Mothers	Perfo-rations.	Deaths: Moths.	Total Opera-tions.
1797 to 1811	Paris	Boivin	20,357	96	23	—	16	—	112
1812 to 1820	Ditto	La Chapelle	22,243	77	18	—	12	—	89
			42,600	173	41	—	28	—	201

GERMAN.

Date.	Place.	Name.	Total Cases.	Forceps.	Deaths. Children.	Deaths. Mothers	Perfo-rations.	Deaths: Moths.	Total Opera-tions.
1821 to 1825	Wurtemburg	Riecke	221,923	2,740	636	127	98	35	2,838
1801 to 1821	Vienna ..	Boer	26,965	100	—	—	43	—	143
1797 to 1827	Ghent	Jansen	13,365	341	—	—	5	—	346
1811 to 1827	Prague	Moschner	12,329	120	—	—	4	1	124
1825 to 1827	Bonn	Kilian..........	9,392	120	—	—	4	—	124
1814 to 1827	Dresden ...	Carus..........	2,549	184	—	—	9	—	193
1817 to 1828	Berlin.	E. Siebold	2,093	300	—	—	1	—	301
1823 to 1827	Ditto	Kluge	1,111	68	14	—	8	3	76
	Heidelberg..	Naegele..	1,711	55	—	—	5	—	60
			291,438	4,028	650	127	177	39	4,205

You will perceive that in these tables the number of forceps operations in British practice is 138; in thirty-five of which the child was still-born, being in the proportion of one in every fourth case. In order to prevent error in this proportion, we have separated Dr. Lee's forceps cases; the total number of which given by him is fifty-five; the mortality of children, thirty-eight; which would be quite out of proportion (being more than one-half) if these cases were not carefully examined. I have endeavoured to do so, and to make the necessary corrections. In nineteen of these fifty-five cases, the forceps failed: they therefore became cases for perforation; of the remaining thirty-six cases, one-half the children, eighteen, were lost, but twelve of these eighteen were destroyed by other causes than the forceps. Deducting, therefore, all such cases from the whole number, the remainder will be twenty-four forceps cases, in which eighteen children were saved and six lost, being in the same proportion, one in four.

In the French reports, forty-one children were lost in 173 forceps operations, being one in four, nearly.

In the German reports of Riecke and Klugè, which state the mortality of the children, the number of their forceps operations united is 2808; the deaths of children, 650; being also one in four, nearly. Thus, then, we may conclude, that one-fourth of the children delivered by the forceps are lost. What is the result when these protracted cases are left to themselves? Is the

mortality increased? I do not think such will be found to be the case. In order to determine this question, I must refer you to Dr. Collins's valuable report—the only report which, from its extreme accuracy and minuteness, affords the elements upon which to form a calculation. Dr. Collins has given tables to show the duration of labour in all the cases he reports; he has also given separate tables to show the duration of labour in forceps cases, and in those which were preternatural. We may also assume, that perforation being only had recourse to " when, after the most patient trial, the impracticability of labour being terminated in safety by any other means was clearly proved,"* that all these cases exceeded twenty-four hours. From these data, then, we shall endeavour to draw a fair conclusion.

Cases of labour protracted to 24 hours and upwards from Dr. Collins's Report.

TOTAL CASES, 430.		STILL-BORN CHILDREN, 150.		MOTHERS DEAD, 40.	
Delivered by forceps	12	Still-born	4	Mothers dead	0
by perforating	79	Ditto	79	Ditto . . .	15
preternaturally	15	Ditto	6	Ditto . . .	0
naturally	324	Ditto	61	Ditto . . .	25
	430		150		40

From this table you perceive, that of 430 cases in which labour lasted twenty-four hours or exceeded it, 324 of them were natural cases, delivered without assistance, and that of these 324 the children were lost in sixty-one instances, which would be about one in five cases. The result of my own inquiries on this subject is nearly similar, and has been obtained from the same source, the Dublin Lying-in Hospital.

Report of 218 cases of labour protracted to or beyond 24 hours.

Delivered.	Cases.	Boys.			Girls.			Mothers Dead	Causes of Mother's Death.
		Living.	Dead.	Putrid.	Living.	Dead.	Putrid.		
By forceps	14	4	1	—	5	4	—	4	{ 1 Puerperal fever. { 1 Rupture of uterus.
By perforations	29	—	20	1	—	7	1	6	{ 1 Puerperal fever. { 1 Rupture of uterus.
Naturally	175	76	19	5	52	22	1	8	3 Puerperal fever.
	218	80	40	6	57	33	2	18	

* Collins, p. 23.

In 5699 cases, 218 were protracted to this degree; and of these, 175 were delivered naturally, and forty-one children not putrid were still-born, being one in four, nearly. Thus, then, you perceive that, taking the widest, and, we would say, the fairest view of this question, the proportion of still-born children in these difficult and protracted cases is nearly the same, whether the forceps be employed or otherwise ; that the difference, if any exist, is in favour of Dr. Collins's practice of leaving these cases to nature. But this is only one view of the question.

It may be said, and has been said, in the energetic language of Dr. Burns, that the mother must be considered. " From the strength of the recommendations of the partizans of nature, we should suppose that whenever the child could actually be born without aid, no hazard occurred; and, on the other hand, that instruments must of necessity prove not only very painful in their application, but dangerous in their effects. Now, the first supposition is notoriously wrong, for *innumerable instances* are met with, where the mother does bear her child without artificial aid, and much, doubtless, to the temporary exultation of the practitioner, but, nevertheless, death takes place, or at the best, a tedious recovery is the consequence."* Is such the case? It is totally opposed to my personal experience; on the contrary, I have been surprised at *the rapid* recovery of patients who have suffered this protraction, when I had erroneously anticipated, from that very circumstance, all the unpleasant consequences here detailed. But I would again ask you to put aside, for the present, individual experience, and examine the facts. In doing so, our data are more limited than those which assisted us in the former question, because, in the French reports, there is a most ominous silence regarding the mortality of the mothers—they say nothing about it. In the German reports, we are limited to that of Dr. Riecke, who gives 127 deaths in 2740 cases, being one in twenty-one, nearly. But take Dr. Churchill's more extensive researches on this question, from whose valuable work on operative midwifery these tables of foreign practice are partly formed. He states, that " amongst the French and Germans, in 479 cases, thirty-five mothers were lost, or about one in thirteen."† Dr. Churchill gives the proportionate mortality in British practice as one in twenty-one; but you perceive that, in the comparative

* Burns, p. 434.   † Churchill's Operative Midwifery, p. 134.

view we have placed before you, there were ten deaths in 138 cases, which is about one in thirteen. Compare this with the result where the cases have been left to the natural efforts. In Dr. Collins's report, there were twenty-five deaths in 324 cases, or one in thirteen, precisely the same as where the forceps had been used. Among those cases which I have observed, there were eight deaths in 175 cases, or one in twenty-two—a proportion in which I can place the more confidence, because it is derived from personal observation.

With regard, then, to the second question, the mortality of the mother, take the estimate in any way you please, and you must arrive at the same conclusion—viz., that the mortality is certainly not increased when these cases are not interfered with, and all the dreaded consequences which Dr. Burns anticipates from such practice have no foundation in fact. But we might even go farther: we might say, that so far from such evils following our Fabian practice, the evidence seems to point the other way, and to prove that the actual mortality is diminished. The twenty-five deaths reported by Dr. Collins include cases of puerperal fever, and other causes of death which might be called accidental, because he gives, under a distinct head, the number of deaths, the " effects of tedious and difficult labours."* These are just eleven cases, or one in thirty cases, nearly. The eight deaths which took place under my own observation, include three deaths from puerperal fever, leaving only five deaths from the severity and protraction of labour, which would be in the proportion of one to thirty-seven cases. Caution, however, is necessary, when we would derive a just conclusion from statistics. It is therefore possible, that if the reports of these forceps operations were more fully given, so as to separate the deaths from accidental causes from those resulting from the operation, the proportion of mortality would be diminished in the same ratio.† We do not wish you to assume more than what we think has been proved—viz., that the mortality of the mothers is not increased by leaving these cases to nature. The safety of the mother or child cannot, therefore, be advanced as a reason for instrumental delivery, when the head is making a very slow but a certain progress.

* Collins, p. 365.

† It is probable that the reports include deaths from puerperal fever, and those following delivery of the *impacted* head by the forceps.

One argument, however, has been much used by the advocates for interference, which is very clearly expressed by Dr. Burns: " Granting (he observes) the recovery to be excellent, is it no consideration that the patient has been subject to twelve, perhaps twenty-four, hours of suffering of body and anxiety of mind, which might have been spared?"* You must perceive that if this argument be worth anything, it will admit of a much more extended application than Dr. Burns would give to it. It might be employed to justify the use of the forceps in every case where the head was within reach, and labour at all severe. Because, why should your patient be exposed to *any* bodily suffering or anxiety of mind, if it were in your power to relieve her from her miseries? On this principle, the forceps might be used (as indeed they have been used) in every tenth case, and the practitioner relieved from the most anxious portion of his duties. But the design of nature will not thus be thwarted; and we might reply to such an argument in the language of Naegele—" If we admit that proportionate difficulties, according to the constitution of each individual, and an effort of strength (requisite in child-birth), are inseparable from the nature of this process, we must conclude *that an abbreviation of this process, though performed by an able hand,* before the salutary change, on which the preservation of health depends, has taken place in the organization of the mother, that a premature and sudden removal of these difficulties cannot be a matter of indifference; that such a violent interference with the functions of nature must incur the risk of destroying the health, though this should not ensue for some time after."† A more immediate injury, however, sometimes follows the application of the forceps in the case we are supposing, as well as in cases of impaction, which we shall have again to consider. The pressure of the instrument may cause slough of the neck of the bladder or the urethra, and thus establish a fistulous opening into the vagina; and the incontinence of urine that follows renders the patient's life miserable afterwards. It is difficult, in all instances, to trace this accident 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 the effects. Nevertheless, I have been able to trace

* Burns, p. 434.   † Naegele's Mechanism of Parturition, by Rigby, p. 88.

this accident clearly to the use of the forceps in several instances. The usual account given by the patient is, "that she had been delivered by instruments, and the child's life saved." Dr. R. Lee, in his "Clinical Reports," gives a candid and clear statement of the results in the forceps cases he details. "Four died from the rash and inconsiderate use of the forceps; seven had the perinæum more or less injured; one had the recto-vaginal septum torn; five were left with cicatrices of the vagina, after sloughing; and one with incurable vesico-vaginal fistula."* Dr. Collins records only *one case* of vesico-vaginal fistula in the whole of his report of 16,654 cases—that was a case of perforation—consequently this accident never was found among those cases which were delivered naturally. The only case of fistula which occurred in the 5,699 cases to which I have so often referred, was one in which I employed the forceps to deliver a child that presented the forehead. 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 assistance, it must have been an accident of frequent occurrence in these cases, when the soft parts were so much compressed; but such did not happen, and therefore they afford a very favourable contrast to the cases delivered by the forceps in nearly similar circumstances. The intelligent practitioner would therefore hesitate to expose his patient to the risk of vesico-vaginal fistula, for the mere gratification of shortening the severities of labour.

We have been reluctantly compelled to dwell longer upon the management of this degree of disproportion than we desired. The difficulty of the question it involves, and the contradictions among the most experienced writers, must be our apology. In the case that we are considering, that in which the second stage of labour is protracted, and the head of the child advancing *very slowly*, we have shown you that there is no increased danger to the mother or child by leaving the case to nature in place of delivering by the forceps; that if there be any difference in the ratios of mortality, it is in favour of non-interference, and rather against the forceps. We have pointed out, as far as imperfectly detailed facts would enable us, that the post-partum accidents of labour

* Clinical Midwifery, p. 32.

follow operations with the forceps more frequently than cases which are left to themselves, and, consequently, the conclusion at which we must arrive, is hostile to the use of that instrument, under the circumstances stated. But recollect, that there is no general rule without an exception, and you will sometimes meet with cases so feeble in their habits that they will not endure a protracted labour without great risk of exhaustion; you may be called to patients where you dare not temporise, whom you must deliver although the head is making a tardy progress. We only ask you to consider these as the exceptions, not often met with, but still necessary to be studied and understood. It is for this reason we have brought before your notice the symptoms of exhaustion, and those which precede it; the same desire to direct your attention to the study of individual cases which may be exceptions to the general principle, we would wish to govern you, leads me to bring before you the varieties, not only in the formation, but in the resistance of the pelvis, so that you may know where an operation might be undertaken and where it cannot be attempted. If we have placed this subject before you with sufficient clearness, we shall conclude by directing your attention to that opposition in the practice of experienced authorities which has rendered its discussion so necessary.

Name.	Total Cases.	Forceps.	Proportion, 1 in	
Ramsbotham . . .	35,745	49	729½	London
Clarke	10,387	14	742, nearly	Dublin
Collins	16,414	24	684, nearly	Dublin
Boivin . . . . ⎫ Lachapelle . . . ⎭	42,600	173	246	Paris
Boër	26,965	100	269½	Vienna
Kilian	9,392	120	78	
Carus	2,549	184	14	Dresden
Siebold	2,693	300	9	Berlin

Ramsbotham, one forceps operation in 700; Siebold, one in nine cases!

LECTURE X.

LABORIOUS LABOURS.

Management of Cases when the Head of the Child is impacted—Opposite Opinions as to the Application of the Forceps—Examination of the Question—Forceps as an Instrument of Compression—Baudeloque's Experiments—Perforation—Advantages of Auscultation —Case when the Head is retained at the Outlet—Accidental Obstructions — Ovarian Tumours — Polypus — Fibrous Tumours —Osteosarcoma.

THE object of our attention in the preceding lecture was to determine the rule of practice in those cases of laborious labour where the head advanced *very slowly*, and with much difficulty, through the pelvic cavity. The conclusion at which we arrived was opposed to interference under such circumstances. That the *general rule* should be to leave the case to nature, but at the same time to recollect that there are *some exceptions* to this rule, depending upon constitutional or accidental causes, where instrumental aid becomes necessary. We shall now examine the next degree of disproportion, that by which *the head is impacted in the cavity of the pelvis;* a case where the ear cannot be felt, where the soft parts suffer very great pressure, and where it is hopeless to expect the delivery of the child by the unassisted efforts of the uterus.

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
passsages, 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 per-
foration 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 to you in the last lecture.   If we could
compare such cases as have been 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—I might almost say, with hor-
ror.   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 paralyzes the judgment of
the practitioner.   Hence we read of cases allowed to remain seve-
ral 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 procrasti-
nation; 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 prac-
tice 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.

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 the purpose of *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 Baudeloque are referred to in almost every popular work on midwifery, and notwithstanding the critical objections raised against them, they are sufficiently important briefly to state them to you. Being desirous to determine the extent to which the forceps could compress the head, Baudeloque 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 Baudeloque 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 from the amount of force employed to approximate them.*

In these experiments, more force was used than you could venture to exert if the child were living, and yet the space

* 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 parfaitment 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 récommandons 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 réduction 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'écartement 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. *Baudeloque,* tom. ii. p. 17.

1635. On peut conclure d'après ces expériences. 1º. 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. 2º. 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. 3º. Qu'on ne doit jamais évaluer son étendue 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. 4º. 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., p. 20, 21).

The following are the results of eight experiments, briefly stated:—

No.	Reduction in Bi-Parietal M.	
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 Baudeloque.

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. Nor can I agree in the opinion of Dr. Rigby, that "the slow and gradual pressure of the forceps, thus exerted [by tying the handles tightly together, and tightening them after every successive effort] upon the head of a living fœtus, will have a very different result to that of the experiments of Baudeloque and others, in attempting to compress the head of a dead fœtus by the application of a sudden and powerful force."* It is impossible to grasp the forceps for the purpose of moving the impacted head, without applying to it a sudden and powerful force; and if this force be maintained in the interval of the pains by ligature, such powerful, constant, and at the same time unequal pressure, acting on the head of the child, would appear to me 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 that degree that 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, I would say, it is impossible. The only case where it might, perhaps, be successfully attempted, is in the diseased pelvis, which may be capable of some degree of expansion, and where the head of the child, being less ossified, is softer and more compressible.†

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

* Rigby's Midwifery, p. 142.

† On this point, I am much more disposed to agree with Dr. Meigs, who remarks—" One of the most dangerous errors relative to the forceps that a student could take up, would be the opinion that the forceps is a compressive instrument by its very design: it is not so—it is an extractor—it is a *tire tête;* and I think it ought to be established as a principle in obstetrics, that where there is not space enough for the descent of the head without the forceps, there cannot be produced a due proportion by merely squeezing the head down to the required dimensions by such an instrument."—Meigs' Philadelphia Practice of Midwifery, p. 295.

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. This contusion becomes a centre around which inflammation takes place, may increase to any extent, and terminate either in a local slough of the compressed part, or a general gangrene of the vagina, if the inflammation assume an erysipelatous type. In the former case, the separation of the slough may be the formation of 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 are 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 might be expelled by the uterus. Formerly, it was customary to wait for " these signs of the death of the child" before perforating, but being 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. 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 I 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, 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 the death of the child has taken place. To prove to you the value of the evidence in this way obtained, I 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, that, 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.*"* 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

* Collins's Practical Treatise, p. 16.

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 crotchet is no longer objectionable, and perforation is deprived of all its horrors.   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 history 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.

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 late 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 I 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."[*]

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!"[†] 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."[‡]

But let us come to more direct evidence. Riecke, in his report of the practice of the kingdom of Wurtemburg, 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—

* Davis's Obstetric Medicine, p. 786, 8vo. edition.
† Ramsbotham's Obstetric Medicine and Surgery, p. 299.
‡ Blundell, by Castle, p. 526.

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 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."† 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."‡ It would occupy too much time

* 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.

† Collins's Practical Treatise, p. 12–13.   ‡ Lee's Lectures, p. 305.

[1] The means of determining the death of the child by the stethoscope is not alluded to by Riecke.

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to accumulate further tesimony to the same effect.* I trust sufficient has been placed before you to authorize the conclusions at which I have arrived, and which are now submitted to you—viz., that when the head is impacted in the pelvic cavity, it cannot 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 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 extending inflammation—is indicated before the death of the child, that then perforation is called for, rather than 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, when—

The head is retarded at the outlet.—When the head is in this position, it may arise from the perinæum being rigid, or from the arch of the pubis 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

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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 crotchet, 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.

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 tubera ischii, 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. Tumours of this kind are, to a certain extent, moveable, and may be either soft and fluctuating, or firm and elastic. Sometimes the sacrum becomes the seat of osteo-sarcoma, and then a hard and perfectly unyielding tumour obstructs the head.

Beside these tumours, another description of obstacle is occasionally met with, the consequence of previously existing inflammation. Cases have been observed *where the os uteri has been agglutinated* in such a manner as altogether to prevent its dilatation. One case is recorded by Dr. Ashwell, in which the os uteri was absent; nor could the first stage proceed, until an artificial opening was made to allow the head to pass. These are, however, very rare cases; a more common effect is the alteration produced in the vagina. Sometimes *a band is found crossing the vagina* and preventing the advance of the head. *The walls of the vagina are occasionally united* for a certain distance, and, again, *a stricture may be formed in the vagina*, just as in the urethra. It is very necessary to make the most careful examination when a case of this kind presents itself, because the extent of the injury done is not always confined to the part which obstructs the head; partial sloughs of the vagina are just as likely to be the result of the previous inflammation, and when these have separated, the portions that have been thus partially destroyed must have been

left extremely thin, and badly calculated to resist any extreme pressure. Thus the vagina may be very easily lacerated if labour is suffered to continue for any great length of time.* When a band is formed in this manner, it may easily be divided by a guarded bistoury, and the obstruction removed; but when a stricture is the cause of difficulty, more care is necessary. The head should be pressed back in the interval of the pains, and the portion of the vagina above the stricture accurately examined; if it be of the usual strength and thickness, or if its density be increased, it is better to allow labour to proceed, in order that the head may gradually dilate the stricture; but if, on the contrary, the vagina be felt unusually thin, it would be extremely dangerous to do so, because the head may force its way through

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* In a very interesting paper on this subject in the Dublin Journal, vol. xxiii., Dr. Doherty states some facts worthy of attention. He mentions one instance of a "slough of the entire inner surface of the vagina. From the vulva to the os uteri, not a point escaped; and to prove how care and attention can prevent ill-consequences, even in such a case as this, I would remark, that the patient who suffered this loss of substance, left the hospital with the passage almost as capacious as before delivery" (p. 67). In another case, where there was occlusion, "There was no *direct* communication between the vagina and uterus; an orifice *below* the occlusion admitted the finger into the cavity of the bladder, into which the os uteri could be felt to project, owing to the destruction of the vesico-vaginal septum also *above* the adhesion." This patient was not pregnant.

The advantage of nauseating doses of tartarised antimony in relaxing a rigid vagina, Dr. D. illustrates by the case of a middle-aged woman, who was admitted into the Dublin Lying-in Hospital in labour of her first child. " On examination, the finger could be passed up the vagina only with the greatest difficulty, and when introduced, felt as if it were surrounded by a cylinder of iron, so thick and hard were the walls of the canal and perinæum. They seemed in truth not to possess the slightest elasticity; so much so, indeed, that I was some time before I could persuade myself that it was not one of those hard, encysted tumours surrounding the rectum that my finger came in contact with. And yet all this rigidity disappeared in less than six hours, under the use of tartar emetic, and the child was expelled without any difficulty " (p. 69).

" While I deprecate the rashness of operating without a well-marked necessity, I would at the same time beg to dwell on the fatal consequences which may ensue from postponing the use of the knife beyond the moment at which it becomes necessary. Every additional instant then adds to the risk of laceration, and of course increases the chance of a lamentable termination to both mother and child; a fact which was forcibly impressed upon me by a case wherein the attendant, while sitting at the bed-side with the scalpel in his hand, delayed employing it, in order to afford another practitioner who was present, an opportunity of examining the part; *meanwhile a strong pain suddenly came on, and the vagina was extensively torn* (p. 72). In a case of face-presentation, a thick band surrounded the upper portion of the vagina. This band was nicked in one or two places, the pains continuing of natural strength and frequency; the face gradually descended, and as it progressed the remainder of the band appeared to relax, and every hope was entertained of a fortunate issue, till about two o'clock, P.M., when rupture took place" (p. 73).

the attenuated portion, and perhaps convert the rectum and vagina into one common cloaca. It would be preferable to divide the stricture in different places, so that it may yield to the head more readily. 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.
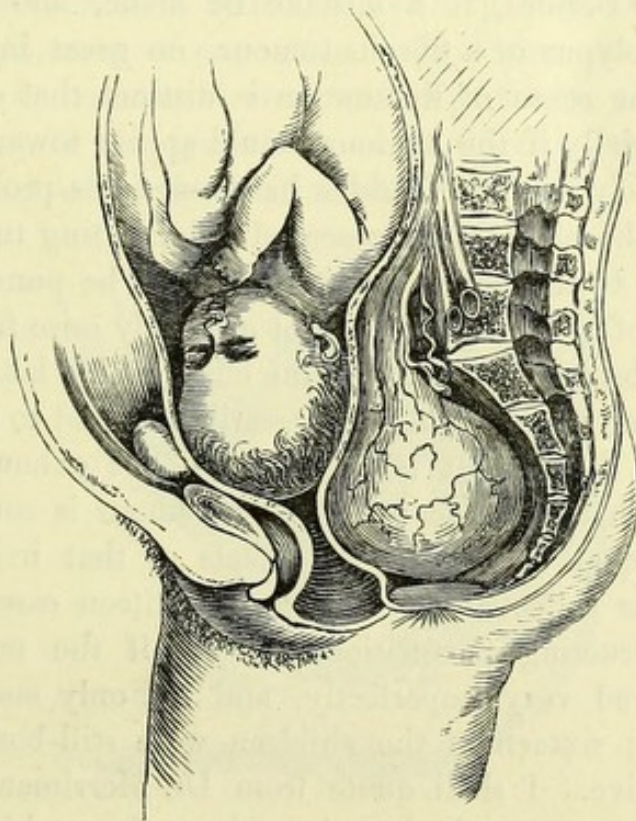
Ovarian Tumour.—Merriman.

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 density, 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. Unless the size be great, it is possible that the head may press the cyst against the sides of the pelvis, and pass below it; a small tumour also may be pushed back towards the brim of the pelvis, when the pains are absent, and perhaps be prevented from again descending when the action of the uterus returns; if by neither of these modes the removal of the obstacle can be accomplished, the only resource left is to puncture the tumour and allow the fluid to escape. This may be done, although there be no distinct sense of fluctuation, because the fluid is often thick, like honey, and may be deep-seated, which will communicate to the fingers an elastic feel rather than that of fluctuation. Besides, if a mistake be made, and you should puncture a polypus or a fibrous tumour, no great injury is done. It is when the sense of fluctuation is distinct that caution is required, especially if the tumour should appear towards the pubic side of the pelvis. The bladder has sometimes prolapsed before the head of the child, and presented a fluctuating tumour. It is not necessary to tell you that this should not be punctured. But 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; 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. Dr. Merriman has collected the history of eighteen cases of ovarian tumours obstructing parturition. One half the mothers died, three recovered very imperfectly, and six only may be said to have escaped; sixteen of the children were still-born, and four were born alive. I shall quote from Dr. Merriman's work the results of these cases as he has given them, from which it appears that the greatest success attended those cases where the tumour was opened:—

" From the enumeration of the cases already referred to, it appears that

" Twice, the labour was effected by the pains, unassisted by the art of the accoucheur ; but one of these women lost her life, and one of the children was still-born.

" Five times, the perforator was used after a longer or shorter duration of labour. Three of these women died, another recovered very imperfectly, and one got well.

" Five times, the labour was terminated by turning the child; all the children were lost, and only one mother recovered.

" Three times, the tumours having been opened, the labour was afterwards trusted to nature. Two of these women recovered, but the other remained for a long time in an ill state of health. Two only of the children were preserved. In three cases, the tumours being opened, it was still found necessary to have recourse to the perforator. One of these women died, one remained in an ill state of health for eighteen months, and then sunk under her sufferings; the third recovered."

Dr. Merriman remarks, " Upon the whole, the evidence we at present possess is more in favour of opening tumours when they contain a fluid, than of any other mode of procedure, for of the nine women who recovered more or less perfectly, *five appear to owe their safety to this operation*, and of the children born alive, two were preserved by the same means."*
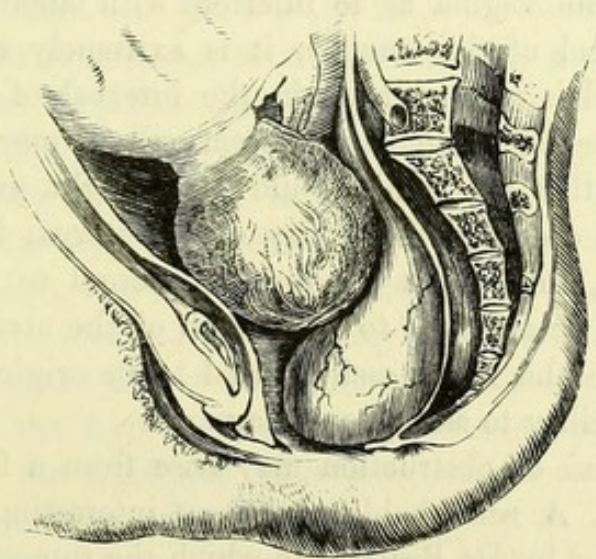
Polypus.—Ramsbotham.

Polypus has been found sometimes to interfere with delivery. An interesting case of this kind is given in Dr. F. Ramsbotham's

* Merriman on Difficult Parturition.

" Midwifery,"* in which the polypus nearly filled the pelvic cavity. However, " the mouth of the womb dilated rapidly, the membranes burst speedily, and in less than an hour after my [Dr. Ramsbotham's] arrival, the head, under the action of powerful throes, forced the principal bulk of the tumour external to the vulva (which still, nevertheless, retained its attachment to the uterus by the stem), and itself instantly followed." † Thus 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 detected early in labour, it might also be in your power to prevent the tumour descending. It might 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.

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 would 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 recognizing 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.

Another cause of obstruction may arise from a fibrous tumour of the uterus. A remarkable and very interesting case of this kind is recorded by Dr. Beatty,‡ in which the tumour was so large

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* Ramsbotham's Principles and Practice, etc., p. 237.
† Op. cit. p. 237-8.
‡ Dublin Medical Journal, vol. xvii. p. 411.

and apparently so attached, as it was thought would 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.
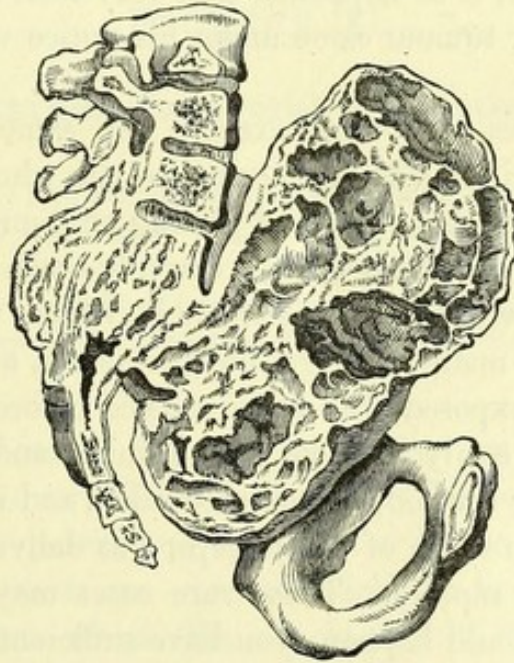
Osteo-sarcoma.

OSTEO-SARCOMA sometimes grows from the sacrum. The bony tumour may be so large as to render delivery *per vias naturales* impossible, and therefore the Cæsarian section must be had recourse to. 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, 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.

Beside these more usual causes of obstruction to delivery, Dr. Drew had detailed, many years ago,* two very remarkable cases of tumours in the pelvis. The first patient, who was not pregnant,

* Edinburgh Medical and Surgical Journal, vol. i. 1805, p. 20.

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 any 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 that very soon after (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. These rare cases may present themselves: if such should happen, you have sufficient encouragement not to despair altogether of giving relief.

We have now concluded the consideration of difficult labours, so far as their causes, symptoms, and general treatment, are concerned. We have directed your attention to cases where the aid of the vectis, the forceps, or the perforator, is called for. It remains to us, therefore, to consider the mode of applying these instruments.

LECTURE XI.

OBSTETRIC OPERATIONS.—THE FORCEPS.

Instruments employed for preserving the Lives of the Mother and the Child—The Vectis—Of limited Application—Mr. Gaitskill's manner of using it—Proposed mode of Operation—Objection to use it as a Lever—The Forceps—Operation with the Short Forceps when the Head is resting on the Perinæum—Operation when the Head is in the Pelvic Cavity—Operation when the Head is fixed in the Brim of the Pelvis.

IN the three preceding lectures, we endeavoured to point out to you the situations at which the head may be impeded in its progress through the pelvis, and the varieties in the degree to which it may be compressed; we were also desirous to place before you the evidence upon which the conclusions therein stated were founded, in reference to disputed questions as to the rule of practice in certain cases of difficult labour. Turning from those controversial subjects, and, leaving the questions when instrumental aid is called for, and what kind of instruments should be employed, your attention must now be directed to an equally important subject—obstetric operations.

The instruments employed in operative midwifery may be arranged into three classes. 1st. 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. 2nd. 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.* 3rd. 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.*

The *vectis* and *forceps* belong to the first class. 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 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 finger 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." *

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

* London Medical Repository, 1823, p. 379—381.

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; but 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 those 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: 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 the 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 sub-pubic 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 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 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 similar to 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." Proceeding thus cautiously, 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.
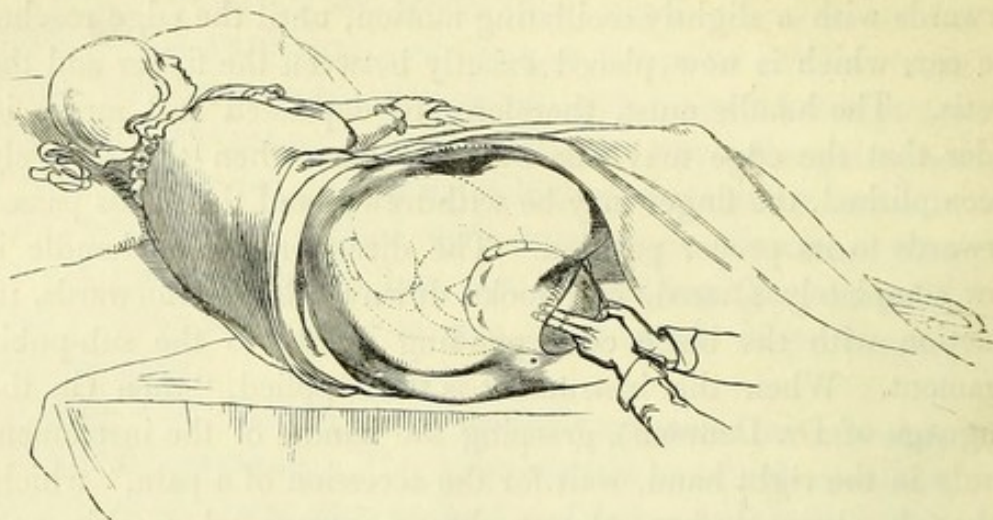
Extraction with Vectis.*

When *the vectis is used to correct mal-positions 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 its introduction; 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 from which the forceps is free, and which should be guarded against. It is necessary to grasp the instrument very firmly, and sometimes 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.

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.

* In these sketches the perinæum, etc., is exposed, to shew the position of the head, which is faintly outlined.

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 description given by authors 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 former operation is therefore sometimes mentioned as a delivery by the long forceps. In speaking of these operations, we would wish to 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*.
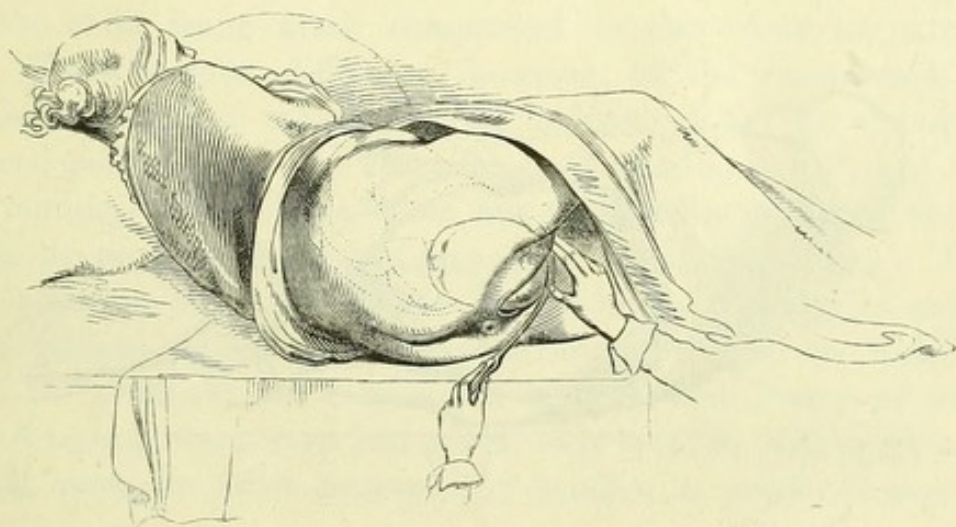
Passing of the Pubic Blade.

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. Having made these previous arrangements, 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 so placed, the handle may be raised towards the pubis, and there maintained by an assistant *in its exact position*. The handle should not be moved to the right or left side, because it is of great importance to observe the precise direction of the pubic blade when 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 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.
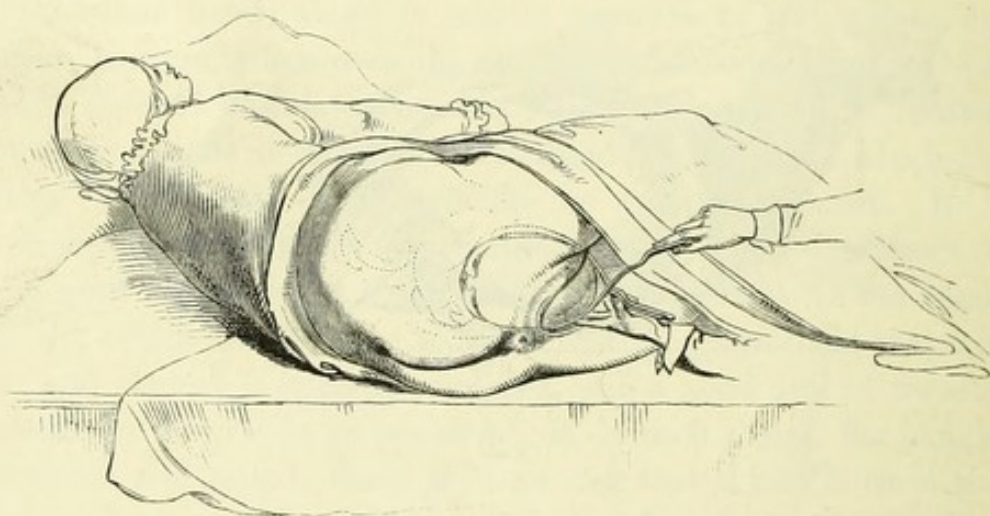
Introduction of Sacral Blade.

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 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 either side, and then upward, 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. For the same reason, it would be advisable to unlock the forceps, and to withdraw the sacral blade, leaving the pubic to be made use of as a vectis. When the perinæum is tightly stretched over the blade of the forceps, passing 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, or 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 child 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* 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† has the fenestræ wide, in order that parietal prominences may pass through them. Dr. Aitken's and Dr. Collins's‡ are very similar in 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 experienced 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, or to apply the forceps, *if the head be slowly advancing*, unless it should happen that dangerous constitutional symptoms are approaching. 2ndly, Not to

* (Vide fig. 3, p. 227.)   † (Vide fig. 5, p. 227.)   ‡ (Vide fig. 4, 6, p. 227.)

apply the forceps *when the head is impacted.* 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, to ascertain that the head is arrested.* Sometimes it ceases to advance, while the tumour on the presenting part increasing, is 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 a diagnostic mark of this distinction; but you should not confine your attention to this point alone, because it sometimes happens 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 the 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 the pains may be strong and frequent, and it is generally a safe recommendation not to interfere so 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 chances 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.   Although agreeing with Dr. F. Ramsbotham in many of the principles of his practice, I find myself opposed to him on this question.   The summary of symptoms which he gives to authorise the use of the forceps, when labour does not continue twenty-four hours, seems to me to be founded upon a principle very hazardous to the safety of the mother.   He states, " If, then, the pains are subsiding gradually, or have entirely disappeared; if the strength is failing, the spirits sinking, the countenance becoming anxious; if the pulse be one hundred and twenty, one hundred and thirty, one hundred and forty, in the minute, the tongue coated with white slime, or dry, brown, and raspy; if there have been two or three rigors; if, on pressing the abdomen, there is great tenderness of the uterus; if there be green discharge; if there be preternatural soreness of the vulva, with heat and tumefaction of the vagina; if the head have been *locked* for four hours, and made no progress for six or eight hours; if the patient be vomiting a dark, coffee-ground-like matter; if there be hurried breathing, delirium, or coldness of the extremities, *then we are warranted in having recourse to the forceps, although the labour have not lasted the limited period of twenty-four hours, or even twelve ;* and we should be acting injudiciously to allow the case to proceed until the last four symptoms appear, without relief being offered."* Dr. F. Ramsbotham enumerates these symptoms, to authorise the delivery of the locked or impacted head—a case in which I have already stated that I do not think the forceps can be at all safely employed; but to apply the instrument when inflammation has advanced to such an extent as to engage the constitution in an irritative fever, and only to deliver before the last four symptoms of exhaustion appear, and that, too, when the head is impacted, seems to me to be dangerous in the extreme.   I am the more anxious, therefore, to impress upon you the importance of not waiting, or withholding your assistance, the moment such symptoms commence; but if, unfortunately, it should happen that they have advanced to the degree so well described by Dr. Ramsbotham, then the

* Ramsbotham's Ob. Med., p.313 and 314.

safety of the mother must be your first consideration, and you should select the operation that will best secure it. With this view, I again repeat, perforation is your only resource, although I admit it to be a very painful alternative. When you have determined upon the necessity for delivery by the forceps, and the time for performing the operation, the same preliminary arrangement should be made as in the former instance, using still greater caution in your antiphlogistic measures. Hence, 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; 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 might be placed loosely round the handles. A steady and powerful traction should be maintained so 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

Plate 1.

Fig. 1. Head in first position
shewing the application
of forceps over the ear on the
pubic side of pelvis.

Fig. 2. Relative position of forceps
and pelvis.
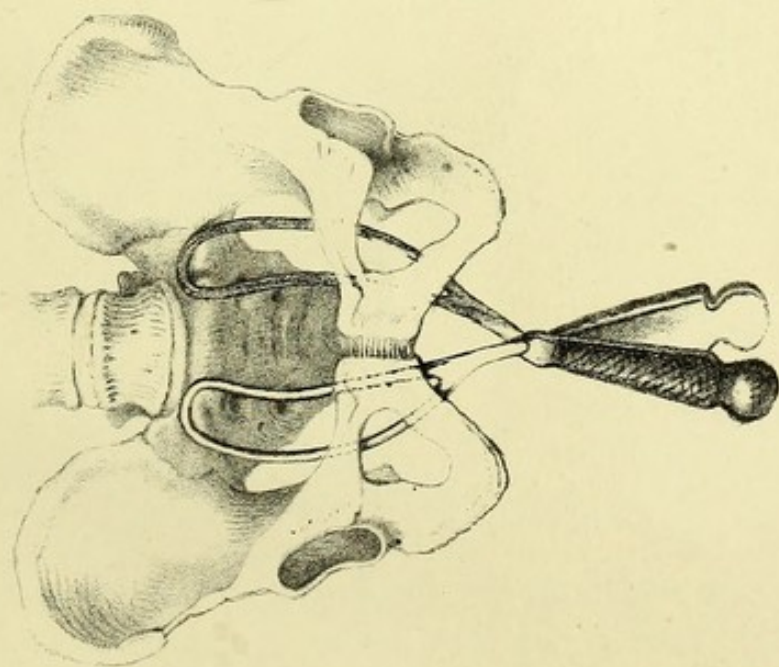
Fig. 1

Fig. 2
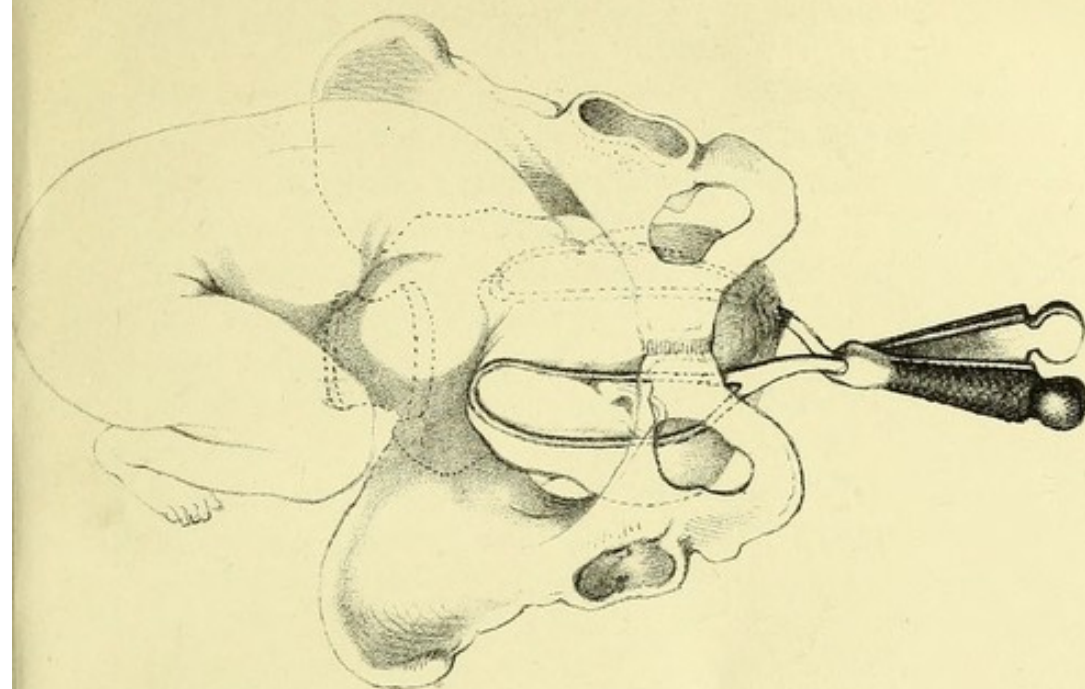
Position of the forceps when applied
over the ear of the child.

H B Tuson, delt. C Fairland, Lith.

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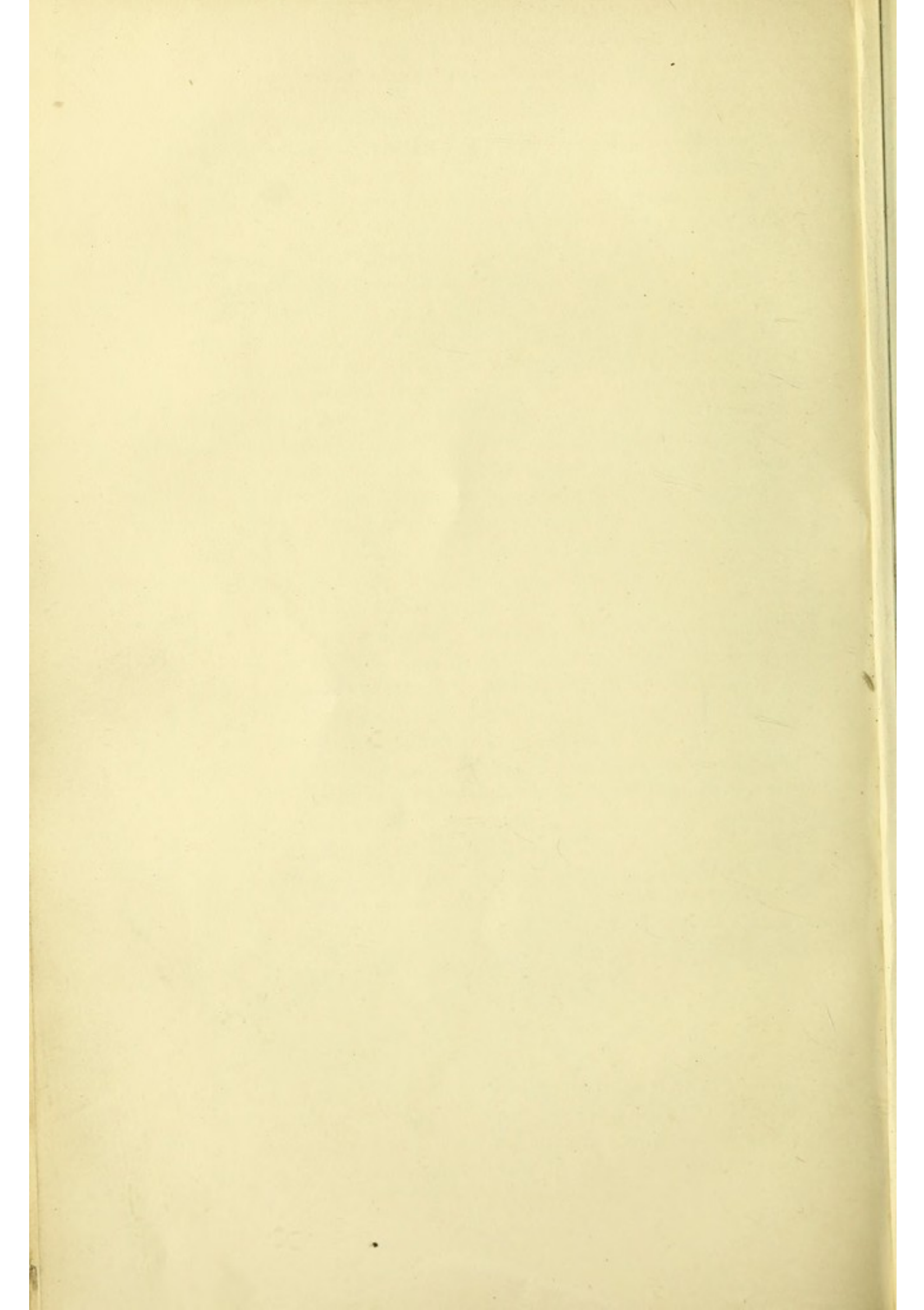
generally succeed in bringing the head through the opposing part of the pelvis, and as it advances more easily and approaches the perinæum, again recollect to leave it as much as possible to the efforts of the uterus. While the head is thus drawn through the pelvic cavity, you should bear in mind the 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 tubera ischii, but when the head is in the hollow of the sacrum, the handles would then be directed forwards towards the pubis. 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.
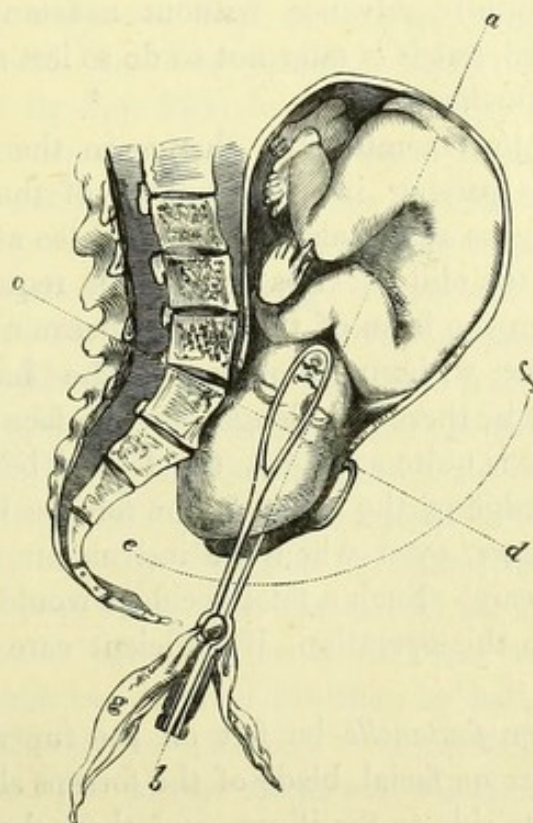
Application of Dr. Radford's forceps when the head is fixed in the brim, etc.

The operation when the head is fixed in the brim of the pelvis differs from either 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 are 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, guiding it 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 might 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 I think justly 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 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 might be crushed by the force employed in extraction. To avoid this, Dr. Davis has contrived a forceps with unequal blades, in such a manner that the curvature of the longer blade could be diminished or increased if necessary. More lately, Dr. Radford, of Manchester (who has had extensive experience in these cases of deformed pelvis), has invented a forceps with unequal blades for the same purpose (vide fig. 12, p. 229). The majority of practitioners, however, employ only one kind of forceps for these two operations, which they call the *long forceps*. Dr. F. Ramsbotham's long forceps (vide fig. 9, p. 229) has a shank between the handles and the blades, and is so curved as to adapt itself to the axis of the brim of the pelvis. Dr. Rigby has introduced Brüninghäusen's long forceps* (vide fig. 10, p. 229), an instrument somewhat longer than Dr. Ramsbotham's, having the second curve describing a larger circle. The lock between the handles also is differently constructed. The late Dr. Hamilton used a forceps about fourteen inches in length, with the second curve describing a smaller circle than that of Dr. Ramsbotham, but it is very clear that Dr. Hamilton never employed it in this operation (vide fig. 13, p. 231). Dr. R. Lee observes, " When Dr. Hamilton was in London, twelve or thirteen years ago, the use of *the long forceps* was one of the subjects of conversation which I had with him; and I was astonished when he informed me that he had entirely, for some time, laid aside the short forceps. On further inquiry, however, it appeared that in *no case did he ever use the long forceps until an ear could be felt*." †

* " The most perfect lock is that of Professor Brüninghäusen of Würzburg, first introduced by ourselves into this country, and commonly known by the instrument-makers as Professor Naegele's forceps."—*Rigby*, p. 137.

† Lee's Theory and Practice of Midwifery.

I believe that Dr. Hamilton was not the only obstetrician who had spoken of and described in very flattering language *these* kind of long forceps operations. Before you venture to undertake such an operation, the utmost care should be taken, in making a vaginal examination, lest you mistake the kind of deformity that prevents the head descending.

I cannot give you a stronger illustration of this, than by quoting the first case of instrumental delivery reported by Dr. Lee, in his Clinical Midwifery:—" On the 28th June, 1823, I (Dr. R. Lee) 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 child. The orifice of the uterus was not fully dilated, and it was very rigid; the vagina 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 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 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 crotchet. Violent inflammation and sloughing of the vagina followed, and about three weeks after delivery, it was ascertained that a large vesico-vaginal fistula existed."*

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

* Lee's Clinical Midwifery, p. 6, 7.

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."*

I 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 will 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 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. 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 pubis*, 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, the forceps may also be applied over the ears, and when traction is made with the instrument, the handles should be directed downwards and backwards towards the perinæum, in order that the chin may the more readily be brought under the arch of the pubis. As soon as this is accomplished, they should be held in the axis of the vagina while the head is passing over the perinæum. In both these varieties, there is great danger of laceration of the perinæum.

* Op. cit. p. 7.

In our description of these different operations, no allusion has been made to the os uteri—we have assumed that it is fully dilated. This is admitted by all practical writers to be essential to any such operation. It is unnecessary, therefore, to dwell upon such a point. 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 be 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 XII.

OBSTETRIC OPERATIONS.

Operations to save the Mother only—Perforation—Importance of Ausculation—
Conditions that authorize Perforation where the Child is alive—Mode of operating
when the Head is fixed in the Brim or impacted in the Cavity—Comparative
Merits of the Crotchet, and the Craniotomy Forceps—Operation when the Head
is above the Brim, or can with difficulty be forced into it—Elizabeth Sherwood's
case—Dr. Davis's Osteotomist—Baudeloque's Cephalo-tribe—Sigaultian Oper-
ation—Cæsarian Section—Induction of Premature Labour.

HAVING described those operations which are calculated to pre-
serve the lives of the mother and the child, we must now turn our
attention to those which are intended to save the mother only.
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 opera-
tion 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 termi-
nate 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, observed the
variations in their character, and find that they have ceased, the
operation may then be performed. But it would be advisable not
to perforate immediately on their cessation, lest you might be

deceived. It is preferable to wait for a short time, if the constitutional symptoms admit of it, and to examine again before you proceed to deliver. The greatest difficulty connected with this operation is *the time* when it must be performed. This is especially the case when the child is alive, and symptoms of inflammation are progressively advancing to a dangerous point. Fortunately these cases are rare; but when they do occur, the practitioner is placed in a dilemma—either he 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 interval 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 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 interval 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. In this train of symptoms, one evidence of danger is, that which shows the inflammation to have extended to the uterus. This might lead to softening of its structure, and consequently to its laceration. When you are satisfied that such is the case, you cannot temporize, the child must be removed. Another evidence is inflammation, increasing in the vagina, which may terminate in slough. This is still more important, if the typhoid character of the accompanying fever, with dry, brown tongue, and very rapid pulse, point out its erysipelatous tendency. In such cases, extensive gangrene very rapidly succeeds inflammation, so that sometimes the whole mucous membrane of the vagina has sloughed away.* Large portions, also, of the anterior or posterior walls of the vagina have been completely detached, and frightful openings made between the bladder, vagina, and rectum. To delay or vacillate, with such a risk before you, would be worse than dangerous: it would be criminal. Any such symptoms would fully authorise this operation, although the child be living. The same rule applies to cases of exhaustion.

With these observations, we shall proceed to demonstrate the manner of performing perforation. 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 pubis before operating; sometimes the neck and fundus of the bladder are so compressed between the head and the pubis, that if a short catheter be used, the urine is only removed from the lower segment, while the principal portion remains above. When this is the case, the head should be pressed back as much as possible, and

* Dr. Doherty on Adhesions of the Vagina, Dub. Journ., vol. xxi. p. 66.

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.

Having secured these essential points, 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 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 embraces 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 required in doing so. The first two fingers of the left hand should rest on the stops of the instrument, to prevent the perforator 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 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, 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

* 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.

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 get it introduced. 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 perforate, but chiefly to prevent it 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 the lowest part of the presentation.

We have thought it necessary to detail to you 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. You will find 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 like 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 is 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 instru-ment; 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, there-fore, seem to be such as to make it supersede the use of the crotchet. Nevertheless, some of the most experienced prac-titioners 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, it tears away just so much of the bone as was broken, and leaves the head behind. This is especially the case when the child has been dead for some time, and putrescency has commenced. Thus the pre-senting 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 difficulty in applying the crotchet after-wards, and there is some danger lest the spiculæ of bone broken by the forceps should tear the passages: a lacerated wound of this kind may give rise to 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 resist-ance be great. These observations on the comparative merits of the crotchet and craniotomy forceps give you the result of my

own experience in the use of these instruments. The objections stated have also occurred to other practitioners, in whose judgment I have the highest confidence, and therefore I feel the more certainty in their truth. Nevertheless, I should not wish you to infer that the craniotomy-forceps is either a 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 their application, but that in the majority of instances in which these kind of difficulties require the aid of instrumental assistance, it is safer to employ the crotchet.

In the description we have given of perforation, your attention has been directed to the operation *when the head of the child has either entered or passed through the brim of the pelvis*, and has there 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 advocates of the Cæsarian section claim for it the advantage that there is at least a chance of preserving the child, while the risk to the parent can hardly be greater, and therefore they condemn any attempt to perforate under such circumstances.

Time would not permit us to enter into the discussion of these questions. 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 sprung up in the discus-

sion of a very remarkable case that occurred in the practice of Dr. Osborne—the case of Elizabeth Sherwood, a cast of whose pelvis is before you. 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 vertebræ, 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."* Such was the pelvis through which
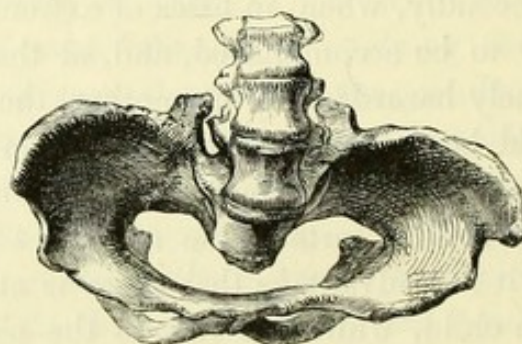
Ovate Pelvis of Elizabeth Sherwood.

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:

* Osborne's Essays, p. 242.

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 scarce 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 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

* Op. cit. p. 247.

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 impossible 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, most 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."[*]

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 such an operation. It is not surprising, 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.
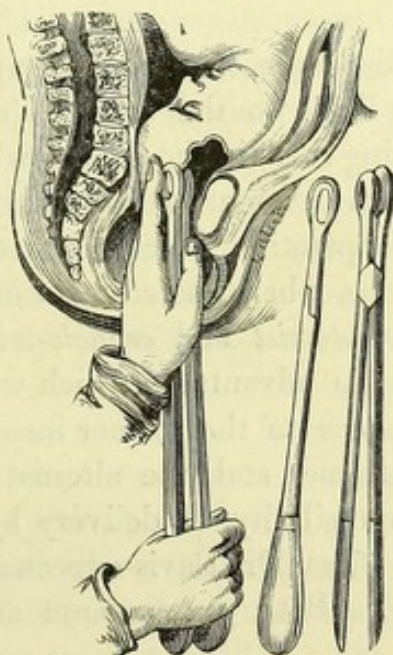
Dr. Davis's Osteotomist.

Dr. D. Davis contrived several instruments to meet the difficulty of these cases—one was the *osteotomist*, a strong bone

* Op. cit. p. 255.

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 which Dr. Osborne was obliged to have recourse to in drawing the cranium through the brim of the pelvis.*

Dr. Davis also contrived a double crotchet, for the purpose of extracting the body of the child, after the head, in this muti-lated state, has been brought through the pelvis, and thus he anticipated that the osteotomist would " enable skilful operators to effect deliveries in cases of moderate distortions with much more facility to themselves, and proportionally less danger to their patients, than heretofore, but it will also have the effect of re-ducing almost to zero, the necessity of having recourse to that last extremity of our art, and the forlorn hope of the unhappy patient —the Cæsarian operation."†

M. Baudeloque, jun., also, has invented an instrument for a similar purpose to the osteotomist, to break up the head, not by cutting it away, but by crushing it together. *The cephalo-tribe* 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 (vide fig. 22, p. 233).

Both these operations are intended to supersede the Cæsarian section, and both are liable to the same objection—viz., the ex-treme 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 cephalo-tribe. In moderate distortions, where the crotchet or craniotomy-forceps may be used, the *osteotomist* and *cephalo-tribe* are unnecessary, because they possess no advantages which would lead us to em-ploy 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

* Dr. Campbell has invented an instrument—the *kephalepsalis*—for a similar purpose as Dr. Davis's *osteotomist*.

† Dr. Davis's Obstetric Medicine, p. 857.

experience must decide the question, but *primâ facie* evidence seems against them. Look at the cephalo-tribe, 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 mal-adroit 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 realized.

Long before these instruments were invented, another 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.

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 hope-less, the child must, if possible, be saved. *The Cæsarian sec-tion* is therefore indicated in those 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 opening the uterus, you are then authorized to undertake the operation, because, if there be a probability that perforation will not ensure safety to the mother, you are certainly bound to consider the child, and to give it a reasonable chance for its life. If, for instance, the ratio of mortality from hysterotomy as compared with craniotomy, in these extreme cases, were equal, or as four to three, this slight difference would not, it appears to me, be sufficient to justify you in destroying the child. Taking this view of the operation, it would be desirable to ascertain by statistical results its precise value, because no estimate of the operation can be formed from individual cases. It is difficult, however, to do so from reports, unless a careful attention is given to the circumstances under which the operation was performed. For instance, the results of the operation in Great Britain and on the Continent differ exceedingly. In the former, more than three-fourths of the patients died, and more than one-half the children were lost. In the latter, the mortality of the mother was much less, and more children were saved. But in Great Britain the operation was performed, as a *dernier ressort*, after the patient had been several days in labour, and under the most unfavourable circumstances, while on the Continent, it was generally undertaken in the first instance. The errors on the one side arose from unne-cessary hesitation and delay, and I fear we must add that, on the other, there have been also some mistakes from precipitancy, and some needless operations performed.

Dr. Churchill has given the results of 409 cases of Cæsarian section :—

1st. Among British practitioners, in 40 cases, 11 mothers re-covered, and 29 died, or nearly 3-4ths.

2nd. Out of 37 cases where the result to the child is mentioned, 22 were saved, and 15 were lost, or 1 in 2½.*

3rd. Among Continental practitioners, out of 369 cases, 217 mothers recovered, and 152 died, or about 1 in 2½.

4th. Out of 187 cases where the result to the child is given, 138 were saved, and 49 were lost, or nearly 1 in 4.

5th. Taking the entire number, which amounts to 409, we find that 228 mothers were saved, and 181 were lost, or about 1 in 2½; and that out of 224 children, 160 were saved, and 64 lost, or 1 in 3½.

More lately, Keyser, of Copenhagen, has applied himself to the same question; he has carefully examined and checked the accuracy of previous statistical researches on the Continent, and has arrived at a result differing slightly from that of Dr. Churchill. 338 cases are collected, of which 128 proved successful, and 210 unsuccessful. The mortality of the mother is, therefore, 0·62. The same data give 0·31 as the mortality of the children. Keyser has taken great pains to classify the cases according to the different circumstances under which the operations were performed, and has thus ascertained a remarkable fact respecting the degree of contraction in the pelvis:—" *The mortality was less in those cases in which it was extreme than in those in which it was more limited.* It was 0·47 in cases which were 1½ (French) inches and less than this, and 0·66 in cases which were 1¾ and more than that measurement."† These latter cases are those in which we have stated that the operation is called for, and therefore, in the Continental practice, where it is performed under the most favourable circumstances, we may assume the mortality to the mother to be about 1 in 2, to the child 1 in 3. I do not think any fair conclusion can be drawn from British practice, because there were so many causes in operation against its success; neither can we ascertain the proportionate mortality where perforation is performed in these extreme distortions. We cannot, therefore, derive any rigid conclusion from a comparison of the results of both operations. But if the circumstances of the case be such that the risk to the patient is increased much beyond ordinary perforation, I do not think we should venture upon that operation in preference to the Cæsarian section. In the former

* Churchill's Operative Midwifery, p. 221.
† London and Edinburgh Monthly Journal, No. LV., p. 542.

case, the child must be sacrificed for a very doubtful advantage. In the latter, there is every reasonable chance of preserving the child, while the mother has at least an equal chance that she will recover. For these reasons we are not disposed to look upon the Cæsarian section with that horror with which some practitioners view it; nevertheless, the serious nature of the operation should be strongly impressed upon your minds, and every caution made use of that is required in capital operations. The strictest antiphlogistic measures should be previously used, to prevent inflammation, and the same means as to temperature, etc., adopted, that have been found so useful in those ovarian operations which have lately occupied public attention. The most essential point, perhaps, to attend to is, *the time* at which the operation is undertaken. It would be advisable to allow some time to elapse after labour commences, to satisfy yourself that the head cannot enter the brim of the pelvis, and thus to confirm your previous diagnosis. At the same time, it would be highly improper to allow labour to proceed to such a length as to hazard either inflammation, exhaustion, or the death of the child. It is for this reason that the operation has so often failed in British practice. In this respect, each case must be considered separately; but you may take it as a rule, admitting of many exceptions, that having previously ascertained, by examination *per vaginam*, the extreme distortion of the pelvis, if after the first twenty-four hours the head does not enter the brim, the operation may be performed. We have Keyser's evidence on this point, also, to prove that such delay would not be injurious to the patient:—" Regarding the time which intervened from the commencement of labour, M. Keyser divides his tables into three categories. In the first, the operation had been performed within the first twenty-four hours; in the second, in the interval between the twenty-fifth and seventy-second hour; in the third, more than seventy-two hours after the commencement of labour. In the first category, the mortality of the mothers was 0·67, that of the infant, 0·28. In the second, the result was respectively 0·55 and 0·33, and in the third, the mortality amounted to 0·72 and 0·60."* From these tables it appears that the middle period, between twenty-four and seventy-two hours, was less fatal to the mother. An operation of so grave a nature should never be undertaken without the aid and assist-

* London and Edinburgh Monthly Journal, p. 542.

ance of at least two professional men of reputation, if it be at all practicable to have their support.

The mode of operating we shall briefly explain. The rectum and bladder must be carefully emptied; the position of the placenta 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 above the umbilicus and terminating about two inches above the pubis; the uterus is thus exposed, and the peritoneum along with it. An assistant should press with both hands firmly on the uterus, at either side of the wound, while the uterus is being divided. This must be done by cautious incisions, in the direction of the external 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 previous 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:—

1st. The shock to the constitution, under which the patient may sink;

2nd. The hæmorrhage which may result from the operation; and

3rd. 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.

If we have pointed out to you with sufficient clearness the different obstetric operations, the degrees of disproportion to which they are applicable, from the slightest to the most extreme, —from simple delivery by the vectis to the Cæsarian section,—if we have succeeded in defining the limits of each operation, we would now direct your attention to a means of obviating the necessity for those operations that involve the sacrifice of the child.

In cases of contracted pelvis, which prevent the passage of the full-grown child, if labour should take place at the seventh in place of the ninth month, you can readily perceive the possibility of the child (then much smaller) being safely delivered. The child is quite capable of supporting respiration at that period; therefore it has been proposed—and the practice is now very generally adopted—*to induce labour to take place* at the seventh month, when we are satisfied that a living child cannot be born at the ninth month.

The induction of premature labour is one of the greatest improvements in modern practice, because by its means the leading principle of obstetric operations may be carried out, and both mother and child preserved, in cases in which otherwise we could hardly hope for such a result. We shall not occupy your time with by-gone discussions on the propriety of prematurely forcing labour; it is sufficient to say, that its propriety—nay, its necessity —is admitted in the cases which we have described to you, and the only point to be determined, is the case in which the operation is required. We must recollect that, independently of other objections, we have a strong reason for not inducing premature action of the uterus if it can be avoided. The uterus is not prepared for such a change: the cervix is still unfolded, the connexion between the uterus and the placenta is more intimate, the circulation in the uterus less easily diverted into other channels; consequently, you expose your patient to greater risk than at the conclusion of pregnancy, and this you would not be justified in doing without a sufficiently powerful motive. The safety of the child is your justification; but you must have clear proof that it is in danger. You cannot trust to an examination of the pelvis only, because, unless distortion is great, it would be premature to say that the

child cannot be delivered. The most certain evidence is the result of previous labours, and in the diseased pelvis you have generally sufficient proof of its necessity. Perforation may have been performed in the previous labour; or with every successive labour the contraction of the pelvis may have increased, so as to render the last more difficult than that which preceded it. If, in such a case, the previous delivery were completed with much difficulty by the forceps, you may fairly assume that the next will require perforation. Thus, you will generally have sufficient evidence to guide you in these cases; but remember the induction of labour is not suitable in first pregnancies.

Different modes of exciting the action of the uterus have been proposed:—1st. *By direct irritation*, as frictions over this organ, artificial dilatation of the os uteri with the fingers, or by the introduction of a sponge tent; 2nd. *By the specific action of ergot of rye;* 3rd, and lastly, *By deranging the connexion between the uterus and the ovum*, either by detaching the membranes from the sides of the uterus, or puncturing the membranes and allowing the liquor amnii to escape. Of these means the last is the most certain, but, at the same time, one which it would be preferable to avoid if other means were efficient for the purpose, because the liquor amnii would ensure a more favourable dilatation of the uterus, and the child be more secure. Ergot of rye is unsafe, because of the child, the preservation of which is your only motive for interfering; therefore, artificial dilatation by a sponge tent may be first tried, and if it fail, the membranes may be ruptured with a stilette. The action of the uterus sometimes commences immediately, but it may not begin for twenty-four or forty-eight hours after the operation.

LECTURE XIII.

OBSTETRIC INSTRUMENTS.

THE VECTIS: History of—Invented by Roonhuysen, De Bruyn—Secret purchased
by Visscher, and Van de Poll—Denman, Bland, Aitken, Lowder, Gaitskill.—
THE FORCEPS: Invented by Dr. Paul Chamberlen, and used extensively by him
and his Sons, Hugh and Peter—Forceps contrived by Giffard, Chapman, Gregoire
—Smellie's Improved Forceps, the Parent of those at present used—Varieties in
the Construction of different Forceps—Objects intended by them—Difference in
the Principle adopted—Dr. Davis's Forceps, Dr. Denman's, Dr. Beatty's, Dr.
Ziegler's. — THE PERFORATOR: Smellie's Scissors, Denman's, Naegele's —
Holmes's Perforators—Crotchet—Craniotomy Forceps—Conclusion.

FROM the details of those instrumental deliveries, we wish now to
draw your attention to the instruments themselves, and, giving
you briefly their history, to point out the alterations and improve-
ments which have been made in them. First, we shall speak of
the vectis and *the 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 opera-
tion was known or practised but 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 was 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 this manual operation [the forceps] a labour may be dispatched (in the least difficulty) with fewer pains, and sooner"—than nature could—" to the great advantage, and without danger, both of woman and child."*￼ 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.

* Churchill's Operative Midwifery, p.74.

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."*

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 inches. The weight of the vectis is 6½ ounces. The handle is fixed in wood."† 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

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* Churchill, p. 87.   † Denman's Introduction, p. 286.

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."[*]
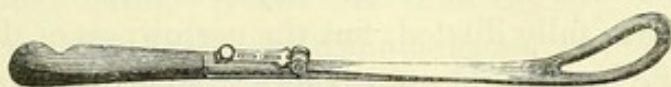
Lowder's vectis, with hinge handle.

Gaitskill's vectis (handle screwed on).

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.

[*] London Medical Repository, pp. 823, 80, 81.

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 transpired 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 women 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, had 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 after 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."*   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 quoted does not, however, prove any great skill on either side. Chamberlen may have killed the patient by his violence in using the forceps, but Mauriceau left her for eight days in labour, and, for all that we are informed to the contrary, would have allowed her to die without relief. The case, however, 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. Johnston, 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 which he had used from the year 1726, stating it to be the instrument used by the Chamberlens, but without stating whence he procured it"† (vide fig. 7, p. 229). 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 was discovered by mere accident many years afterwards. It happened in this manner, as described by Mr. Causardine. The estate of Woodham Mortimer Hall, near Malden, was purchased by Dr. Peter Chamberlen, some time previous 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

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* Mauriceau, vol. ii., pp. 23, 24; Lee's Lectures, p. 291.
† Churchill's Op. Mid. p. 112.

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. Causardine'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. This 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, 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 "[*] (vide fig. 1. p. 227).

The instruments here described were altogether different from those afterwards brought forward by Chapman and Giffard, 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, 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,

[*] Med. Chir. Trans. vol. ix. p. 183.

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 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 figure of 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.* He first proposed the present mode of locking the forceps,† and also had the handles made of wood in place of iron (vide fig. 2, p. 227). These alterations have not been followed in 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 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 out to you 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, $4\frac{1}{2}$ for the handles, $6\frac{1}{2}$ for the blades. Those intended for the high operation

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* Smellie's Midwifery, vol. i., p. 250—252.
† Dr. Rigby attributes the introduction of the lock to Chapman.

exceed this. The late Dr. Hamilton's forceps (vide fig. 13, p. 231) was 13½ inches in length; Brüninghausen's, introduced by Dr. Rigby, 13 inches (vide fig. 10, p. 229); Dr. Radford's long forceps, 13¼ inches (vide fig. 12, p. 229). 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 those practitioners who object to use this instrument for the purpose of shortening a labour which may be much prolonged. Aitken's short forceps (vide fig. 4, p. 227), Dr. Collins' (vide fig. 6, p. 227), and Denman's (vide fig. 3, p. 227), 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; 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 about 6½ inches; Haighton's long forceps, 8 inches in length (vide fig. 8, p. 229). 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. Johnston, Osborne, Haighton, Hamilton, Rigby, Ramsbotham, 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 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 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 pivot, the other a notch which fits into it.
The late Dr. Beatty contrived a forceps with a transverse opening in
the shank of one blade, through which the other passed (vide fig. 16,
p. 231). Dr. Ziegler of Edinburgh has proposed another modifi-
cation of the instrument, which I am 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 which is first introduced,
and thus serves as a guide to the second.
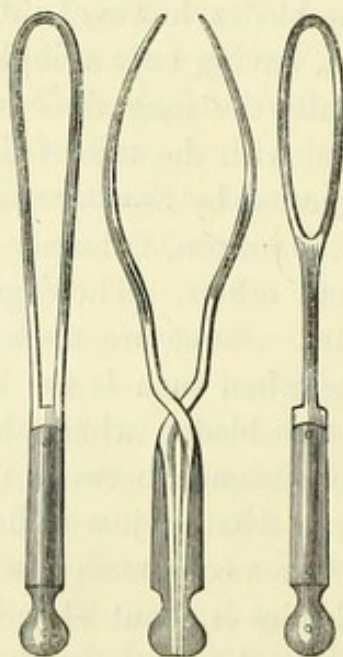
Dr. Ziegler's Forceps.

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 construction 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
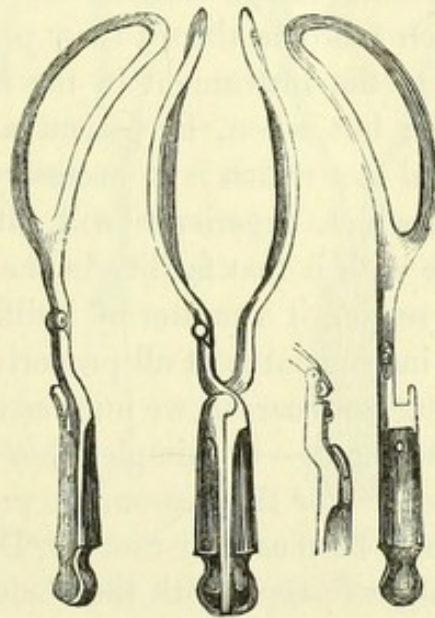
Dr. Davis's Forceps.

forceps which you may take 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 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 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 pubis, and you wish to pass one blade over it, the fenestræ are too wide to allow it to pass behind the pubis; the blade must first be passed along the plane of the ischium, and then brought gradually round to the ear at the pubis; 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 me 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 me one founded much more on theory than practice. These objections only apply to the instrument in the hands of the inexperienced accoucheur; but when, by patient attention, you have acquired that practical tact which is so 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 matter 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 I have found to be the best, and one

which I am 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.* This instrument is well calculated for that operation which I 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.
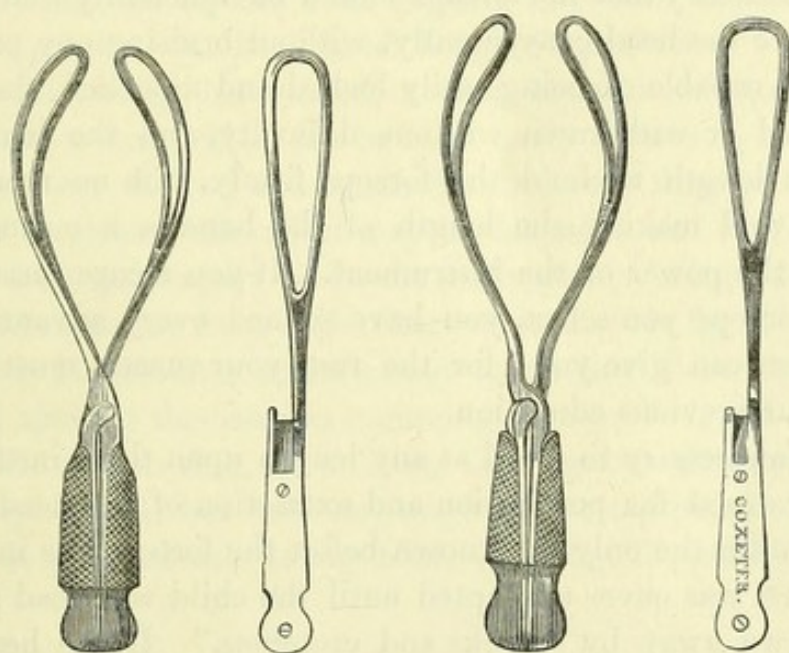
Beatty's Forceps.   Beatty's Forceps modified.

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 (vide fig. 6, p. 227). 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 (vide fig. 12, p. 229). In giving you this account of an instrument of so much importance as the forceps, we wish to

* These measurements are those given by Dr. Beatty, in the Dublin Journal, but the instrument which is in my possession, and which I 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 and an eighth. To this instrument I 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.

avoid leading you into what seems to us a great error—viz., a belief 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.

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.

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 a scissors with a short cutting edge on the outside, terminating in a blunt stop (vide fig. 19, p. 233).   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, and made the

internal cutting edge a flat surface. Thus Smellie's *scissors* became Denman's *perforator* (vide fig. 21, p. 233).

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, 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 (vide fig. 20, p. 233). 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 only to one blade (vide fig. 23, p. 233).

Crotchet, having the correct curve.

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 of the instrument properly curved, and not, as is often the case, made quite straight, which is only suitable for that extreme operation which we have described in Elizabeth Sherwood's case, and which you should not attempt. Very lately, Dr. Churchill has introduced some improvements in this instrument (vide fig. 25, p. 233). 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.
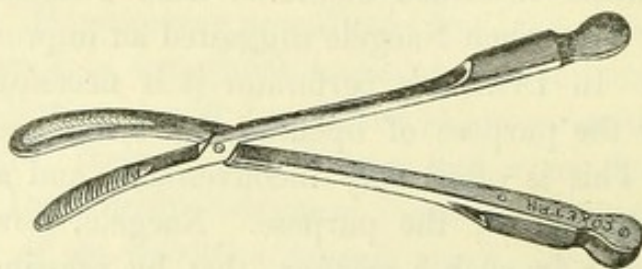
Craniotomy Forceps.

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 with rough lines, which correspond with grooves in the opposite blade, and the bone being held between them can hardly slip from their grasp.

I must now bring to a conclusion this very difficult subject—the management of difficult labours; one which I always feel a reluctance to enter upon, because I cannot go through it without coming into collision with some opposing opinions. In the principles I have laid down I have wished to avoid dogmatism, and have endeavoured to place before you, as impartially as was in my power, the facts upon which the reasoning that led me to them is founded. I think you will find them to be correct, and the safest for you to adopt, when you enter upon practice; but if hereafter, when your experience and manual skill are improved, you find that you can venture on a bolder course than what I have advised, I shall only be too happy to receive the benefit of that experience, and, in return, to be taught by you.

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

Recollect, however, that you must be cautious how you venture upon "a meddlesome midwifery," and *that there are no circumstances to justify violence in performing an operation.*

MEASUREMENTS OF FORCEPS [a]

WHICH HAVE BEEN CHIEFLY USED IN BRITISH PRACTICE.

NAME.	LENGTH — Whole.	LENGTH — Blade, Along curve.	LENGTH — Blade, Direct.	LENGTH — Of handle.	BREADTH — Greatest between blades.	BREADTH — Between points.	BREADTH — Of blade.	Length of shank.	Second curve.	AUTHORITY.
Chamberlen's forceps	11	$7\frac12$	$6\frac34$	$4\frac12$	$2\frac{11}{12}$	1	$1\frac12$	0	0	Measured from the original [b] } vide fig. 1.
Giffard's do.	$12\frac12$	$7\frac14$	$6\frac23$	$5\frac14$	$2\frac13$	2	$1\frac34$	—	—	Mulder
Chapman's do.	15	$9\frac34$	9	$5\frac14$	$2\frac13$	0	$1\frac23$	—	—	Do. vide fig. 7.
Smellie's short do.	$11\frac12$	$6\frac12$	6	$5\frac12$	2	0	$1\frac16$	—	—	Do. vide fig. 2.
Do. long do.	$12\frac12$	$7\frac14$	7	$4\frac34$	2	0	$1\frac13$	—	2d c.	Do.
Pugh's short do.	11	$7\frac14$	7	$3\frac34$	$2\frac12$	$\frac16$	1	—	2d c.	Do.
Do. long do.	14	$8\frac38$	$7\frac14$	$5\frac14$	$2\frac12$	$\frac14$	$1\frac13$	—	2d c.	Do.
Johnston's do.	11	$6\frac23$	6	$4\frac14$	$2\frac12$	0	$1\frac16$	—	2d c.	Do.
Lowder's do.	$11\frac13$	$6\frac12$	6	$4\frac56$	$2\frac23$	$\frac23$	$1\frac12$ [c]	—	2d c.	Do.
Osborne's do.	$11\frac14$	$6\frac34$	6	$4\frac12$	$2\frac34$	$\frac1{12}$	$1\frac13$	—	0	Do.
Denman's do.	$10\frac34$	$6\frac7{12}$	$6\frac12$	$4\frac16$	$2\frac5{12}$	$\frac16$	$1\frac5{12}$	—	—	Do.
Do. do.	10	7	$6\frac12$	$3\frac12$	$2\frac5{12}$	$\frac18$	$1\frac5{12}$	—	—	Do.
Do. do.	$11\frac34$	0	7	$4\frac38$	$2\frac78$	1	$1\frac34$	—	—	Measured, [d] vide fig. 3.
Haighton's do.	$13\frac12$	0	8 [f]	$5\frac12$	$2\frac78$	$\frac78$	$2\frac14$	$3\frac38$	—	Ramsbotham [e]
Hopkins' do.	12	8	$5\frac12$	5	$2\frac12$	$\frac34$	$2\frac14$	$1\frac12$ [h]	2d c.	Radford, [g] vide fig. 8.
Hamilton's do.	$13\frac18$	0	$7\frac58$	$5\frac12$ [i]	$2\frac5{12}$	—	—	—	2d c.	Measured, vide fig. 18.
Aitken's do.	$10\frac12$	0	$6\frac12$	4 [k]	3	$1\frac{11}{12}$	$1\frac5{12}$	—	2d c.	Radford, vide fig. 13.
Davis's do.	$11\frac12$	0	$6\frac12$	$4\frac12$	$2\frac58$	0	$2\frac1{11}$	$1\frac38$	0	Measured, vide fig. 4.
Conquest's short do.	11	$7\frac12$	6	4 [m]	$2\frac8{12}$	$\frac{10}{12}$	$1\frac{10}{12}$	1 [m]	2d c.	Davis, vide page 219.
Do. long do.	$14\frac12$	0	$6\frac12$	6 [n]	$2\frac12$	1	2	2	0	Measured, vide fig. 5.
Ramsbotham's long do. [o]	$12\frac34$	0	$8\frac12$	$4\frac14$	$2\frac78$	1	0	$1\frac12$	—	Radford
Brüninghausen's do.	13	8	7	6	$2\frac{10}{12}$	$\frac7{12}$	$1\frac34$	—	2d c.	Ramsbotham, vide fig. 9.
Beatty's, W. (late) do.	11	$7\frac16$	$6\frac12$	4	$2\frac{10}{12}$	$\frac{10}{12}$	$1\frac5{12}$	$\frac1{12}$ [p]	2d c.	Measured, vide fig. 10.
Beatty's, T. do.	$12\frac12$	0	8	$4\frac12$	3	$1\frac18$	$1\frac38$	—	0	Do. vide fig. 16.
Do. with shank do.	$12\frac12$	0	$6\frac12$	$4\frac12$	3	$1\frac18$ [q]	$1\frac38$	$1\frac12$	0	Beatty, Measured } vide p. 221.
Churchill's do.	12	8	$7\frac12$	$4\frac12$	$2\frac78$	1	$1\frac5{12}$	—	—	Do.
Collins' do.	10	0	$5\frac12$	$4\frac12$	$2\frac78$	$1\frac14$	$1\frac56$	—	—	Collins, vide fig. 6.
Ziegler's do.	$12\frac12$	0	5	$4\frac12$	$2\frac68$	1	$1\frac48$	3	—	Ziegler, vide p. 218.
Radford's long do. [r]	$13\frac34$	0	$10\frac38$ [s]	3	$2\frac68$	0	$2\frac34$	$3\frac12$	—	Radford, vide fig. 12.
Do. the short blade	13	0	10	3	$2\frac68$	0	$2\frac34$	$3\frac12$	0	Do.
J. Y. Simpson's forceps [t]	13	$6\frac3{12}$	6	5	$2\frac{10}{12}$	$1\frac2{12}$	$1\frac{10}{12}$	2	2d c.	Measured, vide fig. 14.

[a] The measurements of these forceps have been taken either from the authorities stated, or from actual measurement, viz., 1. The whole length of the instrument, taken in a direct line from the extremity of the handle to the end of the blade. 2. The length of blade along the curve 3. The length of the blade in a direct line, from lock to point. 4. Length of handle. 5. The greatest space between the blades. 6. The same between the points. 7. The breadth of the single blade. 8. The length of the shank.

[b] This forceps seems to have been the last and the most improved of four made by Chamberlen

[c] Greatest breadth of blade near the lock.

[e] Ramsbotham, Principles, etc., p. 288.   [d] From one in my possession.

[g] Radford's Essays " On the Long Forceps," p. 3.   [f] Length of blade includes the shank.

The handle attached to one blade by a hinge-joint.   [h] Shank forms a ring.

[k] A moveable roller is placed between the handles.

[i] Fenestræ very wide.

One handle screwed on to the blade.   [m] The shank twisted.

There is a transverse opening in the shank, through which the opposite blade passes.   [o] Introduced and used by Dr. Rigby. A pivot lock.

The measurement is here given in one-eighth fractions, to correspond with Dr. Beatty's.

The blades being unequal, the measurement of each is given. The locks are reversed.

The measure of the blade includes the shank, which forms a ring.

Knees above joint to prevent unlocking; joint loose to allow lateral motion.

Fig. 1.

The most improved of five instruments made by Chamberlen, copied from the original.

Fig. 2.

Smellie's forceps covered with leather.

Fig. 3.

Denman's forceps, copied from a fac simile of one in possession of the Dublin Lying-in Hospital.

Fig. 4.

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. 5.

Conquest's forceps, with wide fenestræ. The shanks twisted.

Fig. 6.

Collins' forceps, blades straight.
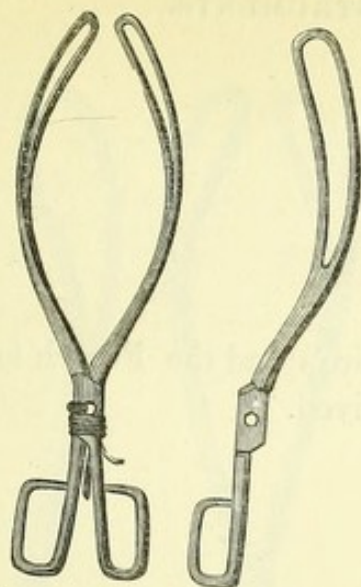
Fig. 1.—Chamberlen's Forceps.
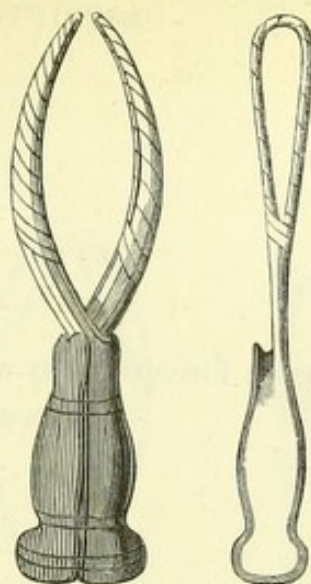
Fig. 2.—Smellie's Forceps.
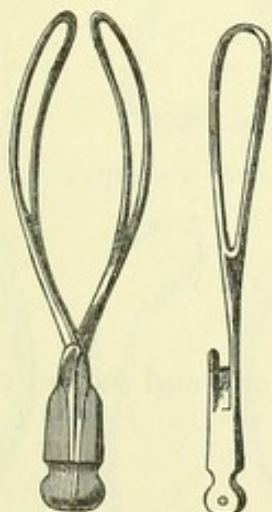
Fig. 3.—Denman's Forceps.
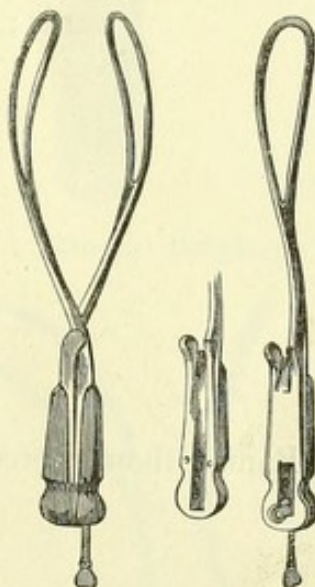
Fig. 4.—Aitken's Forceps.
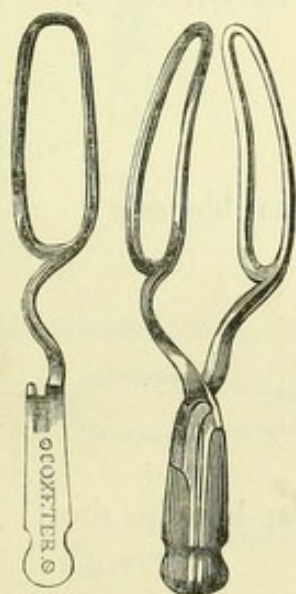
Fig. 5.—Conquest's Forceps.
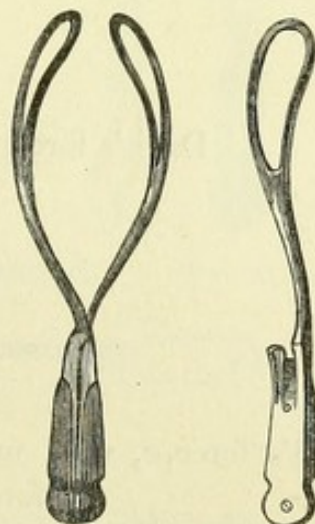
Fig. 6.—Collins' Forceps.

FIG. 7.

Chapman's forceps, from which Gregoire's and the French forceps
seem to be derived.

FIG. 8.

Haighton's forceps; blades very light and slightly curved back-
wards; handles long.

FIG. 9.

Dr. F. Ramsbotham's forceps, with shank and second curve.

FIG. 10.

Brüninghausen's forceps, used by Dr. Rigby.

FIG. 11.

Davis's forceps, with unequal blades.

FIG. 12.

Radford's forceps, with unequal blades; handles short; shank
forms a ring.
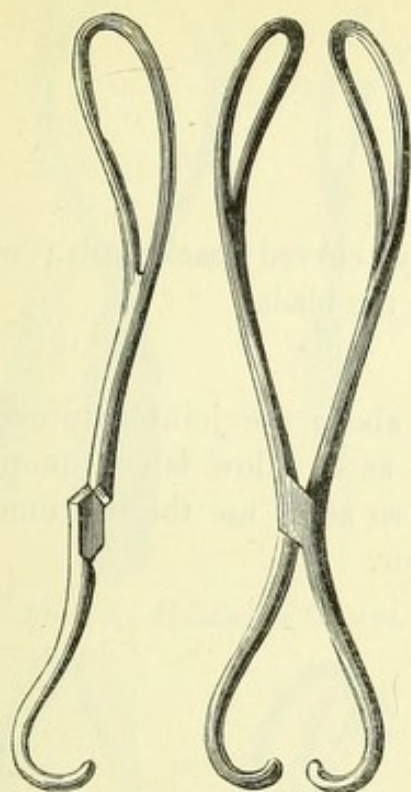
Fig. 7.—Chapman's Forceps.
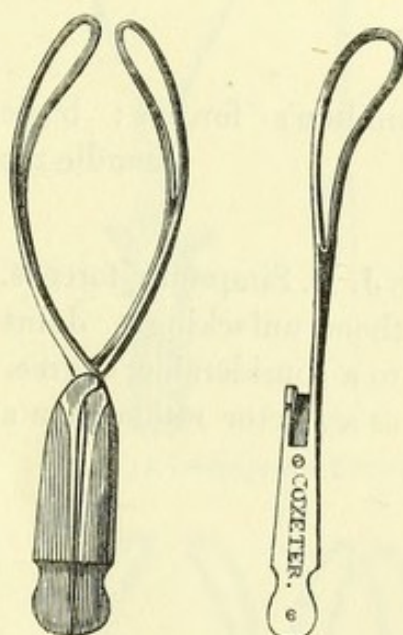
Fig. 8.—Haighton's Forceps.
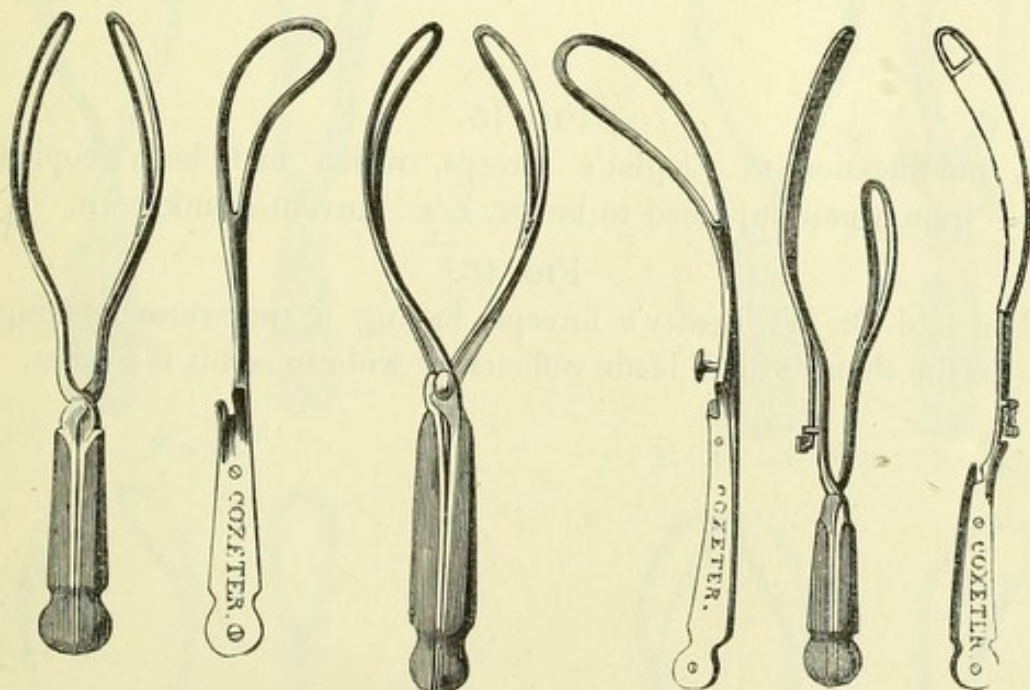
Fig. 9.—Ramsbotham's Forceps. Fig. 10.—Rigby's do. Fig. 11.—Davis's do.
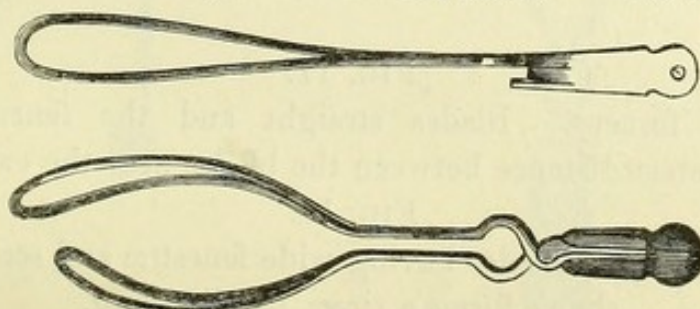
Fig. 12.—Radford's Forceps.

FIG. 13.

Hamilton's forceps; blades strongly curved backwards; one
handle moveable on the blade.

FIG. 14.

Dr. J. Y. Simpson's forceps. Knees above the joint to prevent
them unlocking. Joint so loose as to allow lateral motion
to a considerable degree. Handle so as to use the instrument
as a tractor rather than a compressor.

FIG. 15.

A modification of Ziegler's forceps, which had been copied
from a pair supposed to be Dr. Z.'s. Inventor unknown.

FIG. 16.

The late Dr. W. Beatty's forceps, having a transverse opening
in the shank of one blade sufficiently wide to admit the other.

FIG. 17.

Churchill's forceps. Blades straight and the fenestræ short.
The greatest distance between the blades near the extremity.

FIG. 18.

Hopkins' forceps. Blades having wide fenestræ and second curve;
shank forms a ring; handles long.
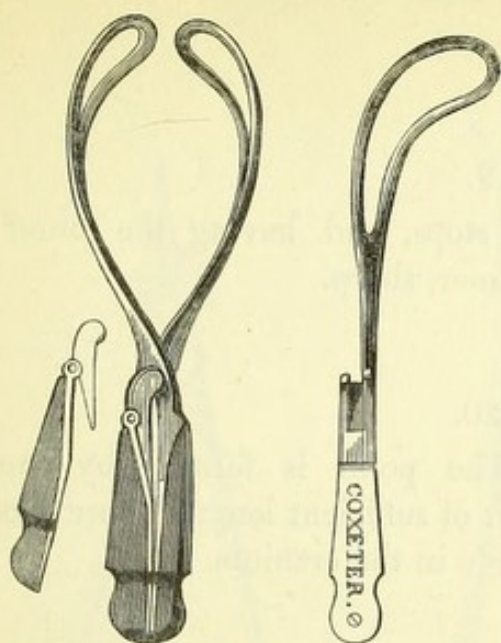
FIG. 13.—Hamilton's Forceps.
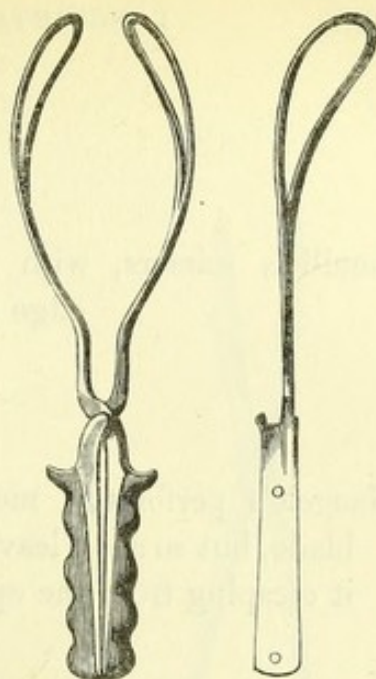
FIG. 14.—Simpson's Forceps.
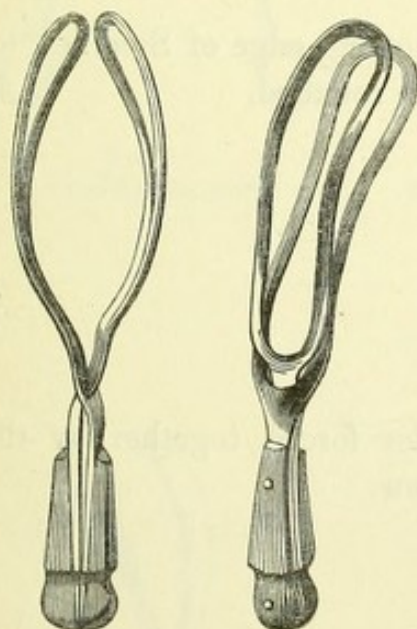
FIG. 15.
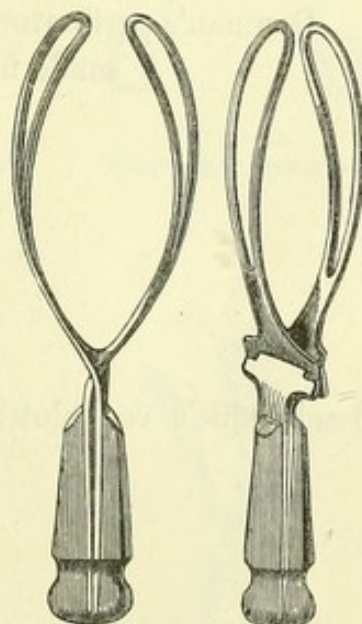
FIG. 16.—W. Beatty's Forceps.
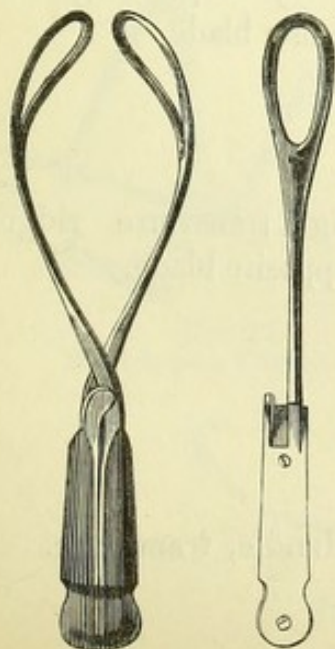
FIG. 17.—Churchill's Forceps.
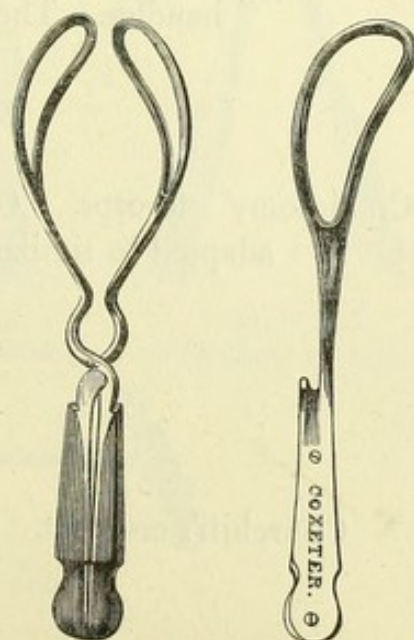
FIG. 18.—Hopkins' Forceps.

Fig. 19.

Smellie's scissors, with rounded stops, and having the outer
edge like the inner, sharp.

Fig. 20.

Naegele's perforator modified. The point is formed by one
blade, but so as to leave the other of sufficient length to prevent
it escaping from the opening made in the cranium.

Fig. 21.

Denman's perforator. The inner cutting edge of Smellie
made flat, the stops not rounded.

Fig. 22.

Baudeloque's cephalotribe. The blades forced together by the
power of a screw.

Fig. 23.

Holmes' perforator. The blades closed by separating the
handles. The point attached to one blade.

Fig. 24.

Craniotomy forceps. One blade having transverse ridges
adapted to similar grooves on the opposite blade.

Fig. 25.

Churchill's crotchet. Point, double. Handle, transverse.
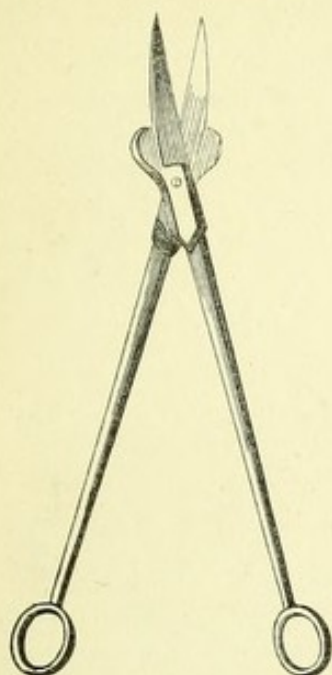
FIG. 19.
Smellie's Scissors.
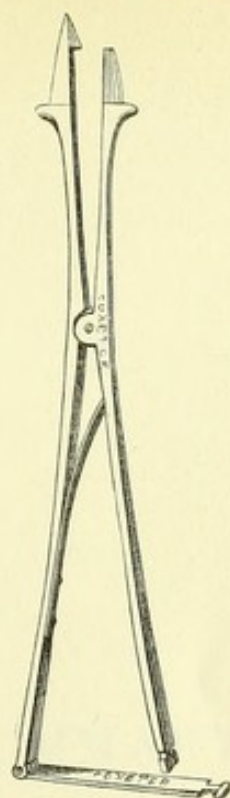
FIG. 20.
Naegele's Perforator.
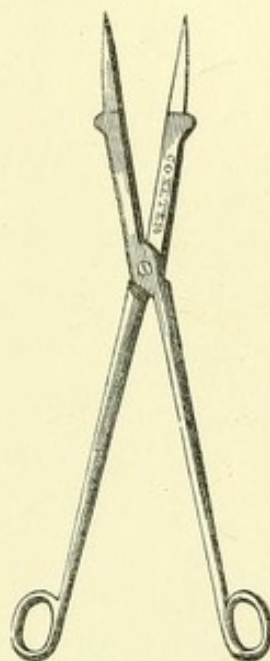
FIG. 21.
Denman's Perforator.
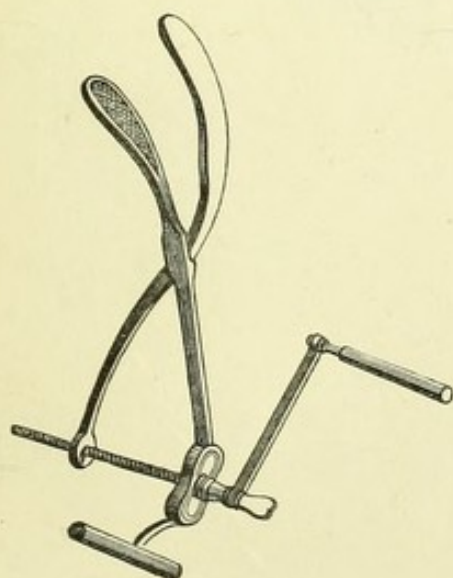
FIG. 22.
Baudeloque's Cephalotribe.

FIG. 23.
Holmes' Perforator.
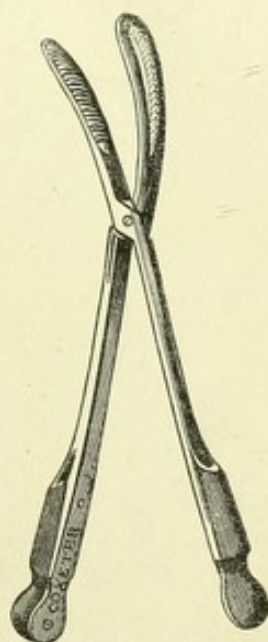
FIG. 24.
Craniotomy Forceps.
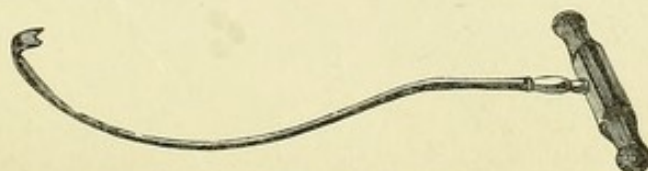
FIG. 25.—Churchill's Crotchet.

SUMMARY

OF THE

PRINCIPLES AND RULES

LAID DOWN IN THE PRECEDING
LECTURES,

ARRANGED AS APHORISMS,

TO WHICH SOME OF DENMAN'S ARE ADDED.

APHORISMS.

SECTION I.

MECHANISM OF NATURAL LABOUR.

I. Labour is the action of the uterus to expel its contents when the fœtus is sufficiently mature to sustain respiration, p. 42.

II. Labour is called natural " if the head of the child present, if the labour be completed in twenty-four hours, and if artificial assistance be not required " (Denman), p. 43.

III. Labour may be divided into three stages. 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, p. 44.

IV. The dilatation of the mouth of the uterus (the first stage) is effected chiefly by the muscular fibres of the fundus acting upon it through the medium of the liquor amnii, which conveys accurately to the os tincæ the whole power of the uterus (p. 48—51), moderates and equalizes the force employed, and dilates the mouth of the uterus without exciting irritation. The pains caused by this action are called *grinding pains*.

V. The order of uterine action is from the fundus to the mouth of the uterus, p. 51.

VI. When the os tincæ offers any unusual resistance to the fundus, the force of the fundus is not increased, the action is frequently renewed, and may be for a time suspended, in order to diminish irritation, so that the object of nature is to accomplish her purpose by time rather than by force, p. 59.

VII. When the dilatation of the uterus is completed, *the second stage of labour* begins. There is then a marked difference in the uterine contraction. Not only is the entire force of the uterus employed, but it is aided by the muscles that bound the abdominal cavity. The pains that accompany this action are called " bearing pains," p. 60.

VIII. The manner in which the head passes through the pelvis in its most usual position, is as follows—

1st. When the head is above the brim of the pelvis, the forehead and the occiput are nearly on the same level, 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 the shorter sacro-ischiatic ligament. The occiput then again descends obliquely along the ischio-pubic ramus, and emerges with part of the parietal bone beneath the pubic arch.

2nd. Simultaneous with this motion, there is a very slight rotation on the longitudinal axis of the head, by which that side of the head which is next to the pubis descends lower than that near the sacrum, so that the parietal protuberance of the pubic side becomes the presenting part.

3rd. As the head is so advancing through the pubic 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.

4th. When the head escapes from the outlet, the occiput rests against the ramus of the 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 arch of the pubis, and the head is expelled in the conjugate axis of the outlet. According to the more usual course, it passes out obliquely, pp. 61, 62, 63.

IX. There are generally *four* positions of the head in which the parietal bone presents. 1st. Left occipito-cotyloid. 2nd. Right occipito-cotyloid. 3rd. Left fronto-cotyloid. 4th. Right fronto-cotyloid. Two in which the face presents. 1st. Right mento-cotyloid. 2nd. Left mento-cotyloid, pp. 64—66.

X. The four positions of the vertex may be known by the anterior and posterior fontanelles, and by the ear.

XI. When the head begins to press on the perinæum, the mucous secretion is increased in the vagina, the head advances and retires with the pains for some time, until the perinæum is sufficiently stretched. The pains then become more powerful, and force the

head through the vulva, there is then the greatest danger lest the perinæum be lacerated, p. 71.

XII. When the head is expelled, the face turns towards the right thigh in the first position, toward the left thigh in the second position. In the latter case the arms frequently lacerate the perinæum, p. 72.

XIII. 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*, p. 73.

XIV. If the abdominal muscles contract sufficiently, or if artificial support be given to the fundus during the contractions of the uterus to expel the child, the placenta is generally separated at the same time, and may be either expelled from the vulva or into the vagina, p. 73.

XV. If the uterus be without support, the placenta may be retained either from deficient irritation or irregular contraction. Hæmorrhage does not usually accompany retention caused in this way, p. 73.

SECTION II.

MANAGEMENT OF NATURAL LABOURS.

XVI. The " show" is a slight sanguineous discharge, arising from the ruptured vessels of the mouth of the uterus, when it first dilates. As soon as this takes place, labour properly begins. The patient has now entered upon the first stage, p. 78.

XVII. When called upon to attend a patient, *the summons should be instantly responded to*. Your introduction should not be abrupt; and if called to a patient for the first time, still greater caution should be exercised, pp. 79, 80.

XVIII. During the early part of the first stage, it is not necessary nor advisable to remain in the room with your patient. It will be sufficient to remain in an adjoining room, until there is occasion to make a vaginal examination, p. 81.

XIX. When the pains have continued for some time regular and frequent, an examination may then be made. 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, or any unctuous substance, within the vagina. Examine whether it be rigid or relaxed, dry or moist. Examine the rectum through the posterior wall, and fundus of the bladder through the anterior. Introduce the middle finger, in order to examine the os uteri. Pass both fingers along the sacral side of the vagina, and when you cannot advance them further, direct them forward towards the pubis, you then feel what seems to be the irregular folds of a flaccid bag projecting into the vagina: examining this with caution, the edge of the os uteri may be traced; if the finger be passed within it, you will sometimes feel the head; you may often fail, and yet the head present. The dilatability of the os uteri, its direction, and the degree to which it is opened, should be ascertained, pp. 82, 83.

XX. If the membranes are ruptured early, an examination should always be made, lest the funis or the shoulder present. Before the fingers are withdrawn 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, p. 83.

XXI. 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. Having accomplished this, a second examination during this stage, unless it be prolonged, would be unnecessary, p. 83.

XXII. The first stage of labour is not always completed before the second begins. The grinding pains merge into the bearing pains so gradually as to require some attention to observe the change. When the bearing pain comes on, 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 bear down. Her voice also alters, its tone is more subdued, and she seems more patient of her sufferings than before. Sometimes the complete dilatation of the os uteri is marked by constitutional

symptoms; there may be a slight rigor or vomiting, perhaps a strong inclination to go to stool, p. 87.

XXIII. The patient must now remain in bed, which should be properly prepared for her reception. A skin of Morocco leather, or a broad piece of India-rubber cloth, must be placed next the bed, to protect it from being stained, and a blanket folded very wide, and enclosed in a soiled sheet, placed underneath the hip of the patient as she lies upon her left side. They should be so fastened together, that the whole may be removed at once, p. 87.

XXIV. When the bearing pains become decided, a sheet should be fastened to the bed-post, and so within reach of the patient that she may grasp it firmly. The nurse should support her feet by pressing a pillow against them. Small pillows between the knees are very inconvenient, p. 88.

XXV. During the second stage, the patient often becomes fatigued and thirsty. You must imperatively forbid heating drinks of all kinds to be given to the patient. A free ventilation of the apartment should be secured, and as few persons as possible permitted to remain in the room, p. 89.

XXVI. In the second stage of labour more than one examination is necessary, but if examinations be repeated too often, the passages become dry and irritated. *The first object* of the examination is to determine the proportion between the head and the pelvis; *the second object* is to ascertain the exact position of the head; *the third object* is to note the progress made by the head, pp. 92, 93, 94.

XXVII. In order first *to determine the proportion*, the finger should be passed, in the interval of the pains, between the pubis and the head, and moved round on either 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, p. 92.

If the ear cannot be reached, and there seem to be a disproportion, its degree may be judged by feeling the scalp. When the head is only slightly compressed, the scalp is simply folded or puckered by the closing of the sutures; as the compression increases, these folds merge 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, p. 92.

R

XXVIII. *To ascertain the exact position of the head,* pass the finger to the sagittal suture. This traverses the presenting part of the head, and looks towards the sacrum Direct it along this suture towards the left obturator space and plane of the ischium, a fontanelle will then be felt: if it be the posterior (a small triangular space or a point where three sutures meet) it is the first position. If it be the anterior fontanelle (a large membranous space bounded by four sides or undefined), it is the third position. When the fontanelle is on the right side of the pelvis, the second position may be distinguished from the fourth in the same manner, pp. 64, 65.

XXIX. If there be a doubt of, or difficulty in, feeling the fontanelle, the ear will determine the side of the pelvis to which the occiput is applied, the lobe of the ear being felt on the corresponding side, p. 67.

XXX. You must be prepared to support the perinæum the moment it suffers any degree of distension. 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 press moderately *with the left hand* over the hip of the patient. *With the right hand* 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 it, the fore-finger and thumb passing on either 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, pp. 94, 95.

XXXI. The perinæum should not *be pressed against too soon;* rather wait until you feel the head protruding with each pain through the vulva. The pains are very unequal, and the object of being prepared to support the perinæum early is to resist too violent distension by them. Support the perinæum against the powerful pains. It is not necessary to press strongly when the pains are weak, pp. 95, 96.

XXXII. When the head is passing the vulva, do not draw the perinæum backwards nor push the head too rapidly forwards. In either case the widest part of the head would be forced too soon over the perinæum. When the head is delivered, examine carefully lest the funis be coiled round the neck. If it be a single coil it is sufficient to draw down more of the funis and loosen it.

If two or more, one must be brought over the head. When this cannot be done the funis must be divided, which should never be done if it be possible to avoid it, p. 96.

XXXIII. When the shoulders are passing the perinæum, caution must be used lest the arms should lacerate it, especially in second positions of the head. Sometimes the shoulders require to be assisted, which 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, p. 97.

XXXIV. 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, p. 97.

XXXV. Pressure should then be maintained either by a temporary bandage or by the hand of an assistant, and the funis tied and divided. Apply a strong ligature of housewife thread, bobbin, or narrow tape, about two inches from the umbilicus, and a second about an inch further. You must be careful to see the part of the funis you are dividing, lest the fingers or any part of the child should be in your way, and also 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, pp. 97, 98.

XXXVI. The hand may be applied to the fundus and a very moderate pressure 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 traction in the axis of the vagina. But if the uterus should not obey the stimulus at first, do not persevere; it is always more advisable to wait for some time than to use too much irritation. Neither should you attempt to remove the placenta by the funis alone, p. 98.

XXXVII. After delivery, a bandage is necessary to support the pelvis by compressing it as much as possible, and to support the uterus by moderate and equable pressure over the whole abdomen. The bandage should be rather more than a yard long

and half a yard wide. It should first be drawn evenly over the pelvis; its lower edge, when so placed, being about an 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 crista of the ilium, so that the pelvis may be embraced by this portion of the bandage, about three inches in width, as tightly as possible. 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 abdomen be included in it without projecting over the bandage, p. 99.

XXXVIII. When the bandage is applied, the folded sheets that had been placed under your patient during labour should be removed, and replaced by others dry and warm, in order that she may be induced to sleep. She must not be disturbed afterwards, p. 100.

XXXIX. If the placenta be not separated in the first instance, wait for an hour, and again, by pressure, excite the action of the fundus. This should be brought as nearly as possible toward the centre of the pelvis, and grasped firmly by both hands. As soon as the fundus becomes hard, strong pressure upon it is generally sufficient to cause the expulsion of the placenta: if it should not, 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, p. 101.

XL. In order to remove the placenta, the funis should be held firmly in the left hand, and the fingers of the right 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. You will often find a large portion 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 toward the os uteri, and, by irritating it, the portion of the placenta that lies within the cervix is often detached. 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 within the os uteri, when the upper part of the placenta may be grasped and the whole removed. The assistant should press on the fundus while the hand is being withdrawn. The placenta should never be drawn away by the lower portion, p. 102.

SECTION III.

DIFFICULT LABOURS.

XLI. Difficult labours are divided into *tedious* and *laborious labours*. When labour is prolonged beyond the average period (twenty-four hours) without being at any time unusually severe, it is called "*tedious*." When, without reference to time, there is a powerful struggle carried on by the uterus to overcome some unusual resistance, it is called "*laborious*," p. 105.

XLII. When labour is tedious from *over-distension* of the uterus, puncture the membranes within the os uteri as high as you can reach, so that the liquor amnii may escape gradually. When the uterus is thus relieved, the pains increase in strength and frequency, and labour proceeds rapidly to its conclusion, p. 106.

XLIII. *When extreme obliquity of the uterus* is the cause of delay, mere change of position is sometimes sufficient to remove this difficulty. If not, or the uterus hang very much over the pubis, a bandage may be applied so as to draw the fundus gradually upwards, pp. 106, 107.

XLIV. When the fundus of the uterus is thrown very much forward, the os uteri is drawn upwards and backwards toward the promontory of the sacrum, and when labour begins, the anterior lip, being the most dependant part, often becomes so thin as to resemble the membranes. It might be mistaken for them; and the cause of delay supposed to be rigidity of the membranes. The supposed membranes—that is, the uterus—might be accordingly punctured. If the presenting surface be carefully examined, the os uteri will be felt toward the promontory of the sacrum, p. 108.

XLV. When a patient is suffering from *hysterical excitement* great caution is necessary. Conversation should not be permitted within hearing of the patient—none but her immediate friend and nurse should be allowed in the room—strict attention should be paid to the evacuations, p. 109.

XLVI. *Mental despondency* is obscurely marked by symptoms of nervous shock—a rapid and feeble pulse—a tendency to chill—coldness of the extremities—constant watchfulness—listless expression—feeble pains;—these are the most dangerous cases. Stimu-

lants are necessary—ergot of rye, to hasten the action of the uterus —and the forceps, if the second stage be at all prolonged, pp. 113, 114.

XLVII. When the os uteri is *rigid*, and the woman of a plethoric habit, a free depletion from the arm, followed by nauseating doses of tartarized antimony, will often relieve it   If she be hysterical, or leuco-phlegmatic, local depletion and cathartic enemata are preferable, p. 115.

XLVIII. When the head is *arrested with the face towards the pubis*, the correction may sometimes be made with the fingers, but it is preferable to introduce the vectis on the pubic side of the pelvis, to press back the head in the intervals of the pains, and to rotate it gradually towards the sacral side.   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 recourse must be had to the forceps.   When *the longitudinal axis of the head is fixed across the pelvic cavity* the anterior fontanelle is very distinct. In the interval of the pains press up the forehead, and so retain it until the following pain returns, when the occiput will descend, p. 121.

XLIX. *The hydrocephalic head* may be known by the increased size of the 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 the bones. If the head be arrested, perforation is required; but the head thus enlarged often passes through the pelvis without assistance, p. 124.

L. *When the head is above the brim* of the contracted pelvis, and it is desirable to determine the degree of disproportion, the simplest and most efficient pelvimeter is the hand of the practitioner. 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 touches the upper part of the sacrum, it is evidence that the sacrum is pressed too much forwards; if it touch the promontory, or just below it, it is very doubtful whether the head can pass. In some cases, when the cavity and outlet are very wide, the whole hand may be introduced within the pelvis; and if the brim be contracted, the degree to which the fingers are compressed will determine the amount of diminution. In the standard pelvis, the fingers, when in the

brim, may be slightly separated from each other. In a slight contraction, through which the head may pass, they are pressed close together. In greater disproportion the fingers overlap each other; and in extreme cases, three, two, and sometimes even one finger only can be introduced: but, excepting in such extreme cases, do not hastily assume, even with every evidence in this way obtained, that the head cannot pass the brim, until time and close observation of the labour removes every doubt, pp. 130, 131.

LI. *When the head is fixed in the brim of the* OVATE *pelvis*, the outlet and cavity being wide, the head may be delivered with the long forceps, p. 132.

LII. The term " *arrest* " is applied to cases where, although the head ceases to advance, the cause either does not depend upon disproportion in the pelvis, or when disproportion exists, it is not so great as to render the delivery of a living child impossible. When the head is pushed back, the finger can pass with facility between the head and the pelvis, the ear may be touched, the parietal bones do not overlap each other strongly, and the scalp is only puckered. If a tumour be formed on the presenting part, it is diffused, increases slowly, and seldom attains any magnitude, p. 133.

LIII. 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 head cannot be easily displaced, it is impossible without force to pass the finger between it and the pubis; the ear cannot be felt; the urethra is compressed, the parietal bones are strongly overlapped, and a tumour grows very rapidly to a great size, often completely obscuring the characters of the presentation; the vagina is also swollen and congested, p. 133.

LIV. Difficult labours become dangerous to the patient, when they give rise either to inflammation of the passages or exhaustion of the uterus. Inflammation of the vagina may terminate in slough; inflammation of the uterus, in softening of its proper structure: the former may cause fistula, the latter rupture of the uterus. Exhaustion gives rise to sudden and dangerous hæmorrhage which may be fatal, and sometimes causes fatal syncope without hæmorrhage. In either case—whether inflammation be present, or the premonitory symptoms of exhaustion shew themselves—labour must be brought to a conclusion, p. 136.

LV. In cases of slight deviation from the standard pelvis, where there is every evidence of space sufficient for the head ultimately to pass through the pelvis, if nature be allowed time for the purpose, interference is improper, although the period of twenty-four hours may be exceeded. But if the head be arrested, and so remain for four hours, notwithstanding the pains are regular and strong, the forceps may be used. If the pains be only feeble or absent, the action of the uterus may be suspended; although the head may be arrested for four hours during that suspension, it may advance when the action of the uterus is renewed. Assistance is not therefore required, until it is found that the uterus fails to do so, p. 142.

LVI. When the head is not arrested, but at the same time advances so extremely slowly in consequence of the narrowness of the pelvis that it seems to be arrested, there is no increased danger either to the mother or to the child in leaving the delivery to the natural efforts. The forceps is not therefore called for,* p. 150.

LVII. *When the head is impacted* in the pelvic cavity, it cannot be delivered by the forceps without such injury to the passages as might endanger the mother's life. The probability of preserving the child's life is not sufficiently certain to justify an attempt which might be so hazardous. In the great majority of these cases, the death of the child takes place naturally; and it may be removed before symptoms dangerous to the mother present themselves, p. 162.

LVIII. If the reverse occur, and danger to the mother—whether from exhaustion or extending inflammation—be indicated before the death of the child, then perforation is called for, rather than render the risk to the mother a certainty by the dangers that result from a forcible extraction by the forceps, p. 162.

LIX. When *the head is retarded at the outlet* of the pelvis, it may arise from the perinæum being rigid, or from the arch of the pubis being too narrow, so that the head cannot pass out between the ischio-pubic rami. The strictest attention is necessary to subdue any tendency to inflammation in the perinæum. Fomenta-

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* Feeble constitutions are seldom able to endure very protracted suffering; cases, consequently, sometimes occur which are exceptions to the above rule, in which the premonitory symptoms of exhaustion appear before labour is concluded. The slightest indication of exhaustion should be attended to, and, when present, delivery effected.

tions must be sedulously employed, and, if necessary, depletion by leeches. Sometimes the vectis may be passed on the pubic side of the head, to assist its advance; but where the difficulty arises from narrowness of the pubic arch, the forceps is preferable, pp. 162, 163.

SECTION IV.

OBSTETRIC OPERATIONS.

LX. The rules that govern the application of instruments are founded upon three principles—

1st. *To preserve the lives of the mother and child.* If this be doubtful—

2nd. *To preserve the life of the mother without reference to the child.* When this cannot be done—

3rd. *To save the child if possible*, p. 172.

LXI. The instruments used for the *first object* are *the vectis* and *the forceps.* For the *second, the perforator, the crotchet, the craniotomy forceps, the osteotomist, the cephalotribe.* For the *third,* the Cæsarian section is performed, pp. 171, 172.

LXII. The vectis is intended to act as an extractor, to assist the feeble action of the uterus, to correct mal-positions of the head, or to overcome any usual 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, p. 172.

LXIII. 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. The *short forceps* is used in the two former operations. The *long forceps* in the latter, p. 176.

LXIV. The following general rules must be observed before these instruments are applied—

1st. It has long been established as a general rule, that instruments are never to be used in the practice of midwifery; the cases in which they are used, are, therefore, to be considered merely as exceptions to this rule [Denman].*

2nd. But such cases can very seldom occur in the practice of

* Aphorisms.

any one person,* and when they do happen, neither the forceps nor any other instrument is ever to be used *in a clandestine manner* [Denman].

3rd. The first stage of labour must be completed, that is, the os uteri must be dilated and the membranes broken, before we think of applying the forceps or the vectis [Denman].

4th. The difficulties which attend the application and use of the forceps are far less than those of deciding upon the proper time when, and the cases in which, they ought to be applied [Denman].

5th. The lower the head of the child has descended, and the longer the use of the forceps is deferred, the easier in general will their application be, the success of the operation more certain, and the hazard of doing mischief less [Denman].

6th. Care is also to be taken that we do not, through aversion to the use of instruments, too long delay that assistance we have the power of affording with them [Denman].

7th. A rule for the time of applying the forceps has been from the following circumstances: that, after the cessation of the pains, the head of the child should have rested, for *six hours*,† in such a situation as to allow the use of the forceps before they are used [Denman].

8th. But this, and every other rule intended to prevent the rash and unnecessary use of the forceps, must be subject to the judgment of the person who may have the management of any individual case [Denman].

LXV. Before the vectis is applied, you must first observe those preliminary measures necessary in all obstetric operations. The urine should be withdrawn with an elastic gum catheter of rather large size (No. 10), and without the 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 be employed. An enema should also be administered, and when the bowels are relieved, the patient, lying on her left side, must be drawn as near to the edge of the bedstead as possible. The pelvis must be raised more than usual, and if

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* An obstetric physician, who is frequently consulted, will of necessity meet more cases of this kind than another.

† *Four hours* is sufficient for this purpose, and the cessation of the pain is not essential.

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. The vectis should be placed in warm water, and anointed, p. 174.

LXVI. Introduce 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. The finger must remain applied to it while the vectis is being introduced. It should be held about the middle, between the two forefingers and thumb of the left hand, and the handle directed 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. When the blade is so applied, press it gently forwards with a slightly oscil-lating motion, until the edge reaches the lobe of the ear, which is now placed exactly between the finger and the 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 forward to its proper position, p. 174.

LXVII. " Then, grasping the handle of the instrument firmly in the right hand, wait for the accession of a pain" [Denman], (which, although absent before, almost always returns when this new irritation is applied to the uterus), and draw steadily with it. " When the pain ceases let the instrument rest, and on its return repeat the same kind of action, resting and acting in imitation of the manner of the pains" [Denman], p. 175.

LXVIII. Carefully avoid using the vectis as a lever; and in order to do so 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 similar to the forceps, and the vectis may be used solely as a tractor, p. 175.

LXIX. When the head begins to advance, and to press strongly on the perinæum, the introduced fingers may be withdrawn, and the vectis maintained in its position, rather for the purpose of acting with 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, pp. 175, 176.

LXX. When the vectis is used to correct mal-positions of the

head, it is better to operate with one not too much curved. One blade of the forceps will often answer in these cases, p. 176.

LXXI. *The operation with the forceps, when the head is resting on the perinæum*, may be undertaken, if there be any diminution in the transverse measurement of the outlet of the pelvis. The pubic blade, with the lock looking upwards, must be passed over the ear in a similar manner to the vectis; and when so placed, the handle may be raised towards the pubis, and there maintained by an assistant in its *exact position*. Pass two fingers of the left hand between the head and the perinæum; hold the sacral blade lightly by the handle with the right hand; and, taking the lock of the introduced blade as your guide, endeavour to direct it so along the introduced fingers, that the edge of the sacral may pass along the lock of the pubic 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, p. 178.

LXXII. When the pains return, the handles of the forceps should be held firmly, the perinæum being carefully supported by an assistant, and traction 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 handles may be drawn, first with a slightly waving motion to either side, and then upwards 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, because there is less risk of injuring the perinæum. For the same reason, it would be advisable to unlock the forceps, and to withdraw the sacral blade, leaving the pubic to act with as a vectis, pp. 178, 179.

LXXIII. *When the head is arrested in the cavity of the pelvis*, the forceps may be introduced in the same manner as before; but if the ear be out of reach, the presentation must be carefully examined. The lambdoid suture may be traced passing up from the posterior fontanelle towards the ear. The trochanter also will give the direction of the plane of the ischium. Both will assist in guiding the pubic blade. The passage of the sacral blade is rather more difficult; 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, p. 182.

LXXIV. When the forceps is applied, dislodge the head from its situation in the first instance, because some accidental displacement may be the cause of difficulty which the uterus cannot correct. When the head is relieved, it will glide into the correct position, and may be delivered without difficulty. If, however, the head remain arrested, the forceps must be seized firmly; and in order to secure your hold, a coarse napkin might be placed loosely round the handles. A steady and powerful traction should be maintained so 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. As the head advances more easily, and approaches the perinæum, leave it as much as possible to the uterus, p. 182.

LXXV. When the forceps is in the pelvic cavity, the shank of the instrument lies between the tubers of the ischia. When the head is in the hollow of the sacrum, the handles are directed towards the pubis. It is advisable rather to follow than to guide the direction of the head, because as it descends it will *naturally* change its position, which might be prevented by attempting too hastily to turn it, p. 183.

LXXVI. *The operation when the head is fixed in the brim of the pelvis* differs from either of the preceding operations; the blades are applied over the occiput and face of the child, and not over the ears. 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, guiding it by the lock of the introduced blade, p. 184.

LXXVII. When the forceps is 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, and the force gradually increased
according to the resistance. Two or three trials will generally
succeed in extricating the head from the brim of the pelvis, when
it will rapidly advance without assistance : the forceps might be
removed, but it is safer not to do so lest any impediment should
delay its further progress, p.184.

LXXVIII. Before *perforation* is performed, the bowels should
be relieved, and the urine removed from the bladder, which
should be carefully examined above the pubis, because sometimes
the neck and fundus of the bladder are so compressed between
the head and the pubis, that if a short catheter be used, the urine
is only removed from the lower segment, 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 might
perforate the canal, p. 190.

LXXIX. 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 not fully
dilated, observe the exact relation of the os uteri to the tumour
on the head. If the os uteri be very thin, and closely embrace
the tumour, its margin must be defined, lest the degree of dilata-
tion escape your notice, p.192.

LXXX. Let the fore-finger 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 fore-
finger. When both fingers meet, the right hand may be with-
drawn from the vagina, and the perforator forced through the
tumour and bone at the part where the fore-finger had been ap-
plied. The first two fingers of the left hand should then rest on
the stops of the instrument to prevent the perforator slipping from
the opening when the handles are raised, and to secure the vagina
from injury. When the bone is sufficiently broken in one direction
the handle may be changed to the opposite, and a crucial opening
made. The perforator should be passed into the opening, and the
brain completely broken up, p.192.

LXXXI. When the perforator is withdrawn, the fore-finger

of the right hand should still remain within the opening, and the crotchet introduced, having the handle directed backwards towards the coccyx, when, with a little careful management, it may be passed through, and the remainder of the brain removed. The handle of the crotchet should then be held firmly in the right hand, while two or three fingers of the left are applied to the bone externally. The force should be so applied, that the bone may be held tightly between the flat part of the point and the finger, without directing it much on the point itself, pp. 192, 193.

LXXXII. When the craniotomy forceps is used, the blade, which is rough or 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 corresponding openings in the opposite blade. Extraction may then be made without difficulty, provided the bone does not give way. This is less likely to take place when the blade is not made with teeth, p. 194.

LXXXIII. The induction of premature labour may be effected by introducing a sponge tent within the os uteri, so as to dilate it. If this fail, puncture the membranes with a stilette. Uterine action generally commences within forty-eight hours, p. 207.

LXXXIV. The induction of premature labour is not applicable to first pregnancy, unless there be very clear proof of great distortion.

The most certain evidence is the result of previous labours, where perforation had been required, or when, with every successive labour, the contraction of the pelvis may have so increased as to render the last labour more difficult than the preceding one: so that, ultimately, perforation might be necessary, unless in this way obviated, p. 207.

PRETERNATURAL

AND

COMPLEX PARTURITION.

LECTURES

ON

PRETERNATURAL AND COMPLEX PARTURITION.

LECTURE XIV.

PRETERNATURAL LABOURS: BREECH, FEET, KNEE PRESENTATIONS.

Preternatural Labours—Definition—Division. 1st. The inverted position of the Child—Breech, Foot, Knee Presentations. 2nd. Transverse Positions—Shoulder and Arm Presentations—Mechanism of Breech Presentations—Anterior Dorsal Positions—Posterior Dorsal Positions—Symptoms and Signs of Breech Presentations—Treatment and Mode of Delivery—Rotation of the Child in Posterior Dorsal Positions—Accidents from neglecting it. Presentation of the Feet—Symptoms—Diagnosis—Knee Presentations — Diagnosis—Sources of Error—Treatment—Complications—Hand and Foot—Twins locked in each other.

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 your attention to those varieties of preternatural positions which more commonly happen when the child is fully grown, and the pelvis of its ordinary dimensions: it is in such cases interference is most

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frequently required; and upon the skill of the operator will depend the safety of the child.

Preternatural presentations may be divided into two classes:—

1st. 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.

2nd. 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 dependant, 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 its anterior or pubic segment, 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, like 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

Fig 1.
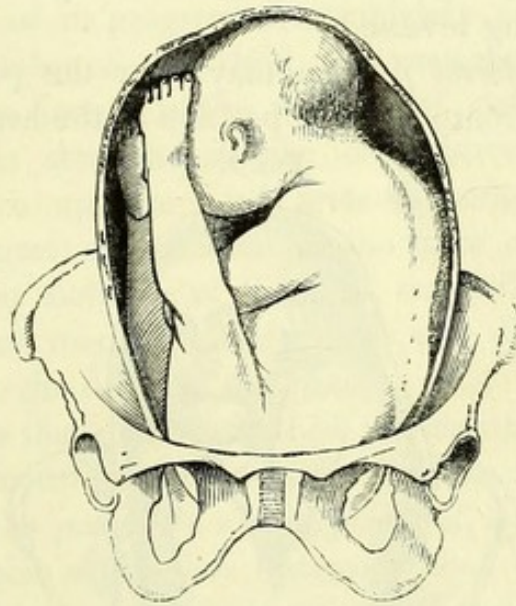
Anterior Dorsal Position.

the head in the right oblique measurement of the pelvis, the 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 to the pubis descends lower than that next to the sacrum, and this position is retained throughout. If the limbs are 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 perineum, and be expelled. The shoulders then enter the pelvic cavity in the opposite (the left oblique) measurement, 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 is 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 second 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.

The posterior dorsal position may enter the pelvic cavity like the third or left fronto-cotyloid position of the head. The sacrum,

Fig. 2.

Posterior Dorsal Position.

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, is completely deranged.   If, for instance, the limbs of the child are 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.

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 this presentation.   Usually one buttock, the most dependant, is found to occupy the pelvis: this is smooth, equal, and, if 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 tumor 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 cases it is not so, especially when the presentation is high in the pelvis, and the os uteri 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: this is increased by frequent examinations, which are repeated because the large tumor that is formed is too often an enigma; extreme congestion is the result, and in some instances the parts have sloughed.

Fig. 3.
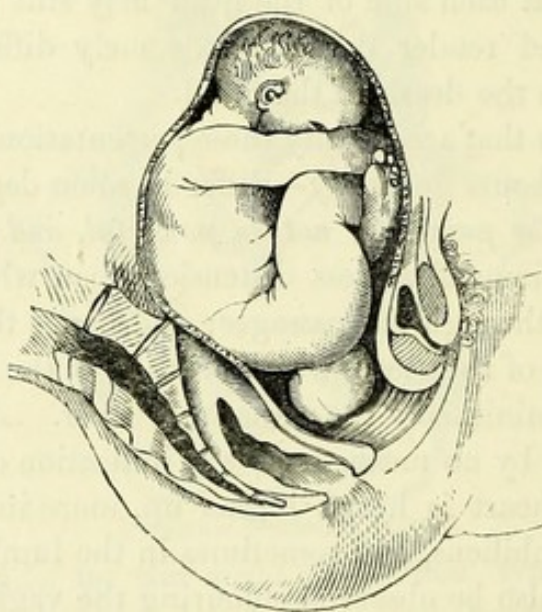
Swollen Scrotum from pressure.

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. When the nature of the case is ascertained, the next question is—

The Treatment and mode of delivery.—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 perineum 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 perineum 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 perineum: 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. 4.
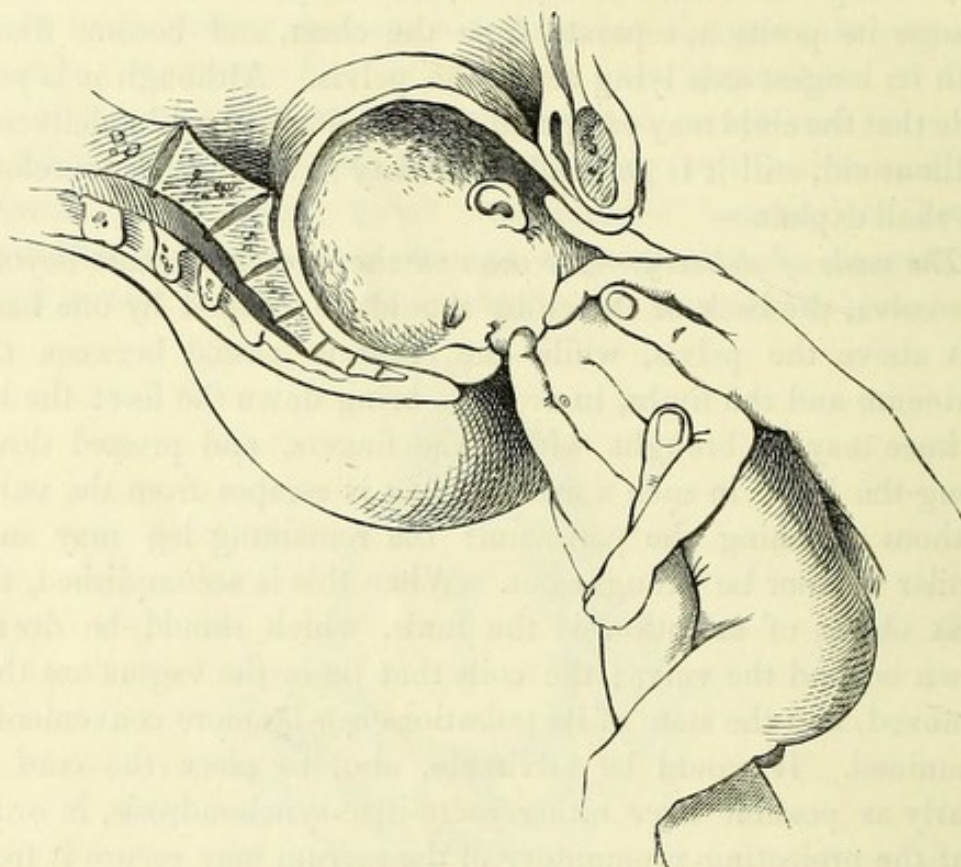
It is sometimes difficult to alter the position in this way, and in may be necessary to pass the fingers along the face towards the forehead, so that they may press it down like a vectis; but this is seldom required. The head should be extracted as quickly as possible, because the funis is now exposed 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 presses upon the perineum, the direction of the force should be in the axis of the brim, but 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 perineum must be carefully supported.

FIG. 5.
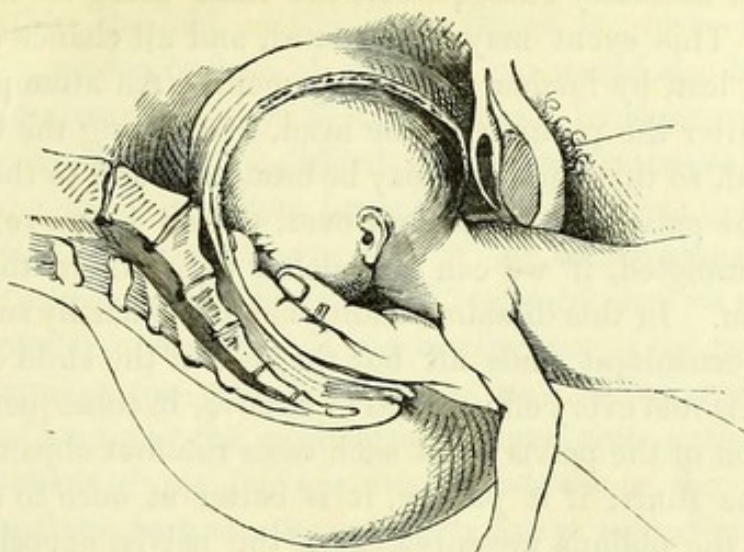
The chief object of interference in breech-presentations is the preservation of the child: the pulsation of the funis should, therefore, be carefully observed during the delivery. If its rate be much increased, or if the arteries beat feebly, the child should be extracted as rapidly as possible. In such a case, there is not time to wait for the return of the pains—it would be advisable, therefore, 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 drawn rapidly 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 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 to you that the natural efforts to deliver breech-presentations should not be interrupted until there was some risk of injury either to the perineum 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 service-able 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 position so favourable as it would have been if the uterus alone expelled the child; consequently the risk to it is greater, and its safety will depend entirely upon the skill and intelligence of the practitioner who undertakes the operation: hence may be inferred the im-portance 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

FIG. 6.
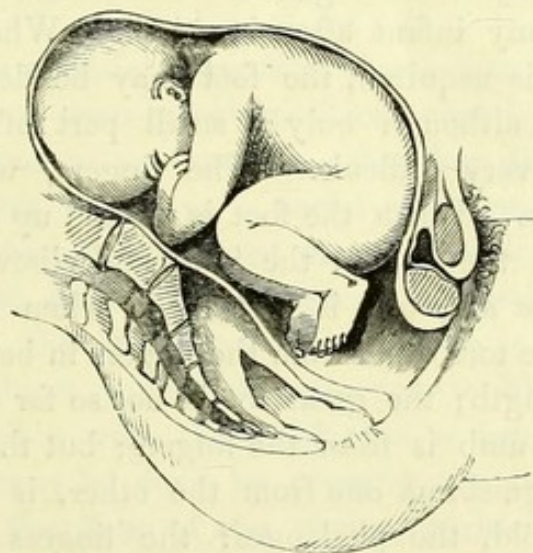
Presentation of the Feet.

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 may 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. They 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.

The symptoms that accompany these labours are also similar to breech cases; the pains are short, apparently inefficient, 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, being 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 is felt, but otherwise it is very difficult. The fingers, when extended, resemble the 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 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, being 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 calcis or olecranon: the patella may be felt, but it is so small, and is often so imbedded in fat, that it is not easily perceived.

The treatment of footling cases is similar to 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 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 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 that both feet come down, the child must be extracted as soon as possible; and to aid this object, you should endeavour to dilate the perineum 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, perineum, and coccyx, while the child is being delivered: the distension excites the uterus to more powerful action.

FIG. 7.
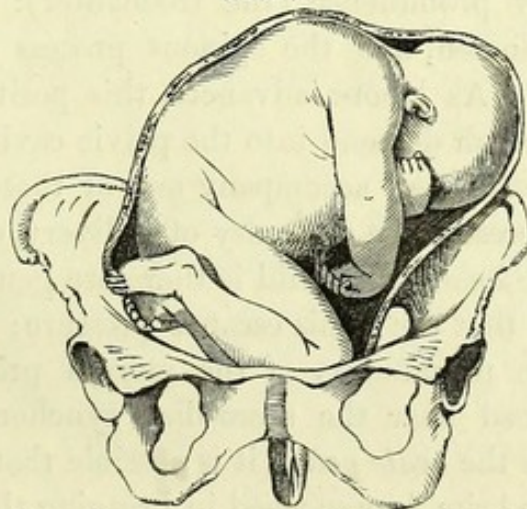
Knee Presentations with Funis prolapsed.

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 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 determined by the state of the funis. If it is 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.

FIG. 8.
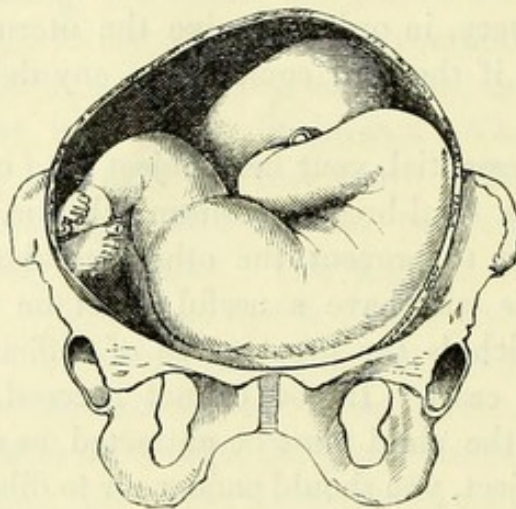
Hip Presentation.

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 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 may accompany any of these presentations, which 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 is 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

it before the pulsation has ceased; and, if so, it may be easily removed from the cavity of the pelvis, and the child preserved; 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. I have seen (I 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 is 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 are entire, no accident can occur so long as the waters are retained in the uterus; and, therefore, interference is unnecessary. 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 without 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

* Dub. Med. Trans. vol. i. p. 146.

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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 perineum, and the second child was
born living. 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 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, it then being practicable,
an examination was made. " I (Mr. Elton) found the vertex of a

Fig. 9.
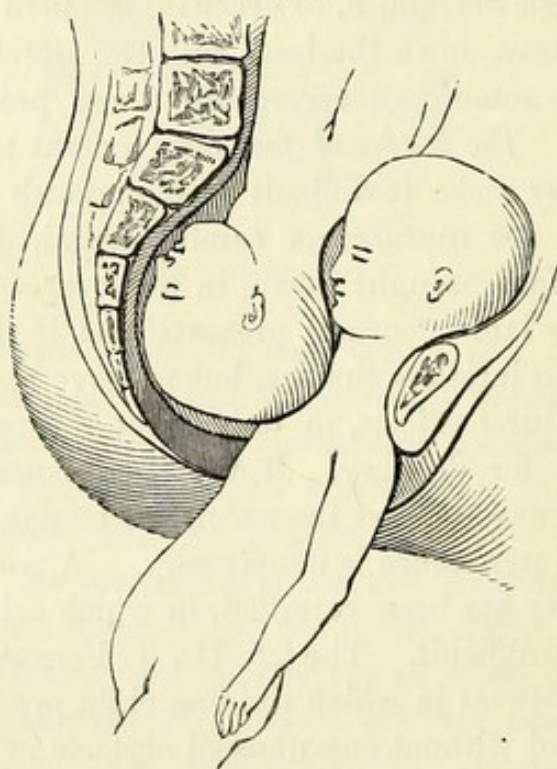
Mr. Elton's Case.

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." What is to be done in such a case as this? I certainly should not be disposed to destroy either child. Before I took up the perforator or the amputating knife, I 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.

* Medical Gazette, July 24, 1846, p. 52.

LECTURE XV.

PRETERNATURAL LABOURS: SHOULDER AND ARM PRESENTATIONS.

The Mechanism of Shoulder Presentations—Anterior Dorsal Positions—Diagnosis and Signs of Shoulder Positions—Treatment. 1st. Cases that present no Difficulty in Turning—Mode of Operating. 2nd. Cases attended with Difficulties from Rigidity of the Os Uteri—the Shoulder fixed in the Brim of the Pelvis, and the Uterus strongly contracted about the Body of the Child—Mismanagement—Deformity of the Pelvis. 3rd. Cases where turning is either Impracticable or Dangerous—Tight Stricture of Cervix Uteri—Inflammation of Uterus—Evisceration—Spontaneous Evolution—Denman's Explanation—Douglas's—Decapitation.

THE next division of preternatural labours are 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 are 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.
1st. *The anterior-dorsal position* of the shoulder, having (1st) the
right arm or (2nd) the left presenting. 2nd. *The posterior-dorsal
position*, subdivided in a similar manner, according as the right or
left arm lies in the pelvic cavity.

Anterior-dorsal positions are the most frequent, and the right
arm, I think, presents oftener than the left. We shall consider
this as the first position, and proceed to examine its relations.

FIG. 10.   FIG. 11.
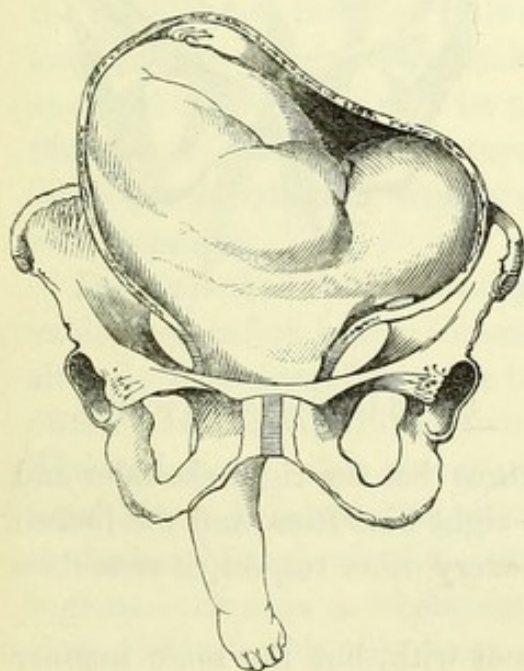
First anterior dorsal position.
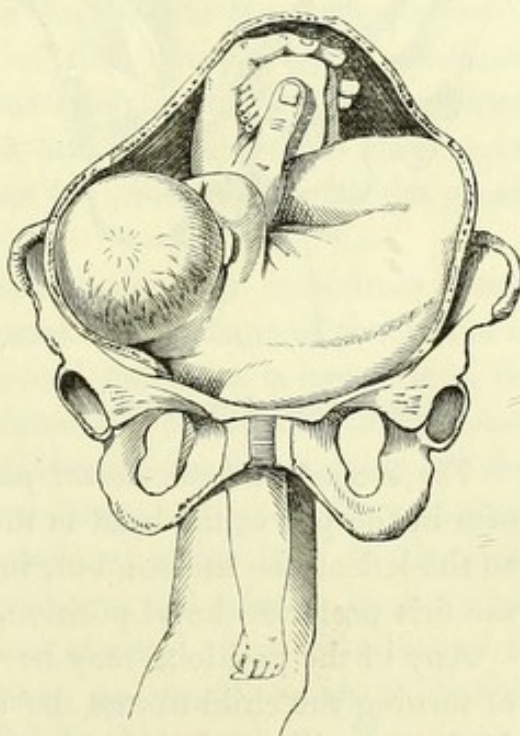
Second anterior dorsal position.

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.

In the first posterior-dorsal 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.

FIG. 12.   FIG. 13.
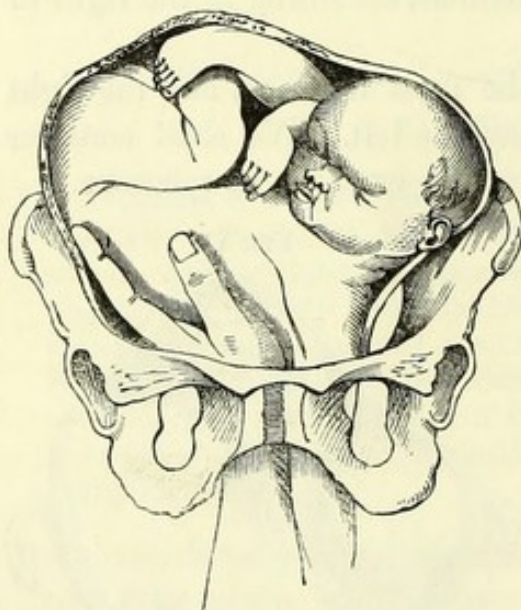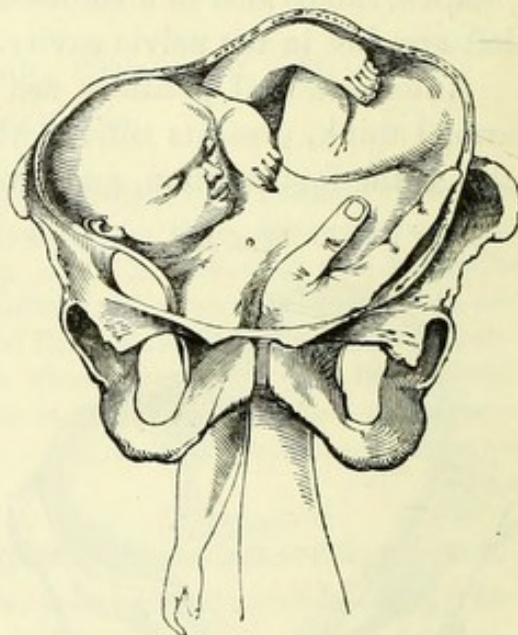
First posterior dorsal position.   Second posterior dorsal position.

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 hap-hazard 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 looks forwards or backwards, corresponds to that of the abdomen and limbs of the child, and the position of the thumb, whether it is to the left or 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 toward 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 its outline, as if divided into two tumors, 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 is quite within reach, it is difficult to determine the presentation. I 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.

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—1st, cases that present no difficulty in delivery by turning; 2nd, cases that are attended with difficulties to a greater or less extent; and 3rd, those cases where the operation of turning becomes too dangerous to be undertaken.

1st. *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 question 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 would not, therefore, be advisable to interfere before the mouth of the womb was 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 the of 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

* 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.

foot is seized, it may be removed by grasping the phalange 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. I 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 might 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 is 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 might excite strong uterine contractions, and thus the resistance to any attempt to force the hand upwards would be greatly increased: the fingers become benumbed, sensation, which is so necessary, is lost, and there is even a hazard that the uterus might give way.

Ruptures of the uterus are said to have been caused by the projecting limbs of the child, when its parieties (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.

2nd. *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 might 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 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 had 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.*"* 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."† 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 are 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 spasm, with nervous irritation, opium 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.

Having previously brought the patient 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;

* La Motte, Observ. 262, p. 467.   † Smellie, vol. iii. p. 243, Case III.

great care is now necessary while pressing it 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 would not only fail in your object, but also do such injury to the uterus as would endanger the life of the mother also.

Mismanagement may cause great difficulty in turning. I have been called to cases where an unsuccessful attempt was made to deliver the child, and the second arm, by mistake, 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 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 I have no experience of its use in this way.   I
have never met with a case where I could not bring down the
foot 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, holding the tape 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 done
carefully and without violence, you will generally succeed safely.
Be cautious also that the tape may not slip from the foot, because
if so, you would have to go over the whole process again.
Knowing the value of chloroform in allaying the irritability of
the patient, and rendering the passages dilatable, I think 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, and the funis pulsates,
the first object is to secure it from pressure, and in a pelvis of

* Vide plate.

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 down well on the chest, and the other applied to the neck; if a steady extracting force is 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 I 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 I think is better, some chloroform. When she is refreshed by rest, and the passages relieved from the irritation of your first efforts, you may again attempt to extract as before. If this fail, we have 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 the 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 is usually 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 succeeded in turning the child under such circumstances, no useful object could be gained by it; but when you reflect on the difficulties before you, that success is more than doubtful, serious injury to the uterus almost certain, and its laceration a very probable result, you would not venture upon so imprudent an operation. The child can only be removed by evisceration, and as it is frequently putrid, and the bones very loose, great care is necessary in extracting the head, lest it separate from the spine, and remain behind 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. I confess that I have never met with a case of arm-presentation in which decapitation was indispensable; and, therefore, I may not properly appreciate the difficulties that it is intended to overcome. Under any circumstances that I have met with, it was far easier to perforate the thorax than to decapitate the child; but, even if it were equally easy, it seems to me liable to some objections from which the former 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 me a matter of no ordinary difficulty. We would not think of it if the head were retained in the womb by a stricture of the cervix, because then the head would have to be removed like the placenta in an hour-glass contraction of the uterus, and you can easily imagine what kind of operation that would be. I cannot readily picture to myself 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.*" Such is the operation, which we may

* Ramsbotham, p. 371.

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presume presents some little difficulty *when the pelvis is contracted;* and if it be not contracted, and such mutilation is necessary, I think evisceration much easier and safer to perform. Both operations are equally to be avoided; but if we are compelled to undertake either, I should prefer that which is attended with the least risk.

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,—even children have been born living in this manner. The natural delivery of a cross-birth was first noticed by Denman,* who called it "*spontaneous evolution.*" " 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 into the cavity of the uterus which they have evacuated, until, the body turning, as it were, upon its own axis, the breech of the child is expelled as in an original presentation of that part.*"† 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 the 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."‡ 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

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* Denman, 328 (Ed. 8vo. Lond. 1824).   † Denman, p. 327.

‡ An Explanation, etc., etc., of Spontaneous Evolution, p. 25, 3rd. ed. Dublin, 1844

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 somewhat 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."*

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, I am inclined to think that

* Douglas, op. cit. p. 25-27.

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spontaneous *evolution*, in the strict sense of the term, sometimes occurs. I 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. I am satisfied that spontaneous *evolution* also sometimes happens. I think that it is very likely, when the child is full-grown and living, that the shoulder, in the intervals of the pains, might gradually leave the pelvis if the body was forced down into it by the action of the uterus.* 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? If the action of the uterus were powerful, and that the body were advancing, I should adopt the latter course, my only interference being to support the perinæum against the strong pressure acting against it. But if the process was retarded or difficult, a blunt hook might be passed over the body of the child above the pelvis, to assist its advance. No attempt should be made to push back the child in order to reach the feet.

* Dr. Doherty's case, *Dub. Journ.* vol. xxvii. p. 349; Dr. Copeman's case of back presentation; Crosse's cases, p. 107.

LECTURE XVI.

COMPLEX LABOURS.—GENERAL VIEW OF HÆMORRHAGES.

Bichat's Division of Hæmorrhage—by Exhalation—by Rupture of a Blood-vessel.
—Principles of Treatment in Medical and Surgical Hæmorrhage.—Uterine
Hæmorrhage in the Early Months of Gestation.—Flooding at the time of De-
livery—Arrangement of the Uterine Arteries and Veins.—The Circulation in
the Placenta.—Description of the Hunters, Weber, Goodsir.—The Effect of
Partial Separation of the Placenta.—Source of Hæmorrhage.—The Effect of a
Complete Separation.—Objections considered—Conclusion.

THE last division of labours embraces those accidental complica-
tions 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 hæmor-
rhages, convulsions, ruptures of the uterus, inversion of the
uterus, prolapse of the umbilical cord, twins, etc., 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 ruptures 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 prompti-
tude of the accoucheur. This alone would be a sufficient reason
for demanding a careful examination of the subject; but I have
an additional and equally powerful motive for asking a patient
and impartial attention to it—because in a case of so much
danger, in which 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 hæmorrhage takes 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 are 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 me, they are 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 in one way, produced for the purpose of arresting hæmorrhage caused in a manner altogether different.

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 admit red blood to exude from them. Why they do so, it is not our province to inquire; it is sufficient to state, that vessels, which hitherto resisted its escape, now permit red blood to pass, and that these vessels still maintain themselves 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. 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, one which 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, to moderate as much as possible the force of the circulation. Secondly, to encourage the formation of coagula in the mouths of the bleeding vessels until they are closed by lymph and the inherent contractile power of their coats. Let us now examine the points of resemblance, or of distinction, between these and uterine hæmorrhages.

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 proportionably increased — the arteries in connection with the placenta are especially 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 not 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.

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."* 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 coil of the artery is more twisted on itself, and the impetus of the blood 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 artery more angular, so as to give it rather a zig-zag than a spiral direction.   You perceive, therefore, that by this mechanism the agency of a new power is

* Dr. W. Hunter's Anatomical Description, etc., p. 17.

introduced for the purpose of suppressing hæmorrhage, which is not employed in other arteries.

*The veins of the uterus** 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 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, 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

* Vide Fig. 14.

Plate 2.
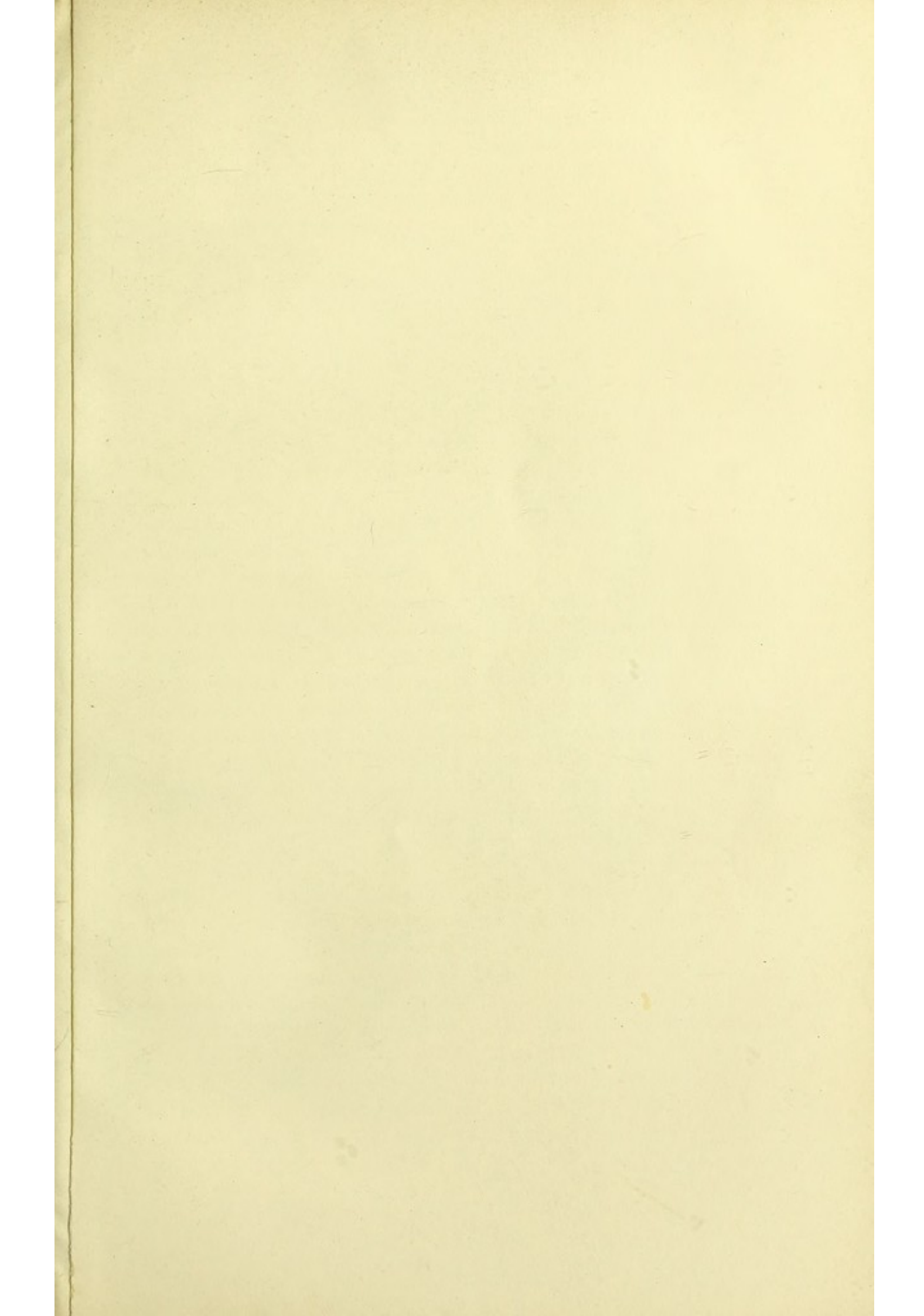
Fig. 14.
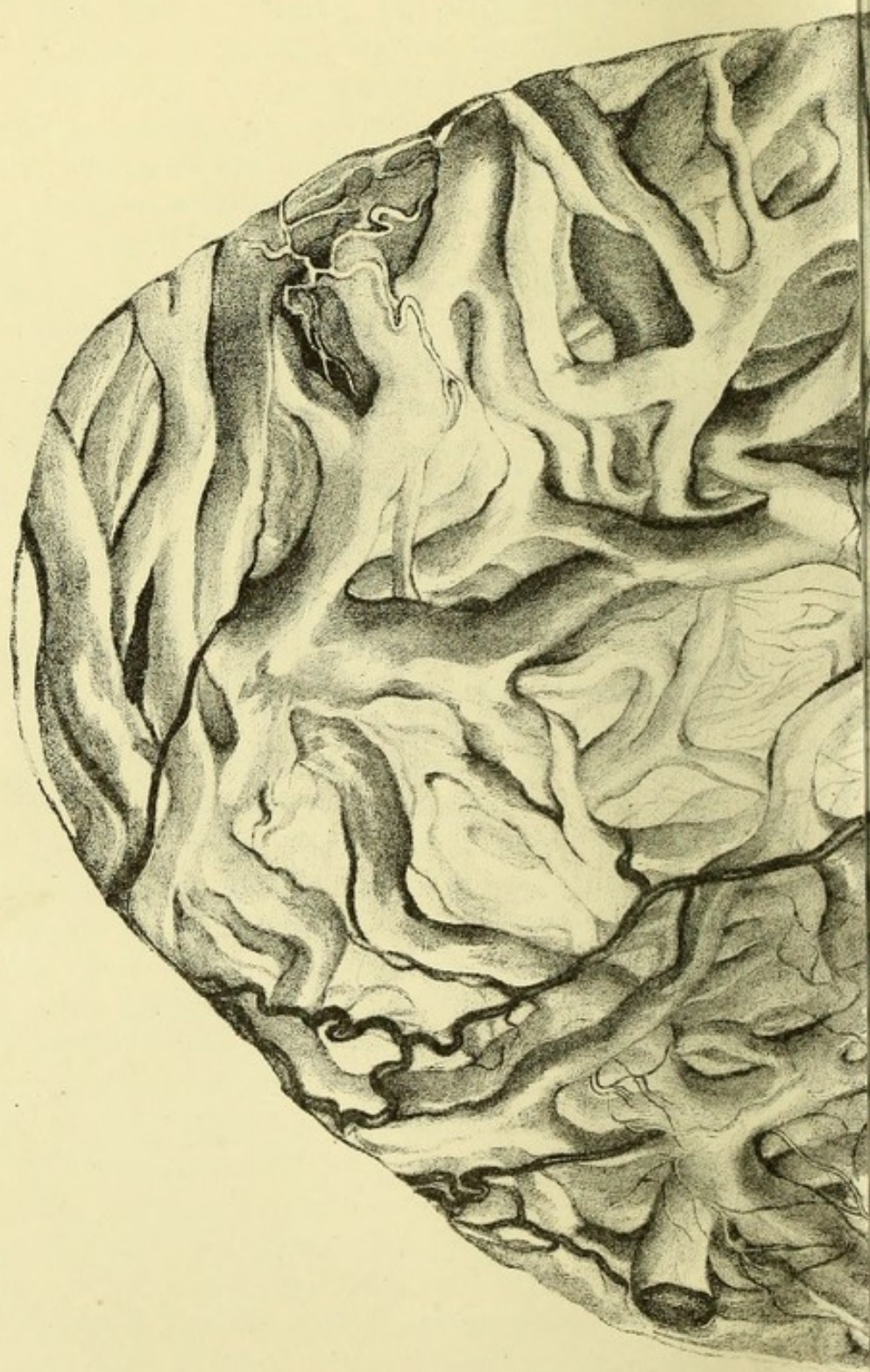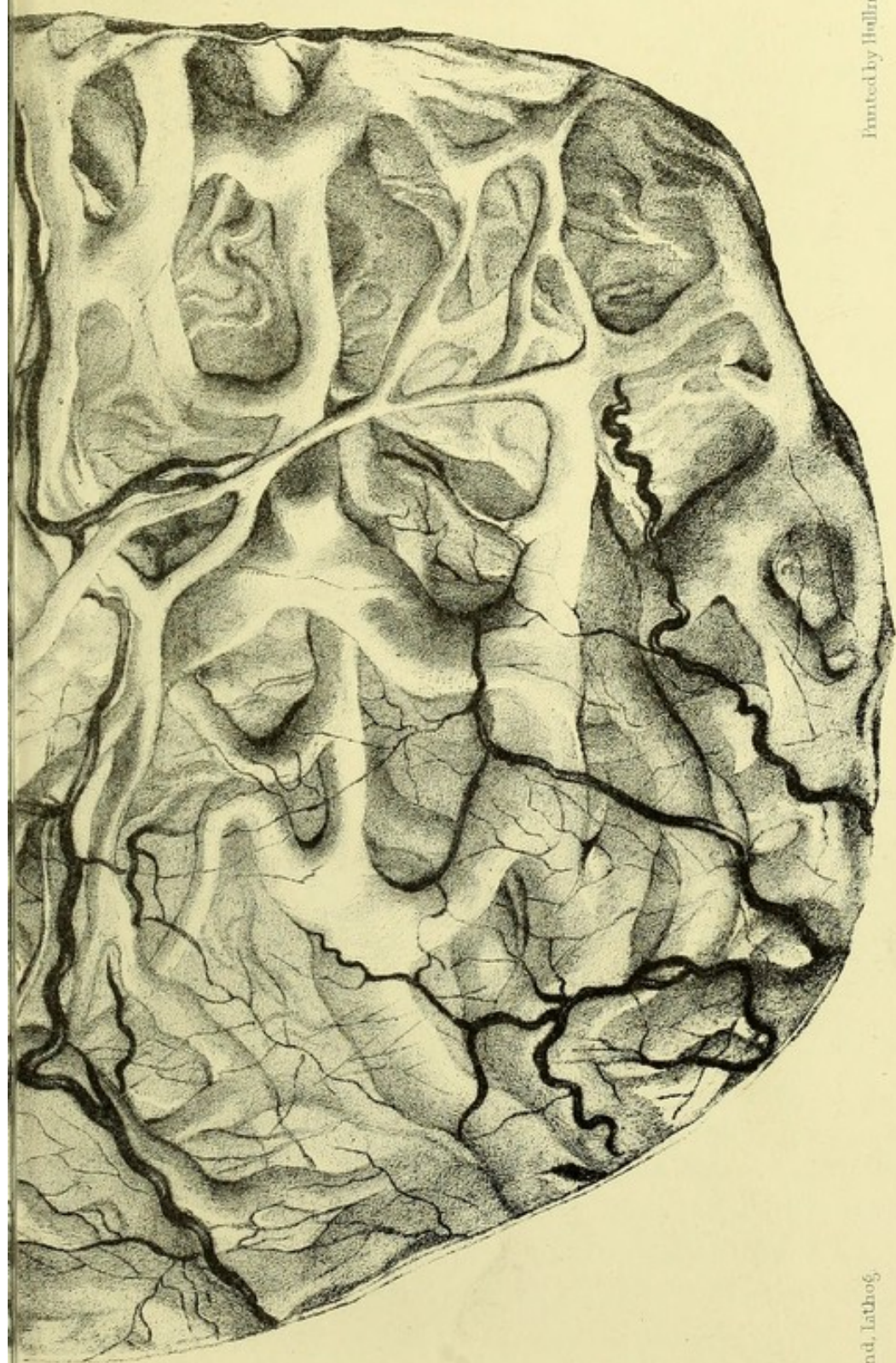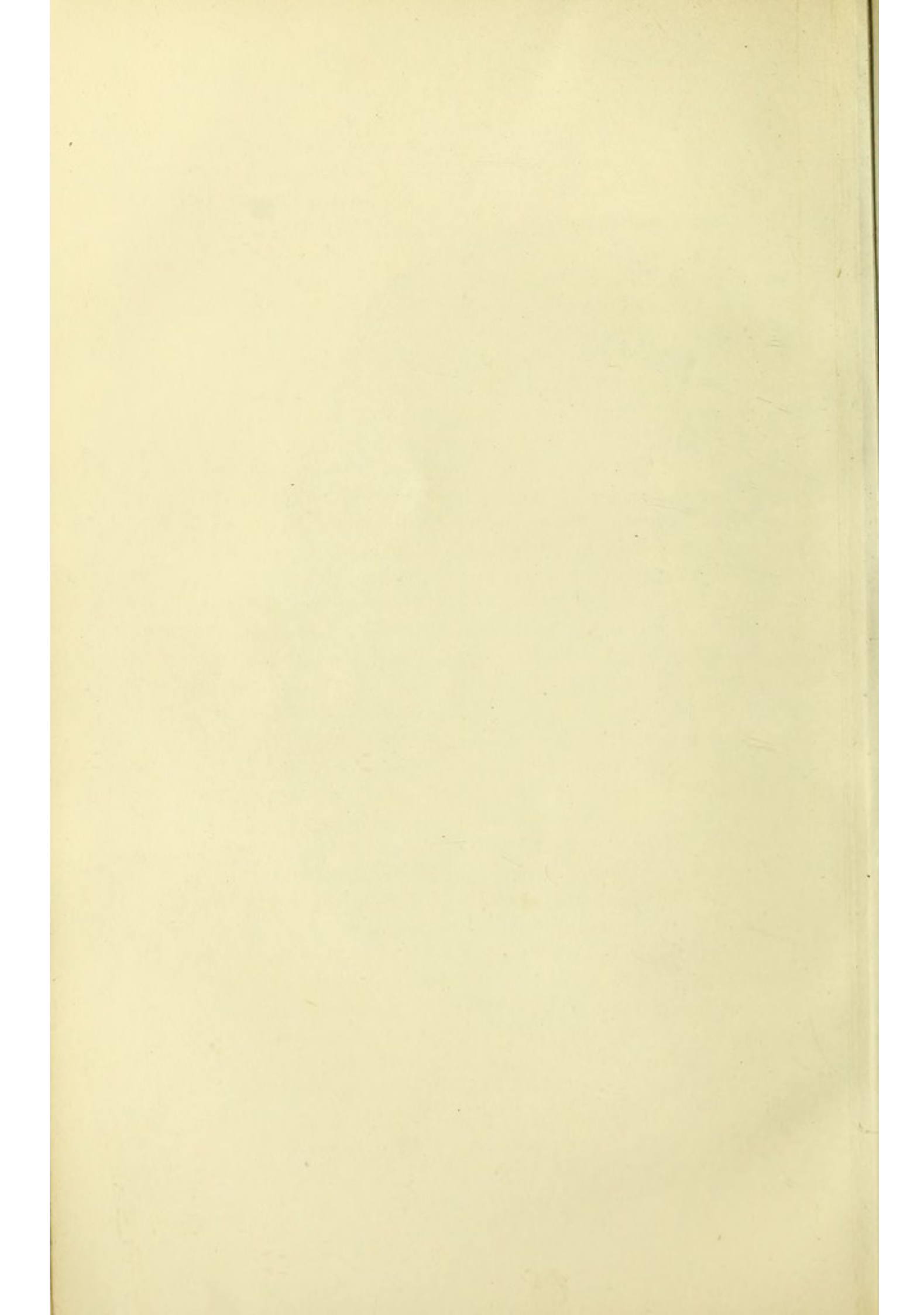
these passages upon the contraction of the muscular fibres with which they are everywhere immediately surrounded."* Professor Goodsir repeated this dissection, and observed the same appearances.† Professor Simpson also made a similar examination, and observed that, " when a venous tube of one plane comes 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 into 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.*‡ 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.

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 the placenta, and how this

* John Hunter's Works, by Palmer, vol. iv. p. 68.
† Goodsir's Anatomical and Pathological Observations, p. 61.
‡ Northern Journal of Medicine, January, 1846.

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 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 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 inference 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. Such had been, and is even still, the opinion of some writers, but its inaccuracy has been clearly proved.

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 have been made to repeat these injections, but without success; and thus incontrovertible evidence seemed to be afforded in favour of the opinion that the placenta was entirely fœtal. The injections, and the doctrine founded upon them, were considered to be equally fallacious. Such had been the opinion of Dr. R. Lee, who has since admitted his error, and points 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, 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

* This evidence of Dr. R. Lee was first published in his Lectures (p. 135-136) in 1844, some years after it was ascertained. I have quoted it because it is the strongest negative on the opinion that no maternal blood flows through the placenta. Dr. Sharpey also has, by a most successful injection, demonstrated that maternal blood penetrates the whole placenta (vide Fig. 22).

that, throughout its whole extent, villus was connected with villus, and tuft with tuft, by similar threads of venous membrane."*

These reticulate threads form the cavernous structure of John Hunter: thus you perceive that the first and the last enquirer 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, I 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 penetrates 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, form 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-*

* Goodsir, op. cit. p. 61.

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 farther 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.*

On a question of so much difficulty, and one which has been so much misunderstood, I have preferred giving you the descriptions of the best and most careful observers, rather than my 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 is 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

* Wagner's Elements of Physiology, p. 201-202 note.

connection between the placenta and uterus were broken through?
If the placenta were separated partially from the uterus? From

FIG. 15.
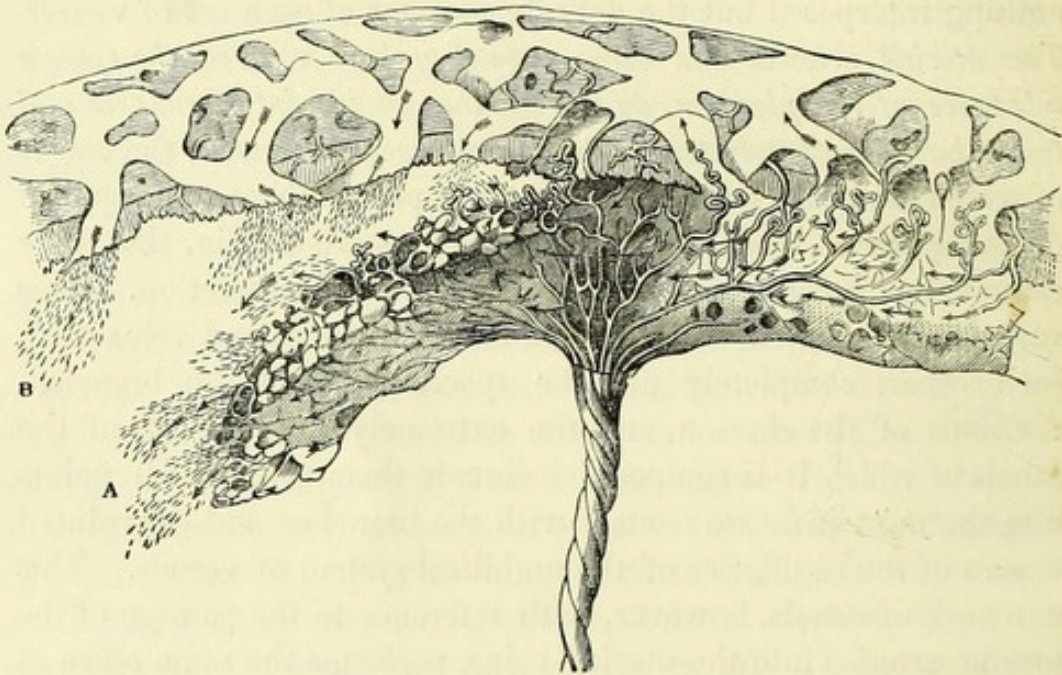
Diagram Sketch to represent the sources of Hæmorrhage from Placenta and Uterus.
A. Arterial current through Placenta.   B. Venous reflex current from uterine
sinuses.

the nature of this injury, the torn curling arteries might not pour
out much blood.   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—1st. From the openings that communicate with the rete
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
through the placenta—2nd. From the venous orifices on the
surface of the uterus.   The maternal blood flows from both ex-
tremities 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 cer-
tainty of the fact which the late Dr. Hamilton stated many years
ago,—which Professor Simpson has since with so much ability
confirmed, but which still remains an enigma to perplex some
writers on the subject,—you can understand why, when the
placenta is partially detached from the uterus, blood flows from

its denuded surface, and that the exposed uterine veins (or sinuses, as they are called), are not the only sources of uterine hæmorrhage. When that viscus 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.

Let us next consider the natural provisions to check hæmorrhage from these surfaces when they are thus exposed by a 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 importaut 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 prevented. The importance, nay the necessity, of this new agent, to prevent hæmorrhage from the uterus, is, I trust, sufficiently obvious to you.

Hitherto I 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 is retained in the cavity of the womb, or is 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; and I cannot perceive, nor can I 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*), that you may have relaxation of the uterus without any hæmorrhage, and conversely

* Account of some of the more important Diseases of Women, p. 832.

X

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 to me, then, that hæmorrhage *must* be the result of a *complete* relaxation of the uterus. In this I am happily supported by the opinion of Prof. Simpson, who remarks, " No doubt the occurrence after delivery of great and decided atony in the whole muscular system of the uterus does assuredly give rise to post-partem hæmorrhage."* 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, 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 its direction and 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 me, 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

* Northern Journal of Medicine, January, 1846.

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.

Let us now examine the converse proposition. It sometimes happens that, when the uterus is strongly contracted, flooding takes place. I confess that I 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? I 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 my 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 I 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 to increase to flooding. In spite of every means that was used, exhaustion and death took place. One was, however, omitted, in consequence of the contraction of the uterus: the hand was not passed within its cavity, which the sequel proved to have been an unfortunate omission. A small portion of the placenta, 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 placenta 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."*   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.   Of this, however, I can give you no evidence; but, I would ask, Are these exceptions—and, I 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 I were to lay down such a proposition, I should lead you into an error that the first case of hæmorrhage you might meet with 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.

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 is 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

* Rigby's Midwifery, p. 259.

hæmorrhages, because 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 there may be flooding when the uterus is contracted; but these exceptions do not invalidate the general principle *that contraction of the uterine fibres is the essential means of arresting uterine hæmorrhages.*

We have still, however, to consider the influence of another important agent over the uterine circulation, which must be taken in connection with that we have explained to you, in order to understand correctly the principles of treatment.

Fig. 16.*
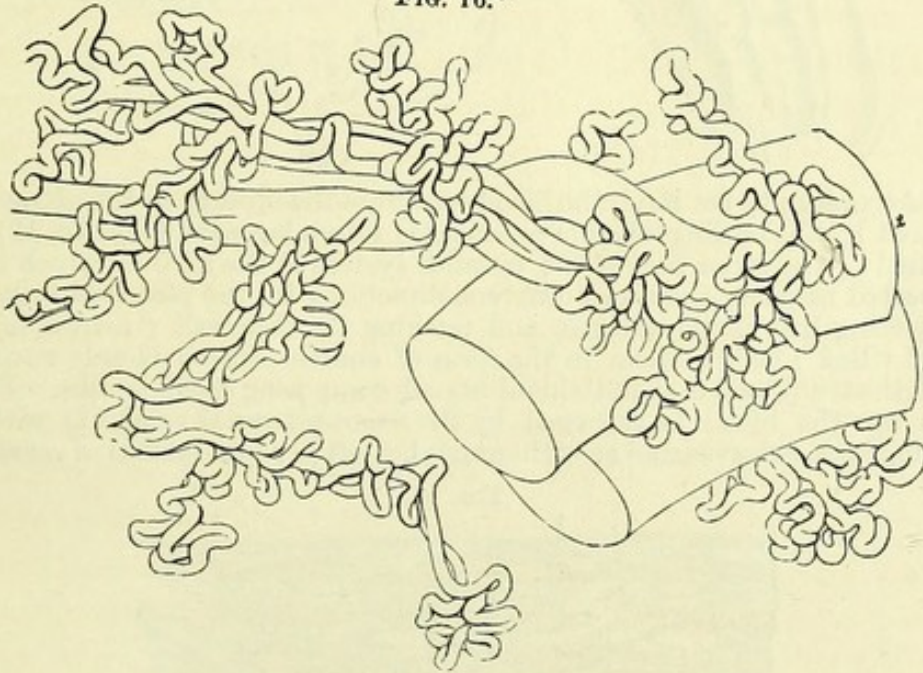
The accompanying illustrations will render the minute structure of the placenta more intelligible.

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.

* Fig. 16 represents the villi of the fœtal portion of a mature human placenta magnified 100 diameters after E. H. Weber.

"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."*

Fig. 17.†
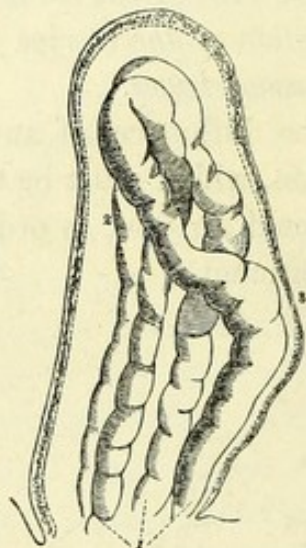
Fig. 18.
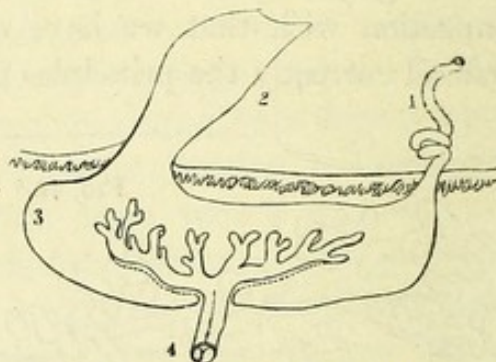
"According to Dr. Reid, the blood sent from the mother to the placenta is poured by the curling uterine arteries (1) into a large sac (Figs. 18, 19), (3) formed by the inner coat of the vascular system of the mother, which is intersected in many thousand different directions by the placental tufts (4) 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 blood is returned by the utero-placental veins (2) without having been extravasated or without having left her own system of vessels."‡

Fig. 19.
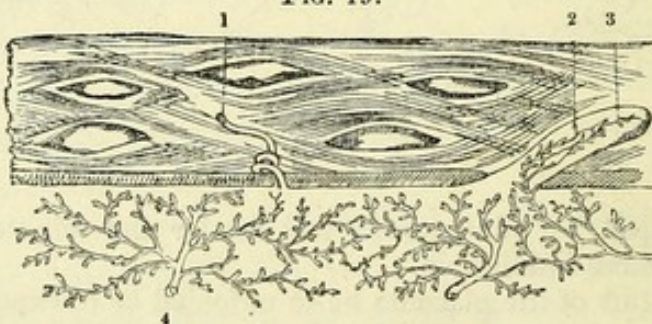
Fig. 20. Represents the fœtal surface of mature placenta.

Fig. 21. A diagram sketch to represent the relative distribution of the fœtal vessels, and the maternal spongy structure in connecion with the uterine veins

Fig. 22. Taken from a beautiful drawing made by Mr. Tuson, of a placenta most successfully injected by Dr. Sharpey. The fœtal vessels were injected with vermillion. The maternal portion with colourless size.

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* Müller's Physiology, vol. ii. p. 1605.

† Fig. 17. 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.   ‡ Müller, p. 1606.
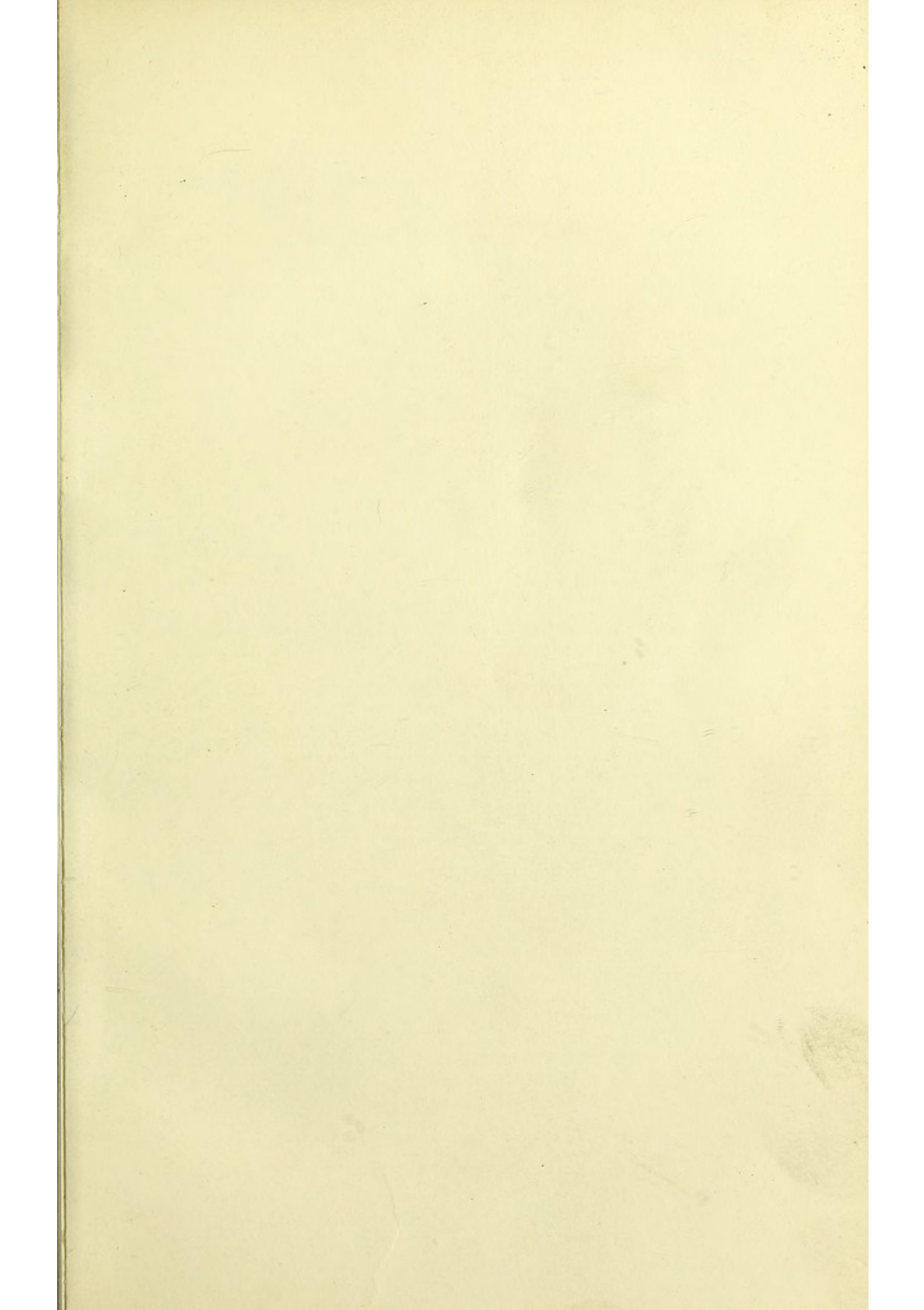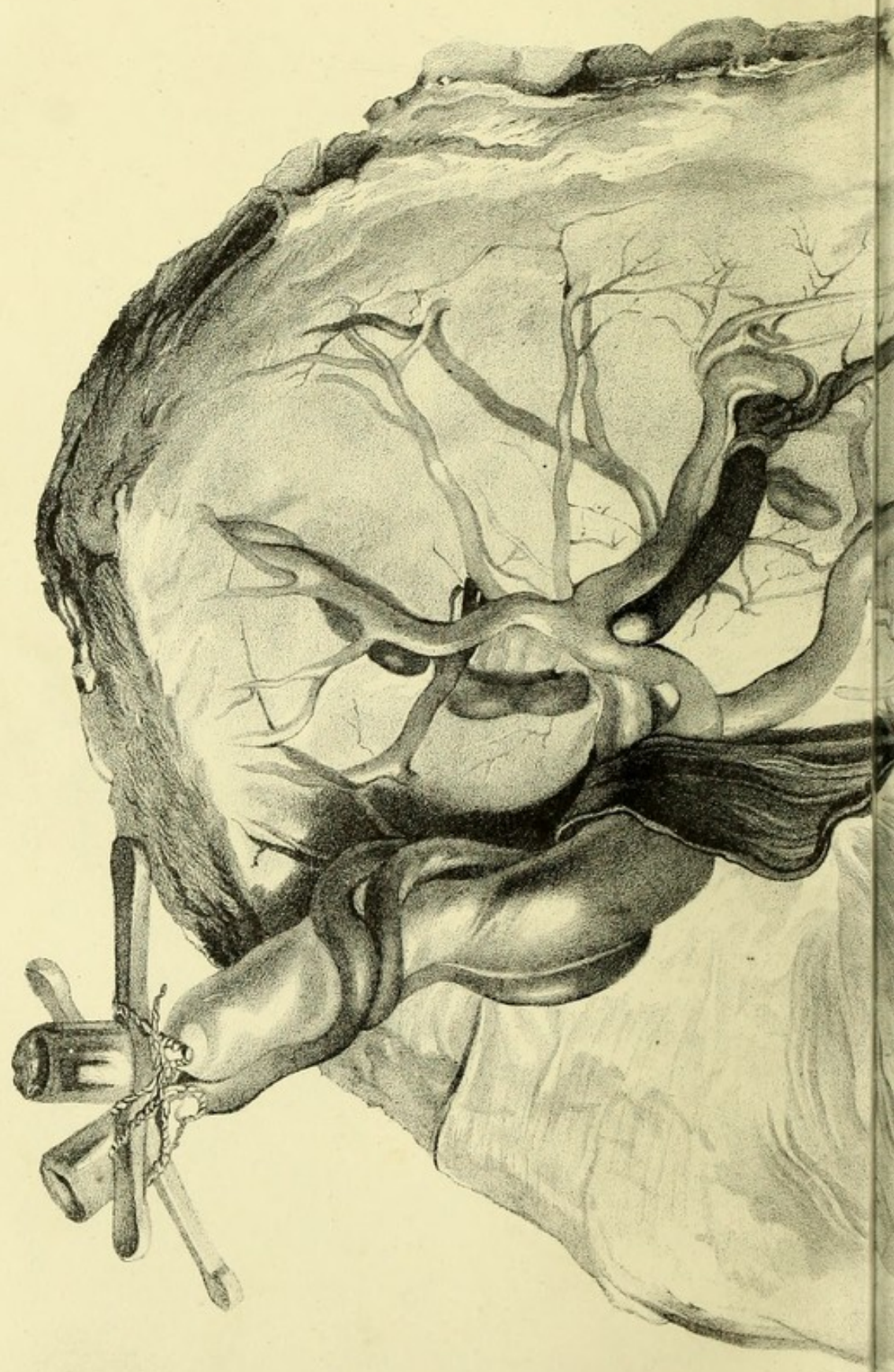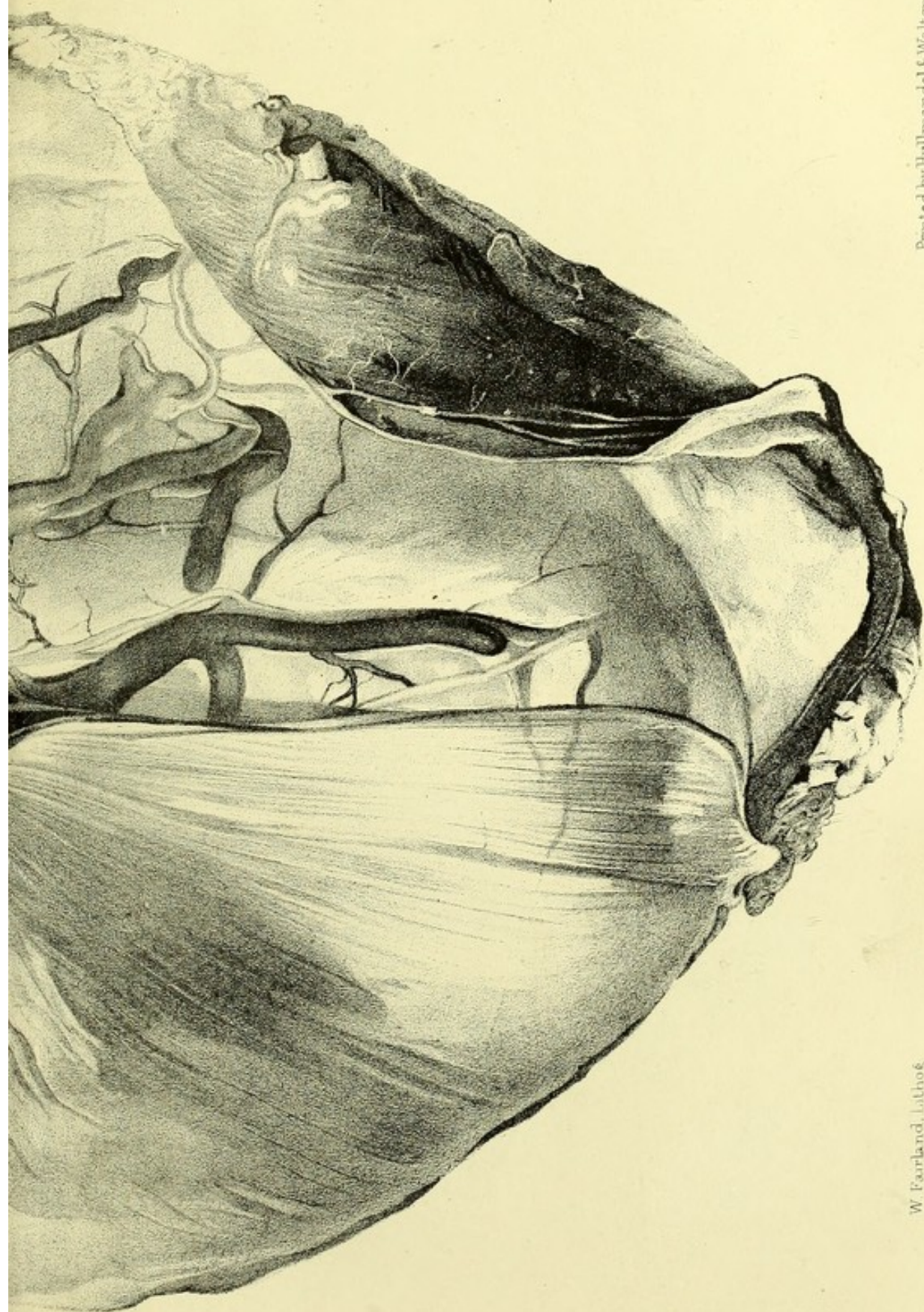
Plate 3.

Fig. 20

Plate 4.

Fig 21.
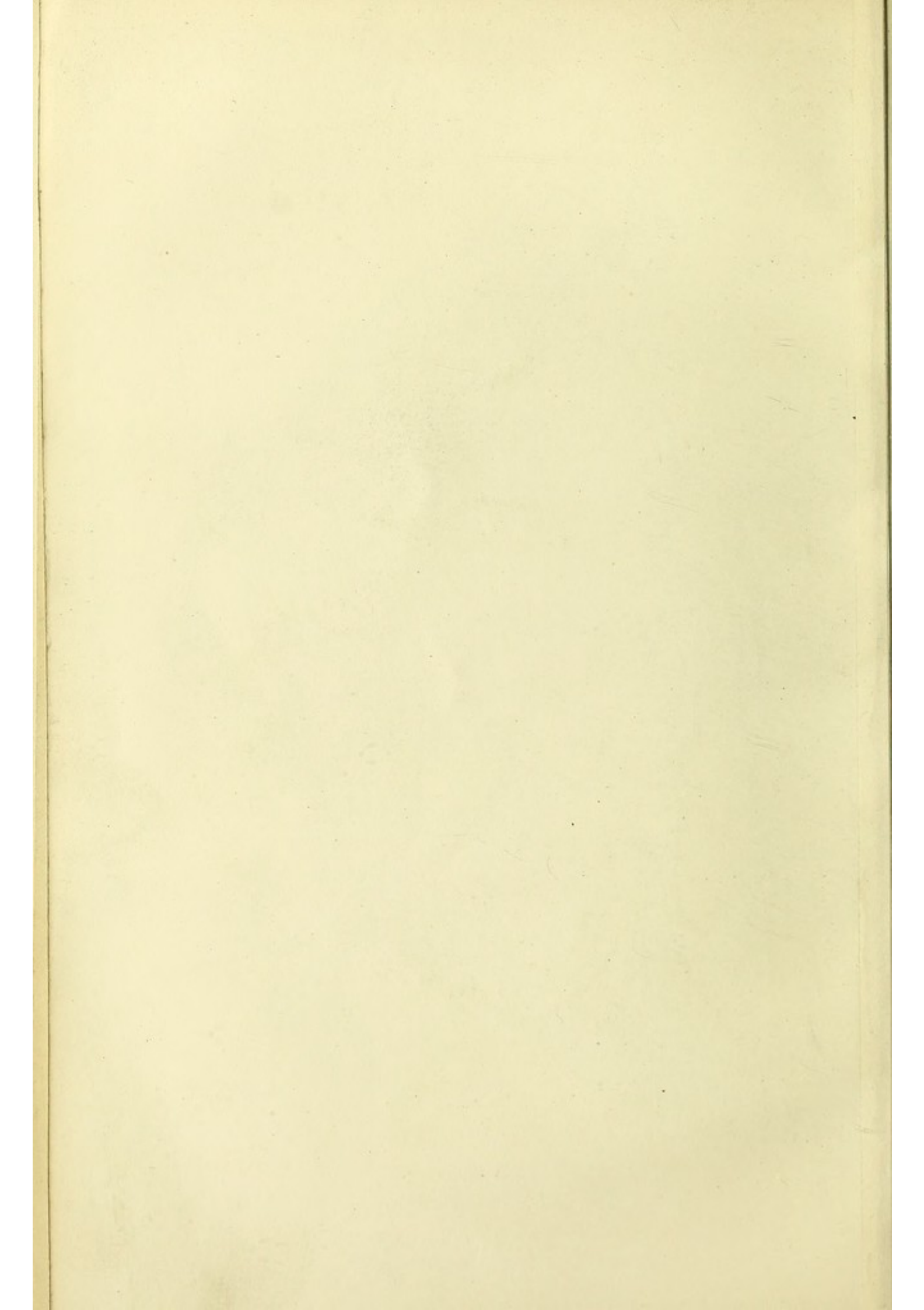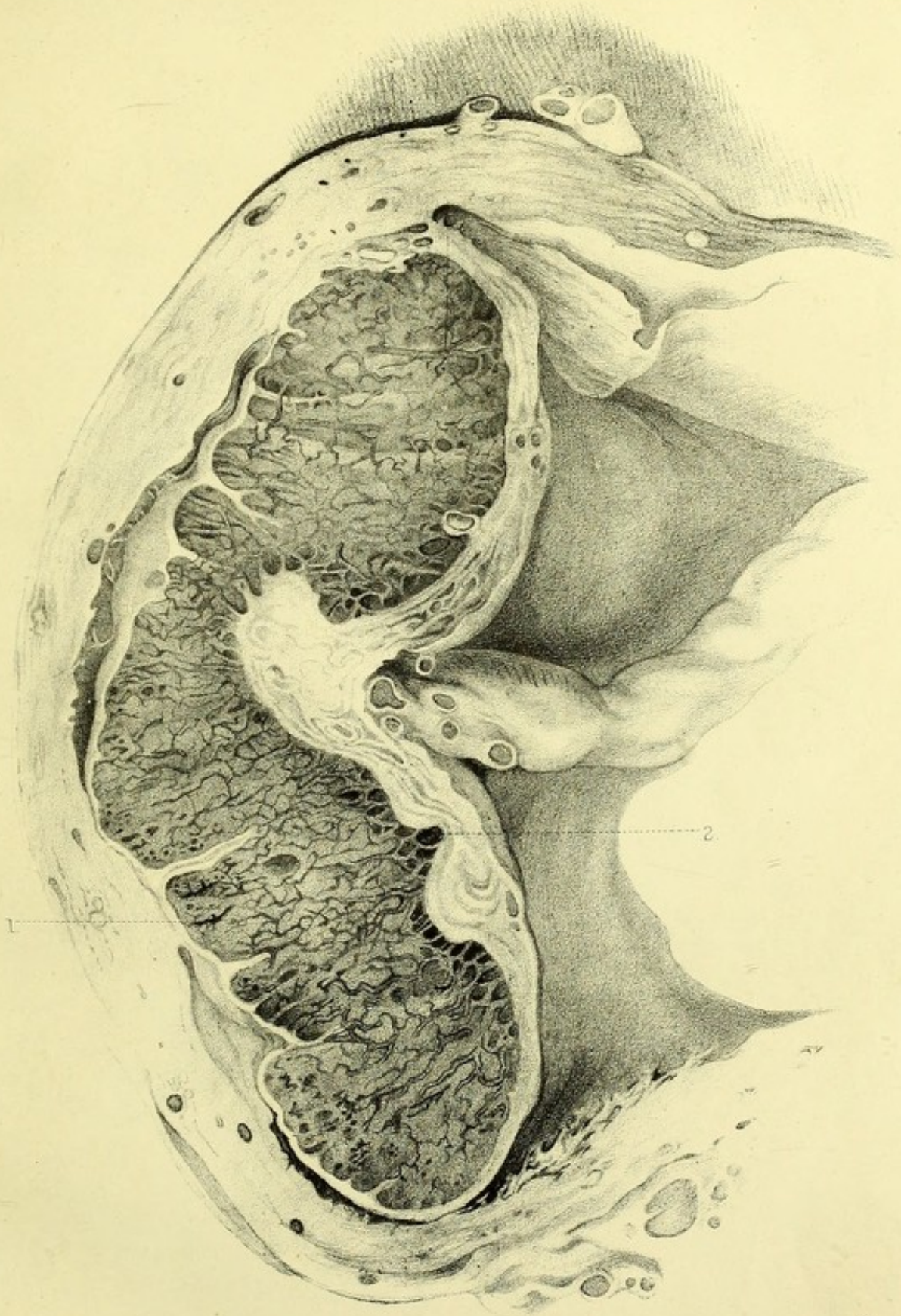
1 *Fœtal Vessels.*

2 *Reticulate structure.*

NATURAL VIEW OF PLACENTAL VESSELS,

taken by Mr Tuson from a Placenta injected by Dr Sharpey.

Plate 5.

Fig. 22.
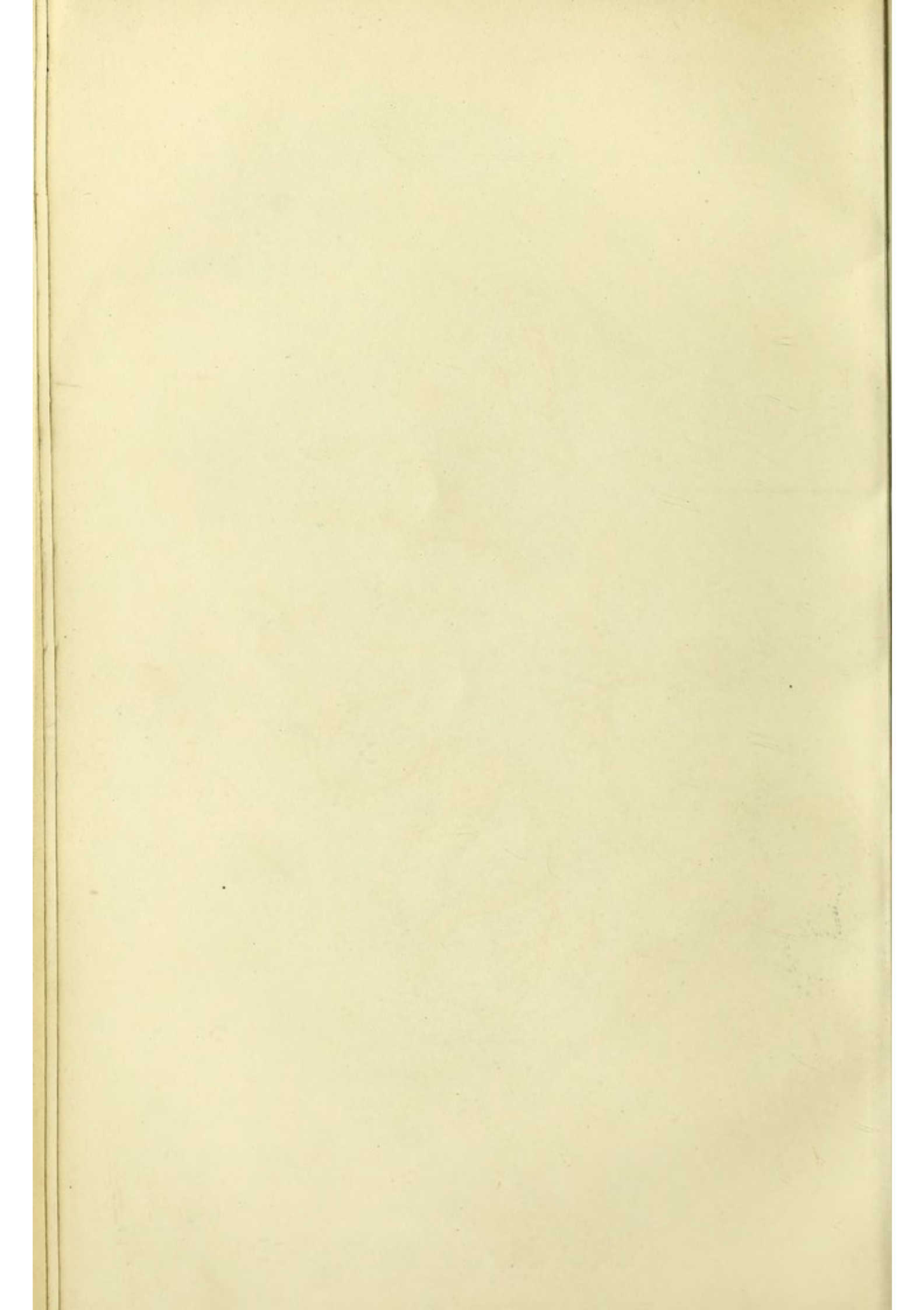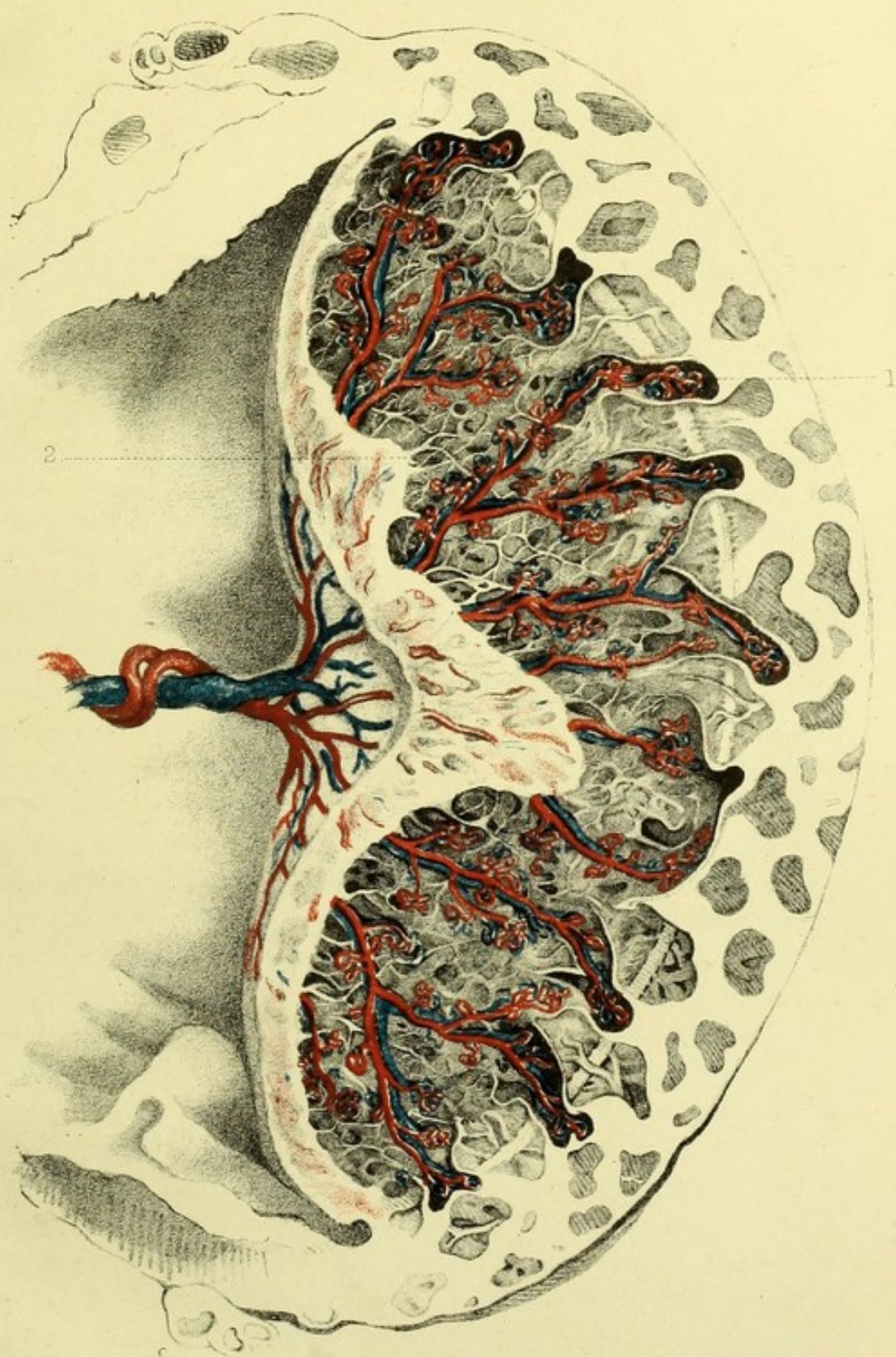
1 *Fœtal Vessels.*

2 *Reticulate structure.*

DIAGRAM VIEW OF PLACENTAL VESSELS.

from a drawing by M.ʳ Tuson
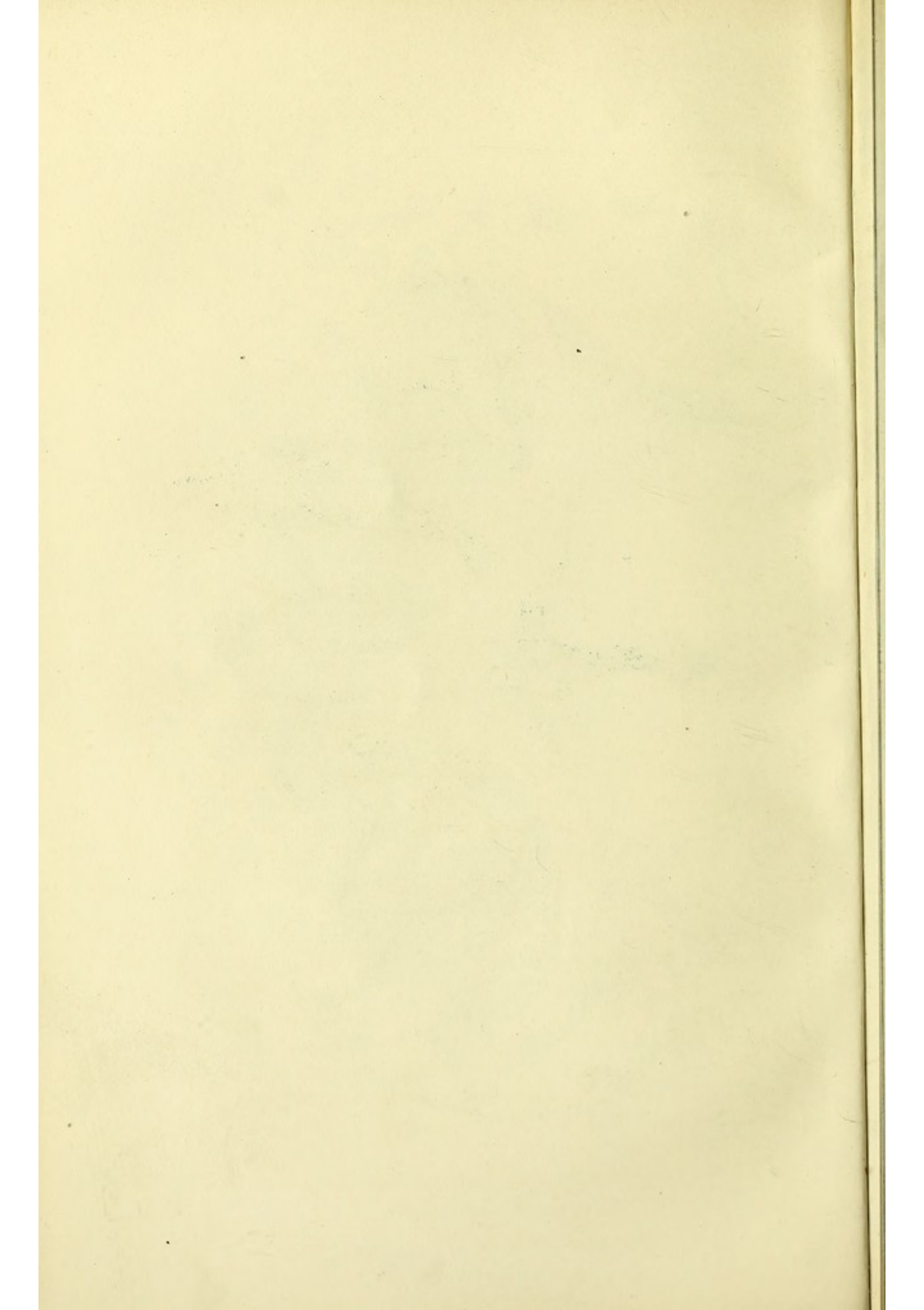
LECTURE XVII.

GENERAL VIEW OF HÆMORRHAGES, CONTINUED.

Vital Causes.—Nervous Influence.—Effects of Excitement and Depression of the Nervous System on the Contractility of the Uterus.—Natural Agents and Therapeutic Remedies for the Arrest of Hæmorrhage illustrate the Principles laid down—viz., Syncope, Coagulation. — Depletion.— Cold.— Astringents.— Styptics.—Stimulants.—Opium.—Ergot of Rye.—Electricity.—Direct Irritation of the Uterus.—Compression of the Aorta and Cava.—Transfusion.—Special Floodings before Delivery divided into Accidental and Unavoidable.—Accidental Hæmorrhage before Birth.—Causes.—Symptoms.—Treatment.

WE have explained the means provided by Nature to prevent hæmorrhages from the uterus: they present another illustration of mechanical contrivance equally interesting as 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 he 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 me by my friend, Mr. Forbes, with whose permission I 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.

This case, I 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 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 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.

From these general observations you will perceive that, in the mode of arrest, uterine hæmorrhage differs essentially from hæmorrhages 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.   Those of the uterus depend altogether upon its contractile tissue; and hence, as in general hæmorrhages, one of the great 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 your atten-

tion to the different agents and therapeutic remedies employed for this purpose—first pointing out those that are applicable to general hæmorrhages, and then we shall contrast them with such as control floodings from the uterus.

Syncope is a natural provision to relieve a bleeding vessel from the momentum of blood impelled 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 serious flooding: for instance, a small coagulum may form in the cavity of the uterus, which gradually increases; 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

flooding. The same contrast may be observed in therapeutic remedies.

Depletion is frequently employed in general hæmorrhage—for instance, in epistaxis—because, by diminishing the impetus of an over-excited circulation, coagulation readily takes place in the open vessels, and their coats can 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 to you, 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 when employed in floodings. In other hæmorrhages the refrigerating effect of cold is serviceable, both because it 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 employed generally, and the circulation is lowered by it, the danger of the case may be greatly increased. Judging from some opportunities I have had of witnessing this effect, I look upon general refrigeration with great apprehension; the circulation may never recover itself: but if, on the contrary, its 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 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 that 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." 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; for instance—

Stimulants are almost indispensable in the former; they would be most mischievous in the latter. 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

* Gooch, op. cit. pp. 338—339.

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 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 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, might 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 would stimulate; a larger one would exhibit its sedative effects; but if, on the contrary, that irritability is destroyed, and the uterus atonic, the same large dose would only act a stimulant: nor will the sedative property of the medicine be observed until the nervous energy is restored.

The truth of this fact I have frequently observed in cases of extreme flooding. The usual dose (m xxx.) of tincture of opium, had 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 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 I

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 hæmorhage 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 I might be convinced of its truth, I 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 I have frequently had the opportunity of making. Cases have occurred in which these remedies, administered in the manner stated, have produced the effects described. I 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 lately 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."* Mr. Dorrington,+ Mr. Wilson,‡ and Mr. Clarke,§ 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 a 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, is 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 a 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

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* Provincial Med. Surg. Journal, Dec. 24, 1844, p. 603.
+ Provincial Med. Journal, March 11, 1846, p. 105.
‡ Provincial Med. Journal, April 29, 1846.
§ Dublin Hospital Gazette, March 1, 1848.

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. I confess that I 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; but its value is questionable in other instances, because of the risk of subsequent inflammation of the veins.

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 that is 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 me 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 me 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 had been 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—and in the majority of cases it has failed—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."* Dr. Ashwell mentions two unsuccessful cases. I have myself witnessed three cases, in which transfusion was performed without any accident: they all died. Dr. Blundell's objection might be offered. It might be said, that the operation was performed too late; but I do not believe such an objection is valid. Transfusion is extremely hazardous, and if there was 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 of any use, the effect in such instances must be the *experimentum crucis* to determine it. The cases in which I 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. I have only mentioned unsuccessful cases. I am happy to have it in my power to brighten this gloomy picture with one successful case that illustrates these observations. It occurred in the practice of Dr. Waller, who states that he was called in by Mr. Greaves to a case of profuse flooding, in consequence of partial placenta presentation. His patient appearing in a desperate condition, Dr. Waller's attendance was requested.

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* Blundell's Obstetricy, by Castle, p. 350.

" I [Dr. W.] found her in a very unpromising state, with a completely blanched countenance, pale and livid lips, cold extremities, laborious respiration, and a pulse scarcely perceptible; the general surface of the body was also cold—in short, everything indicated approaching dissolution. Stimulants had been freely given, but they failed to excite even a temporary rally. The vagina was filled with coagula, and as the hæmorrhage appeared to have ceased, I did not think it advisable to disturb the clots by attempting delivery. The symptoms of exhaustion increased; stimulants were had recourse to with no better effect; and nothing but transfusion seemed, under these circumstances, to hold out the slightest chance of relief. . . . The operation was at once commenced. When about five ounces of blood had been introduced, the amendment was evident; the pulse was more perceptible; and the countenance assumed a somewhat better aspect. . . . The rally continued for about two hours and a half, when the female again began to sink, and jactitation supervened; gruel with brandy was given without any benefit; the pulse was again but just perceptible, and the body getting cold. I again injected about four ounces from the same individual who had previously supplied it, but this time the symptoms did not improve. The stream issuing from the punctured arm was so languid, that it was not thought right to proceed, and a fresh subject was sought to furnish us with a better supply. The husband of the patient being in the room, came forward to our aid; he looked rather pale, and therefore we gave him a glass of hot brandy and water, and then opened a vein, from which blood flowed in an impetuous stream. The first injection of about two ounces produced a marked alteration in the pulse: it became decidedly perceptible. When nine ounces had been injected, the countenance was much improved: there was even a slight appearance of colour in the cheeks, and pain in the arm was complained of. Four ounces more were introduced, when all symptoms of immediate danger vanished. There was no faintness afterwards; the surface was warm; the pulse steady, about 100 in the minute; jactitation ceased; and nourishment was retained on the stomach. . . . Dr. Waller left the case in the hands of Mr. Greaves, who informed him that after a sleep of some hours the pains increased, and he felt a portion of the detached placenta in the vagina: this was expelled by the natural

efforts.   A dead child soon followed, the remainder of the placenta coming away an hour afterwards without hæmorrhage.   The mother recovered."*   I have detailed this case, because it is so instructive, so encouraging, and so well illustrates the observations we have made.

It now remains for us to consider the *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 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, I think, 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 exertion, as straining, mental emotion, plethora, spasmodic contractions of the uterus, etc.   Not one of these causes appears to me 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

* Medical Times, vol. xvii. p. 256, January 18, 1848.

uterus may receive a very violent shock, and the placenta not be disturbed.*   The structure of the placenta is such as to admit of its expansion and contraction without breaking through its connection with the uterus.   I question very much, therefore, that any spasmodic contractions could separate it.   These causes seem to me to produce their effect in a different way.   Each of them must, in a greater or a less degree, disturb the general circulation, and 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 both 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 had 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 did not yield to the weight of the blood effused.   Drs. Hardy and M'Clintock refer in their valuable report to two cases of this kind, that 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."†

Small coagula on the uterine surface of the placenta is a

* Medico-Chirurgical Transactions, vol. xii.

† On Midwifery and Puerperal Diseases, p. 194, by Drs. Hardy and M'Clintock.

common occurrence. The ordinary effect of labour seems to be sufficient to produce these partial effusions. They do not affect the constitution of the patient, or 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 overexcited circulation, we sometimes meet with others of an opposite character giving rise to hæmorrhage. Some women of a leucophlegmatic temperament, may have been the subject of anæmia, have had leucorrhœa, menorrhagia, etc. 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 hæmorrhages 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 it subsides: 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 the action of the uterus; the pains are weaker, and the pulse more rapid and jerking, but they are very soon succeeded by the symptoms of nervous irritation and exhaustion. The patient is 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, countenancé deadly pale, the eyes fixed, or slightly drawn upwards, extremities cold; as she revives she speaks incoherently, respiration is stertorous, jactitation 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 blown out with every expiration; convulsions may supervene, and at length, after a few gasps, this 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 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 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 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 the former infused in a wine-glass of water, may be given alone, or, what is better, in combination of opium. Thirty or forty minims of tincture of opium may be added to the infusion, 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; I have known a glass of brandy scarcely support the pulse. Brandy, with laudnum, 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, Pusos, 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, I have no hesitation in deciding in favour of rupturing the membranes; I have never found it 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 are 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 I cannot speak without some hesitation. I confess I like *to see* whatever discharge may flow from the uterus; nor do I feel satisfied so long as there is the least trickling of blood. If the vagina were plugged, I 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. I think you will find it very seldom necessary to turn the child; the means already detailed are generally adequate to control flooding, and 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.

LECTURE XVIII.

UNAVOIDABLE HÆMORRHAGE.

Source of Danger.—Natural Means of arresting Hæmorrhage.—The Effect of Dilatation of the Os Uteri on the Utero-Placental Circulation.—Importance of the Reticulate Structure of the Placenta.—Manner in which Hæmorrhage is arrested. —Separation of the Placenta, the Natural Mode of arresting Hæmorrhage.— Causes of Failure.—Complete and Partial Attachment of the Placenta.—Symptoms of Unavoidable Hæmorrhage.—Sources of Error.—Vaginal Examination.— Treatment.—Cases where Hæmorrhage is only commencing.—Compression of the Placenta.—Mode of plugging the Vagina.—Turning the Child.—Mode of Operating.—Case where the Patient is in extreme Exhaustion.—Danger of turning.—The Question of separating the Placenta discussed.

UNAVOIDABLE HÆMORRHAGE is a much more serious variety of flooding than that which we have briefly described; consequently, from the time that 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; because, when the os uteri begins to dilate, this connection is broken through, and hæmorrhage unavoidably follows. Even before the full term of pregnancy, when the cervix begins to expand in order to form a part of the uterine cavity, the attachment of the placenta may be disturbed, and hæmorrhage 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

Fig. 23.

Plate 6.
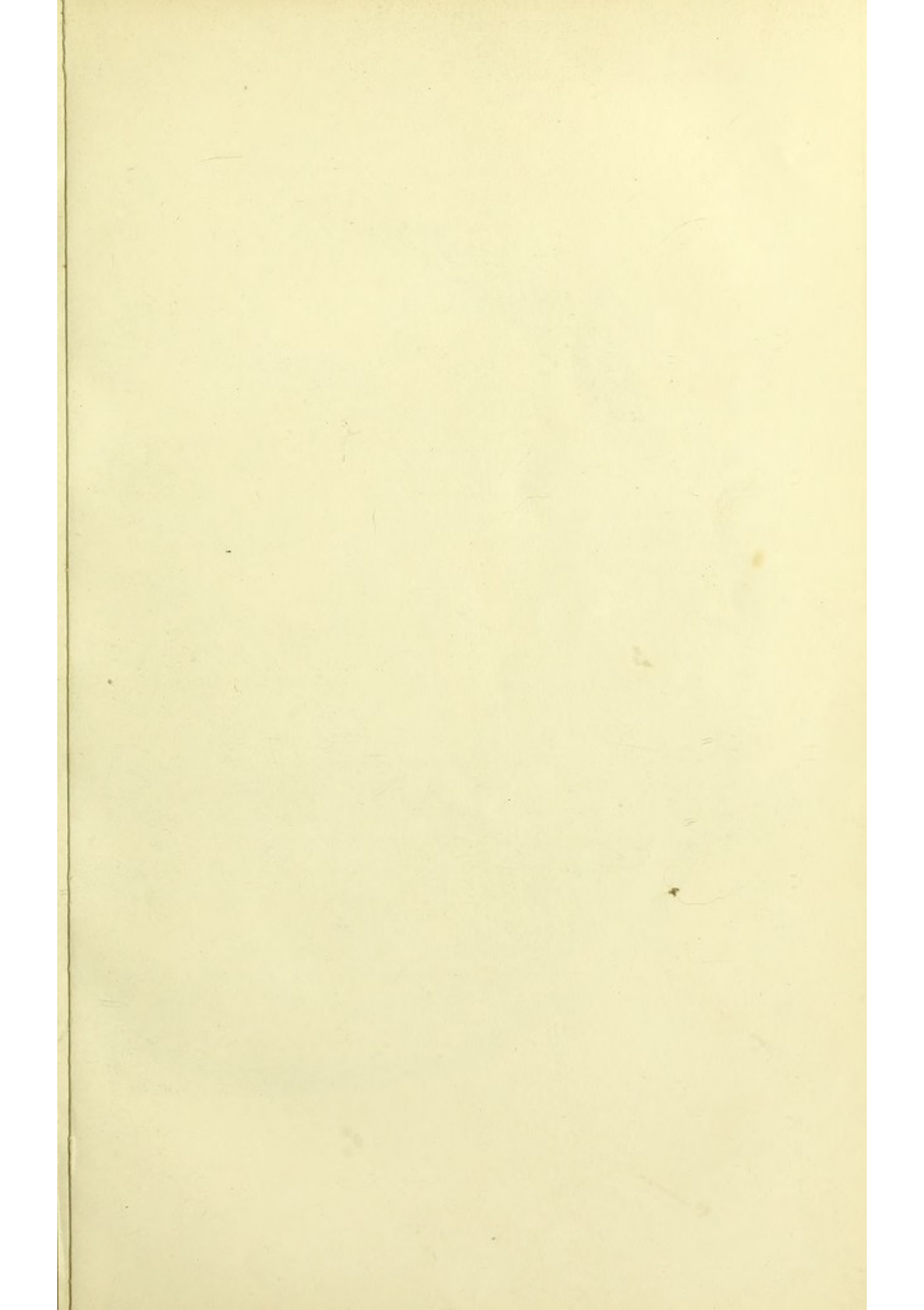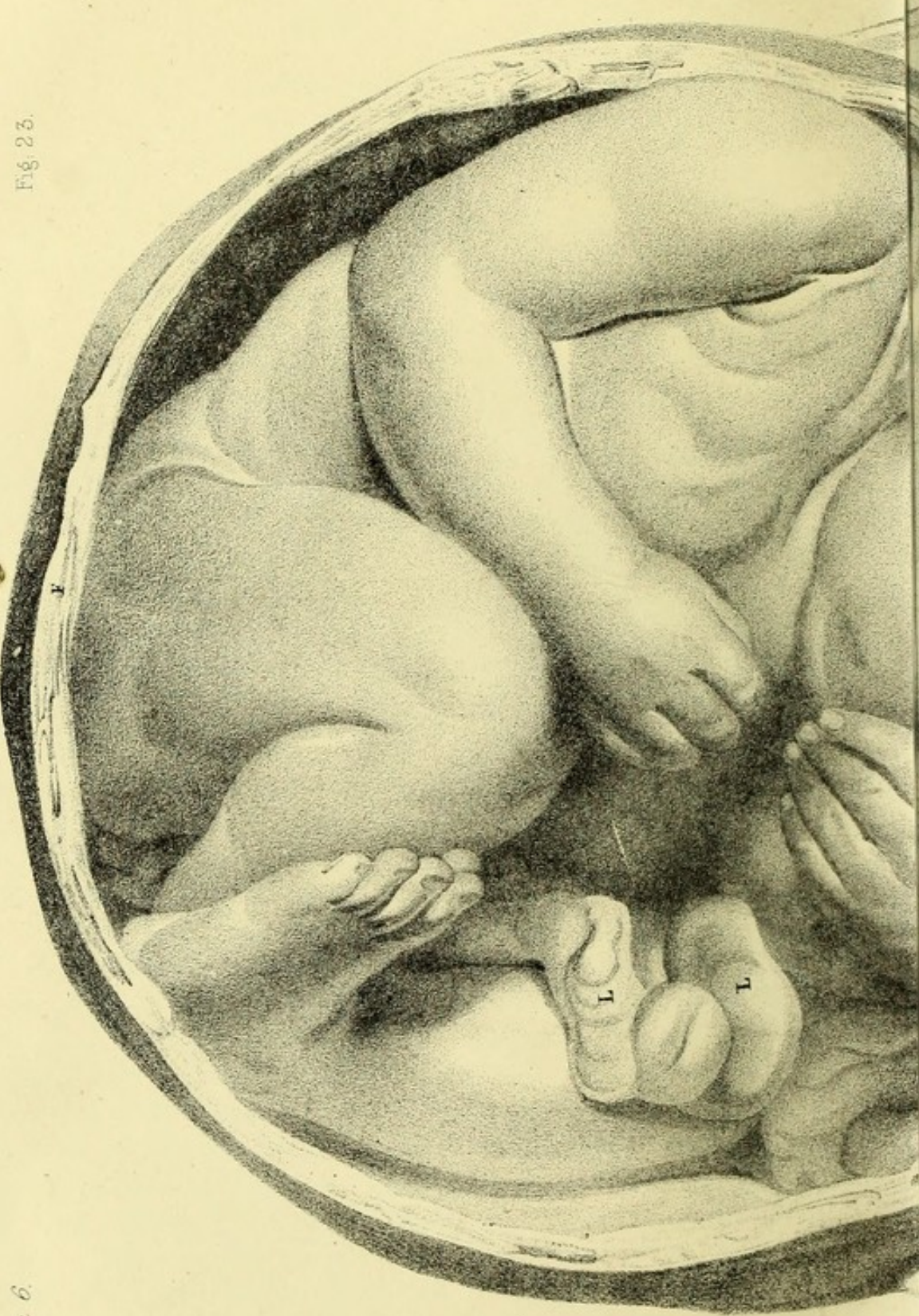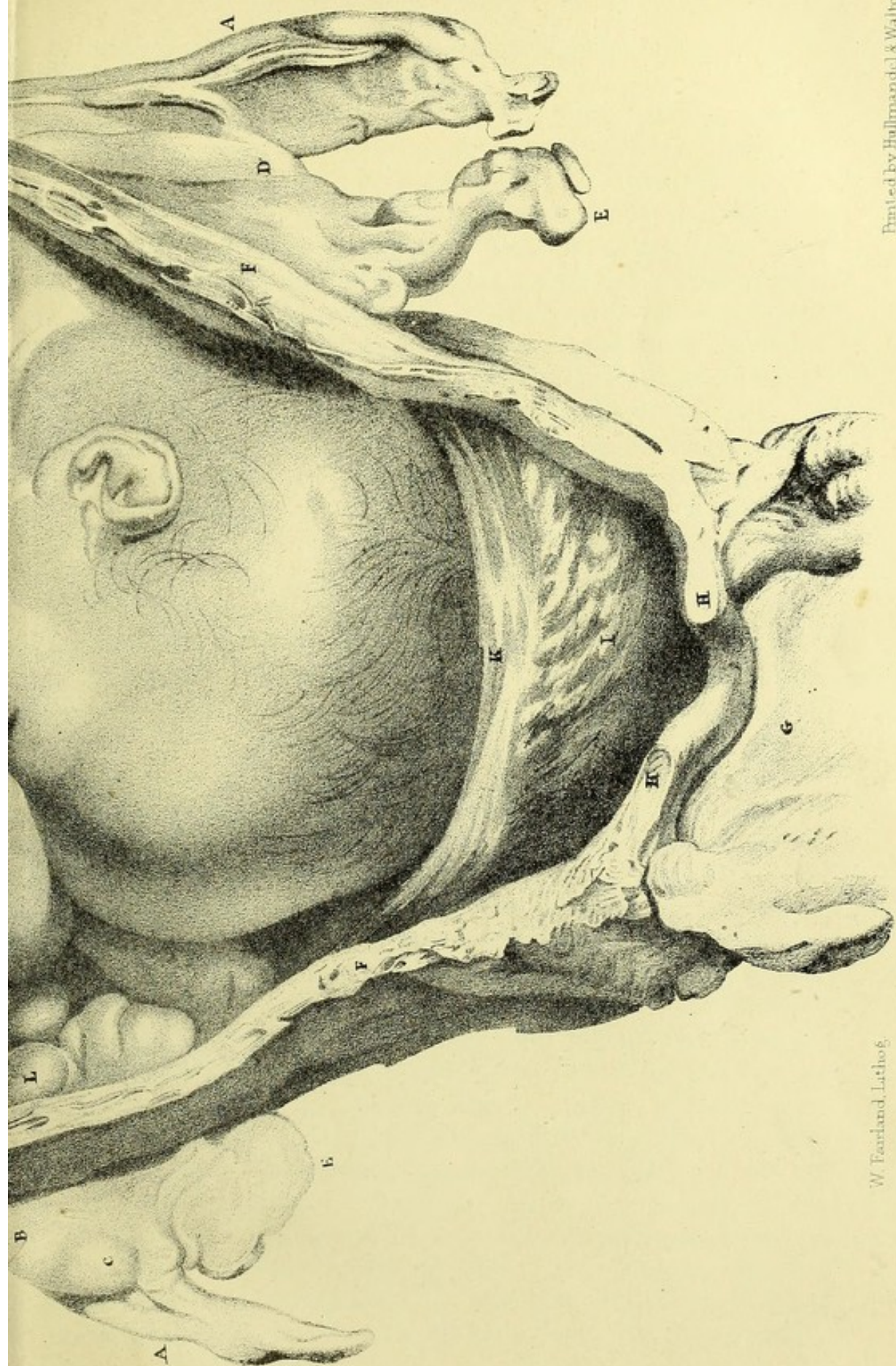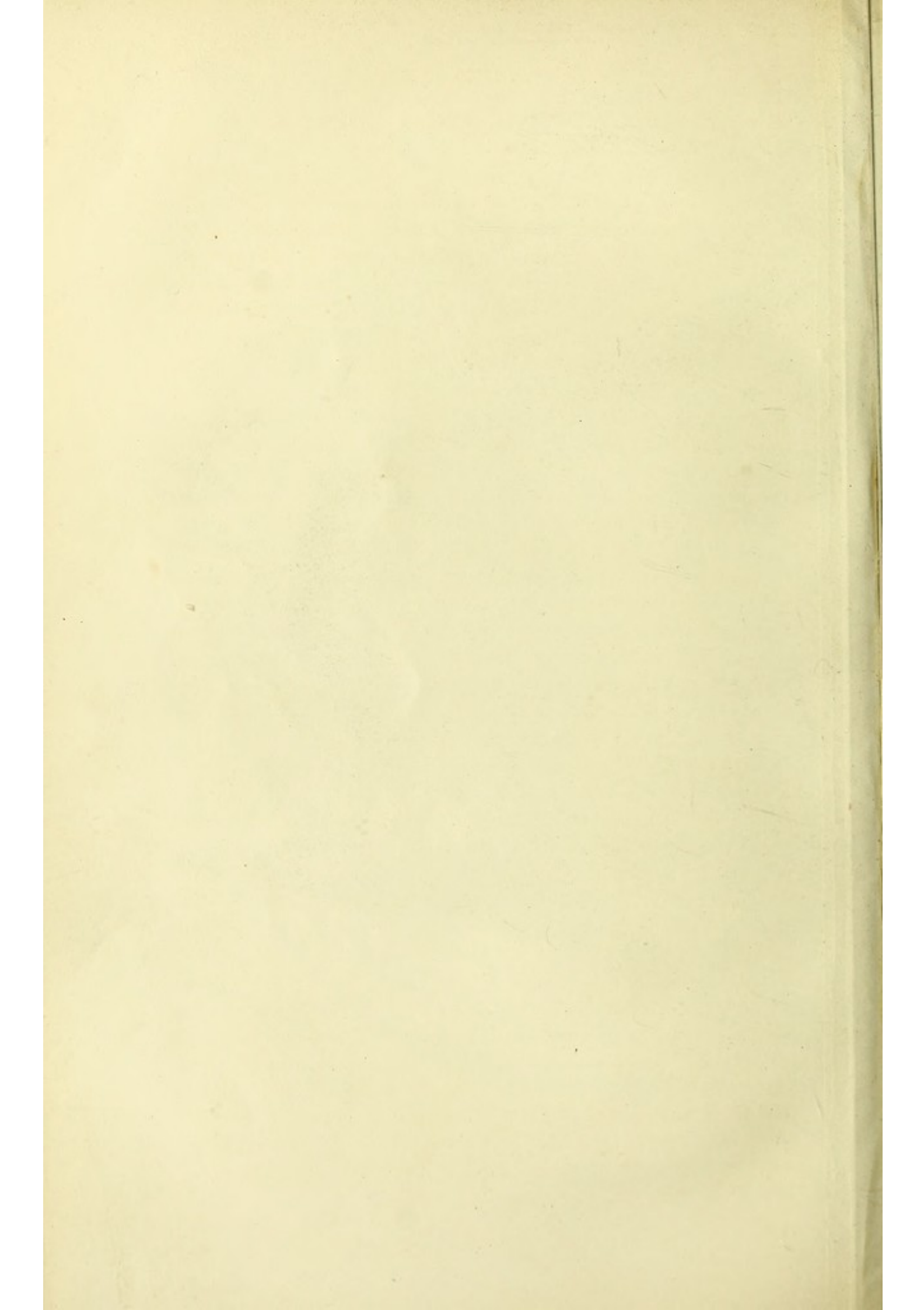
deprived of the advantage which this powerful agent gives us in controlling the bleeding vessels.

The extent and danger of this form of hæmorrhage depends upon this 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 cannot, there-fore, pour out much blood; such is not the case, however, with the large uterine veins when they are broken across: one frag-ment 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 dis-charge? If the former were true, 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 latter be the case, 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 to you 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 provi-
sion, 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 uninter-
rupted 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, there is a tendency
to coagulate,—it 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 coagu-
lation 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 is 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 would flow freely and most danger-
ously so long as the cervix uteri remained expanded, and no

contraction of its tissue took 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 would be the result. But the dilatation of the os uteri is in fact the contraction of the cervix: the womb could not open unless the tissue of the cervix contracted upon itself. I 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 set up, and thus the regurgitation of blood from this source 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 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: 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 is 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 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 this position of the placenta require your closest attention, because the timely notice of such an accident is of importance, in order to undertake its successful

* Monthly Journal of Med. Science, March, 1845, p.181-183.

treatment. Hæmorrhage may appear at any time within the period that the cervix is expanding to form part of the uterine cavity: it may occur at the seventh, eighth, or ninth month of gestation. The manner of the hæmorrhage is characteristic: a sudden gush of blood from the uterus may take the patient quite by surprise: there was no shock or violent exertion to cause it; she had 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 separation 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, partly coagulated, or, if long retained, 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 the error that I 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.

An early vaginal examination is always necessary whenever hæmorrhage appears: both fingers, if not the hand, should be passed into the vagina, and the os and 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 has 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 is near the os uteri, or the dilatation is 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, depends solely on his promptitude and decision. Notwithstanding this necessity, the *treatment* is at the present time involved in a most inextricable controversy. I shall not ask you to unravel it with me, 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 you of the utero-placental circulation: these will, I trust, serve to guide us safely 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 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, and where you are in sufficient time to put any treatment into effect you think proper: what is your chief object? If possible, to save both the mother and 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 were done incautiously, the mother might be sacrificed; if the latter were hastily carried into effect, the child would be destroyed. We must avoid falling into either of these errors, and act upon correct principles in our treatment. To accomplish the objects we have 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. Our first step is, therefore, to use the most efficient means to arrest the discharge while the uterus is dilating. This may be effected, 1st, by directly compressing the placenta; 2nd, by maintaining and increasing, if necessary, the action of the uterus.

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. I have been in the habit of using two or three small plugs in preference to

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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 are 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. The material that I generally employ is hemp or tow: it is always easily obtained; and I think entangles the current of blood better than sponge, which very soon becomes coated with a thin layer of coagulated blood, and scarcely arrest the discharge. This, however, is a mere question of personal experience: every practitioner has his favourite, and I may be allowed to indulge in mine. When you have made the necessary vaginal examination, introduce a ball of tow loosely rolled up; 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 me 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 much more difficult; but, knowing the effect of hæmorrhage in rendering the os uteri dilatable, I do not apprehend much difficulty in such a case as this. I 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 the sake of the child, therefore, I should not do so. For this purpose, a long gum elastic catheter of the *largest size* may be made, so as to have a pointed

stilette to pass quite through it; this can easily be prevented passing beyond a certain distance, by a button or screw at the end opposite the point.

FIG. 15.
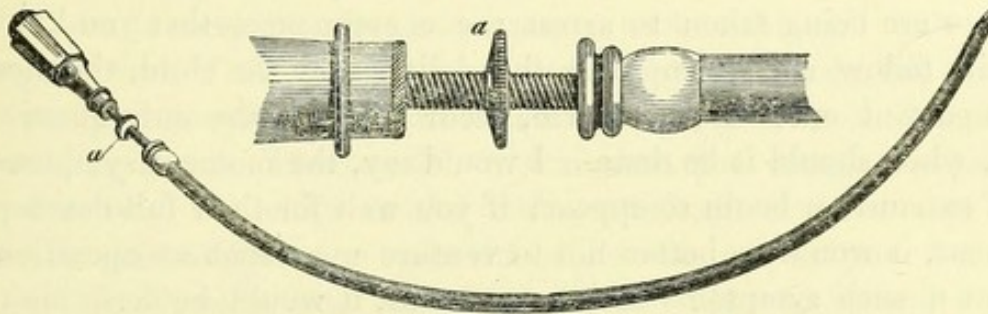
Gum Elastic Catheter, with Spear-pointed Stilette passing through it.
a, Screw-nut to sheathe the point.

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. The source of hæmorrhage being thus secured, we must direct our attention—

2nd. *To maintain, and to increase, if necessary, the action of the uterus.*—It is our duty, therefore, 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 insure an efficient action of the uterus; but if you wish to save the child, I 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,—the temperature 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 one, will, of course, occur to you: the only question is, when should it be done. I 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 are 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 shows 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 is sufficiently open for the purpose. If the labour has continued for some time without exhaustion in the patient, the outer plugs may be removed, and a vaginal examination cautiously made, you will generally be able to ascertain the degree of dilatation without disturbing much the plug in contact with the placenta: if the os uteri is one-half or even one-third dilated, you may deliver. In either case, when about to operate, the external plugs being removed, I think it is better to leave the remaining one in its position: consider it as a 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 so much force in breaking them. 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 looking for the foot: if the knee first meets 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, it 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 is 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 applied to the vulva, and the whole secured by the abdominal bandage carefully applied. If, however, it should still 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.

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 me 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.

When the patient is in extreme exhaustion.—If, in such a case

as this, you were to adopt the same practice as that 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,"* 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 dispatched 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."†

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."‡

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."§

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

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* Rigby on Uterine Hæmorrhage, p. 33. † Giffard's Cases in Midwifery, p. 89.
‡ Smellie's Midwifery, vol. iii. p. 162. § Rigby on Hæmorrhage, p. 121.

not attempted. I shall refer to Dr. R. 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." *   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. I shall quote one such case from Professor Simpson's valuable paper on this subject. Dr. Dewar, of Dunfermline, relates a case in which, in spite of every precaution, frequent hæmorrhages occurred before labour. " Labour took place at the full time, and, as was dreaded, was accompanied with severe hæmorrhage from the beginning. When I saw her about an hour after pains had begun, the orifice of the uterus was pretty well dilated, and a soft spongy mass, apparently the centre of the placenta, protruded from it. There was no time for interference, for almost instantly a strong pain forcibly expelled the whole of the placenta from the vagina. To my surprise, the flooding ceased. Pains continued active, and the child was born in less than ten minutes. After a little time, the infant revived, and the mother recovered well, though considerably exhausted." †   A case came under my own notice in which the natural process of delivery was clearly shown. I was summoned by my friend and former pupil, Mr. Tweed, of Brook Street, to see a patient of his, who had flooded very much. He had plugged the vagina, by which the discharge was controlled: the os uteri had dilated to the size of a crown piece, and the placenta was found to present. As there was no hæmorrhage to signify, and the os uteri

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* Lee's Clinical Midwifery, p. 144, 1st edition.
† Monthly Journal of Medical Science, p. 176.

was rather rigid, I was reluctant then to interfere, but recommended that the vagina should be again plugged, and if hæmorrhage returned in the least degree, to turn the child. In two hours, the plug and placenta were both expelled together, all hæmorrhage ceased, and in a hour and a half afterwards the child was delivered, still-born. The woman rapidly recovered: when the placenta was examined, a large coagulum was found in the spongy structure beneath the membrane covering the uterine surface of the placenta. Some years ago, when residing in Dublin, I had been hastily sent for in consequence of violent flooding; I arrived about half an hour after the message was received, and in the interval the patient had expelled the placenta and child, by which the hæmorrhage was arrested. This patient also recovered without any drawback. These cases are only small additions to a large number already recorded by Professor Simpson, and several other practitioners, all proving that Nature, of her own accord, sometimes succeeds in separating the placenta from the cervix of the uterus, the effect of which is, the cessation of the hæmorrhage, and generally the recovery of the patient. We have seen also that even the child may escape such unfavourable circumstances. 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 the utero-placental circulation, that such should be the case—and if turning the child is 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 castigations 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, to do so; but if we have any doubt about the mother's safety, not to 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 are

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; I only ask you to examine, as I have done, 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 contractions of the uterine fibres, not the separation of the placenta, which arrests hæmorrhage, and therefore, that the practice 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 were 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. I have already mentioned to you a case of fatal hæmorrhage, where a small portion of the placenta was left behind in the uterus, the remainder being expelled. Was flooding here from the placenta or the uterus? I am perfectly convinced, 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."* 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, hæmorrhage 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. W.'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 I 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

* Medical Gazette, Sept. 26, 1845, p. 943.

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 the pillow, and instantly expired."*

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 sunk in fifteen minutes after the child was removed. The only doubt that occurs to me in this case is, Whether the patient sunk *because* the child was removed. Whether the contracting womb, taking its 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, which could be so easily taken away, to what opprobrium would he not have been exposed, had the woman died; nevertheless, to do so, until she was more perfectly recovered, appears to me her only chance.

These instances I have selected from several, because they may be contrasted, and were reported by gentlemen who (like myself) have been perfectly impartial observers of the controversy carried on respecting the proposal to separate the placenta artificially; who were neither advocates nor opponents of the practice, and on whose testimony, consequently, the strictest confidence may be placed.

I trust we have succeeded in pointing out to you the danger of turning the child when your patient is extremely exhausted — in proving to you that, even in these cases, Nature sometimes succeeds in arresting the flooding by the separation of the placenta—that when this happens hæmorrhage ceases, even where the action of the uterus is suspended. It remains for us to consider whether, in these cases, artificial separation of the placenta may be put in practice.

* Medical Times, Jan. 15, 1848.

LECTURE XIX.

UNAVOIDABLE HÆMORRHAGE — CONTINUED.

Extreme Exhaustion.—Artificial Separation of the Placenta.—Evidence in support of this Practice.—Rigidity of the Os Uteri.—Danger of Turning in such Cases. —Treatment.—Rules to be observed in Cases; 1. When no Exhaustion has taken place; 2. In extreme Exhaustion; 3. In Rigidity of the Os Uteri.—Post-partem Hæmorrhages before the Separation of the Placenta.—Causes.—Uterine Inertia.—Irregular Contraction.—Morbid Adhesion of the Placenta.—Hæmor-rhages after the Separation of the Placenta.—Case of Plethora—of Uterine Inertia —of Mismanagement after Delivery.

In the preceding lecture we pointed out to you the resources of Nature in arresting unavoidable hæmorrhage—that her remedy consisted essentially in detaching the placenta from the surface of the uterus. We gave you reasons why we should not adopt this practice in all cases of placental presentation, and were consider-ing how far this imitation of Nature might be applicable, in certain exceptional cases, where the legitimate practice of turning the child could not 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 circum-stances, 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 con-sulted—the child is but a secondary object. I 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."* In 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 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."† 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. W.) 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."‡

I shall quote another testimony — that of Mr. Brown, of Kensal Green, who, " like the majority of his medical brethren, had a natural repugnance to desert old and well-established rules of practice for novel, and what might be considered dangerous, innovations." Mr. Brown was hastily summoned to a lady whom

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* Medical Times, Jan. 8, 1848, p. 233.

† Medical Times, Jan. 15, 1848, p. 257.

‡ Ibid.

he had attended before " in a premature labour of her first child at the seventh month of gestation, and who, he understood, was now advanced to about the same period of this her second pregnancy." There was very considerable hæmorrhage ; and " upon making an examination per vaginam, I (Mr. B.) ascertained that the flooding still continued, and resulted from nearly a complete presentation of the placenta over the os uteri. . . . . The os uteri was dilated to the size of a half-crown, but so extremely rigid that I could not insert two fingers within it, nor was there any probability of its yielding to any attempt at dilatation that could be safely applied. Under these circumstances, what plan was to be pursued ? As it was impossible to turn (the usual course in these cases), from extreme rigidity of the os uteri, I proceeded to rupture the membranes at the anterior part, just under the arch of the pubis, where alone they could be felt, but this failed in arresting the hæmorrhage ; for with every return of uterine action, the blood continued to pour forth with unabated violence. It became now plainly evident that the delivery must be brought about ; and having been led to believe, from several circumstances which the patient described to me, that the fœtus was dead, I judged that this was a favourable opportunity of testing the correctness or the contrary of Dr. Simpson's views upon this subject. Accordingly, without the least difficulty, I with the forefinger of the right hand separated the entire placenta from the uterine surface, and *almost immediately the hæmorrhage ceased.*"* For three hours afterwards no hæmorrhage occurred ; a dead fœtus was expelled, and the patient recovered.

These cases are selected for the same reason as the former, because the impartiality of their evidence cannot be questioned. Similar instances are recorded by Messrs. Haughton, Everitt, Wales, and many other practitioners who were not the advocates of this practice; but if I were to appeal to those who are its supporters,—if I were to quote the experience of the late Mr. Kinder Wood, of Manchester, who, it now appears, had frequently adopted the practice of separating the placenta, although he did not publish his cases,—to Dr. Radford, who followed him successfully in the same course,—and especially to Professor Simpson, who has brought the whole question so ably before the profession ;—if I were to bring forward their evidence in addition

* Lancet, vol. ii. 1845, p. 694.

to that brought before you, I should accumulate such a weight of testimony, as would compel the most sceptical to admit that the artificial separation of the placenta, like its natural detachment, in place of increasing, arrests unavoidable hæmorrhage.

Let us return, then, to the case before us—extreme exhaustion in the patient; and if it should unfortunately happen that you are called to such a case,—if you find your patient almost pulseless, with cold extremities, cadaverous countenance, perhaps tossing herself about the bed, in the effort to breathe—I 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. (I presume, of course, that the apparatus has been previously prepared for you). But should the pulse be restored, and reaction at all take place, I think you will find that a full dose of ergot of rye will sufficiently answer the purpose. I do not ask you to remove the child even then, because I am very doubtful that any advantage is gained by doing so. The source of hæmorrhage is in the cervix uteri, not at the fundus, exactly where it is compressed by the head of the child on one side, and the plug at the other, which it appears to me 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, notwitstanding 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 might occur. There is no rule without its exception; and although in 99 cases no flooding may follow, in the 100th you might 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. Such was the cause

that led Mr. Brown to separate the placenta: we have, therefore, to consider its treatment in cases of unavoidable hæmorrhage. You can readily perceive the danger of such a complication, that there would be a great risk of laceration in the attempt to force the hand into the uterus. I 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 had 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 23rd case seems to illustrate this:—" Hæmorrhage at the 8th 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 dilatation 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." *

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

* Lee's Midwifery, p. 377.

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."* 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' case, was particularly striking, because the os was not very rigid, the greatest care was used (and I have personal experience of Dr. Collins's caution): nevertheless, the uterus was ruptured. Should we separate the placenta here also? Mr. Brown did so successfully; and if in such a difficulty we had no other alternative than to separate the placenta, or to turn the child, I certainly should prefer the former as a less dangerous operation; but I do think that if we reflect a little on the cause of the rigidity, we shall not often be placed in such a dilemma as this. My own experience points out to me, 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 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 is 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 circumstances, and this danger might be, perhaps, avoided. I think 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,

* Collins' Practical Treatise, p. 98.

A A

I should separate the placenta in preference to turning, because it seems to me 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.

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—

1st. *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 increasing until you can deliver the patient.

2nd. *In a case of extreme exhaustion*, with frequent fainting, fluttering pulse, rapid, laboured, perhaps stertorous respiration, blowing of the cheeks, jactitations, incoherent and 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. I am aware that this rule is a direct infringement on the principle of those who look with horror on the risk of allowing a woman to die undelivered. It appears to me to be the only chance of preventing her death.

3rd. *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.

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* on the management of natural labours, we pointed out to you the importance of allowing the uterus to expel the child slowly, and while it is doing so, to

* Lect. VI. pp. 97-101.

support the contracting fundus with the hand placed over, and 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, 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 slight, but as the debility of the uterus increases, it soon amounts to a profuse flooding: the patient is placed at once in extreme danger, and the practitioner is in equal difficulty to cause its 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, when the uterus generally remains contracted, it will not do so. 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 it is only for a moment, —again it is lost. While this want of tone may be observed in the uterus, a corresponding amount of constitutional irritation may be noticed in the patient. The pulse is increased in frequency, and assumes the jerking hæmorrhagic character; the patient is watchful and restless; complains of sinking, and does not experience that relief from the termination of her sufferings that is usual after delivery. 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 that are applied saturated, but in a short time, if no means for prevention are used, the stream rapidly increases to a torrent, deluging the bed, and forming a pool on the floor beneath. If the attendant is 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, dosy state: syncope may follow, and hæmorrhage for a moment cease, but it soon returns with the pulse, 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 I 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 such extreme symptoms presenting themselves. I say generally, because there are some melancholy exceptions in which a feeble constitution is irrecoverably sunk by the first discharge.

The treatment of such cases must be directed, 1st. To restore the tonic contractile power of the uterus. 2nd. To remove the placenta. 3rd. To prevent, as far as possible, any subsequent relaxation of the uterus.

In order to accomplish the first object, you must endeavour by every means in your power, to support the general circulation, which the symptoms point out to you is struggling to maintain itself. Without attention to this, merely 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 Tinct. 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 broth when taken cold, 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, I think, 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 becomes your duty, in this favourable opportunity,—

2ndly. *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, from 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. Our next object is, therefore, to do this, and—

3rdly. ·*To prevent, as far as possible, any subsequent relaxation.*—When contraction of the uterus takes place, and it is made thus to 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 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 fatigued, an assistant may take your place; but

you must be particularly careful that he understands your object, because I have seen more than one instance where pressure was made everywhere but where it should be: but when the uterus is properly compressed, it becomes an extremely efficient mode of preventing its relaxation.   In order to insure this effect, by the continuance 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.   For this purpose, several napkins may be prepared: some of them, 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 such 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 of the uterus.   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, and if so, 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.   One of these has been invented by a fellow-pupil who attended this class, and therefore is an additional recommendation to your attention.   My friend, Mr. J. R. Pretty, has contrived a very ingenious instrument, on a principle that had been for many years previously acted upon by his father,* who had been in the habit of using a common tourniquet and a pad, made either of cork or a book well padded with a napkin.   It gives me pleasure, therefore, to bring this instrument before your notice, because it seems very well adapted for the purpose, and the invention comes from one of yourselves.   I

* Med. Gazette, June 25, 1841, p.538.   Ibid, Dec. 23, 1842, p. 449.

shall give you Mr. J. R. Pretty's description of the bandage he has contrived:—" It consists of three pads, the central one being
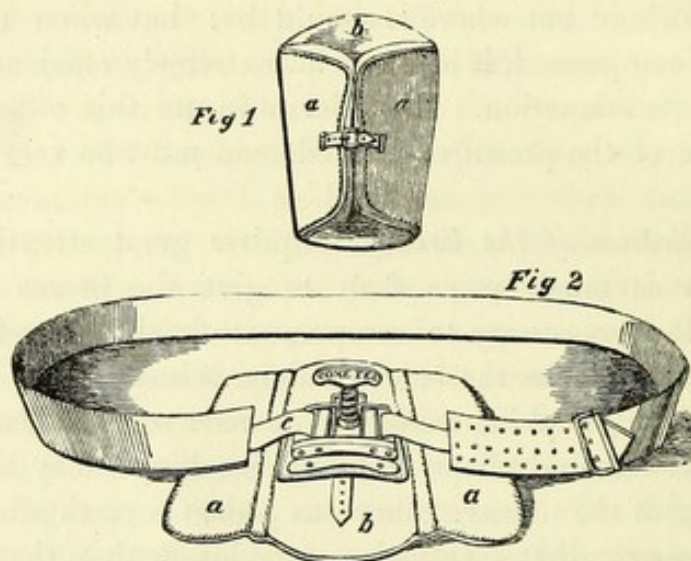
FIG. 1. Pad folded; *a a* lateral pads clasped; *b* central pad.—FIG. 2. Pads opened; *a a* lateral pads; *b* central pad having the tourniquet, *c*, attached to it.

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, 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."* 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 have not yet ceased; the state of the circulation and 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

* Medical Gazette, Jan. 16, 1846, p.117.

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 is 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: but if a more careful examination be made, you will find that such is not the case. Sometimes the posterior surface is relaxed, or perhaps one side of the fundus is contracted, and the opposite not so. Wherever, 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. You will find that 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. I have stated to you that 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 it: we shall therefore consider separately,

Stricture of the cervix uteri, attended with hæmorrhage. This 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. These 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 was very patiently expecting the delivery of the placenta, quite unconscious of what had been going forward, because no discharge from the vagina was 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 stric-

ture, 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 give the patient some stimulant previously, with opium and ergot; in fact, to use every means to induce a 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.

This 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.   I am inclined to the latter opinion; I do not think it at all so frequent as it is described: very few cases of it have fallen under my own observation, although I have been summoned more than once to supposed cases of hour-glass contraction, when none at all existed, the mistake arising in the way I have explained— the os uteri being mistaken for the stricture.   You must therefore be cautious not to confound 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 the os uteri.

Morbid adhesion of the placenta, when it is partial, always causes hæmorrhage, but when it is completely adherent does not do so: the latter, however, is very rare,—I 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 is 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 by the hand. The funis will conduct it 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 detecting the edge of the placenta plainly; we 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, 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 inflammation of the veins of the uterus, from 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, 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. You are not even safe on the tenth or fourteenth days. One of the most alarming hæmorrhages I ever had to treat occurred on the tenth day after delivery. The lady had gone on very well up to that time; but while 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 might 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 his patient was flushed, and had a very 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, 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."* 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." I 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 [I 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."† In these directions I cordially agree.

Uterine inertia sometimes continues longer after delivery than might be expected, and will cause hæmorrhage even at the tenth or fourteenth days. I witnessed the occurrence of flooding on the tenth day, that was near being fatal, in a poor emaciated woman, to whom I have already alluded in a previous lecture.‡ By careful attention to her while in the hospital, she gradually gained strength, but on the tenth day, while 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. I think 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

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* Gooch, Diseases of Women, p. 333-4.
† Gooch, p. 338.
‡ Lectures on Natural and Difficult Parturition, p. 111.

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 XX.

PUERPERAL CONVULSIONS.

Divided into Sthenic, Asthenic, and Hysterical Convulsions.—Sthenic or Hyperæmic Convulsions.—Premonitory Symptoms.—Symptoms attending the Paroxysms.—Symptoms of Apoplexy.—Distinction between Epileptic and Puerperal Convulsions.—Between Apoplexy and Puerperal Convulsions.—Asthenic or Anæmic Convulsions.—Causes of Convulsions.—Remote or Predisposing Causes.—Proximate or Exciting Causes.—Conclusions.

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 of pregnancy to the time that 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.

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 paroxysms 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 every form were alike. Others enumerate its varieties, and speak of epileptic, apoplectic, anæmic, and hysterical convulsions. We shall propose for your consideration three forms—1st, Sthenic or hyperæmic convulsions; 2nd, Asthenic or anæmic convulsions; 3rd, 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 these 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 that 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 that is 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 meets with much resistance to its efforts, and its action is impeded by uterine congestion, convulsions are frequently the result.

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. Puerperal convulsions may seize the patient either before, 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: you have in fact two sources of irritation 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 dinners and wines, and had been seated before a large fire."* Labour came on soon after, 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 at tea:"† the following day she had convulsions and premature labour. Both these were fatal cases, and in both 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.

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

* Lee's Clinical Midwifery, p. 17.　　　† Op. cit. p. 19.

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 swollen and livid, the mouth retracted and covered with a bloody foam, the teeth violently clenched, and the tongue 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, is 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 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.

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. I 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 I 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 presents 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 me, has caused more confusion in the rules of treatment that 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; still more so in treating the same form on exactly the same principle in very opposite conditions of the constitution. No one errs by 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.*

Puerperal convulsions, 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."* I confess that I cannot accede to either of these views; true puerperal convulsions seem to me sufficiently distinct from both one and the other to render it necessary not to confound them.

* Ramsbotham's Obstetric Medicine, p. 456.

It is quite true that epileptic convulsions may occur during labour, and 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.

Epileptic and puerperal convulsions differ in the way 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 apparently 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 that are generally preceded by symptoms indicating a highly excited state of the circulation that often terminates in the most marked symptoms of apoplexy, and that 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:—

1. An aura precedes the attack.	1. Symptoms of cerebral congestion precede the attack.
2. There is no hissing expiration.	2. Hissing expiration 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 puerperal 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 farther, 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. I cannot think so; I should willingly call puerperal convulsions " epileptic," only if I did so, if I 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, I am 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 me to convey the essential character of the convulsions we are now discussing.

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 I 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 these attacks, 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 them " 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.

The causes of puerperal convulsions may be considered in two points of view: the remote or predisposing cause, and the proximate or exciting cause. 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 " eccentric" causes, because the nerves of the affected organ communicate the irritation to the spinal system, which reflects it in violent convulsive paroxysms.

The 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 excited, an irritant, that 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 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. Professor Simpson has quoted several such cases.*

Epilepsy has been considered as a predisposing cause of puerperal convulsions, but I greatly doubt that such is the case. I have met with several cases of labour in epileptics; and, led astray by the assumed identity of these attacks, I 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

* Edin. Monthly Journal, Nov., 1843.

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.* 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."† In fact, the predisposition seems to lead in the opposite direction. Pregnancy and labour have the effect, rather of suspending than exciting these attacks.

The proximate causes of convulsions, or those which immediately excite the paroxysm, are more difficult to expose, because they are wrapped in the mysteries of the nervous system. I am unwilling to occupy your attention with a discussion on some of these questions, which stand so conspicuously on the field of controversy, like standards, as it were, to challenge disputation. It shall be my object to place the subject before you in such a manner as will enable me to explain to you more clearly the principles of treatment.

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

* Hardy and M'Clintock on Midwifery, p. 269.
† London Journal of Medicine, vol. ii. p. 87.

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 that we now speak of, 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 cause of convulsions is impure blood; for instance, when the kidneys are unable, from Bright's disease, to fulfil their proper function, to eliminate 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 practioners: 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; I am disposed, however, to doubt its frequency. In the cases of puerperal convulsions that I have met with, the majority were strong, healthy young women, without any œdema, who did not impress me 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, I fear to adopt it in these instances; first, because the pressure exercised by the gravid uterus is of too gradual a growth to cause any great amount of congestion, the circulation has

sufficient time to find new channels for itself, and relieve the
emulgent veins. Secondly, the period of the attack would be
more frequently at the last month of gestation or the commence-
ment of labour than we know it to be. I am 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 predis-
posing, and the consequent impurity of the blood as a *direct
proximate*, *cause* of convulsions.

The indirect proximate causes appear to me 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 are 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 eccen-
tric causes—it would be clearly illogical to seek for two causes to
explain one and the same effect in the same case. If we are 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? In answer to the first question, I 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 propa-
gated from that organ to the brain), "the most striking of which
is the following:—I was called some years ago, by one of the
midwives 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 hæmorrhage, 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."* Dr. Ramsbotham then quotes, from the late Dr. Ingleby's 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."†

A case very similar to this once occurred to myself. 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. I did so, without any difficulty; but, like Dr. Ingleby's patient, mine resisted the operation. In the struggle she was seized with convulsions, and died in a quarter of an hour. Such cases are not, I am persuaded, rare exceptions to the general rule, and they form so many proofs that convulsions

* Ramsbotham's Obstetric Medicine, p. 568-9.
† Ingleby on Hæmorrhage, p. 186.

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.

It remains for us to inquire what renders the uterus thus morbidly irritable. This second 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 me, however, that this alone is not an adequate cause: if it were so, the number of cases of puerperal convulsions would approximate much nearer to that of difficult labour than they appear to do. Dr. Collins reports four hundred and thirty cases of protracted labours—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. I quote from these reports, because I 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 to me 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 system 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 me 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 occurs 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 circulation; 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 perineum, causing local congestion, tenderness, inflammation, etc., but no convulsions. In another, you may observe every symptiom of hyperæmia of the uterus: its contractions become short and interrupted,—I 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, 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 can 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 is the effect, not the cause, of the convulsive paroxysm, and should therefore not be confounded with cases where albuminuria, as a disease, acts as a predisposing cause. In the latter case, albuminous urine 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 such-like causes, they are much more fatal.

As we have been drawn into rather a protracted discussion of these difficult questions, we shall briefly sum up the conclusions at which we have arrived—

1st. 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.

2nd. The predisposing causes of puerperal convulsions, are either an excess of blood (hyperæmia), a deficiency of blood (anæmia), or impure blood (toxæmia).

3rd. The proximate causes of convulsions are chiefly *eccentric*, being the morbid irritation of the afferent nerves supplying the different vital organs. Impure blood, as in albuminuria, is a *centric cause.*

4th. *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.

5th. *Morbid irritation of other organs* also causes puerperal convulsions, because, during pregnancy, and at the time of labour, the nervous system is more excitable that 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.

6th. 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 XXI.

PUERPERAL CONVULSIONS.

Treatment of Sthenic Convulsions.—Depletion.—Tartar Emetic.—Purgatives.—
Treatment during the Fit.—Cold, as a Shock.—The Question of immediate
Delivery considered.—Statistical Results.—Danger of turning.—Asthenic Con-
vulsions. — Depletion contra-indicated. — Stimulants.— Opium.—Purgatives.—
Counter-irritation.—Hysterical Convulsions the least dangerous Form.—Symp-
toms.—Treatment.

IN the preceding lecture we pointed out to you three forms of
puerperal convulsions,—the sthenic, asthenic, and hysterical con-
vulsions: we inquired, also, into the causes, both remote and
proximate, that induced the paroxysm in the two first 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, 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 con-
ditions: you cannot treat convulsions from hyperæmia, anæmia,
and mental shock, precisely in the same manner: the treatment
of convulsions cannot be carried out correctly without a clear view
of the cause of the attack; no general principle of treatment can
be applied indifferently to every variety of the disorder.

The treatment of that form most commonly met with shall be
the first object of our attention; we shall then consider other less
usual varieties. 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., etc., give you sufficient notice of the excitement in the circulation, and the impending danger: if, with these symptoms, the pains are 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, or if the bowels are constipated, emetics and active cathartics are necessary. The salutary effect of depletion may be maintained by placing the patient under the influence of tartarized 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 I am 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 prevent the tongue 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 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. I have seen the bed surrounded by friends, some holding the body, others the legs and the 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 falling out of the 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 to dash the face with a whisk: I have adopted this practice frequently, and with complete success: the paroxysm was sometimes stopped

altogether, but 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 : I think 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 (gr. x.) 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.

The most important question, however, 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. I very much doubt the propriety of this practice as a general rule. I do not mean to object to the introduction of the forceps when the head is within its 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 to me very objectionable, because I think it 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 precipitate interference positive danger may be incurred. This seems to me 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 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.
Smellie	10	not stated		5	5	—	10	—	3	1	3	1	—	. - .	4	1
Merriman . . .	36	28	8	not stated		3	not stated		13	4	7	—	8	1	3	1
Lee	55	25	9	14	23	10	43	—	32	9	7	4	12	2	2	1
J. Ramsbotham* .	25	14	3	11	11	3	20	2	15	4	2	—	5	1	3	3
Lever	14	8	6	4	8	2	12	2	8	—	4	1	—	—	2	1
Josh. Clarke . .	19	16	3	—	17	2	19	—	8	3	3	2	6	—	—	—
Collins	30	29	1	10	18	2	29	1	15	—	6	—	8	5	—	—
Hardy. . . . ⎫ M'Clintock . . ⎭	13	10	3	2	8	3	13	—	6	1	3	1	4	1	—	–
	200	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, exactly 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, and half of them died: this number includes only five preternatural positions; we may,

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* 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 show the comparative success of the different modes of delivery.

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	27	4½ nearly.
Forceps	35	13	3　ditto.
Crotchet	43	12	4　ditto.
Turning	14	8	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. In confirmation of this objection, as well as to demonstrate the safety of a practice where this operation (turning) was, I might say, excluded, I shall place before you the results of Dr. Collins' practice in the Dublin Lying-in Hospital, as well as that of Dr. Johnson, in the same establishment, as reported by Drs. Hardy and M'Clintock. The cases of convulsions that generally occurred in that hospital, were precisely of the class we are now describing. Some of them have fallen under my own notice, and I think they bear ample testimony to the success of the treatment.

Dr. Collins gives thirty cases of convulsions occurring almost invariably " in strong plethoric young women, with their first children, more especially in such as are of a coarse make with short thick necks."* Of these thirty cases, fifteen, or one-half, were delivered by the natural efforts, and no death occurred; six by the forceps with equal success; and in eight the children were removed by the crotchet.

* Collin's Observations, p.199.

Table of Cases of Convulsions, from the Reports of Drs. Collins, Hardy, and M'Clintock.

Authority.	Total Cases.	Before and during lab.	After labour.	First	Subsequent.	Living.	Dead.	Living.	Dead.	Natural.	Mothers died.	Forceps.	Mothers died.	Crotchet.	Mothers died.	Total deaths.	Observations.
		Period of attack.		Preg-nancy.		Boys.		Girls.		Mode of Delivery.							
Collins . .	30	28	2	29	1	8	12	5	6	15	—	6	—	8	5*	5	* 3 had ruptured uterus.
Hardy and M'Clintock	13	10	3	10	3	3	3	4	3	6	1	3	1	4	1	3	
Total results	43	38	5	39	4	11	15	9	9	21	1	9	1	12	6	8	

Of these patients, five died, but in three instances the uterus was ruptured; consequently only two deaths are fairly attributable to convulsions. The whole mortality in Dr. Collins' practice, five cases, would be in the proportion of one in six; but if you exclude three cases of ruptured uterus, it would be one in fifteen. Drs. Hardy and M'Clintock report thirteen cases, six delivered naturally, three by the forceps, three by the crotchet, with one death in each mode of delivery, in the proportion of about one in four of the whole number; but although this mortality seems much greater than the former, it must be recollected that in statistics the smaller the number of total cases from which a ratio is derived, the greater is the risk of error in the proportion that it indicates. The mortality in Drs. Hardy and M'Clintock's tables is not, however, greater than that in the general table under similar circumstances; and when the latter proportion is derived from two hundred cases, while the former is only from thirteen, I think we may fairly presume that a larger number of cases in Dr. Johnson's practice would shew a less mortality. The conclusions that are derivable from these facts are—1st. That in those cases where the delivery was unaided (about half the whole number), the mortality was least; 2ndly. That where the crotchet or forceps were used, the deaths were only slightly increased; 3rdly. That the highest mortality was in those cases where the child was turned.

I have directed your attention to the practice of the Dublin Lying-in Hospital, because of the general uniformity of the class of cases that were liable to convulsions. They generally occurred

with women pregnant for the first time: there were thirty-nine first, and only four subsequent pregnancies: the proportion of boys was greater than girls—twenty-six to eighteen; and the women were of the character described by Dr. Collins—strong, plethoric young women: you may, therefore, readily infer that the cause of the attack was uterine congestion, greatly increased by the violent struggle to force the large head of the male child through the too resisting passages. In other reports, convulsions were of a more mixed character: some brought on by uterine irritation; others by strong mental emotions: some were anæmic, and some had severe labour. Hence the proportion of those attacked in subsequent pregnancies is greater.

So far, therefore, as the delivery of a patient in hyperæmic convulsions is concerned, I should recommend you to trust to the action of the uterus (which is always increased) to effect the delivery, at the same 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 are continuing, but if they have subsided it is better not to do so, lest you might 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 I 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: believe me, 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 wariety, which may well be contrasted with that we have been considering.

Asthenic or *anæmic convulsions* will occasionally fall under your notice. Anæmic convulsions from loss of blood, are the final and the fatal symptoms of extreme hemorrhage: 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 takes 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., æt. 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, liq. opii. sed., 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." *

I have quoted this case nearly at length, because it shows very clearly the character of this attack, and points out to you 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 I suspect the culinary aids, the sago and wine, the improved nutriment, the care and attention she received,

* Guy's Hospital Reports, vol. viii. p. 496.

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. I was 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. I 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 not alone a deficiency 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.

I think 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 one may arise with women who have had many children; the other occurs 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 those cases reported by the late Dr. Ramsbotham and by Dr. Collins. Both were taken from a very extensive, but a very different field of practice. In Dr. Ramsbotham's cases, convulsions generally induced labour; in Dr. Collins's, labour produced the convulsion. The one had to treat young women pregnant for the first time, with strong constitutions, and

of plethoric habits; the other 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."* 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, I think, 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.†

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 are necessary, the warm stimulant cathartics are the best, such as aloes, assafœtida, turpentine, etc.

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* Ramsbotham's Observ. pt. ii. p. 278, Case 162.
† Symptoms, etc., of Puerperal Insanity, by James Reid, M.D., p. 28.

Depletion is contra-indicated; generally it cannot be at all employed; but in some instances, nevertheless, it may be used with caution. You know, 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 convulsion 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 tha 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, I think, 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 termination; 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 any other of the 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 that is indirectly excited,—the primary and secondary centres of excitation. Thus we find 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 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, if labour be near, may

induce convulsions that 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 are 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,* 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, throws 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. It appears to me that 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 consequently exhaustion of nervous power: hence we find that the action of the uterus, in place of being increased, is suspended by the paroxysms, thus affording a diagnostic sign to discriminate these fits from the former puerperal convulsions.

The *symptoms* that characterise the convulsion are the same or similar to what is 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 inten-

* Lecture vii. p. 108.

sity of her sufferings absorb 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. I have seen a patient thrown into 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. I am quite convinced, however, that this apparent insensibility is not true coma: the loss of consciousness is, I might say, simulated; the patient hears everything that is said, and a little deception has sometimes a very salutary effect in arresting the paroxysms. I 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, or spasm of the glottis.

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 me. 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 dose, 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 to make a vaginal examination, she at once became restless, tossed about the bed, and almost brought on a second paroxysm. When left alone, she awoke from this imperfect dose, 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, which, 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 also very difficult; hysterical convulsions are never dangerous; true puerperal convulsions are always so; but, if hysterical convulsions are 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 scybalæ: 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, after which the convulsions disappear.   In convulsions like these, I think chloroform might be of much service, on the same principle as ether and opium, but as yet I have no experience of it.

The treatment of patients liable to such attacks is the most successful when undertaken before labour begins. Here, especially, prevention is better than cure.   If, during pregnancy, the state of the digestive organs are 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 XXII.

RUPTURE OF THE UTERUS.

Lacerations of the Os Uteri.—Their Frequency.—Total Separation of the Cervix
—Cases of Scott, H. Carmichael, Kennedy, Lever, etc.—Laceration of the Va-
gina.—Symptoms of Rupture.—Premonitory.—When Laceration takes place.—
Their variable Character.—Treatment.—When the Head is in the Pelvic Cavity.
—Mode of Delivery by Forceps.—By Crotchet.—When the Child has escaped
into the Abdomen.—Objections to the Operation of Turning.—Gastrotomy.—
Subsequent Treatment.—Peritonitis.—Objections to Depletion, Purgatives, Mer-
cury.—Advantages of Opium.

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 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."[*] 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."[†] The case, however, of Dr. A. Douglas, led
him to think something might be done; and since his time, reco-
veries 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.

Ruptures of the uterus may occur during pregnancy or labour:
we shall direct your attention to those lacerations only that happen
during parturition.

[*] Smellie, vol. iii. p. 386.   [†] Denman's Essay on Ruptured Uterus.

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 pubis and linea-ileo-pectinea, or posteriorly opposite the promontory of the sacrum: it may, however, be rent at the sides, and occasionally the laceration 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 three hundred and three cases of this accident. One hundred and twenty eight occurred during parturition, and the situation of the rent is thus given:—

15 from cervix to fundus.	11 of the fundus.
14 of the anterior part of the uterus.	13 of the posterior part.
7 of the left side.	8 of the right side.
2 of the body of the uterus.	2 of the vagina.
7 were transverse.	2 involved the bladder.*

47 were at the cervix either involving the vagina or a separation from it.

The 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 one hundred and seventy-two 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 ...	24	18	17	21	18	16	9	5	5	9	8	3	2	17

* American Journal of Medical Sciences, vol. xii. p. 390.

Dr. Collins' report of thirty-four cases, in the Dublin Lying-in Hospital, presents a similar result.

No. of Pregnancy	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th
No. of Cases ...	7	6	6	2	2	5	6	1	1	2	2

From these tables, it appears, that if each pregnancy be taken separately, a larger number of cases are found in the first than any other; but if all subsequent pregnancies be taken collectively, their united numbers preponderate considerably. Thus, in Dr. Trask's tables, there are twenty-four first and one hundred and forty-eight subsequent labours. In Dr. Collins' report, seven first and twenty-seven following deliveries. 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 nearly in the proportion of three to one female birth.

	Boys.	Girls.	Total.
Dr. Collins' Report	23	10	33
Drs. Hardy and M'Clintock .	8	1	9
Total	31	11	42

Thus, in forty-two cases, thirty-one boys were delivered, and only eleven girls.

Disproportion in the pelvis generally exists. The character of the pelvis is recorded by Dr. Trask in seventy-nine cases; and of these sixty-eight were contracted, and only eleven normal.

These three facts, a first labour—a male child—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 eighty-seven cases of rupture, which present the following results:—

36 cases were in labour 10 hours and under.
21   „   „   20   „
15   „   „   30   „
7   „   „.   40   „
8   „.   „   60 hours and upwards.

You perceive that the majority of these lacerations happened when there was no protraction of labour; confirming the remark of Dr. Collins on this point, " By referring to the general table it will be seen that seven of the thirty-four were first pregnancies, and that in several of them the labour was not by any means severe, *but rather the contrary.*"* 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.

The causes of laceration may be divided into *mechanical* and *pathological*. 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;"† and singular to say she reserved from the 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.‡ The same fatality sometimes attends the operation of turning the child. The late

* Dr. Collins' Treatise, p. 308.   † Lancet, 1828-29, vol. i. p. 34.
‡ American Journal of Medical Sciences, vol. xii. p. 146.

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 syneope came on after delivery:" she died in two hours, having a rent in the right side of the uterus through the muscular coat only.* 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† 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.‡ 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.§ 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.‖

In these cases, the laceration was caused by the violent action of the uterus which this medicine excited; and I am the more anxious to bring them before you, because the attention of the profession has been very little drawn to it. Dr. Trask's opinion

* Lancet, 1841, 1842, vol. i. p. 796.   † Lectures, p. 141.
‡ Med. Gazette, vol. xxvii. p. 372.   § Lancet, 1836-37, vol. i. p. 381.
‖ Journal Practique Medicine de Montpelier.

on this point so perfectly coincides with my own, that I 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 directed 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. Dr. F. Ramsbotham relates a case of rupture during a breech presentation, and another in which there was a slight distortion of the pelvis: in both the catastrophe was mainly attributable to the exhibition of ergot of rye; and he has known some other instances of rupture from its employment in cases unfitted for its use. It should be a rule in no case departed from, to refrain from the exhibition of this medicine when any disproportion exists between the head and the pelvis, caused either by contraction of the diameters of the pelvis or by the excessive size or malposition of the head; in presentations of the trunk and superior extremities; when obstacles to the birth of the child exist, as from morbid contractions of the vagina and obliterations more or less complete of the os uteri; and before the os uteri is *completely dilated or at least* perfectly dilatable."*

The pathological causes of ruptured uterus especially deserve your attention, because they are as yet imperfectly understood, being only partially inquired into; and I believe their influence in the production of this accident is much greater than is generally supposed. When I was attached to the Dublin Lying-in-Hospital I had the opportunity of closely observing the cases of ruptured uterus that occurred there, and was surprised to find many deviations from the descriptions given of the essential charactions of this complication. Believing it to be produced by the violent action of the uterus tearing itself in its efforts to

* American Journal of Medical Sciences, vol. xii. p. 391.

force the head of the child through a contracted pelvis, I 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, I was surprised to find rupture of the uterus where no mechanical causes existed adequate to explain it; 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 me 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 * pointing out such morbid appearances as presented themselves; and I am happy to find that what were then only suspicions have since received the 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. 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 my notice. Dr. Collins mentions another, stating that the cervix was not *thicker than strong brown paper*.‡ 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, you may have a very extensive laceration without any severe pains, or any of those prominent symptoms that often precede the

* Dublin Journal, vol. vii. p. 198.
† Duparcque, Histoire complète des Ruptures et des Dechirures d l'Uterus, 1836.
‡ Collins' Treatise, p. 305.

accident.　You can appreciate 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 be then 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 I 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 the fifth day after delivery; she died in an hour, and on dissection it was discovered that a patch of the uterus about the size of a shilling had given way corresponding to the projection of the sacrum.*

Dr. Collins mentions another case of this character which will explain its peculiarities—" A woman was delivered of her sixth 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."†

A review of several such cases as these, point 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: this effused blood may be, for a time, confined between the lining membranes of the uterus: in one case,

* Collins' Treatise, p. 288.　　　　† Ibid, p. 396.

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 as these 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, inflammation has set in, and proceeded to this dangerous extent before relief has been afforded.

Cracks in the peritoneum are 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,[*] Mr. Partridge,[†] Dr. J. Ramsbotham, Dr. Lever, and Sir Charles Clarke,[‡] 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 case 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, and I think, morbid cause, must have been in operation in these cases. I 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

* Dublin Journal, vol. v. p. 325.　　　† Medico. Chir. Trans. vol. ix. p. 72.
‡ Transactions of Association for the Improving of Medical and Surgical Knowledge, vol. iii.

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.

Lacerations of the os uteri have been very little noticed, although my 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 consequences 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, I might 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, abundant evidence of previous mischief was afforded by the deep fissures in the cervix, accompanied by great induration and ulceration. If enquiry 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 consequences 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.* 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. Dr. E. Kennedy met with two such cases in the Dublin Lying-in-Hospital. Dr. Lever also relates two cases; one of them being 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 Thursday,

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* Med. Chir. Trans., vol. xi.   † Dublin Journal, vol. xci. p. 53-54.
‡ Ibid. p. 154.

without producing any effect on the os uteri (nearly sixty hours). 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 either 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 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."* 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—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, I 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

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* Guy's Hospital Reports.   † p. 118.

appear, it is remarkable that five of these six cases 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 that we have alluded to 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, Queen's College, Galway, relates one case of this kind which was fatal;* Drs. Hardy and M'Clintock another that escaped.† The cases we have quoted, taken collectively, bear evidence of great variety, both as to the cause and the characters of these lacerations.

The symptoms 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 the gradual development of the symptoms, that it 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 had 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 is 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 incontrollable; everything taken is immediately rejected, the ejected matter being usually the contents of the

* Dublin Journal, vol. xxvii. p. 326.   † Hardy and M'Clintock, p. 394-95.

stomach mixed with mucus, but sometimes it is dark, 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 had been mistaken for uterine inertia, and ergot of rye given to increase them. Again, in certain cases labour is completed without any indication of mischief: nevertheless, laceration has taken place, which soon after becomes manifest. So severe an accident generally causes a violent constitutional shock; but there are cases where neither the stomach nor pulse, nor respiration, were 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 appear 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.

The treatment will need a careful examination: promptitude and decision are essential in òrder 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 taking place? secondly, how are we to proceed when rupture occurs?

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. I do not think that you can 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 in rupture.

The treatment, when rupture has occurred, consists in the immediate removal of the child,—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 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 the crotchet. The forceps may be used for the purpose, 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 for the purpose, you should remember that the uterus no longer exercises any counter-pressure

on the child, and 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 in the pelvis, so as to require any force in its application, I think the crotchet is preferable if 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 fore-finger within the opening before the perforator is withdrawn; the crotchet may then be introduced andt he head drawn down.* While this is being done, an assistant should press firmly on the child in the abdomen to prevent it 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, or attempt to force your hand through the rent into the abdomen; rather draw down the

* The contrivance suggested by Dr. Arnott, and put into practice by Professor Simpson, might be preferable to either forceps or crotchet. An Indian-rubber cloth disc applied to the head, and maintained there by an exhausting syringe, would perhaps better answer the purpose.

placenta by the funis to the opening in the uterus, and endea-
vour to get a portion of the placenta through it with the least
possible disturbance. Having succeeded thus far, the remainder
may be drawn away 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.
I really do not think this is at all necessary, and may be highly
objectionable. I very much doubt that in any of these cases
there is the least risk of strangulation of a protruding intestine.
I do not know 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
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 con-
traction 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, I think, very doubtful, nor is it 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 your
manipulation. The principal object of your 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
preferable rather 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,* in which a considerable portion of intestine protruded, not only 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."† 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 me, 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." Having drawn them down and turned the child, there yet remains its extraction through the laceration; the limbs, the body, the

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* Essay on Rupture of Uterus.

† Denman's Midwifery, p. 242.

‡ Dr. Trask gives sixteen cases of hernia of the intestines through ruptures, and only one of strangulation.

shoulders, the head, passing through it 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 the " 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 118 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.
Gastrotomy	23	16*	7
Turning . . . . ,	49	19	30
Undelivered.	46	12	34

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 have been omitted more than another, we may fairly assume that the publication or suppression of such cases have 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 rather more than one-half of the cases delivered by gastrotomy were saved. These facts are highly important, because they are consistent with the conclusions that I think we must arrive at when we reflect upon these different modes of treatment. We have already pointed out to you the extreme danger of turning, which it now appears is almost as bad as abandoning the case altogether. It remains for us to consider

* 2 cases of Gastrotomy omitted—1 during pregnancy, 1 after turning.

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 tuning, 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 105 cases of delivery by different modes, with the following results:—

	Saved.	Lost.
Delivery accomplished with ease , . .	34	21
Ditto with more or less difficulty . . .	15	35

" 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 from 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 they recognise 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 Cæsarean 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 his operations 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."* 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 could take place; that adequate means may be used to obviate the shock it might produce; 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 the most difficult to meet, is popular 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, that of turning or 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

* Blundell's Midwifery, p. 709.

uterus are sufficiently rare to justify any mode of treatment that
has not been generally adopted. The facts brought forward give
strong support 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:—

1st. When the head of the child is in the pelvic cavity, and
the forceps may be applied without difficulty, let it be employed.

2nd. 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.

3rd. When the head is fixed in the brim of the pelvis, perfo-
ration 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 is pushed back above the pelvis, the
child must be removed either by turning or gastrotomy. The
former operation is very objectionable; and, therefore—

4th. When the child is in the cavity of the abdomen, forced
there either by the uterus or the hand of the practitioner, the
only operation that appears to me to give a reasonable chance of
success is gastrotomy.

5th. When the child still remains in the uterus, norwithstand-
ing 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 might perish while in the act of delivering
her. 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 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 consequent
depression of all the vital powers.

LECTURE XXIII.

INVERSION OF THE UTERUS.—PROLAPSE OF THE FUNIS.

Causes.—Pulling at the Funis.—Shortness of the Funis.—Spontaneous Inversion.
—Symptoms.—Difficulty of Diagnosis in some Cases.—Treatment.—Mode of
replacing the Uterus.—Questions with regard to the Separation of the Placenta
before or after restoring the Uterus.

Prolapse of Funis.—Great proportionate Mortality of Infants.—Descent of the
Funis before the rupture of the Membranes not so dangerous.—Prolapse when
the Waters are discharged in the First Stage of Labour.—Prolapse in the Second
Stage.—Treatment.—Delivery by the Forceps.—By turning.—Reposition of the
Funis.—With the Fingers.—The Sponge (Osiander).—A Bag (Mackenzie).—
By means of a Catheter.—Method of.—Michaeli's.—Chailly.—The Author.—
Importance of Immediate Delivery if these means fail.

INVERSION OF THE UTERUS is a very serious consequence of
delivery, and one which, more than any other, has reflected
odium on the practitioner in midwifery; the most disgraceful blun-
ders, and the most frightful results, have been the effects of
ignorance of the nature of this accident. 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—nay, 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.

The causes of inversion of the uterus are most usually traceable
to violence, although sometimes the accident happens sponta-
neously. *Pulling at the funis* improperly is, perhaps, the most

frequent cause. The placenta being retained, an attempt is made to separate it by pulling 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. 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 I believe this very rarely happens: I 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." †

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* Edinburgh Monthly Journal, June 1848.

† Hardy and M'Clintock's Practical Observations, p. 223.

Spontaneous inversion of the uterus sometimes happens. Mr. J. Clarkson relates an instructive case of this kind. Mr. Clarkson 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. Tnis 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, tlthough I made deep pressure for it."* 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, 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

* Lancet, vol. ii. p. 406.

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 is necessary, the os uteri may be felt surrounding the neck of the tumor 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 does 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 pubis, the uterus cannot be traced. The surface of the tumor 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 was peeled off the surface without any loss of blood. In other instances there was profuse hæmorrhage. Dr. Lever relates a case of fatal hæmorrhage which followed the separation of the placenta from an inverted uterus. Mr. Newenham 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 had lost its tonic contractility, and that it is too flaccid to retain its form under the force compressing it,—hæmorrhage, perhaps profuse, would be a natural consequence of this condition. If, on the other hand, there is no uterine inertia, but the fibres, through some violence, are 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 would take place, because the contraction of the uterus in this inverted position is just as great, 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 such accident has happened. In both instances it would depend upon the presence or absence of an efficient uterine contraction.

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 tumor, 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. If the inversion be irreducible, its treatment belongs to a different subject from that we are at present discussing. The mode of replacing it is somewhat similar to prolapsed uterus. The tumor is firmly compressed with both hands, and the centre of the fundus pushed upwards towards the pelvis 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 Indian rubber bottle. Much of your success will depend upon your promptitude: the uterus should be returned quickly; but if there be much delay or violence, it may become

* 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 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 a 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.

impossible to do so. Recollect, therefore, the opposition which the perinæum may give you: 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. Newenham 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. I 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 tumor 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,* I think 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 is 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 a 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 the tonic contraction of the uterus more efficiently.

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 three hundred and fifty-five cases of prolapsed funis, in two hundred and twenty of which the child was still-born—nearly two-thirds. 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—1st, when the funis descends before the dilatation of the os uteri: 2nd, 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 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, that he could have recourse to, 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 me 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.	Dead.	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."* 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 those sources of error, I am 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. I should, therefore, not hesitate to recommend you to delivery the child immediately that the funis descends, if you find it impossible to replace it.

The *re-position 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

Collins, p. 346.

complication), she reclines on her left side, in the usual obstetric position; but if the descent has 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."*

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 I fully agree with Burns' remark on this practice—" If the hand is to be introduced so far, it is better at once to turn the child."† Dr. Mackenzie proposed to enclose the prolapsed portion of the funis in a bag, and thus to return it. I have known this method succeed, but it is very awkward and inconvenient, and has more frequently failed. Osiander suggested a plan that has answered his expectations, and I 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

* On Midwifery and Puerperal Diseases, by Drs. Hardy and M'Clintock, p. 342-43.
† Principles of Midwifery, p. 433.

must be made to prevent the sponge 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, while 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 (de 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. Steevens 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 placed between the open extremities of the stilette; the stilette is drawn within the catheter and secured by

Plate 7.

Michaelis Method.

Chailly's Method.

The Author's Method.

THE REPOSITION OF THE FUNIS.
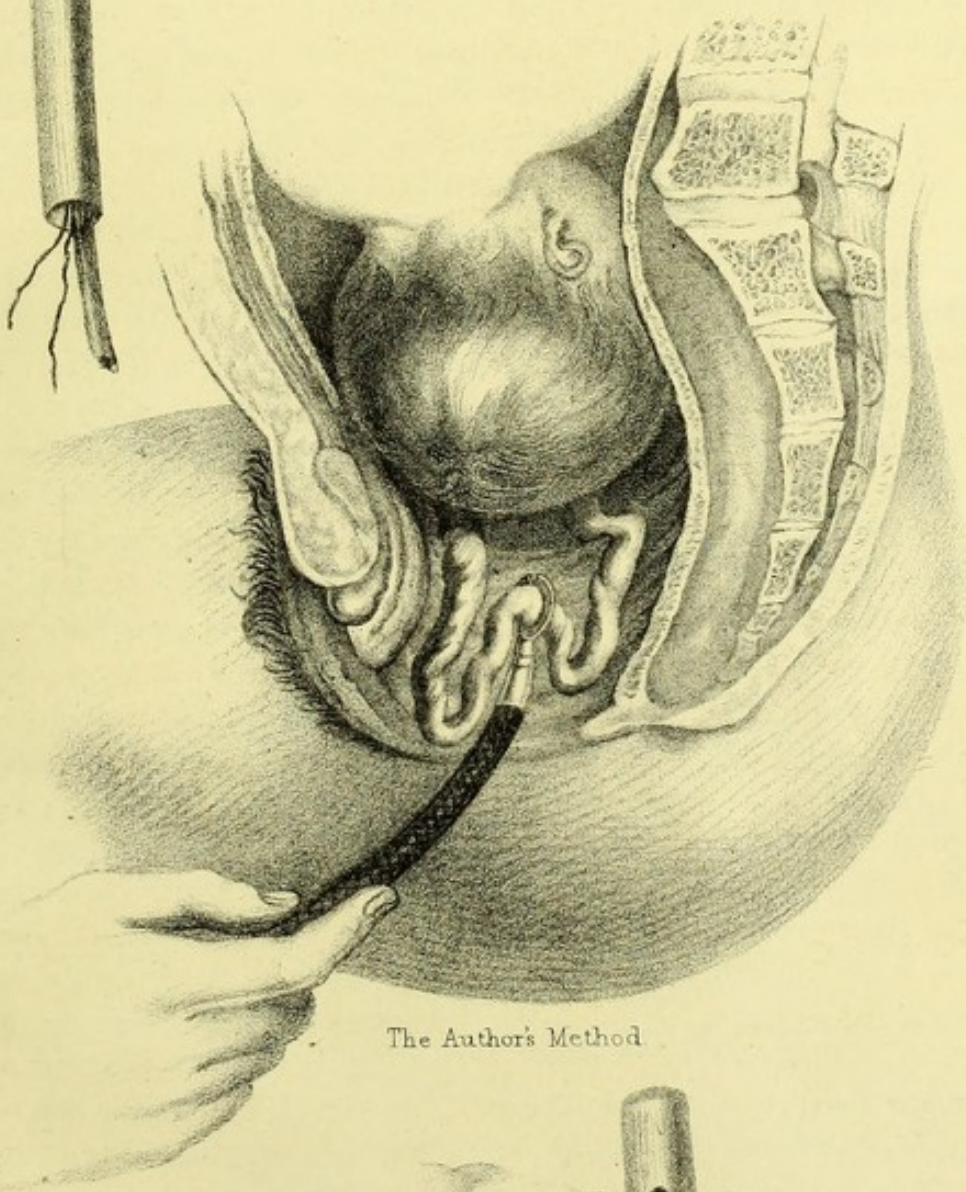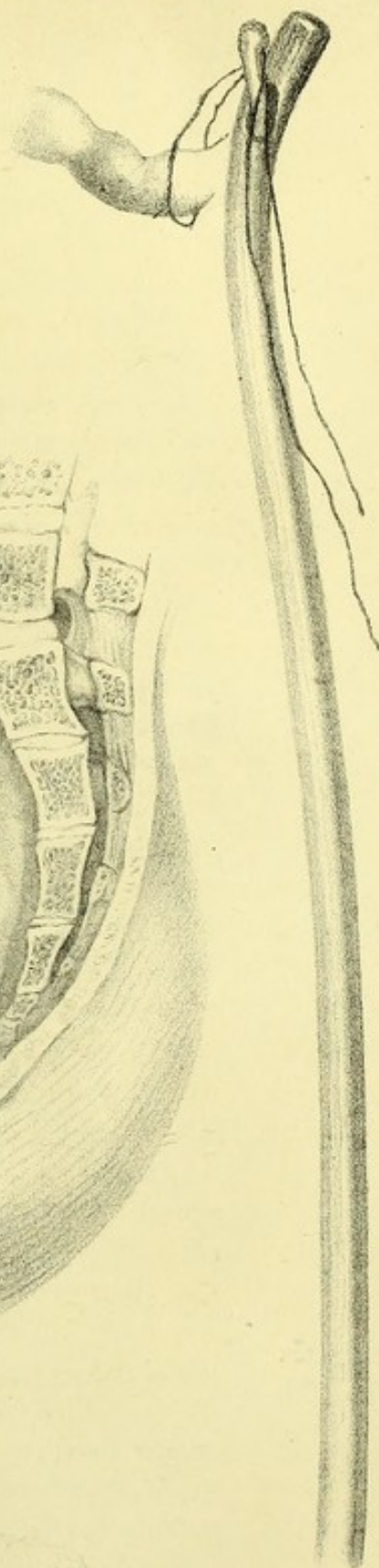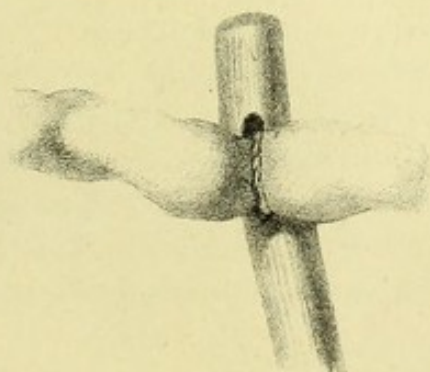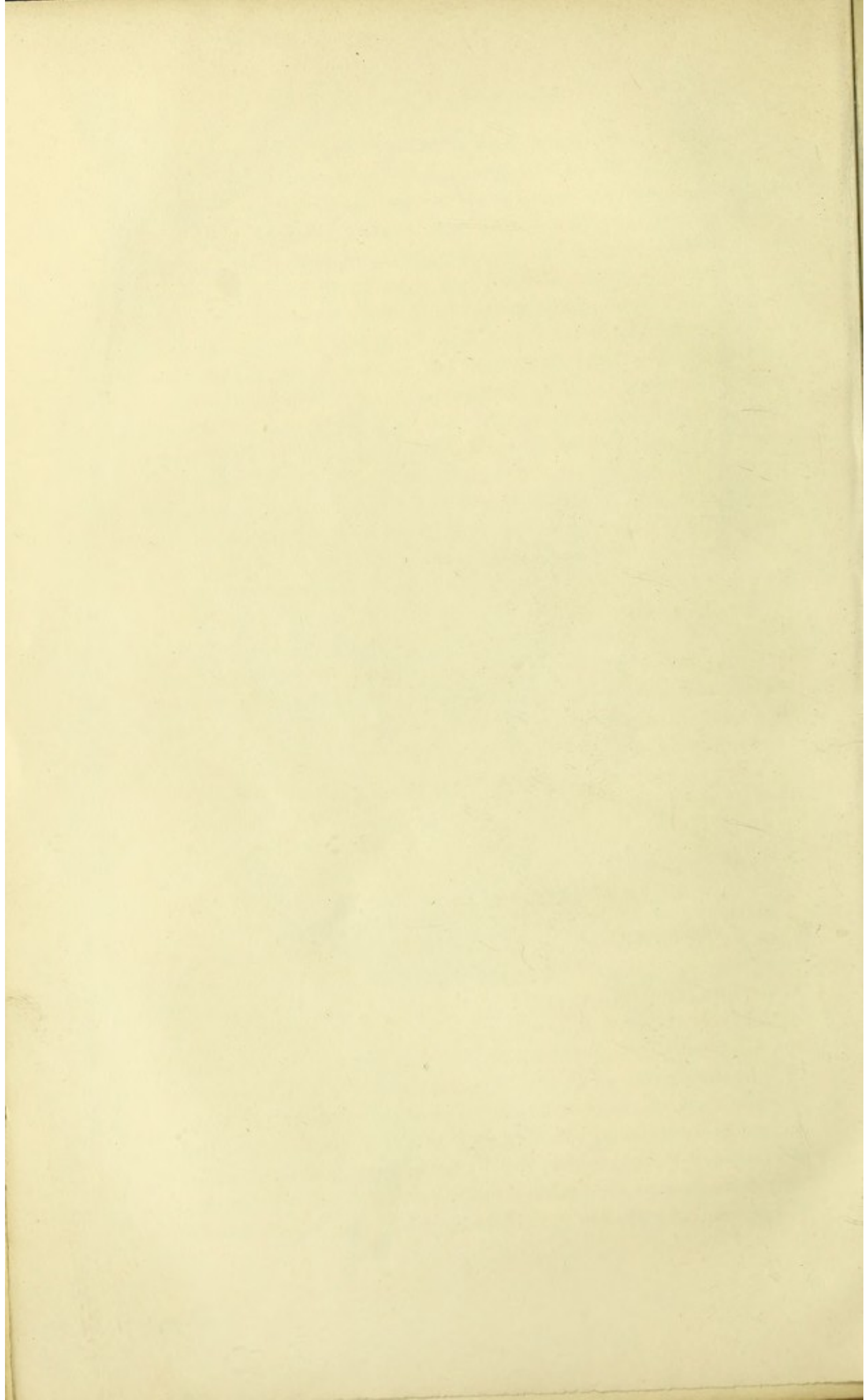
a screw at the opposite extremity; the forked extremity of the stilette is thus closed upon the membrane of the funis, and holds it. The catheter, with funis attached, is then pushed up beyond the head.

Of all these contrivances the last would be the most useful if it could be made to answer its intended purpose: but I 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 me, which, I think, might obviate this inconvenience, and answer the purpose. I have had an instrument made, having the divided extremities of the stilette 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.
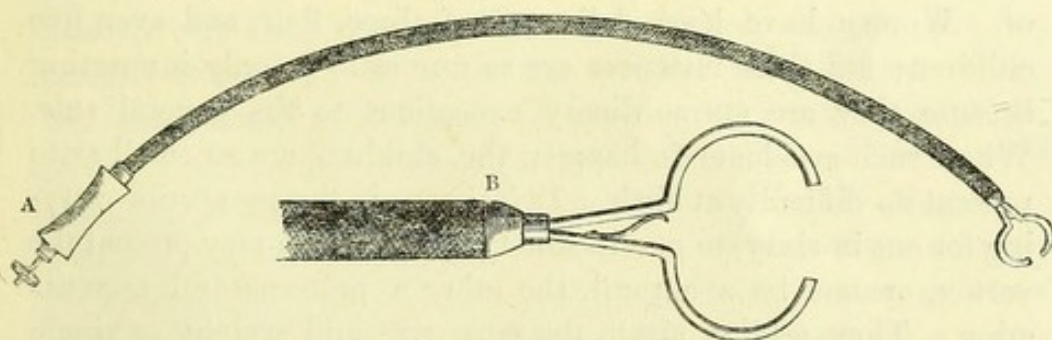
A. Catheter, having the ring closed.
B. Extremity of catheter, ring opened by spring when pushed forward.

Dr. Ramsbotham proposes another method, suggested to him by a gentleman practising in the country. For this purpose, " we shall only require a piece of thin whalebone from eight to twelve inches long, and half an inch wide, and less than a yard of narrow tape; but which may be obtained wherever women are present. Near one end of the whalebone two holes should be bored about an inch asunder; the tape should be carried through

first one and then the other; so that the loops should lie lengthwise on the whalebone between the holes, and both strings should hang down on the same side. When used the fold of funis must be placed within the loop, and the tape drawn moderately tight—not sufficiently so, however, to impede the circulation through the umbilical vessels—and the end of the instrument thus charged must be carried up into the uterus above the child's head; the tape must then be taken away by pulling at one string, the funis released, and the whalebone withdrawn" (Obstetric Medicine and Surgery, p. 493). This drawing away of the tape constitutes the objection, there is the risk that it may be caught by the whalebone, and if so, the funis is compressed during the time the practitioner is trying to get it away.

If it were possible by any of these means to effect the re-position 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 are not realised—if we fail in replacing the cord—I would again repeat that we are bound to interfere: to deliver with the forceps if the head be at all within reach of its application; and, if not, to turn the child.

PLURAL BIRTHS are the last complication that we have to speak of. 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 for one in sixty, to one in ninety cases. Both may present the vertex, or one be a natural, the other a preternatural present-ation. 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 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. I 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, skin of copper colour, and considerably advanced towards putrefaction: the cuticle everywhere peeling off. Cruveillier, 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 of the fœtus arrested at four and half months. My friend, Mr. Pretty, reports 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, a uterus of the ordinary size may be thrown very much forward, and the abdomen 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 demarkation 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 is heard *equally distinct* at opposite sides of the abdomen ; if the pulsations are not synchronous ; if the position of the two sounds are 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 the heart may be heard through the abdomen and mistaken for 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 duing its action.   After delivery of the first child *its funis should be carefully tied* on the placenta side; instances are met with of a double placenta having between them large intercommunicating branches sufficient to cause a profuse hæmorrhage if the funis is 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 sometimes 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 is 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 XXIV.

ETHERISATION.

Anæsthesia, meaning of the Term —Æthers.—History of Etherisation.—Nitrous Oxyde.—Sulphuric Æther first used in America in 1846 by Mr. Morton.—Introduced into London by Dr. Boot, and used by Mr. Robinson in Dentistry; by Mr. Liston in Surgery; in Midwifery, by Dr. Simpson, January, 1847; February, 1847, by the Author; on the Continent by Du Bois, Siebold, Grenser, etc.; in America, by Dr. Channing, in Midwifery, May, 1847.—Its Advantages. —Chloroform introduced by Dr. Simpson, November, 1847; used by the Author, November, 1847, in the Operation of Perforation.—What Chloroform is.—One of many Hydro-carbons possessing similar Properties.—Ternary Compounds.— Carbon the essential Element.—Comparative Action of Alcohol.—Sulphuric Æther.— Chloroform.— Hydrocyanic Acid. — Physiological Action of Anæsthetics.— On the Circulation, Dr. Snow.—On Nervous Tissue, Mr. Nunneley.— Affinity of Anæsthetics for Oxygen counteract the Affinities of Animal Tissues.— Action of Chloroform on the Heart.—On the Blood.—Mr. Nunneley's Views of its Action on Nervous Tissue.—Its Effect progressive. — Upon the Nerves of Sensation—of Motion—on Perception.—The excito-motor Axis.—The Ganglionic System.—On Muscular Irritability.—Death from Chloroform how produced.

ANÆSTHESIA means the diminishing or annulling pain. It has been discovered within the last few years, that certain of the æthers possess this peculiar property, and hence *ætherisation* has been introduced into the practice both of surgery and midwifery, for the purpose of relieving the extreme sufferings to which patients are exposed in surgical operations, and in the agonies of labour. The æthers 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 to suffering humanity, have

necessarily become subjects of much controversy. The advocates of ætherisation, 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.

When controversies become warm, it generally happens that the question in dispute is lost sight of, and thus the use of ætherisation, especially in midwifery, has been so obscured by mere prejudice, by false reasoning, and by false facts, that it requires a very careful examination of its properties, the mode of its administration, its beneficial and its injurious effects, to form any just conclusion respecting it. Having given, then, a brief outline of the history of its introduction, we shall consider what these æthers are; what they do; how they may be employed in obstetric practice; and, lastly, whether they may be safely used for the relief of the parturient woman, or should be altogether discarded from practice.

The history of anæsthesia might commence at the most remote period; in fact its origin is hidden in the mysteries of mandrake and other *secret* agents for removing pain, which Dioscorides and Pliny tell us the ancients used. Then, as now, it appears they had the power to throw a patient into a deep sleep, and annul the pain of a surgical operation. The history, however, of *ætherisation*, dates from the year 1844, when Mr. Horace Wells, of Connecticut, acted upon the idea of Sir Humphrey Davy, and tried whether nitrous oxyde would relieve pain. He obtained some of this gas, and proceeded to Boston for the purpose of making known to Drs. Warren, Hayward, Jackson and Morton that he had used it with success in the extraction of teeth. An experiment was tried with nitrous oxyde on a boy with toothache, which, however, failed; nevertheless Dr. Morton, a dentist, seems not to have given up the idea; he sent to Dr. Jackson for some of the nitrous oxyde, but he not having any prepared *sent him some sulphuric æther instead*. Dr. Morton tried it with success, and, in 1846, announced that he had discovered the anæsthetic influence of sulphuric æther. Its use spread rapidly in America both in dentistry and in surgery. And its advantages were communicated in November of the same year to Dr. Boot,

of London, in a letter from Dr. Bigelow, of Boston. Mr. Robinson, the dentist, of Gower-street, used it (Dec. 19th, 1846) with complete successs. On the 21st, Mr. Liston had it administered in two surgical operations, one an amputation of the thigh, another, the removal of the great toe-nail; both were completely successful, and its reputation spread rapidly in England and France; as yet, however, it had not been tried in midwifery, but very soon it extended to this also.

January, 1847, Professor Simpson used it in a case of turning, and the result was most satisfactory. "It proved that though the *physical suffering* of the parturient woman could be annulled by the employment of æther inhalation, yet the *muscular contractions of the uterus* were not interfered with." *

February, 1847, a case of turning came under my own notice. I used sulphuric æther, and delivered the patient without pain. It was used in France and Germany by Du Bois, Fournier, Deschamps, Martin of Jena, Siebold, and Grenser.

Its advantages in obstetric practice were again reflected to America, and Dr. Channing, of Boston (its birth-place), used it with complete success in a forceps case, May 5th, 1847. The American practitioners did not hesitate to employ it in obstetrics; and thus the use of sulphuric æther as an anæsthetic became general, I might say, throughout the world. However, there were some disadvantages connected with its use: the apparatus was formidable; the vapour pungent, and to some persons very disagreeable: it often caused great irritation in the bronchi, and the stage of excitation being distinct, and sometimes prolonged, it was inconvenient for operations, alarming to the bye-standers, and was often very difficult to control: in some cases it was tardy in producing its anæsthetic effect. These objections were felt much more in the practice of midwifery than surgery, and stimulated the energetic mind of Professor Simpson to search for some other agent capable of accomplishing the same object. It was not long before his search was successful. Dr. Gregory, of Edinburgh, proposed to him the Dutch liquid: Mr. Waldie, a chemist, of Liverpool, *chloroform*, and here the true spirit of devotion to science, even at the risk of life, was manifested. Like Sir Humphrey Davy, Dr. Simpson first tried the experiment of inhaling chloroform himself, before he ventured to administer it

* Medical Gazette, February 26, 1847.

to others. In his anxiety to obtain a suitable agent, he inhaled several other chemical liquids, such as acetone, nitric æther, benzin, the vapour of iodoform, etc., etc. Mr. Millar, Professor of Surgery in the University of Edinburgh gives a most graphic description of these experiments.

" Most of these experiments," he says, " were performed after the long day's toil was over—at late night or early morn—and when the greater part of mankind were soundly anæsthetized in the arms of common sleep. Late one evening, it was the 4th of November, 1847, on returning home after a weary day's labour, Dr. Simpson, with his two friends and assistants, Drs. Keith and J. M. Duncan, sat down to their somewhat hazardous work in Dr. Simpson's dining-room. Having inhaled several substances, but without much effect, it occurred to Dr. Simpson to try a ponderous material, which he had formerly set aside on a lumber table, and which, on account of its great weight, he had hitherto regarded as of no likelihood whatever. *That happened to be a small bottle of chloroform;* it was searched for and recovered from beneath a heap of waste paper; and with each tumbler, newly charged, the inhalers resumed their vocation. Immediately an unwonted hilarity seized the party; they became bright-eyed, very happy, very loquacious, expatiating on the delicious aroma of the new fluid. The conversation was of unusual intelligence, and quite charmed the listeners—some ladies of the family and a naval officer, brother-in-law to Dr. Simpson. But suddenly there was a talk of sounds being heard like those of a cotton-mill—louder and louder—a moment more all was quiet and then—a crash. On awaking, Dr. Simpson's first perception was mental—" This is far stronger and better than æther," said he to himself. His second was to note that he was prostrate on the floor, and that among his friends about him there was both confusion and alarm. Hearing a noise, he turned round and saw Dr. Duncan beneath a chair; his jaw dropped, his eyes staring, his head bent half under him, quite unconscious and snoring in a most determined and alarming manner. More noise still and much motion. And then his eyes overtook Dr. Keith's feet and legs making valorous efforts to overturn the supper table, or most probably to annihilate everything that was on it; I say more probably, for frequent repetitions of inhalation have confirmed, in the case of my esteemed friend, a character for

maniacal and unrestrainable destructiveness, always under chloroform in a transition stage. By-and-bye Dr. Simpson, having regained his seat, Dr. Duncan having finished his uncomfortable and unrefreshing slumber, and Dr. Keith having come to an arrangement with the table and its contents, *the sederunt* was resumed. Each expressed himself delighted with this new agent, and its inhalation was repeated many times that night . . . . In none of these subsequent inhalations, however, was the experiment pushed to unconsciousness; the first event had quite satisfied them of the agent's full power."*

Such was the bold and hazardous means by which the power of this new agent was ascertained. Its properties were rapidly circulated in a short paper by Professor Simpson,† and it became the object of much discussion, especially in the practice of midwifery.

November 24, 1847, I was summoned to a case of difficult labour in consequence of a very contracted pelvis, the conjugate measurement being only two and half inches. It was her seventh child, all her previous labours were protracted, varying from fifty-six to eighty hours' duration. I was obliged to perforate the head of the child, as she had been thirty-six hours in active labour without any effect on the head, it still remained above the brim. I determined to put her under the influence of chloroform, and having obtained Dr. Snow's assistance, upon whose skill and experience I could depend, we proceeded to administer this new agent. She soon fell into a quiet sleep, the operation was performed, she was bandaged, the soiled clothes removed, and the bed settled before she awoke. In about fifteen minutes she looked up, recognised me, and said she felt no pains then, but was evidently in expectation of their return. Some of the gentlemen present were leaving the room, and she became alarmed, thinking that we were going to desert her; but being at length convinced of the fact of her delivery, her countenance lighted up with delight. She said the chloroform caused her a much more refreshing sleep than she had previously enjoyed, so much so, that when first spoken to, she felt annoyed at being disturbed. I watched this case most anxiously, lest some post-partum mischief

* Surgical Experience of Chloroform, by Professor Miller, p. 10, 11.

† Account of a new Anæsthetic Agent as a Substitute for Sulphuric Æther in Surgery and Midwifery, by J. Y. Simpson, M.D. Edin. 1847.

might arise, but I was astonished to find that symptoms of rest-lessness, prostration, and subsequent inflammation, that I had been accustomed to observe in these severe cases, were altogether absent. I never saw a patient recover so well nor in so short a time. This fact made me a convert to chloroform. It possessed all the advantages that were sought for in sulphuric æther; no apparatus was essential, the vapour was devoid of all pungency, and had an agreeable smell like apples when kept for some time; the stage of excitation was often scarcely apparent, being so rapidly followed by that of sopor, the quantity required to produce anæsthetic effects was very small as compared with sulphuric æther, and consequently chloroform soon superseded it both on the continent and in America. Such is a brief outline of the history of this agent, and before we enter upon the question of its advantage or disadvantage in the practice of midwifery, we must first consider what it is.

Chloroform is one of many substances that possess similar properties, only differing in degree. Hydrogen and carbon form their base, and this may exist either alone or united with a third element, and thus form a ternary compound. They all possess in a greater or less degree anæsthetic properties; they all seem to influence the nervous system in a similar manner; they are all more or less vapours or gaseous; but differ from each other in degree and the rapidity with which their peculiar effects are produced. The most remarkable of these are benzin or benzole, chloroform (perchloride of formyle), Dutch liquid (chloride of olefiant gas), sulphuric æther, alcohol, hydrocyanic acid: there are many others, but these will sufficiently explain their peculiar properties. We shall first place their elements, specific gravities, and degree of volatility before you and then examine their properties.

	Anæsthetics.	Carbon.	Hydrogen.	Chlorine.	Oxygen.	Nitrogen.	Specific Gravity.	Boiling Point.
Hydro-Carbons.	Benzin or Benzole	2	1	..	..	..	0·8500	187°
	Chloroform	2	1	3	..	..	1·4800	140°
	Dutch Liquid . . .	2	2	2	..	..	3·4484	180°
	Sulphuric Æther .	4	5	..	1	..	0·7154	96°
	Alcohol	4	6	..	2	..	0·7960	172°
	Hydrocyanic Acid	2	1	..	..	1	0·6969	80°
Chloride of Carbon . .		4	..	4	..	..	1.5520	248°
Chloric Æther	A mixture of Chloroform and Alcohol.							

Mr. Nunneley, of Leeds, from whose valuable paper " On Anæsthesia and Anæsthetic substances," I have formed this table, has performed no less than three hundred and sixty-three experiments on animals, for the purpose of determining several interesting questions relative to the action of these, and several other similar compounds. He has clearly established, that there is a large class of bodies which have the common property of temporarily suspending consciousness and sensibility, the vitality remaining; that they are characterised by a similar composition, or chemical alliance, and have a common mode of action upon animal bodies. The majority of these agents are ternary compounds, but the third element seems not to be essential to the anæsthetic effects. That is, the hydro-carbon base may be combined with oxygen in one (sulphuric æther), with nitrogen in another (hydrocyanic acid), with chlorine in a third (chloroform), and produce similar effects, only differing in degree. And again, he has shewn, that even in the hydro-carbon base, hydrogen is not essential, because chloride of carbon (carbon and chlorine) produces similar effects as benzole (carbon and hydrogen); and hence the inference that carbon is the essential element of anæsthesia. Hydrogen (itself almost inert) seems to have the effect of giving carbon an activity that it would not otherwise possess, and the third element of the compound regulates, as it were, the intensity of the effect. Thus, with oxygen, its effects are retarded; with one volume, as sulphuric æther, inhalation causes anæsthesia, but not for some time, the quantity of vapour consumed being large. With two volumes of oxygen, as in alcohol, inhalation has no effect, and it is not until a very large quantity is taken into the circulation from the stomach that any anæsthetic action is produced. Chlorine increases the activity of the anæsthetic much more, as in chloride of carbon, chloride of olefiant gas, chloroform; the inhalation exciting its effects with a promptitude too often dangerous. On other surfaces, however, as the mucous membrane of the stomach, and the integument, they are slower in manifesting themselves. But, with nitrogen, the intensity is at its highest; hydrocyanic acid, whether inhaled, taken into the stomach, or applied to the skin, equally produces anæsthesia with a fatal suddenness.

Binary compounds of carbon are also anæsthetic; and although carbon is the essential agent, the second element makes a remark-

able difference in the intensity of its effect : thus, with hydrogen (benzole) and chorine (chloride of carbon), it very much resembles chloroform ; but with oxygen (carbonic oxide) a poison is formed as violent and instantaneous as hydrocyanic acid.

The physiological action of anæsthetics, and their effect on the animal tissues, is a subject too extensive to permit me to do more than glance at it; and as chloroform is the most remarkable, and the most generally used of these agents, we shall consider more especially its physiological effects, and refer to the others by way of illustration.

The action of chloroform, like chloric, sulphuric æther, etc., is most promptly made manifest by inhalation : its effects, when taken into the stomach, or injected into the rectum, are by no means so powerful. When the vapour is received into the lungs, it is rapidly expanded over all the 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 then the vapour may be received by these blood-vessels and carried into the general circulation, or it may act directly upon the nervous filaments, and from thence upon the whole nervous system. Dr. Snow brings prominently forward the former of these views, Mr. Nunneley the latter. Although each seems to rest rather too exclusively upon his peculiar explanation, the views of both must be considered correct, and rather to illustrate than to be opposed to each other. With regard to the action of anæsthetics through the circulation. Dr. Snow has demonstrated one important fact, and has given very strong reasons in support of another. He has proved, that the anæsthetic effect of a vapour is in the inverse ratio of its solubility in the blood;* thus, alcohol, which is soluble to any extent, has scarcely any anodyne effect, while chloroform, that is very little so, acts with great power. Again, he conjectures, and with much reason, that chloroform, and similar agents, which are absorbed, but not dissolved, in the blood, exert a strong affinity for the oxygen that is inspired and goes the round of the circulation; that, although this affinity is not sufficient to abstract the oxygen, and form new compounds, it still may prevent the usual affinities taking place ; carbonic acid is not found in the same proportion, carbon is not removed

* Medical Gazette, March 31, 1848.

from the tissues, and hence the effects observed. In proof of this, Dr. Snow performed several very ingenious experiments,* showing " that the quantity of carbonic acid evolved from the lungs is diminished under the influence of æther and chloroform." Dr. Prout demonstrated the same fact in drunkards, that the quantity of carbonic acid produced in respiration was diminished after drinking alchoholic liquors. So also animal heat, which bears a direct proportion to the consumption of oxygen, was found to be diminished, and the colour of the blood corresponded with this hypothesis. Dr. Snow observes, that " when the blood which flows from the arteries and veins can be separately observed, *whilst the patient is well under the influence of the narcotic*, it is seen, that the arterial blood is somewhat less florid, and *the venous less dark*, than under ordinary circumstances. This fact may also explain the peculiar effect of another anæsthetic on the blood. Mr. Nunneley observed, in animals poisoned with carbonic oxyde, that both venous and arterial blood was *bright florid*,† as if this compound equalled and neutralised the affinity for oxygen possessed by the tissues, and thus the inspired oxygen went unchanged through the capillary circulation, and rendered florid the venous blood returning to the heart ; hence the rapidly fatal effect of carbonic oxyde. Chloroform possesses this power, but in a much less degree; and, it is probable, that its peculiar effects are attributable to this circumstance. In this sense it may be compared with the effects of extreme cold, when there is, in proportion to the reduction of temperature, a reduction of oxygen, and less carbonic acid expired. The prickly pain first excited, then the loss of sensation—the numbness produced, followed by drowsiness — the inability to regulate voluntary motions, and ultimately complete sopor — all correspond.

The solubility of chloroform in the blood, has an important relation to its action. Being only slightly soluble, a certain portion of free chloroform, as a vapour expanded by heat, flies through all the arteries of the body; but it must first arrive at the heart, and hence the importance of Dr. Sibson's remarks in reference to deaths from chloroform. " The poison," he observes, " penetrates 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

* Med. Gazette, 1851, p. 622. † Trans. Prov. Associations, vol. xvi. p. 261.

blood passing into the coronary artery is less diluted, is more strongly impregnated with chloroform, than is the blood in any other part of the system except the lungs." The experiments of M. Gosselin * also illustrate the same fact; he injected chloroform into the external jugular vein, so that it passed at once to the heart before it reached the lungs; they will, therefore, explain the phenomena of death from chloroform commencing at the heart. In the first experiment, two grammes of chloroform were injected into the external jugular-vein of a middle-sized dog. The animal died in less than a minute. An autopsy was made *immediately after*; the heart was found voluminous and distended; there was no gurgling, and although examined under water, not a bubble of air escaped. Both lungs presented emphysema on the level of their anterior and inferior margins, particularly on the inferior lobe, there were some points of echymosis, but of small extent and superficial. In another experiment, M. Gosselin injected three grammes. " The animal appeared at first to suffer but little, then stretched out its paws without any convulsive movements, let its head drop, and died; the whole occupied a little less than a minute." When opened after death, in the same manner, the heart was enormously distended, and did not at all contract; but after a few moments some contractions were resumed under the influence of external stimulants. Dr. Snow's 44th Exp. proves the same thing. Having *saturated* with the vapor of chloroform, a jar of the capacity of 600 cubic inches, " A young rabbit was put into the jar: it was very quickly affected and ceased to breathe in less than a minute: it was taken out immediately the respiration ceased, and the ear was applied to the chest, but no motion of the heart audible. The thorax was opened as quickly as possible, and when the heart was first observed it was quite motionless, but it had not been exposed to the air for a minute, before it began to contract, the auricles beginning to move first, and shortly afterwards the ventricles; and in three or four minutes it was contracting vigorously. This recommencement of the heart's action no doubt resulted from the evaporation of the chloroform from its surface, and the consequent liberation of the nerves, there situated from the influence of the vapour. Soon after the chest had been opened, a drop of chloroform was allowed to fall on the heart and its

* Archives Générales de Medicine, tom. xviii., December, 1848.

motion instantly ceased, but gradually commenced again in the course of a few minutes, and it continued to contract feebly for some time."*

These experiments prove the effects of free chloroform on the heart, whether conveyed to it directly by the jugular or by the pulmonary veins, and are of great importance in our inquiry into the causes of death in those fatal cases which have taken place. If the heart escape from such effects, chloroform passes through all the vessels of the body with a rapidity in proportion to its volatility. Dr. Snow has found that it does not enter into any new combination, but again passes off unchanged by the lungs and other channels, hence the composition of the blood is not altered by it.

The volatility of chloroform has also an important relation to its action. Being very volatile and but slightly soluble in the serum of the blood, its powerful anæsthetic properties place it first in the list of these agents. Mr. Nunneley's observations, to a certain extent, support those of Dr. Snow. Mr. Nunneley does not think that the blood is poisoned, or that its organization is materially altered, and argues that " the blood 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 the colour. *That which flows from a wound during an operation is as bright as usual.*"† Again, with regard to his numerous post-mortem examinations, Mr. Nunneley observes, " *If there be one appearance more constant than another it is the crimson or scarlet colour of the lungs.*" Mr. Nunneley and Dr. Snow, therefore, are perfectly agreed as to the condition of the blood in these cases. Mr. Nunneley, however, points out more prominently the effect of chloroform on the nervous system. He considers that the action of an anæsthetic "is primarily in all cases, and principally if not entirely, upon the nerves, and further that it is upon the peripheral extremities of these that the direct effect mainly occurs." The effects upon

* London Medical Journal,
† Trans. Prov. Medical and Surgical Association, vol. xvi. p. 359.

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respiration, the heart, and circulation, are only secondary. We shall not occupy you with a discussion of this question, it is the less necessary because it is obvious that there is no priority of action between nerves and blood vessels; we might as well expect from a wound pain without blood, or blood without pain, as to separate the action of chloroform on nervous tissue from its imbibition, within the accompanying vessels. Dr. Snow points out the effect on the circulation; Mr. Nunneley, with equal truth, its influence on the nerves.

That the first effect on the nervous system is local, is proved by the action of chloroform when directly applied to the skin, and its evaporation is prevented. " The first sensation is that of warmth; smarting and pain soon follow, and with these generally redness and some swelling. After a time the pain ceases, when numbness and loss of sensation ensue: if the application be some time longer continued, most distinctly and unmistakeably these proceed along the course of the nerves, far beyond the part with which the agent is or has been in contact." Such is the experience of Mr. Nunneley, who tried its effect locally upon himself. He has found, also, that this partial loss of sensation and motive power is sometimes persistent for days. From this fact, he infers that the action of chloroform is first directly upon the nervous fibrillæ that surround the vesicles of the lungs, and that, *cæteris paribus*, " the larger the number of these which can be directly and simultaneously acted upon, the greater will be the effect." He argues hence, that the direct effect of chloroform on the immense nervous expansion in the lungs produces the general effect upon the nervous system. We cannot, however, assent altogether to this view, because it is difficult to argue from analogy here; and if this explanation were correct, chloroform could not be used. The effect of chloroform on the sentient nerves of the surface cannot accurately explain its effect on the pneumo-gastric nerve: if it were true that chloroform acted first upon this and then upon the whole nervous system, the respiratory tract would be the first to feel its influence, respiration would become excited, then slower, and if, like sensation, the irritability of the pneumo-gastric were lost, respiration must cease and death ensue. Now, in giving chloroform, one of the dangers that we seek to avoid is any interruption to respiration, because, if it be at all retarded, or the irritability of the nerves be in the least weakened, blood

begins to accumulate in the lungs, and asphyxia is imminent; hence, in order to prevent any such effect taking place, the administrator is, or should be, most careful that atmospheric air freely enters the lungs, so that their cells may be, as it were, shielded from the too powerful agency of this anæsthetic.

The influence of chloroform on the nervous system, when properly administered, may be considered to be progressive; the sentient portion of the cerebro-spinal axis is first affected; the patient may be pinched and feel it very slightly, if at all, still she possesses motive power. A patient in labour is conscious that her sufferings are relieved, she can hold the inhaler and inspire chloroform; presently, however, as its influence increases, she lets it drop; the motor portion of the nervous system is now becoming engaged, so that there is a total loss of sensation and a partial loss of voluntary motion. The cerebrum nexts manifests its influence, often simultaneously with loss of voluntary motion. The patient loses consciousness, she may be pinched or cut without sensation: if the arm be raised, it drops; still, however, excito-motor actions remain: if the eyelid or conjunctiva be touched, winking is excited. Some experiments of Dr. Tyler Smith seem to prove that the excitor-motions are even exalted * at this stage; hence Dr. Smith explains the increased force of the uterine contractions so often observed. Soon, however, this excitor force is diminished, and the eyelids are no longer irritable: at this degree, the most severe operations in surgery may be performed; at this point, also, danger is approaching, and should be guarded against, because, when the true spinal system is getting under the anæsthetic influence of chloroform, if the force of the vapour be increased, the respiratory tract becomes engaged, the irritability of the pneumo-gastric nerve may be paralysed, and all its consequences ensue.

Fortunately, this loss of power in the respiratory muscles becomes evident from the stertor observed in respiration, and although stertor may occur, as safely as in natural sleep, you should always look upon it as a beacon to indicate change. Thus

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* A guinea-pig being placed under the influence of chloroform, the effects were carefully observed in the uninjured animal. At first the breathing became hurried and increased in vigour, and the limbs, particularly the posterior extremities, were convulsed; when the limbs were pinched, they were smartly retracted by reflex action. It was evident that, as a first effect, the function of the spinal marrow was *exalted*. London Medical Journal, vol. i. p. 1108.

far, then, chloroform may be safely used; but if we pass one step beyond this, and increase the quantity of the vapour, or what is the same thing, if we do not carefully guard against its accumulation, danger presents itself. The respiratory tract is the last excito-motor axis that is affected. The intercostals and thoracic muscles first lose their vigour, inspirations are slower, less perfect, and at longer intervals, the chief muscular action is diaphragmatic, ultimately this also ceases and death takes place. If a post-mortem examination be then made, the lungs are generally found distended with blood, so also the right side of the heart and great venous trunks, because the capillaries of the lungs becoming engorged, the heart fails in its effort to propel blood through them, while at the same time the supply from the veins continues and over-distends the right side.* The left side receives but little from the lungs, and therefore may be empty or nearly so. If, however, the post-mortem examination be deferred for twenty-four hours or more, these appearances of congestion will diminish in the heart; the rigor-mortis, which in all cases of death by chloroform rapidly succeeds, expels the

* The following experiment of Mr. Nunneley will illustrate this. He gave chloroform to a very large strong bull terrier bitch for the third time. "It was made to inhale one drachm and a half of chloroform from a large sponge, which had previously been steeped in water, temperature 100°, stomach not quite empty. Took it very quiet and determinately, evidently attempting not to inspire for about a minute, when, unable to resist inspiration any longer, she began to struggle most violently. At two and a half minutes, neither sensation nor reflex action; three minutes, breathed very feebly and slowly; four minutes, no respiration nor motion of the heart perceptible; six minutes, *a little spasmodic action about the throat and diaphragm perceptible* which lasted about twenty seconds: this was the only motion perceived after four minutes. At eight minutes the sponge was removed, having still a strong odour of chloroform. During her struggles, a large quantity of flatus was passed per anum, and in about six minutes a little urine, and a small nodule of fæces, which rested in the anus.

Post-mortem examination in half an hour, not having given the least indication of life.

Head. Brain excessively congested; the vessels of the cerebrum and cerebellum filled with blood; those of the pia-mater and the sinuses enormously distended with dark brick-red fluid blood, which flowed out very freely.

Chest. Lungs dark red from congestion, but much collapsed; mucous membrane of trachea, like all other membranes, congested, but not covered with mucus.

Heart enormously distended, especially on the right side ; venæ cavæ excessively filled; the pulmonary vein filled, but not excessively; pulmonary artery filled; aorta and large arteries contained some blood. Blood, upon left side, dark dirty red and quite fluid; on the right side, black and coagulated."—*Trans. Prov. Association*, vol. xvi. p. 180-181.

blood from its cavities. This, however, is not always the case; the blood so retarded also becomes dark in colour and coagulates loosely. Thus, then, chloroform may overcome the influence of the cerebro-spinal centre of sensation and motion—of the cerebrum, the centre of perception—of the true excito-motor spinal axis—and yet scarcely touch the ganglionic system. The muscular contractility of the heart, the intestines, the uterus, may still remain unaffected. This is a highly important fact, in relation to its obstetric use, because one of the objections levelled with 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 is sometimes suspended for a time under its influence. I shall not, therefore, hesitate to quote from a witness, whose testimony is the more valuable because he is not one of the advocates of chloroform. In proof of this fact, Dr. Tyler Smith relates this experiment—" A fresh 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 contractions of the heart, intestines, and of the uterus, had each their own peculiarities of action. The heart and intestines both contracted and dilated, as having to receive and to transmit onwards their contents. The uterus only shortens 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 are of the spinal system.*

Muscular irritability is the post-mortem evidence of nerve-force; rigidity of muscular fibre, the proof of its death. When respiration and the heart's action, when life in fact has ceased, still the body is flexible, the muscles obey the influence of the electric current, and several hours may pass before post-mortem

* London Medical Journal, Dec., 1849, p. 1109.

rigidity takes place. Chloroform promptly destroys this lingering life. In all the experiments performed on the lower animals, it has been observed that they became rigid in a remarkably short time after death. Mr. Barlow* performed several experiments to prove that this is the effect of chloroform; rigidity follows almost instantaneously, and galvanism has no effect.

Thus when choroform or any other anæsthetic enters the cells of the lungs, it is imbibed by the blood, it is carried by its serum first to the heart and then sent with more than railroad speed to every organ, every structure in the body, the nervous tissue is that which is susceptible to its influence, but not equally so. Throughout the nervous system, the degree of susceptibility varies with the character of the nerve and its function; the nerves of external relations which may be impaired without injury to life, are first affected; the vital organic nerves are the last influenced. The posterior roots of the spinal nerves up to the optic thalami which communicate sensations, are first rendered insensible. The anterior roots and corpora striata are then paralysed, and motor power is lost. Simultaneously with this, the cerebrum and cerebellum are engaged, the patient loses consciousness, and before this take place, or as it passes away, the lower animals are observed to lose the control of their movements. A profound sopor is soon succeeded by stertorous respiration, and if the action of choroform be continued, the respirations become slower, the thorax more quiet, and ultimately the diaphragm alone continuing to act at length ceases, and with it the action of the heart : death takes place, but still the ganglionic system is alive, the muscular fibres of the intestines and uterus obey stimuli : soon this power is also lost; the irritability of muscular fibre is the last to disappear, and often in ten minutes after death the body is perfectly rigid.

The excito-motor, or true spinal system, is influenced soon after the cerebro-spinal axis, and in the same order, the excitors first, and then the motors; the respiratory tract is the last of these engaged, and hence the importance of watching carefully any loss of excitor-force; the eye-lids and conjunctiva may be observed to lose their irritability, the motions of the eye-ball prove the effect on the fourth and sixth motor nerves; but if this be neglected, stertor will sound an alarm that cannot safely be passed over. The uterus is under the control both of

* London Medical Gazette, vol. xlviii. p. 713.

the excito-motor and the ganglionic nerves; the former may be destroyed, and yet the latter maintain uterine contractions.

Anæsthetics observe stages in their effects. The first stage is stimulation, or excitement; the second is a stage of transition, the dream before sleep, or before waking; the third is the stage of sopor, more or less profound. They do not all, however, agree in the manner that these effects are produced; on the contrary, there is the greatest possible difference between them. Alcohol affords the best example of the first stage; the stimulation is prolonged, the transition gradual, and sopor slow in appearing. Hydrocyanic acid is a perfect contrast; there is scarcely any stimulation, the transition so quick as not to be observed, sopor promptly fatal. Chloroform causes some excitement, but, if pure, very little; if mixed with alcohol (chloric æther), or containing formic acid, the excitement and local irritation is greater; this stage is also short; the patient may be quite collected and enjoy the vapour; the stage of transition manifests itself sometimes by talkativeness, then incoherency, then muttering without the power of distinct articulation; occasionally, in certain constitutions, convulsions of the voluntary muscles occur, and, in robust habits, there may be a temporary violent delirium. I have not, however, observed either of these effects in females who were in labour. The stage of sopor soon arrives and puts an end to these symptoms. Having given you this outline of the physiological effects of chloroform, to which anæsthetic I am confining your attention, it only remains for us to consider the way in which death occurs.

Death from chloroform may begin at the heart, its action may be at once paralysed, and, if so, it has no power to propel blood into the lungs; the capillary circulation in the lungs is therefore arrested, and blood either accumulates there, or is pressed back to the heart in the act of expiration. The lungs may be greatly congested, as in asphyxia, or only slightly so. Both sides of the heart are distended with blood; but, if the examination be made some hours after death, the rigor mortis expels it. On the right side it cannot do so, at least, only very gradually, because the contraction is opposed by the distension of the veins, so that a considerable time would be required for this force to overcome the valves, and send back the semi-coagulated blood from the venous trunks into the smaller branches.

In one of M. Gosselin's experiments, in which two grammes of chloroform were injected into the external jugular vein, and in which the animal died in less than one minute, " both lungs presented emphysema on the level of their anterior and inferior margin, particularly on the inferior lobe; and in some points there were ecchymoses, but circumscribed and superficial."* In Hannah Greener's case (the first instance of death fram chloroform), " the external appearance of both lungs over the whole surface, but especially in the inferior portions, was that of organs in a very high state of congestion. They were mottled with patches of a deep purple, blueish, or *scarlet* hue. . . . Along the outer and anterior border of both lungs, particularly of the upper lobe of the left lung, were several emphysematous bubbles of small size. . . . The heart contained dark fluid blood in both its cavities; very little in the left."† The effect of chloroform on Hannah Greener, and on the dog in M. Gosselin's experiment, was precisely the same, both died of syncope, not of asphyxia—the dog in one minute, Hannah Greener in two; hence I infer that her death was an example of death at the heart.

Death may begin at the lungs, and yet it is not, strictly speaking, asphyxia. There may be some excited action of the respiratory muscles in the first instance, but this is soon changed for slow and imperfect respiration: there are no violent convulsive efforts to inspire, no gaspings for breath, but rather a gradual cessation of thoracic movements, the heart continuing to propel blood, and the diaphragm maintaining a feeble action until all ceases.

True asphyxia is caused by the absence of oxygen from the blood. The asphyxia of chloroform is produced by a deficiency of carbonic acid. In the former, carbonic acid accumulates in the lung-cells, excites violent irritation, and all the phenomena of laborious, convulsively laborious respiration. In the latter, carbonic acid in these cells is less than usual, and it is probable (but of this I cannot speak with certainty) that the irritability of the pneumo-gastric fibrillæ is diminished, so that it produces little or no effect in exciting inspiration. In both cases, the lungs become greatly congested, and, consequently, the post-mortem appearances are nearly alike; but the causes that produce them appear to me altogether different. It is the more necessary to make the distinction, because the treatment of such cases would be completely

* Vide p. 448.   † Medical Gazette, Feb. 12, 1848, p. 225.

misunderstood if it was assumed to be a case of asphyxia in the sense that we generally understand the term.

These are the only modes in which chloroform produces its fatal effects. Deaths occurring several hours, some days, some weeks after the inhalation of chloroform must be the result of other causes; it seems to me impossible that chloroform could produce so distant an effect. It does not combine with nor alter the blood; it cannot materially derange any of the vital functions, because death takes place before its influence can extend to the organic nerves—unless in death at the heart, where the cause is easily explained. I cannot perceive, therefore, how chloroform can cause death several days after it is administered.

LECTURE XXV.

ÆTHERISATION, CONTINUED.

Its Obstetric Use.—Effects of Chloroform on the Patient.—Action of the Uterus under Chloroform.—The Mode of administering Chloroform.—Inhaler used by Author.—Quantity required.—Time of Inhalation.—Use in Operations.—Inhaler used at University College Hospital.—Dr. Snow's Inhaler.—Dr. Heming's of Dublin.—The Advantages of Chloroform.—The Disadvantages.—The Purity of Chloroform essential.—Rules for its Administration.—Objections offered to the Use of Chloroform.—Sudden Deaths.—Injurious Effects consequent on Inhalation.—Effects on Child.—Objections disproved.—Conclusions.

HAVING explained to you what chloroform is, and what it does, we are now prepared to consider its obstetric use, its influence on the parturient woman, the modes of its administration, its advantages, and its objections. 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, 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, nor sense of soreness, that so often harasses the patient; when the action of the uterus ceases, she is disposed to sleep, and if 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 she is holding at the time a towel or sheet, the arm has less power and

gradually drops down; sometimes she speaks of feeling unusual sensations, and often when the pain comes on cries out much more loudly with it; as it subsides, she talks incoherently. If chloroform be then removed, so that its effects pass off, she has no recollection of the pain that 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 only cause her to bear down with them; she seems asleep in the intervals, but if the eyelids are touched winking is excited, and she again rambles about her affairs, or some topic of her dreams. At this stage of transition, it is very desirable not to make a vaginal examination, still less to perform an operation; the mind is not under control, and the former may excite ideas that it is in every way desirable to avoid, not that this is necessarily the case; on the contrary, I 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 properly performed, because the woman becomes restless and unmanageable, and often shouts out much more boisterously than if she had taken no chloroform. A little more chloroform is necessary, and then profound sopor succeeds; she feels no pain, and is quite unconscious of anything that is done. At this stage the eyelids may be touched without any effect, the pupils are drawn upwards, and sometimes stertor may be heard. This state may be continued with safety during any ordinary operation, and is especially useful in severe operations with the forceps, the crotchet, or in turning the child.

When the patient is in profound sopor, it sometimes happens that she cries out during an operation, as if suffering great pain; and yet when she has recovered consciousness, is not aware that she did so, nor has any recollection of pain: she will tell you she had none. This fact has been frequently observed by others, and an explanation of it attempted. We shall not, however, venture to do so; it is sufficient for our purpose, to refer to it as a proof, that when a patient is under the influence of chloroform, her expressions are no measure of the amount of pain which she really endures; thus, in the transition stage, a patient may exclaim loudly when there is no pain; for instance, when a vaginal examination is made; hence it is most desirable to avoid a

continuance of this stage.   The patient should either be brought back to the first stage, by withdrawing the chloroform, or the dose increased, so as to cause sopor.

The same dose of chloroform, given in precisely the same manner, produces different effects on different constitutions; with some, the first inhalation of a very small dose gives relief, and if continued, soon produces sopor; with others, the same quantity may be inhaled again and again, and the patient scarcely perceives its effects.   With the former the greatest caution is required; inhalation should not be repeated too frequently, and sometimes it is better to suspend it altogether, until its effects pass away, and then to renew it.   With the latter, but little good is effected until sopor takes place; all her sufferings are then relieved: when this is necessary, chloroform should be withdrawn the moment sopor supervenes, and only renewed when the patient is observed relapsing into the transition stage.   These cases, however, are exceptions to the general rule, which are necessary to be understood, because, although they will not embarrass those who are experienced in the use of this agent, they excite great surprise and no little perplexity with those who may use it for the first time, and who may naturally expect very different results.

Pure Chloroform causes no inconvenience during its inhalation, given in the gradual manner we have mentioned.   If there be any cough excited, or spasm, or sense of suffocation, chloroform is either impure or given too rapidly; any disturbance, therefore, of the respiration, of this character, should be considered as an evidence of its improper administration.   Impure chloroform often excites great bronchial irritation; and if pure chloroform is given in its full dose, the first effect sometimes is spasm of the glottis, and a sense of suffocation; both should be avoided.

The action of the uterus under chloroform is not generally interrupted, and when so, it is not always clear that chloroform is really the cause.   The uterine contractions are governed by the excito-motor and ganglionic nervous systems.   The latter is never influenced, and will, therefore, always maintain them.   The former requires the full dose to disturb its power.   A moderate quantity may only increase excitation, and cause a corresponding increase of action; thus the uterine contractions may be increased, and labour make a more rapid progress than before.   If the action of the uterus, however, be suspended, because the excitor

nerves are less active, the effect is only temporary, because the ganglionic system restores the contractions, while the very fact that the excito-motor nerves are under the influence of chloroform, renders the passages much more yielding and dilatable than they were before. But in many cases, where the pains have been for the time suspended, I have great reason to doubt that chloroform had anything to do with this result. I attribute the suspension to another cause, which has quite as great an influence over the true spinal system as chloroform. Mental emotions are known to exert this power. Nothing interrupts uterine action more than sudden shocks—than apprehension. The experienced practitioner is well aware of the importance of caution in the kind of conversation going forward in the lying-in chamber, of either by a look or by a word exciting the fears of his patient, he knows that an unguarded vaginal examination sometimes stops the pains: nay, his very entrance into her apartment often suspends labour.

It is not surprising, therefore, that if he prevail upon his patient to inhale some chloroform—a new medicine, said to be most dangerous, that has sometimes caused sudden death, that even the doctors themselves are not agreed upon using, but on the contrary, some of high reputation condemn—it is not wonderful if the first effect of its inhalation should be a suspension of the pains.

That such is the case in some instances, I am satisfied, from the very contrary effect taking place in other cases from precisely the same cause. That is, some patients dread their pains far more than either chloroform or its exhibitor; they had previously struggled against them, and their fears may have caused a suspension of the uterine contractions; but the moment that 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 mode of administering chloroform varies with different practitioners, according to the effect that they desire to produce. When complete sopor is required, a handkerchief or sponge may be used, in the manner of Dr. Simpson; or an inhaler, that covers both the mouth and nose. My object, in its administration, is two-fold—either to lull the pains without removing them, and consequently, not to interfere with the intelligence of the patient, or like others, to cause complete sopor and absence of pain. The former mode of exhibition renders it applicable to cases of ordinary labour, the latter to obstetric operations. In using chloroform for

the purpose of lessening the severity of the pains, the inhaler I
employ is applied only to the mouth, because while the anæsthetic

FIG. 29.
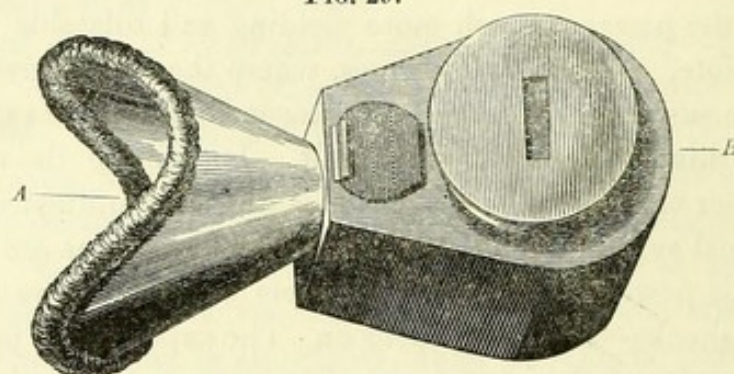
A, Mouth-piece.   *B*, Box containing the sponge.

is thus entering the lungs, double the quantity of atmospheric
air passes before it through the nostrils, and protects the cells
from its too powerful influence. *The quantity of chloroform
required is generally one or two drachms.* I was in the habit,
when first using it, of limiting myself to a drachm, poured on the
sponge of the inhaler; but I soon found it had little or no effect,
so much escaped by evaporation. I have therefore adopted a
different method, that is to inspire some of the chloroform before
administering it; if the quantity used is not sufficient, the inspi-
ration causes no effect; if otherwise, it feels warm, slightly pungent,
and excites cough, precisely as the inhalation of ether, but in a
less degree. This method has also the advantage of recognising
pure from impure chloroform, the latter being always very pun-
gent, and exciting irritation. When the pain commences, the
inhaler may be applied to the mouth, and continued 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, after the inhaler is removed, in order to disperse any
chloroform that may remain about the face, because being heavier
than atmospheric air, it does not ascend rapidly, consequently,
more of this agent may be inhaled during these intervals than the
practitioner is aware of, and thus its effects may accumulate. So
also the position of the patient makes a difference in the rapidity
of the effect, and for the same reason, the vapour being four times
heavier than atmospheric air. If she lie on her side, in the usual
position, so that the inhaler is either on or below the level of the
mouth, she inhales only so much as she can inspire; but if she lie
on her back, and the instrument be applied to the mouth, from

above downwards, more vapour passes into the lungs than would be drawn in by the act of inspiration.*

The time that the patient should commence inhalation depends very much on the circumstances of the case. I generally select the conclusion of the second stage of labour, when the head is descending on the perinæum, because then the pains are generally intolerable, and the perinæum yields more readily under chloroform than without it. If, however, previous to this, the pains are so acute that the patient is evidently unequal to her suffering, and especially if the action of the uterus be interfered with, chloroform may be administered without hesitation. Under such circumstances, I have given it in the first stage, when the os tincæ was not more open than a sixpence, and was gratified to find the dilatation advance most rapidly. But if the parturient woman does not suffer so acutely, and many do not, if she can bear her pains well, and labour is 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, twenty-four hours; but such is the agony which the patient experiences within that time, that I am satisfied the exhaustion of the patient — the mental depression — the diminished energy of the vital forces which follow, predispose more to slow and troublesome recoveries—if they escape more serious attacks—than any other cause.

We are told that the pains of labour are physiological, that is, healthy pains, and should on no account be interfered with, because they are so. This is certainly the case with a perfectly healthy woman, but we might as well call the neuralgia experienced by many women during their pregnancy, a physiological pain not to be meddled with, as to denominate by such a term

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* Dr. Fleming relates a case in illustration of this fact. " A boy, aged sixteen, was the subject of a morbid growth of the skin, which hung in loose folds on his back. An operation was decided on for its partial removal. A few days previous I subjected the boy to the vapour of chloroform, with satisfactory results. The operation was necessarily performed with the boy lying on the abdomen. *I administered the chloroform without reflecting on its high density;* the boy himself was aware of the difference in its effects on this occasion, *and there was no relief of pain.* In the after-stages of the operation his position admitted of change, and with it the effects of anæsthetic were decisive."—*Fleming on Chloroform*, p. 23.

the intolerable agony that some women suffer during their labour, too often without the slightest relief.

The inhalation of chloroform when operations are necessary, or when the former method gives no relief, is the same as in surgical

FIG. 30.
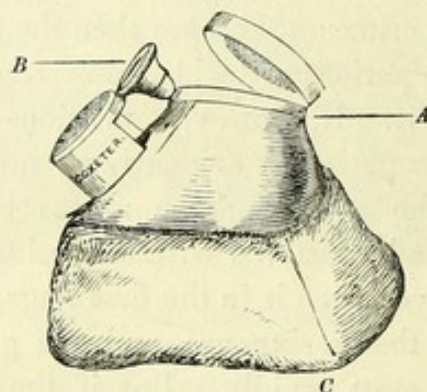
A, Sponge-box.　　*B*, Trumpet-shaped tube for the admission of air.
C, Face-piece covering mouth and nostrils.

operations. The inhaler that is used in University College Hospital, and I believe in other London Hospitals, answers the purpose remarkably well. The nose as well as the mouth is covered by it, so that chloroform enters by both passages; atmospheric air is freely admitted, but the vapour being confined, its strength is greatly increased; hence the importance of carefully observing its effect on the respiration of the patient. The pulse also should be noted before inhalation, and not only its frequency but its strength ascertained. In this mode of administration it is most desirable to make the transition stage as short as possible, to induce sopor promptly but with caution. The first inhalations should always be tentative. *Never commence with the full dose,* but rather try the effect of a small quantity, and then increase it. Half a drachm, for instance, may be poured on the sponge of the inhaler, and after two or three inspirations, it may be withdrawn, so as to observe the effect. By this means the quantity required may be estimated.

Inhalers of different kinds have been contrived for the purpose of regulating the quantity of vapour inspired. Dr. Snow* suggests one having a thin brass vessel containing chloroform placed within another of glass containing water, " which, by supplying the caloric that is removed in the vaporization of the medicine, prevents the temperature from being lowered. It also prevents it from being raised by the warmth of the hand, and thus keeps

* Snow on Narcotism, p. 29.

FIG. 31.
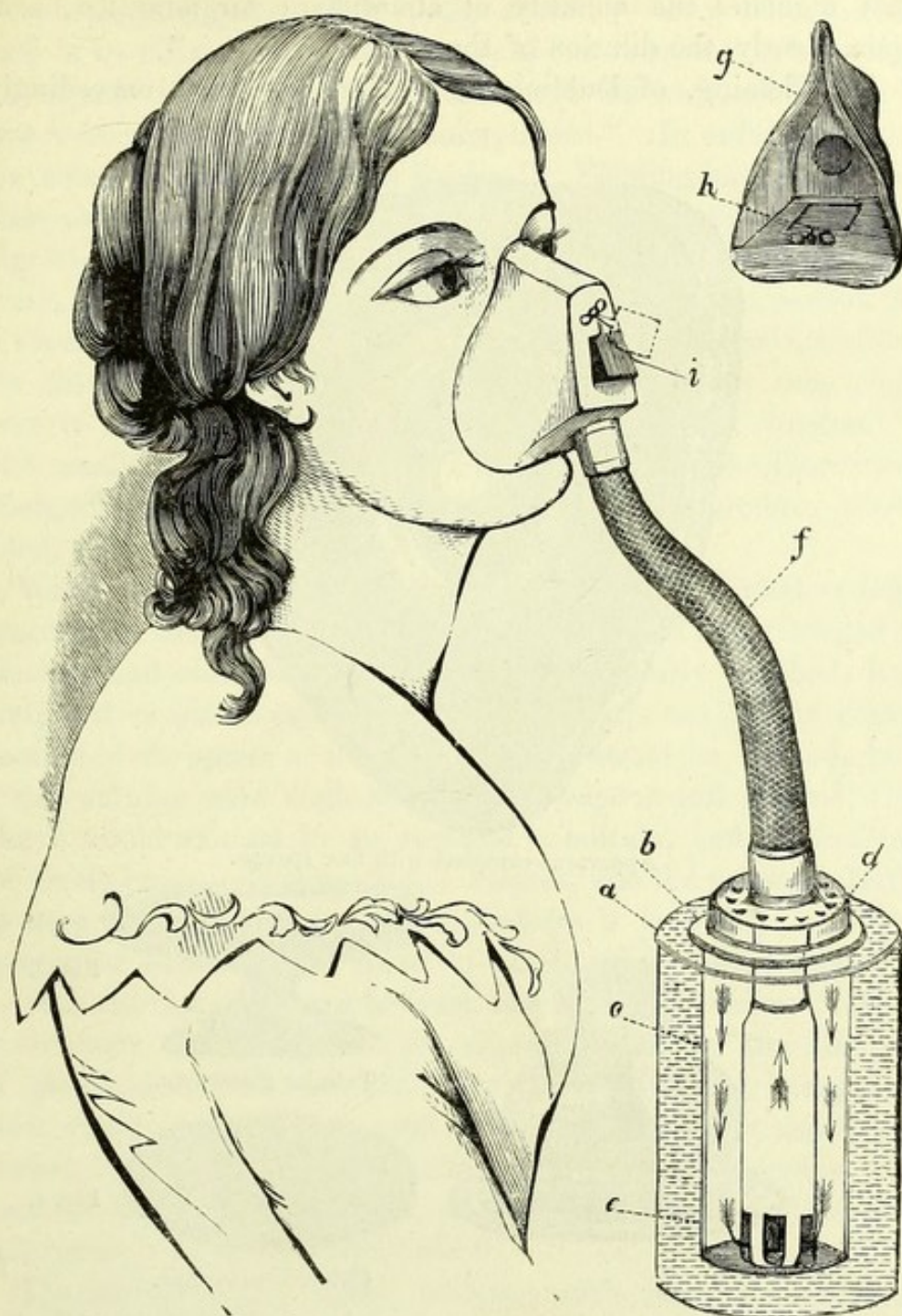
a. Outer case containing water-bath screwed on.

b. Cylindrical vessel into which the chloroform is put; it is lined with a coil or two of bibulous paper up to the point *c.*

d. A cylindrical frame which screws into *b.* It has apertures at the top for the admission of air, and its lower two-thirds are covered with a coil or two of bibulous paper, which touches the bottom of the vessel *b.*, except where notches *e* are cut in it. *f.* Elastic tube. *g.* Inside view of face-piece pinched together to adapt it to a smaller face. *h.* Inspiratory valve. *i.* Expiratory valve of face piece. The dotted lines indicate the position of this valve when turned aside for the admission of air.

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the process steady." The face-piece has also a moveable valve, that regulates the quantity of atmospheric air admitted, and, consequently, the dilution of the chloroform.

Dr. Fleming, of Dublin, has also contrived an exceedingly
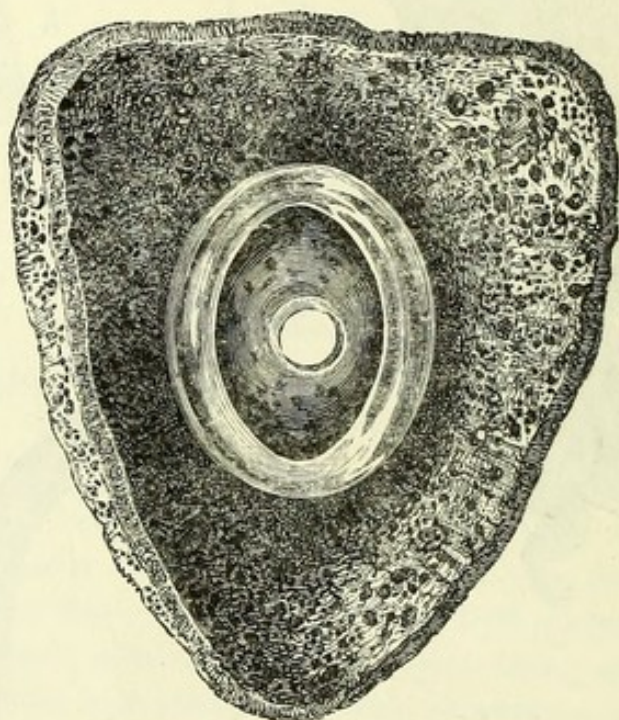
Fig. 32.

Apparatus complete with face sponge.

Fig. 2.
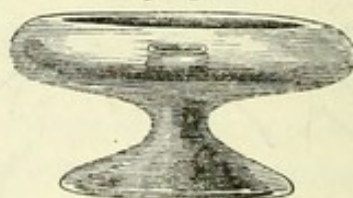
Fig. 1.

Fig. 3.

Tubular glass stem.

Fig. 4.

Chloroform sponge.

simple apparatus for the purpose. "It consists of a small glass capsule (fig. 1), 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 a 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 (fig. 2). 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 not unimportant." In order to insure the access of atmospheric air freely, Dr. Fleming has altered the glass capsule. "The stem, in place of being solid, is tubular (fig. 3), and of a size to admit the top of the fore-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 thus play over it when in use, according to the will of the surgeon." * The smaller sponge, which Dr. Fleming calls " The Chloroform Sponge" (fig. 4), contains about a drachm of chloroform when filled, and thus the quantity is regulated.

When chloroform is administered by any of these inhalers that concentrate the vapour, the quantity used should never exceed a drachm; and even then, its effect should be closely watched, lest undiluted vapour should enter the lung. This can hardly occur because of the spasm of the glottis, which would be excited, but if this warning were neglected, and the vapour still applied, the glottis would soon be in an opposite condition, and chloroform too freely enter. This neglect, I suspect, was the cause of death in more than one instance. If chloroform is poured on an open sponge or handkerchief, so as to admit of free evaporation, a much larger quantity may be used, but then the greatest caution is necessary, the strength of the vapour depends on the distance of the handkerchief from the face; it should never be applied quite close, because the atmospheric air would be too much excluded, if too far, it has no effect; in using it, therefore, the handkerchief in a funnel-shape, should be held near the face, and the distance regulated by the effect.

The inhaler that 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, that no sudden accident can happen, and being administered gradually, its increasing power may be observed; but it is not so suitable for operations where perfect sopor is required, because it is slow in producing such an effect; besides that the transition stage is much more prolonged.

* Fleming on Chloroform, p. 28, 29.

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 exposed, but in promoting a more favourable recovery. Since the publication of Mr. Traver's valuable work on Constitutional Irritation, the profession acknowledge the danger that sometimes results from intense pain; patients have never recovered 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. This I believe to be utterly untrue. I know nothing that predisposes more to troublesome consequences, than long-continued and severe pain, especially with delicate women, their recovery is always slow; the function of lactation tardy in establishing itself, and if there be any injury to the passages, or a morbid poison within reach, they have no power to resist the one or to subdue the other. Serious inflammations, if not puerperal fever itself, may seize them. This, however, is quite a question of experience, not of argument; my own teaches me that chloroform, when judiciously administered, is most valuable in promoting the rapid recovery of the parturient woman.

The disadvantages of chloroform are chiefly the result of want of sufficient experience of the vapour and its effects on certain constitutions. One of these is *sickness of the stomach*, some women having inhaled chloroform so that their labour is successfully concluded, are seized afterwards with nausea and vomiting. I have been told of one case where it was very violent, and was followed by jaundice. Dr. Snow, who has had most extensive experience of this agent, has found the same effect after surgical operations. He attributes it, in many cases, to a neglect of the condition of the stomach, at the time that chloroform is inhaled. " If it is inhaled 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 where sickness has occurred in this condition, it has been in some instances of considerable duration, and accompanied with more than usual depression." This effect, however, may be removed by warm wine, or brandy and water with a few drops of Battley's solution added to it.

Headache is another consequence which sometimes follows its use; but this very rarely occurs, and when so, is only a temporary effect. But by far the most troublesome consequences from its use

arise in certain constitutions, where the nervous system is previously disordered: even in these cases, such effects are only produced by the full dose, and too often by an over-dose. If the patient be hysterical, a fit may occur in the transition-stage, so also Dr. Snow has observed with epileptics, that a paroxysm may happen as the patient is becoming unconscious. Men of robust constitutions have been seized, at the same stage, with a temporary delirium; women of feeble habits with faintness and giddiness. Such consequences have been sometimes, but certainly very rarely, observed, when the full dose of chloroform was given for operations either in dentistry or in surgery; but in its obstetric use they are not likely to occur, because loss of consciousness is not necessary to the relief of pain; the most moderate dose is sufficient for this purpose; and if it should happen that you meet with those peculiar constitutional idiosyncrasies that will not tolerate chloroform, you at once perceive it in sufficient time to prevent accident, by observing that the effect is disproportioned to the dose given. Hence also the importance of the rule *never to give a full dose of chloroform in the first instance.*

The purity of chloroform is essential.—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; so also the test of litmus paper will determine acidity. A simpler and much more convenient test than these, one that is, at least, quite sufficient to excite your suspicions and induce you to apply the former tests, is to rub the palms of the hands with chloroform; if the odour is fragrant it is pure; if pungent, the contrary.

Before we examine the objections that have been raised against the administration of chloroform in the practice of midwifery, let me place before you some rules as a guidance if you think proper to try its influence.

1st. In natural labour do not interfere so long as the patient can

bear her pains well, if she rest or sleep quietly in the intervals, and the action of the uterus is not interrupted, that is, if she is not teased with short, very severe and very inefficient pains, you need not give chloroform.

2nd. If, on the contrary, you find that in the first stage of labour its severity is such, the anguish of the patient so great, that pain is evidently a cause of protraction, chloroform may be given with great benefit; but as this does not often happen, you may reserve its use until the second stage of labour.

3rd. In the second stage, chloroform may be given when the bearing pains are becoming intolerable, which you may know, not only by their great intensity while the uterus is in action; but also, by the restlessness of the patient in the intervals, you find her watchful, dispirited, still crying, although in a more subdued tone, from pain and feeling of soreness.

4th. It, therefore, may be administered either when the head is in the cavity of the pelvis, or pressing on the perinæum. In the latter case, it is also very useful in causing a more efficient relaxation of the passages, and may be employed if any delay should be caused by rigidity.

5th. When operations are necessary, its administration is similar to its use in surgical operations, the same rules apply to both, hence an assistant is necessary, who is perfectly conversant with the properties of chloroform. It is obvious that you cannot operate and give a full dose of this agent at the same time.

6th. Chloroform when given *must be pure*; a drachm may be poured on the sponge of the inhaler having the mouth-piece,* and its effect observed if, as is usually the case, it has none, the quantity may be increased until you find, on inhaling it, that cough is excited. Let the inhaler be applied to the mouth just as the pain commences: carefully watch its effect both on the pulse and the respiration; if it is slow and uniform, you may proceed, the pulse may be increased from excitement, and is not, therefore, at first to be depended upon. When the pain ceases, withdraw the inhaler.

7th. When inhalation has been continued in this interrupted manner for some time, if you observe an alteration in the countenance of the patient, if the face is flushed, or bloated, or if the pulse continue frequent, it is better to fan the face, and not to

* Vide p. 462.

renew the chloroform for a few pains; but when they are returning to their original severity it may then be repeated.

8th. Be careful that there is a free circulation of air in the apartment, and observe its temperature. Chloroform is very volatile, and the patient would consequently inhale more of the vapour, if the temperature of the room were high than if it were moderate.

By observing these rules, I think that chloroform may be used with perfect safety and with great benefit in natural labour. A serious accident seems to me to be impossible. Let us, however, consider briefly the objections that are offered to its administration. I regret to say, that among a host of arguments against the use of chloroform there is scarcely one that I can find of a truly scientific character. They may be divided into those that are founded upon facts misunderstood, upon false reasoning, and even upon mere prejudice; a natural result when we argue, not from our own experience, but from what we hear of the experience of others. When a question concerns facts, the only way of determining it, is by experiment, by direct observation seeing "whether these things are true"; without this, the most ingenious reasoning is only a waste of words and time. Thus, with regard to chloroform, while the chief objectors are found among those who never do, who never would use such an agent, those, on the other hand, who have carefully examined its properties, whether in the way of experiment on the lower animals, or by observing its effects when administered for the purposes that we have mentioned, all have agreed in one opinion as to its perfect safety when given with judgment and by those who perfectly understand the nature and properties of the agent they are using.*

Sudden death from chloroform is the most important of these

* Mr. Nunneley has laid down the following rules—

" Not to employ too much of the agent at one time.

To take care that the temperature be not too high.

To be sure that the air can pass easily and freely into and out of the lungs."

And, further, to take care, " That so soon as there are indications of unconsciousness and insensibility being produced, to withdraw the anæsthetic, and only to give such a diluted vapour as shall just suffice to keep up the condition of insensibility, which, when once produced, may be usually maintained by a very moderate quantity of vapour."...... " If these directions," he observes, " be attended to, rarely will death be occasioned by either æther, chloride of olefiant gas, or chloroform, although, as I have before stated, chloroform I consider to be the most dangerous of

objections. Chloroform when given in the full dose, either for a surgical operation or in the extraction of teeth, has in twenty-three instances caused sudden death. I quote from an able article in the Foreign Quarterly Review,* which professes to exclude all ambiguous cases. In all these cases, with two exceptions, death took place in from one to ten minutes. Some deaths were almost instantaneous, others in one, one and a half, and two minutes. If, then, we take the simple facts of death happening so suddenly, the face becoming blanched with blowing respiration, frothing of the mouth, and the head dropping, where would you say death had commenced? If we have made the physiological effects of chloroform intelligible to you, it is obvious that nearly all these cases were instances of death commencing at the heart. If so, then either chloroform must have been administered in so concentrated a dose as to arrest the action of a healthy heart (according to Dr. Snow thirty-seven minims is sufficient for this purpose if the whole quantity be conveyed there) or the fibres must be so weakened by disease as to be controlled by a much smaller quantity, by an ordinary dose. Now, to adopt the language of Dr. Snow, " I cannot conceive how a moderate and gradual inhalation of chloroform should cause any person's heart, however diseased, suddenly to cease beating. There are neither facts nor analogies in support of such an occurrence." The only and the most striking fact adduced, is that of Mr. Badger; no one would question Mr. Robinson's skill and caution in the administra-

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all, yet even of this, when due care is exercised, *experience has shewn the danger not to be very great."* These remarks apply to the full dose.—*Trans. Prov. Med. and Surg. Association,* vol. iv. p. 378.

Dr. Snow states, " There is, however, no reason to doubt that chloroform is, when administered with care and a sufficient knowledge of its properties, unattended with danger, or, at all events, with a degree of danger so small that it cannot be estimated, not greater, for instance, than attends the minor operations of surgery, or the taking of ordinary doses of medicine.—*Snow on Narcotism,* first Seven Parts, p. 28.

Mr. Dunne, who has also given the subject a most careful attention, remarks, " The conditions necessary to insure uniformity of effect and perfect safety to the patient, are, that the chloroform be pure, and the mode of inhalation be slow and regular, with a proper dilution with atmospheric air. When these conditions have been rigidly observed *no fatal case has ever occurred;* and it is truly a matter of surpris. considering the extent to which chloroform has now been employed, and the indiscriminate and injudicious modes at times in which it has been administered, how few fatal cases are on record."—*Medical Gazette,* August 15, 1851, p. 285.

* British and Foreign Medico-Chir. Review, No. xvii. p. 158.

tion of this agent, and yet the heart ceased to act in one minute after that gentleman inhaled chloroform: but was chloroform clearly the cause of its cessation? Would it have ceased to beat had none been given him. Lord George Bentinck, to all appearance, a strong and healthy man, dropped dead on the road where he was walking, from heart-disease. Had he been amusing himself with chloroform, and the same thing occurred, his death would have been attributed to chloroform, just as Mr. Badger's. This, therefore, is by no means a clear case; but if it be admitted that chloroform is dangerous in such cases, it appears to me that we have quite sufficient means of ascertaining the strength of the heart's action before giving this anæsthetic to decide whether its administration is safe or otherwise. Hence, then, I attribute death in these cases, either to want of attention or want of sufficient knowledge of the properties of chloroform. When we consider the multitude of cases in which this agent has been administered, both here, on the continent, and in America, the powerful properties of chloroform, and the want of experience, which is the necessary consequence of a medicine being new; it is not surprising that these accidents should have occurred; and I think that it will be admitted, that the twenty-three or twenty four cases is a very small number in several thousand instances where it has been given.

In obstetric practice, the risk is much less than in surgery, because sopor is not essential, the quantity of chloroform may be very small, so small as to render such an effect an impossibility; hence it may be given with less hesitation than in a surgical operation. Having, in 1850, made this subject the object of my enquiries, I could not find a single authentic instance of death from chloroform in midwifery practice.* Since then, however, a suspicious case occurred in my own practice, and Dr. F. Rams-botham relates another † where death might be attributed to this agent: a careful consideration of both cases will, I think, satisfy you, that whatever may have been the cause of death, chloroform had very little to say to the fatal result.

* Further Observations on Chloroform in the Practice of Midwifery.

† The case related by Ramsbotham, was that of a lady in the country, " a few miles from London," who was confined of her fourth child. Her first was delivered by the long forceps without chloroform; the second naturally under its influence, " *and her recovery was speedy and perfect*;" the third time it was again adminis-tered more sparingly than before; but, for four days after the child's birth, she was

I was summoned to attend a lady in her first confinement who had been taken in labour the previous night. I saw her about eight o'clock a.m.; the dilatation of the uterus was advancing favourably, and was completed at ten o'clock a.m. As soon as the head entered the pelvis, and the pains became very severe, I administered chloroform by the mouth; the severity of the pains was greatly mitigated; she remained quite conscious throughout, and was delivered in two hours: when the placenta was expelled she fell asleep; on awaking, two hours afterwards, she was seized with slight cough and some difficulty of breathing; the means used gave no relief, and in the evening dyspnœa had so much increased that she was cupped at the back of the neck to ten ounces. This gave sufficient ease to cause sleep for about two hours, but when she awoke the dyspnœa returned with still greater distress, and continued to increase during the night. On the following morning, she became asphyxiated, and died about two o'clock p.m. A post-mortem examination was made and the kidneys found extensively diseased; the blood, which coagulated loosely, was carefully analysed, but no trace of chloroform could be detected; the lungs were of course highly congested.

This case may be compared with that reported by Dr. Ramsbotham. Both patients were perfectly free from the slightest inconvenience for more than an hour after they had inhaled

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harassed by pains of the head, vertigo, and wakefulness. Attributing the distress she then suffered to the insufficiency of the dose, when again pregnant she intreated that, in her labour, it might be given with sufficient freedom to insure its perfect effect. Parturient pains came on about noon. The chloroform was given at half-past seven, P.M., when the os uteri had acquired the diameter of an orange, and the pains had become frequent and strong. The effects were at first delightful and tranquillising; after refreshing sleep, she rose and bore some moderately strong pains for an hour without a return to chloroform. It was then resumed, and repeated in frequent half-drachm or drachm doses, but (except once) only when she entreated to have the delightful chloroform, from about ten o'clock P.M., till a quarter before twelve o'clock, soon after which time the child was born. She instantly expressed much gratitude, and expatiated on the relief afforded her, though even then she felt wrung with the severity of her labour. *The uterus contracted well, and the patient appeared comfortable.* At the end of an hour and a half distressing dyspnœa came on, attended with excessive lividity of the face and all the signs of extensive engorgement of the lungs and head. Her respiration became more natural under the means employed, and in three hours and a half she lay down to rest; but in half an hour she suddenly arose with a return of most distressing dyspnœa, that was soon followed by convulsions, and almost immediate death. *No post mortem examination was made.—Ramsbotham, Ob. Med., p. 169, 3rd. ed.*

chloroform; the symptoms that then presented themselves were those of the convulsively laboured respiration that attends dyspnœa. Mr. S——'s patient, having received partial relief, lay down to rest; but in half an hour she suddenly arose with a return of most distressing dyspnœa, that was soon followed by convulsions and almost immediate death. Mine continued to suffer notwithstanding the means used from twelve o'clock midnight until two o'clock p.m. of the following day. Could chloroform produce such effect as these? Is it possible that a patient could remain perfectly comfortable for an hour after its inhalation, if it acted as a poison? And lastly, I would ask, is distressing dyspnœa the effect that chloroform would produce, if its inhalation influenced, in the least degree, the pneumo-gastric nerves? It could not be the case; the very fact of these patients suffering to its full effect the " besoin de respirer" that attends dyspnœa, is the strongest proof that the cause of this difficulty was not produced by chloroform; because, if this agent had any effect, it must destroy that irritability. In the case where I had administered the vapour, the quantity was scarcely sufficient to lull the pains, still less to affect the respiratory tract; and much less than an hour is quite sufficient to dissipate whatever might remain after inhalation. It may be said that chloroform did not paralyse the nerves but altered the blood. Nothing, however, is more perfectly established than that chloroform has no such effect. In those experiments, where the arterial blood became black and less coagulable, the change was secondarily produced by the manner in which the too powerful action of chloroform impeded respiration *by paralysing to a greater or less degree the respiratory nerves*. Such could not be the effect in this case, because the respiratory nerves were in the highest state of irritability, and violent dyspnœa gave the best proof that they were not under the influence of chloroform. These cases testify strongly to the importance of making the action of anæsthetics your most careful study; because, it is only by doing so, you can detect that most ingenious and most constantly applied of all sophisms, *post hoc, ergo propter hoc*. Such seems to me to be the error into which Dr. Ramsbotham has been drawn, and taking a too superficial view of the subject, assuming that chloroform acts by poisoning the blood,* infers that this case proves that " its poisonous influence may persist and remain in operation

* Ramsbotham, p. 173.

long after its exhibition is discontinued." Such an effect, I believe, to be impossible; and I am the more anxious to state so, because of the gentleman who had charge of this case. "I will merely add," says Dr. Ramsbotham, " that the caution, skill, and experience of the gentleman who superintended this case, are above question, and that I know no one in the circle of my medical friends on whose judgment I myself would be inclined to place greater reliance." I would also add, that Mr. S. may rest perfectly satisfied that there is nothing in this case to damage in the slightest degree his professional reputation, or to give him any uneasiness on the subject. It is only to be regretted that a careful post mortem examination had not been made; because these are not the only instances of fatal dyspnœa after labour from other causes than chloroform. Air has been found to enter the veins from the uterus, in some instances; and in others, causes have been ascertained quite sufficient to explain the symptoms and death.

Injurious effects consequent on the inhalation of chloroform have been advanced as objections to its use. Time will not permit me to enter upon this question at length. It is said to have caused puerperal mania in some instances, puerperal fever in others; great prostration and debility in a third class of cases. I have never met with such instances, nor have I read a single accurately related case of the kind; these cases, if they exist, lie quite beneath the surface; and at present, we have little more than the simple assertion, " that such or such a patient took chloroform during her labour, which was followed by puerperal mania," etc. We require much more than this, because, as patients are sometimes attacked by puerperal mania, who never took chloroform, it is necessary to trace the effect clearly to its cause; and we cannot do so without having every particular connected with such cases. The majority of those that have been quoted are only additional illustrations of the *post hoc, propter hoc*, sophism. Nevertheless, we must not deny that cases may occur where chloroform acts injuriously. It is the law of all medicines, especially those of great power, that certain constitutions are intolerant of them. Chloroform cannot be an exception, and hence the importance of tentative doses in the first instance; but my own experience of this agent, has convinced me that the usual

* Ramsbotham, p. 169.   † Op. cit. p. 169.

effect of chloroform is directly the reverse, and that women recover from their confinements far better after chloroform than without it.

Its effect on the child I have already, in the paper referred to,* fully discussed. I have quoted in that monograph, 540 cases of natural labour, in which either chloroform or æther had been used, and not a single child was lost. Mr. Nunneley, arguing against the doctrine that the blood is saturated by anæsthetics, quotes a very interesting experiment that will illustrate this question.

" A young cat, three-fourths gone with kitten, was put into 375 inch jar, with 30 minims of aldehyde" (C. 4. H. 3). She died in twelve minutes. " The body was immediately opened— there was vermicular motion of the uterus; but not a single fœtus stirred in the least, *though the umbilical arteries pulsated,*" proving, says Mr. Nunneley, that " though the animal was fully under the influence of the aldehyde, and, consequently, the blood must have been saturated to its full capacity, *yet the fœtal hearts continued to pulsate even after the body of the mother had been laid open*, and they were removed from her. On the supposition of the blood being saturated, these ought, by having the maternal blood carried to them, to have been paralysed, if not consentaneously, at least within a short period of her own heart acting."†

We have endeavoured to show you very briefly, that the safety of the mother and her offspring are not compromised by the judicious inhalation of chloroform. For a more full discussion of these objections, I can only refer you to the tract already alluded to, as I must now draw to a conclusion; but I cannot do so without expressing my deep regret, that the use of chloroform in midwifery is still surrounded by such a halo of prejudice that even eminent authorities cannot look at it through any other medium. How else can we explain the absurdity of describing the sopor of chloroform as intoxication—of speaking of " the intoxi- cating properties of chloroform—of informing women that they might probably be made " dead drunk," or must certainly be reduced to that condition which the law designates " drunk and incapable"? Such objections as these are quite unworthy of the objectors; not only because they are untrue and give an erroneous

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* Further Observations on Chloroform.
† Trans. Prov. Medical and Surgical Association, pp. 223, 362

representation of the physiological phenomena that take place, but because they betray great want of knowledge of the properties of the agent that is objected to. They are, in fact, rather appeals to prejudice than reason, and may be placed in the same category with other and more disgusting assertions, which have been made with regard to the ramblings of the parturient woman in the transition stage.

Alcohol and chloroform are both hydrocarbons, so is hydrocyanic acid; they all affect the same tissues, and in a similar manner, but differ *toto cælo* in the degree and rapidity of the effect: each have a transition stage—the stage of intoxication: with hydrocyanic acid it does not last a second; with chloroform, only a few minutes; with alcohol, it remains for hours. The sopor of chloroform may be caused without any excitement; the sleep of drunkenness never can.

But to place this difference before you in a clearer light, I shall place the properties of these two hydro-carbons, chloroform and alcohol, side-by-side.

Chloroform.	*Alcohol.*
1. Slightly soluble in serum.	Soluble to any extent.
2. Very slightly stimulating.	Highly stimulating.
3. A most powerful sedative even in small doses.	No sedative effect until taken in large quantities.
4. Its effects rapidly disappear.	Its effects continue for hours.
5. Most powerful when inhaled.	Least powerful when inhaled.
6. Comparatively slight effect when administered by the stomach.	Effects most powerful when taken into the stomach.
7. No alteration in the appearance of the brain, in cases when it has caused death rapidly.	Apoplectic congestion of the brain where it has been fatal.

From this parallel, you perceive that the agency of chloroform and alcohol on the constitution are altogether different; that chloroform does not "intoxicate" in the sense that the term is used in this objection, but that the exciting stage is very short, merely transient to the sopor that succeeds. The sleep of chloroform is totally different from the sleep of drunkenness, the one passes away with the vapour and leaves the patient as perfectly herself as she was before; the other continues so long as the blood is charged with alcohol, and even when consciousness

returns, the effects of alcohol require a long time before they disappear.

Having thus explained the properties of chloroform, its effects on the constitution, its advantages and disadvantages; having also considered the objections offered to its use, I shall conclude by briefly enumerating the points we have considered:—

1. Chloroform does not paralyse the uterus, although from its influence on the excito-motor nerves, when the full dose is given, its action may be for a time suspended.

2. Chloroform has no effect on the life of the child.

3. Chloroform, when judiciously given, has no effect on the life of the mother.
   a. When given by the mouth, so as to influence the sentient nerves, it could not cause death, because it is not sufficiently powerful to act upon either the respiratory or the ganglionic nerves.
   b. When given in the full dose to produce sopor, it will not cause death, unless the quantity given is so concentrated as either to paralyse the heart's action, or the pneumo-gastric and other respiratory nerves. A fatal result must be the consequence of a want either of attention or knowledge.

4. Chloroform does not leave any morbid after-effects, in the great majority of cases where it is given; but it must be remembered, that chloroform, like other powerful medi-cines, may act injuriously on certain constitutions, and hence the importance of a careful inquiry into such cases.

5. Chloroform produces the most beneficial after-effects in cases where there had been intense suffering during labour, because it obviates the nervous irritation, the con-stitutional shock that is the result of long-continued and very severe pain.

6. We may add, that its too powerful effect may be obviated by fanning the patient, dashing the face with cold water, applying the vapour of ammonia to the nostrils. These

remedies, however, are intended to stimulate the excitor
nerves, they cannot therefore have any effect if these
nerves lose their power.   In such cases, artificial respira-
tion, has been found by Dr. Snow to be useful; not by
pumping air into the lungs, but rather pumping the
vapour out of them, and allowing atmospheric air to enter
by exciting inspirations.

LACTATION,

TOGETHER WITH

POST-PARTUM INFLAMMATIONS AND FEVERS.

LECTURE XXVI.

CONVALESCENCE AFTER PARTURITION.

State of the Patient after Delivery.—Stage of Depression.—Interval between Parturition and Lactation.—Errors in Management immediately after Delivery.—Period of Reaction.—Formation of Milk.—Disturbing Causes, local and constitutional.—Excessive Flow of Milk.—Its Effects and Management.—Diminished Flow of Milk.—Treatment.—Sore Nipples.—Mode of preventing the Secretion of Milk.—Condition of the Uterus after Delivery.—After-pains.—Causes and Management.—Coagula.—Flatus.—Uterine Neuralgia.—Lochia.—Changes in their Character.—Indications.—Importance of Attention to Purulent Discharges.—Lacerations of Perinæum.—Treatment,

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 prepared to leave its temporary resting-place, a new series of phenomena is observed in the struggle between the enormous expulsive power of the uterus and the resistance opposed to it. We have already pointed out to you 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. The

activity of the nervous and circulating 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 is essentially a period of repose; and if, by good management, the patient is left undisturbed during that or even a much shorter interval, if she obtain a sound and refreshing sleep, it is surprising the rapidity with which the constitution is restored: 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, that 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 its size previous to conception, to return again to its ordinary function of menstruation, and 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 original condition previous to conception. Many interruptions to the proper fulfilment of these vital actions occur, that give rise to every variety of derangement, each of which become objects of our attention and treatment, and therefore require to be carefully studied.

In the *first period* immediately after delivery, the cause of disturbance is generally found in the errors of those who are immediately about the patient. We have described it as 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, when the patient is allowed no repose, and is kept in a constant state of excitement after her delivery. 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 only looked upon 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, which, 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. Delicate women are much more susceptible of nervous irritation at this than at any other period.   If their rest be disturbed, or their sleep put astray, they remain wakeful and unrefreshed; presently the senses become more than usually excited; the noise of their infant, although from another apartment, disturbs them; light is exceedingly unpleasant to them: 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. I 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." 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 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 attempts are made to have the child take the breast, which are fruitless, 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. Too much excitement is not the only risk to which the patient is exposed during this interval. Errors in diet, also, may be very easily committed. We have stated to you 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: you will find the combination of Liq. Opii seda-tivus with the æthers, sulphuric æther, Hoffman's liquor, etc., etc., very useful. 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.

The second period 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 has been judicious, and no morbid causes of derangement are 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 source 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 most 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 previous to lactation, and why the experienced practitioner is so solicitous that this function be safely established.

If the child is 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 your 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, you will meet with cases where there is nothing of the 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 a opposite condition to this: there is scarcely any reaction, the milk is secreted scantily, and what is extracted contains but little nutrition; the infant is, therefore, never satisfied. After having obtained what it can it may sleep, exhausted by its efforts to draw the breast; it is only a momentary doze, it 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 its passage 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 is best carried out by nauseating doses of tartarized antimony, and also by the saline aperients: both may be combined. The latter 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, is relieved, the milk that had been arrested will frequently flow quite freely: if it be slow in doing so the breast-pump may be used with advantage; or, what is still better, if practicable, another child may be applied to the breast, older and stronger than the infant, who 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, and aperients given.

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 a 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 or soup 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 Liq. Opii Sed., will be found useful; and especially having perfect silence in the lying-in chamber: the noise of the infant, or even the whisperings of the nurse, are sure to arouse 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. Recollect, in this treatment of your patient by good diet, stimulants, and anodynes, that the

bowels are very likely to be locked up if you neglect them, and if so there is a great risk of further derangement. Purgatives are, therefore, necessary, but not of the hydragogue class. Castor oil may be given; the aloes and myrrh pill, or any of the warm aperients. Enemata are highly serviceable, if the intestines are sluggish: the fœtid enema, with or without turpentine, will be found useful, and I have occasionally derived advantage by giving at the same time the preparations of iron. The sesquioxide of iron, with the bitartrate of potash, may be given in an electuary sometimes with great benefit. 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 only concerns her own strength of constitution.

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 accidents 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 has 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 of what is the condition of the nipple, and in this first stage a mild astringent may arrest it.   I have found alum whey as a lotion useful; the curd that is thrown down may be applied as a poultice to the nipple; the child should be applied to it as seldom as possible, and before doing so it would be well to guard the nipple previously 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. Other astringents are also used with benefit.   Tinct. of catechu, kino, myrrha, borax, may be applied in solution with advantage. If, however, the fissure take place, and the nipples 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 it, 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.   There are many contrivances under the name of nipple-shields, which are used in these cases, all of 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 they are so far useless; but if it could, so far from preventing irritation, it would increase it considerably: 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. The only use of such instruments is to guard the nipple from undue pressure or irritation afterwards; and when it is not greatly inflamed, a nipple-shield is serviceable in preventing irritation from the dress, but when much inflammation is present, they should never be employed. *Depressed nipples* are extremely troublesome, and render the chance of nursing almost hopeless. They may be drawn out by the breast-pump so as to enable a strong infant to seize and to maintain its grasp; but they more frequently fail to do so: the nipple gradually falls back into its former place, while the infant is moving about its mouth to seize it. Such cases as these, as well as 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 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-tart. of soda, for instance, with a low diet, will certainly succeed.

Let us now turn from lactation to the uterus; from the observation of the second to *the third period* that we have spoken of. It is necessary that you should have a clear apprehension of the condition of the uterus now from what it was before the delivery of the child. First, the *contraction* of the uterine fibres is becoming permanent, and a state of permanent 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 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 that 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 these 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 parietes of the uterus, and excites spasmodic contractions. If this happens soon after delivery, the patient experiences pains as severe as labour pains: the agony sometimes endured is even greater than 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 æther, and the local application of hot fomenta-tions, 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 I have known the patient scream with the agony 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, I think, 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; I 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, æther or ammonia, with opium, will generally disperse them.

Both these causes of after-pains come into operation most fre-quently 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 that 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, that 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 them the term " neuralgic" as best expressing the character of the pain; 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 that 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 after-pains differs from 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 application of a few leeches previously 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 its condition previous to conception. The character of the discharge will indicate whether the changes that are going forward are healthy or otherwise. The first appearance 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 tinct. ferri. hydro-chlor. is very useful: the sulphate of iron also, with sulphate of magnesia, in some tonic infusion, may be given. 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 cervix of the uterus, or 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 is 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 sub-acute

character. All or any of these causes will give rise to the secretion of pus; and, unless they are at once removed, may increase, and expose your patient to months of protracted suffering long after her delivery. You will perceive, therefore, that the lochia, 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 formed of different degrees of extent. 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 other 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 a piece of lint between them 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 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.

LECTURE XXVII.

POST-PARTUM INFLAMMATIONS.

Acute Inflammations.—Sthenic and Asthenic.—Inflammation of the mucous Membrane of the Vagina and Uterus.—Sthenic Inflammation of the Vagina.—Causes.—Symptoms.—Treatment.—Asthenic Inflammation.—Very dangerous Character.—Injurious Effects consequent on the Inflammation.—Inflammation of the lining Membrane of the Cervix Uteri.—Of the lining Membrane of the Uterus.—Inflammation of the fibrous Structure of the Uterus.—Of the Peritoneum.—Of the Sub-peritoneal Tissue.—Of the Uterine Veins.

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 that a very slight cause would light up inflammation. The labour itself, and too often the management of it, gives rise to many causes of injury, and hence 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 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—amongst the rest the introduction of the hand, or the injection of cold water into it—all are causes that excite inflammation in the body of the uterus when reaction takes place. The form which inflammation may assume is as various as the causes that produce it. Inflammation may be confined to the vagina and mucous membrane 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.   We shall first consider—

Inflammations of the mucous membrane of the vagina and uterus. —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 so 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—I 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.

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 so 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 pubis and promontory of the sacrum. The urethra, which lies between the head and pubis, is sometimes so bruised that slough is the result, and fistula the consequence of slough. Hence may be established one of the most unmanageable and distressing affections to which the parturient 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, which can scarcely occur without the neighbouring tissues being also 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 assis-
tance.   As soon as this takes place warm fomentations may be
omitted, and cold astringent injections substituted; sol. liq. 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 has 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 læsions that
may be left behind.

Asthenic inflammation of the vagina is a far more serious result
of labour: the whole vagina is quickly engaged in the inflamma-
tion, which sometimes extends to the uterus.   Its tendency is to
terminate rapidly in gangrene, which is not confined, as in phleg-
monous 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 mem-
brane 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 oppo-
site 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 themselves 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 either
those that produce constitutional depression—foul air, bad diet,

mental anxiety, etc.—causes that alter the healthy condition of the blood—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 I have observed, that when the vagina is thus inflamed, pimples appear about the lips, which 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 which we have been considering. 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 I am 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 I think the solutions of the chlorate of soda, or chlorate of potash, 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 inflam-

mation 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 in either the left or right inguinal region, more generally the left: the fundus uteri feels rather larger and firmer than usual. If 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 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, local depletion should be immediately had recourse to; 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. Pil. Hyd., with Extr. Hyoscyam. Hyd. e Cræta, and Dover's powder, 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 fine reticulate sub-peritoneal 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 laboured, and any effort at respiration 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 induce: thus they are never completed, but are cut short by a rapid expiration, sometimes accompanied by cough.   The bowels are constipated, and the skin 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 is 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 efforts; 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. I 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 irtitation 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 the moment that peritonitis yields to its influence, the mucous membrane feels its effect, which is manifested by the diarrhœa that follows. I am much more disposed to recommend the free use of opium. It has the advantage of allaying the high degree of nervous irritation that is the necessary consequence of inflammation affecting a membrane in such intimate relation with the vital organs, and perhaps arrests its progress 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 is analogous to peritonitis, the result of perforation of the intestine, rupture of the bladder, etc.

In proposing to you this plan of treatment, I have no claim to originality. Dr. Stokes, of Dublin, pointed out the use of opium in a valuable paper that appeared in the Dublin Journal of 1832. "The first form of inflammation," he observes, "in which the use of opium appears peculiarly advantageous, may be stated to

be that of peritonitis occurring under circumstances *where blood-letting cannot be employed*. Now the following are the circumstances under which I have seen this condition arise:—

1. Peritonitis arising from the escape of fœcal matters into the peritoneal cavity, through a perforating ulcer of the intestine.

2. Peritonitis arising from the bursting of an abscess into the peritoneal cavity.

3. Peritonitis occurring after the operation of paracentisis in debilitated subjects," * to which we would add—

4. Rupture of the uterus.

In idiopathic inflammation of the peritoneum *depletion* is necessary, but not to the extent that it is used 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, has a more decided effect than blood taken 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* I 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, gives great relief; you must, however, closely watch its 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. I prefer the vapour bath, if it can be obtained; the steam apparatus that had 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. I 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

* Dublin Journal, vol. i. p. 125.

week after the accident. The morbid appearances may be grouped
into two classes, corresponding to the two stages of the inflam-
mation. 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 admix-
ture 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 is poured into the peritoneum, as in
ruptures 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 is 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 quan-
tity of serum is less than in the first group. In the latter, the
characters are more like what accompanies 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 appear-
ance; 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 adhe-
sive, 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 sub-peritoneal 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, Churchill. It is necessary, therefore, to recall to your recollection the anatomical relations of the sub-peritoneal 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, 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 to 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 is not circumscribed, or does 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: thus 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 only complains of inability to move, which she attributes to weakness rather than pain; the pulse still 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; she 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 tumor 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, that is the next step to fluctuation. If these signs are 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 should 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; to foment the pelvis carefully, both by fomentations applied externally, and by warm injections into the vagina and rectum. If the patient is able to move without distress, the warm hip-bath would be very useful; but if motion cause pain it is better to omit it: mercury with opium may be given moderately. Hydr. c. Creta, and Dover's powder, form a good combination — 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 weakness: 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 excites violent reaction and inflammation of these veins. The irritation caused by the introduction of the hand into the uterus, for the same purpose, or the removal of an adherent placenta, also predisposes to inflammation of the veins. The absorption of putrid matter, 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 them in connection with that subject.

The symptoms by which you recognise this form of inflammation are of a typhoid character: a rigor occurs about the time that 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 shrunk; 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.   There is no form of inflammation that prostrates the vital powers more completely than phlebitis; *the treatment* is, therefore, chiefly stimulant; and, 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 given moderately, watching their effect, especially on the pulse. If they act beneficially, the pulse becomes more steady, fuller, and softer; presently its rate will decrease: if they are 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.

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 opening of the veins are found contracted, the coats somewhat thickened; and if the vein be exposed its 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.

In this brief account of uterine phlebitis, we have confined your attention to its least complicated form,—that inflammation which is produced independently of the absorption of a morbid poison, and which follows the same course in the uterus as elsewhere. It is necessary to recollect that such an inflammation may occur, and is sometimes met with, where there are no causes of an epidemic character to produce it, and when it is evidently not the result of the absorption of putrid matter. Take, for example, a case of extreme flooding, followed by inflammation of the uterine veins: the cause here is as obvious as the effect, and we have endeavoured to describe to you the course that such an inflammation will pursue. We shall have again to speak of the more common form of phlebitis that is met with in cases of puerperal fever; but at present we are anxious to point out to you that there may be phlebitis without puerperal fever, which if you were to form your opinions by all that is written on the subject would seem to be at least doubtful.

LECTURE XXVIII.

PHLEGMASIA DOLENS—POST-PARTUM FEVERS.

Phlegmasia Dolens. –History of the Disease.—Its Cause.—Adhesive Inflammation of the Crural and Pelvic Veins.—Symptoms.—Terminations.—Treatment: Depletion, Mercury, Opium, Antimony, Purgatives, Blisters, Tonics, Diuretics, Bandaging the Limb.—Pathological Appearances described by Lawrence and Davis.—By R. Lee.—Conclusions derived as to the Nature of the Disease.—Phlebitis presents three Forms: the Adhesive (Phlegmasia Dolens), the Circumscribed Suppurative, the Diffused Suppurative Inflammation.

Post-partum Fevers.—Milk Fever or Weed.—Symptoms and Treatment.—The Gastro-bilious or Intestinal Fever.—Causes.— Symptoms.—Treatment.—The Miliary Fever.—Description.—The Cause producing it.—White's Account of the Management of the Parturient Woman in his Time.

" PHLEGMASIA alba dolens" is the popular name given to another form of inflammation that was quite unknown until the last few years. It received this name because the leading feature of the disease was a general swelling of the leg, which became greatly enlarged, hard, white, and painful. Its true cause was a mystery, and therefore the professsion, as in all other instances, indulged very freely in hypotheses. The oldest and most popular belief was founded on the doctrine of metastasis. Mauriceau supposed that it was owing to a reflux upon the lower extremities of certain matters, which should have been evacuated by the lochia. Pusos, Levret, and several others, thought that it was a metastasis of the milk from the breast to the leg, " *dépots du lait,*" " *metastasis lactis;*" and this very simple and convenient explanation seems to have held its ground with the profession to a later period than we might suppose. Dr. R. Lee mentions a case in which, not many years ago, " a celebrated London accoucheur was so strongly impressed with a belief of the truth of the doctrine of milky deposits in crural phlebitis, that he ordered the infant to be kept night and day at the breasts, lest the milk should make its way

to the thigh." Even then, however, the more scientific part of the profession discarded this explanation, and sought for it among the parts directly affected. In 1784, Mr. White, of Manchester, adopted the opinion that the disease depended upon obstruction or some other morbid condition of the lymphatics. Mr. Trye, of Gloucester, supposed that they were ruptured: Dr. Ferier, that they were inflamed. In 1800, Dr. Hull doubted this doctrine, as inadequate to explain the facts. He considered that the blood-vessels were also engaged, and supposed that its proximate cause consisted in an inflammatory affection, by which serum and lymph were affused abundantly into the cellular tissue, thus producing the swelled leg; and that " all the textures, muscles, cellular membranes, lymphatics, nerves, glands, and blood-vessels become affected."* Thus far the explanations as to the nature of the disease were little more than guess-work, each suggestion being adopted according as it best suited the leading symptoms observed; no inquiry was made into its pathology, nor any examination made of the morbid alterations caused by the disease, until 1817, when my late respected predecessor, Dr. Davis, first pointed out its true character. 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 vein, 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 coats, and of a deep red colour, was filled with a firm bloody coagulum, adhering to the sides of the tube, so that it could not 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 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

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* Lee on Diseases of Women, p. 148.

about a teaspoonful of a thick fluid, of the consistence of pus, of a lightish brown tint, and pultaceous appearance. The uterus, which had 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."*

We have detailed the substance of this dissection rather at length, because it embraces all the leading characters of the disease, and determines the time that 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 (Jan. 1823) M. Bouillaud related several cases and dissections, in which the crural veins were obliterated.† Thus, it was established that phlegmasia dolens was inflammation of the crural veins. Dr. Robert Lee went a step further, and endeavoured to connect this inflammation with the uterus; that it was, in fact, an extension of inflammation from the uterine veins to those trunks in immediate connection with them: a paper on this subject was published in the Medico-Chirurgical Transactions in 1829.

From this history, it is evident that this disease must be considered as a form of venous inflammation, which may be taken in connection with that which we have just considered. The former inflammation was acute, this is more chronic in its character. Chronic inflammation of the veins in connection with the uterus might be an appropriate title; but as I am anxious to avoid terms that involve a doubt, I shall adhere to the old and popular name, phlegmasia dolens.

This disease occurs at a later period than inflammation of the uterine veins: it is observed on the twelfth day after delivery, and sometimes as late as the twentieth. Like inflammation of the sub-peritoneal tissue, it is frequently consequent upon some preceding inflammation. The causes that produce it are also similar.

The symptoms which it presents are, generally, a rigor, more

* Davis's Obstetric Medicine, p. 908.
† Archives de Médicine, tome ii., Jan., 1823.

or less distinct, some headache and nausea, with a quick small pulse; the patient is irritable and anxious: she soon complains of pain and uneasiness about the pelvis; she is restless, but cannot move without pain: she describes it as extending from the groin down the thigh and leg, or perhaps she may be seized with a violent cramp-like pain in the calf of the leg, or in the muscles of the hip. The inguinal region is soon observed to become tumid, and the swelling to extend down the thigh and leg, so that in a day or two the whole limb is greatly enlarged, tense, shining, and elastic; the pain then diminishes, but the limb is immoveable. In some instances, the swelling begins from below, in the ham or the calf of the leg, or the ankle, and extends upwards. Although the patient is comparatively free from pain, yet it is soon excited if the lymphatic glands or venous trunks are compressed; sometimes, also, red lines, and occasionally a blush of erythema, may be observed taking the course of the lymphatics. The veins feel hard and knotted, like whip-cord, are painful when pressed, and roll from the finger. The temperature of the limb is increased. The lymphatic glands are swollen, hard, and painful; they have been observed sometimes to suppurate. The constitution manifests a considerable amount of irritation; the pulse rises often to 140, small, quick, and occasionally feeble; the tongue is white; the countenance pallid; there is great thirst, with some degree of nausea: the lochial discharge, and the secretion of milk, are generally arrested. The patient gets very little sleep; she spends a restless night, and in the morning is often bathed in a profuse perspiration. This stage of the attack will last sometimes ten days or a fortnight, when the constitutional symptoms gradually disappear; the pulse falls by degrees to its natural standard; the tongue becomes clean; the milk returns; and the patient gets refreshing sleep. The swelling in the limb diminishes, so that it is no longer so elastic, but pits on pressure; the tenderness of the veins and lymphatics have disappeared; 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 great difficulty, and she may remain lame even for months after the attack. One limb only is, most usually, affected. In some rare cases, both limbs have been simultaneously engaged; but it more frequently happens that one leg, generally the left, is first attacked; the disease then leaves it and seizes upon the right.

This inflammation is not usually fatal: it may terminate in simple resolution, or may leave behind some thickening of the cellular tissue, or a varicose state of the veins; the swelling of the limb does not, therefore, completely subside, and the patient continues lame. Suppuration very rarely occurs, but when it takes place it greatly increases the danger of the case. It has happened that large collections of pus formed in the pelvis, and the patient died of hectic fever. Death also takes place suddenly in some instances: cases are related where a sudden change of position—sitting up in bed—caused death.

The treatment must be governed by the effect produced by the disease on the constitution. If the patient be plethoric, the pulse firm, and but little constitutional irritability present, *depletion* may be employed with more boldness, but even here local depletion is always to be preferred: thirty or forty leeches applied directly over the veins and lymphatic glands, will sometimes cut short the attack. If the constitution, however, be much under its influence, and the symptoms of its irritation be prominent, depletion must be used with great caution,; eight or ten leeches applied in the same situation, and repeated from time to time, is much safer than a larger number applied at once. It is better, also, not to adopt the practice of encouraging the bleeding afterwards; or, in other words, by means of fomentations establishing a drain from the bleeding vessels: a constant trickling of blood produced in this way, often causes greater depression than a large quantity of blood taken at once: if, therefore, we fear a large depletion, lest it might be followed by such an effect, we must take care to avoid producing it in a different manner. *Mercury* is a medicine of great value in this form of inflammation, not carried to the extent of salivation, but merely to affect the gums slightly. If persevered in too far, the powers of the constitution sink under it, and the medicine acts rather as poison, but if moderately used, it is highly beneficial. *Opium* should be combined with it, and the proportion of opium increased just as the constitution gives evidence of irritability. In this, as in all other instances where exhaustion and consequent irritability of the nervous system is present, opium is invaluable. In this disease both medicines may be given in moderate proportions. *Antimony* is sometimes exhibited with advantage. In plethoric habits, where a large depletion is indicated, but with whom,

nevertheless, it is not desirable to diminish much the quantity of blood that is circulating, tartar emetic may be administered, either in nauseating doses, or in combination with saline aperients. In feeble constitutions, antimonial powder may be substituted. *Purgatives* should be given with caution. The state of the bowels is very variable; sometimes they are constipated; in other instances the patient is attacked with diarrhœa; the evacuations, also, are frequently very offensive: purgatives are, of course, only indicated when the former condition exists, but even here it is better to relieve the bowels by warm emollient enemata than by active cathartics. Avoid every source of irritation in the immediate neighbourhood of so serious an inflammation: an active catharsis may rekindle an inflammation which was about to subside. Counter-irritation is also very serviceable. Mr. Sankey * has found *blisters*, applied over the most painful part, and repeated every two or three days, of great use. *Turpentine* fomentations have been employed with great advantage. During this stage, the diet should be mild and unirritating; a milk diet, sago, arrow-root, tea and toast, with barley water if there be any thirst: a diet of this character may be selected according to the taste of the patient. In the second stage, when the fnflammation begins to subside, the tenderness to diminish, and the limb to pit on pressure, a more nutritious diet is required. *Tonics* are also indicated, and quinine, with sulphuric acid, may be given freely in any bitter infusion. In order to reduce the size of the limb, and to promote absorption, frictions and bandaging are extremely useful: it may be rubbed with soap liniment, or the mercurial ointment diluted, and a bandage carefully applied from the toe upwards. When the inflammation is on its decline, this is easily effected: in fact, the absorption may be too rapid, and the venous circulation loaded with more than it can dispose of: to relieve this, and to promote an equally rapid excretion, it is necessary to excite the action of the kidneys, and therefore diuretics are essential while absorption is going forward. The bandage should be retained for some time after the size of the limb has been reduced, because it is necessary to recollect that the principal trunks that convey the blood returning to the heart are obstructed: and hence the anastomosing veins are over-distended in the effort to supply their place:

* Edinburgh Journal, vol. x. p. 402.

the superficial veins become varicose, and, if not supported, may remain so permanently. By these means, venous inflammation of this character may generally be subdued. It has happened, however, in spite of the best directed treatment, that phlegmasia dolens has been fatal. Death has taken place quite suddenly in some instances, even when there was a favourable prospect of the patient's recovery. In other cases, the blood evidently became poisoned: the inflammation was diffused, collections of pus were found in distant parts, and the patient died with the symptoms of toxæmic phlebitis.

The pathological appearances of phlegmasia dolens have been very accurately described by Mr. Lawrence, in the first dissection that was made to investigate this disease. Subsequent post-mortem examinations proved the same facts, and showed that the femoral, the iliac veins, and their branches, and sometimes even the inferior cava, had been the seat of inflammation. Mr. Lawrence, however, found the uterus of its natural size; "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." From this account, it would seem as if this form of inflammation was quite independent of any inflammation in the uterus. Judging, perhaps, from the fact that phlegmasia dolens is frequently observed as a sequence of uterine inflammation, Dr. R. Lee took every opportunity of investigating this point, and has related dissections that appear to prove a connection between them. He has traced the results of inflammation along the hypogastric and uterine veins, as far as the uterine plexus of veins. In one case he observes—" The left hypogastric or internal iliac vein was in the same condition, but in some places reduced to a cord-like substance, and its cavity throughout completely obliterated. The branches of this vein taking their origin in the uterus, and usually termed the uterine plexus, were found completely plugged up with firm reddish coagula of lymph. From the commencement of the branches of this plexus of the hypogastric vein to the termination of this vein in the iliac, the whole had become thickened, contracted, and plugged up with coagula, and adventitious membranes of a dark blue colour. The same changes had taken place in the uterine

plexus and trunk of the right hypogastric vein, from the uterus to its unusual termination in the left common iliac vein."* These dissections seem to prove the connection between inflammation of the pelvic veins and that of the uterus, as cause and effect; but still it is open to a doubt that it is generally true. First, because other observers who have related dissections, do not mention that the veins in the immediate neighbourhood of the uterus were affected. It may be, as Dr. Lee supposes, that they were not looked for, and had escaped their notice; but we do not think that this case applies to the first very accurate dissection made by Mr. Lawrence, who had evidently sought in the uterus for the cause of inflammation, and found none. Secondly, the varicose state of the veins of the leg that often occurs, and the frequency of hæmorrhoids during pregnancy, prove the effect of an obstructed circulation on the smaller veins, hence we infer that the pelvic veins must be equally liable to dilatation below the point of compression. It is not likely that this varicose condition should be confined to merely terminal branches. If the pelvic veins become varicose during pregnancy, they are in a morbid condition: their coats, at least the outer cellular coat, is thickened, and it is probable that the surrounding cellular tissue is also altered and indurated: they are thus in a state more susceptible to inflammation than the healthy vein would be, and hence a slighter cause would produce such an effect. Thirdly, the morbid change produced in a varicose vein by inflammation is precisely what is observed in phlegmasia dolens. Adhesive lymph is poured out; the blood is coagulated, and thus the inflammation is prevented from extending itself. The contrary may certainly take place; suppuration may overcome this effort, pus may poison the blood, and the patient die with the symptoms of acute phlebitis (Dr. R. Lee relates such cases); but they are clearly exceptions to a general rule. The ordinary course which phlegmasia dolens pursues is precisely that of an inflamed varicose vein. With regard to the time that it appears after delivery, phlegmasia dolens seems to follow the law that the more chronic or subacute post-partum inflammations observe in this respect. Inflammation of the sub-peritoneal tissue often possesses this character, and presents itself at an equally late period: so that acute inflammations, whether of the mucous membranes, or fibrous structure,

* Lee's Lectures, p. 535.

or the serous surface, are always observed soon after parturition: the more chronic forms mark a longer interval. Phlegmasia dolens, however, sometimes manifests its symptoms as early as the fourth day after labour.

The conclusions, then, to which we have arrived as to the nature of phlegmasia dolens, are—First, that it is essentially an inflammation of veins that have previously become varicose, and have undergone those morbid alterations in their coats and surrounding structures that is so frequently observed in varicose veins. Secondly, that the tendency of this inflammation being to limit itself and become circumscribed, it may be confined to the iliac veins alone, or may extend downwards to their minute branches, or along the crural trunks. It may pass upwards by the inferior cava, a short distance, but seldom passes the emulgent vein. In all these instances the boundary of the inflamed veins is clearly marked. Thus the inferior cava may be engaged, and the emulgent veins perfectly free; the crural or saphena may be inflamed, and the profunda free; and even the uterine branches of the hypogastric vein may be involved in the inflammation, and yet the uterine veins themselves totally escape. Thirdly, the exciting causes of the inflammation may be accidental,—as sudden exposure to the cold, and such like; these will produce inflammation very readily in a structure morbidly susceptible to its influence. So, also, an antecedent inflammation may be an exciting cause, and in this sense inflammation of the uterus or vagina may produce phlegmasia dolens. Fourthly, this inflammation may deviate from its proper course; the effusion of lymph and the coagulation of blood may not prevent the diffusion of pus into the general circulation, and thus phlegmasia dolens may assume the characters, and be followed by the same fatal result as acute phlebitis; but these cases are exceptions. Phlegmasia dolens does not do so in the majority of instances, nor is it generally a fatal disease.

We have now considered two forms of venous inflammation,— the one acute, the other chronic; the uterine veins are the seat of acute phlebitis: the venous trunks in the neighbourhood of the uterus are chiefly affected in phlegmasia dolens: the former occurs less frequently than the latter. True inflammation of the uterine veins is comparatively rare. Toxæmic inflammation, that which is produced under the influence of morbid poisons, is

perhaps the most frequent form. It is, however, necessary that we should distinguish one from the other, because it appears to us that much confusion has arisen from including under one name, and the same description, simple inflammation, and that which is the result of the absorption of a poison. The former follows the same course as is observed in venous inflammations that are caused by wounds and other injuries. The latter is only one effect of a destructive element that is by no means confined to the uterine veins. The morbid appearances that accompany phlegmasia dolens will exhibit the conservative power that an inflamed vein possesses of preventing the mischief that otherwise must follow. Pus, the product of this inflammation, in a certain sense, acts as a poison if it be mixed with blood. It may be carried into the general circulation, and if so, it renders the blood impure. If pus accompany the blood, its irritation excites inflammation in the vein that conveys it: a small quantity of pus may be carried rapidly along a vein without having such an effect, but if its progress be retarded, as in the capillary circulation, it will excite inflammation in the vessels where its progress is arrested. The curative object of nature in phlebitis is to circumscribe the inflammation, and to prevent the diffusion of pus: that is generally successfully accomplished in phlegmasia dolens,—first by the rapid coagulation of the blood itself, which is always the effect of its admixture with pus; and secondly, by the effusion of lymph from the sides of the inflamed vein by which the impure blood is confined. This is successful in phlegmasia dolens, because the inflammation is subacute, and its progress, comparatively with other forms, slower. This form of phlebitis seldom exceeds the adhesive stage : the inflamed vein is blocked up with adherent coagula, and cut off from the general circulation. If the inflammation subside, the vasa vasorum either remove the plug by absorption, and again open the vein, or obliterate by the same means the vein itself. Thus, in the post-mortem inspections of phlegmasia dolens, you will find sometimes the affected veins filled with these plugs, sometimes having a small central canal, or the vein is obliterated to a mere thread.

In the more acute form of venous inflammation, this protective process is seldom so complete: on the contrary, some pus usually makes its way into the general circulation, and its quantity, as well as the effect which it produces, depends very much upon

the strength of the patient's constitution. If the vital powers are active, the pus,—the peccant humour of the older nosologists,—is again circumscribed in some distant vein or veins, makes its way to the surface in the form of abscess, and is thus removed from the blood. Hence these abscesses are commonly critical. If the constitution cannot accomplish this purpose, pus becomes more abundant, excites asthenic inflammation, to a greater or less extent, in the several veins through which it passes; and, in fact, exerts the same destructive action as a morbid poison. We may, therefore, consider these inflammations in three degrees of severity. The first is the adhesive inflammation, which is observed in phlegmasia dolens; the second is the circumscribed puriform inflammation, which is occasionally met with in acute uterine phlebitis; the third is the diffuse puriform inflammation, which may occur at any time in a debilitated constitution, but which is always the result of the absorption of morbid poisons. The first form is seldom fatal, and when so it merges into the second or third variety. The second is much more dangerous; nevertheless, by proper treatment, the patient may be saved from it, unless it degenerate into the third form, which is always fatal.

We have stated to you that true uterine phlebitis is comparatively a rare disease. This will be intelligible to you when you reflect on the structure of the uterine veins. The lining membrane of a vein, although highly irritable, is the last to inflame. To adopt the language of Hasse, " the internal membrane of the veins reacts, indeed, 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, are very rarely, and never extensively, the seat of true inflammation."* The uterine veins are just like the corpora spongiosa; they consist only of a single lining membrane, closely surrounded by the uterine fibres, through which it is difficult to trace any cellular tissue. They are, therefore, in that condition which would render them least susceptible to true inflammation.

* Hasse's Pathological Anatomy, p. 11.

This fact may also be viewed as an admirable provision of Nature to save the parturient woman from consequences which otherwise would inevitably follow. Bear in mind Cruveilhier's comparison of the uterine cavity to an open wound, having the mouths of these veins exposed. If inflammation were readily excited, few women would escape its most serious result; and thus parturition itself might be viewed as only the commencement of a disease of the most dangerous character, the uterine veins at once inflaming when exposed to the air, and other causes of irritation. This, however, is not the case; the admission of air has no effect upon them. They may be quite insensible to the contact of even putrid matter; such, for instance, as a putrid ovum or a putrid placenta. The rough manipulation that is frequently adopted in delivering the child, or in extracting the placenta, does not generally excite them to inflammation. On the contrary, when inflammation is so produced, it generally begins in tbe fibrous structure, and extends to the veins. In certain instances, it is probable that the uterine veins are only the medium of communicating an irritant to act on the veins in immediate relation to them, without these vessels being influenced by it. Dr. R. Lee's view of phlegmasia dolens may be, therefore, in some cases, quite correct. There are certain conditions, also, in which this protective power is altogether lost. There are certain states of the constitution in which any, the most trifling of these causes, is sure to excite the worst form of phlebitis. We shall enter upon their consideration when speaking of puerperal fever. At present we are only desirous of guarding you against an error that we fear is too prevalent with regard to phlebitis,—that is, the mistake of confounding very opposite varieties of inflammation in one classification.

POST-PARTUM FEVERS were as frequently met with some years ago as the inflammations we have been considering. The ephemeral fever, the gastro-bilious or intestinal fever, and the miliary fever, received as prominent a place in the descriptions of the older authors as the puerperal fever. At present, however, the last fever seems to have absorbed all the rest. The ephemeral and gastric fevers are described as occasional accidents; the miliary fever is only an historical event; puerperal fever alone occupies the attention of obstetric authors.* This may be

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* Drs. Blundell and Ramsbotham describe the hidrotic or sweating fever. The author has not met with it unless in connection with acute or chronic phlebitis and puerperal fever.

readily explained; and the fact affords a strong evidence of the improvement in obstetric practice. The former fevers were generally the result of mismanagement. Indiscretion in diet, neglect of the bowels, or improper exposure to cold draughts of air, where the patient was kept in a high temperature, induced ephemeral fever at the time that the milk was forming in the breast. When no attention was given to the state of the bowels, and they became torpid, the irritation was communicated to the whole gastro-intestinal mucous tract, which did not manifest itself until the period of reaction after delivery. Gastro-intestinal fever then was developed. And lastly, when the rule was on no account to allow the patient to chill after delivery, but to avert it by warm stimulating drinks, by hot fires, heaped-up bed-clothes, and close apartments, the miliary fever showed itself, and sometimes followed a very dangerous, if not a fatal course. Happily this fever has disappeared with the removal of its cause; and both the others are met with far less frequently now than they had been formerly. A very brief description will, therefore, be sufficient to dispose of them.

The ephemeral fever occurs just as the breasts are becoming distended with milk. It commences with a rigor sometimes extremely severe. I have seen it like an ague fit. This, however, is soon succeeded by a hot stage. The patient is thrown into a profuse perspiration, in which she frequently falls off asleep; the fever subsides, and she has no further return of it. The secretion of milk is not usually arrested; and if so, the application of the child to the breast, when the paroxysm is passing off, is the most efficient febrifuge you can employ. In other respects, it is better to let the fever take its course, only avoiding such accidental causes as may alter its character. Thus, in the cold stage, warm drinks and warm coverings are necessary; while it is equally essential in the hot stage to reduce cautiously the temperature. If improper food had been taken previously, an emetic would be advisable; and, on the same principle, an aperient may be given, in order to remove from the bowels any cause of irritation that may exist. Little else is required, unless the patient is more than usually prostrated by the attack. In such cases it may be necessary to give tonics after it has passed away.

The gastro-bilious or intestinal fever seems like the preceding fever, only that it is protracted. It commences nearly in the same

manner, but does not pass off so quickly. When the paroxysm subsides, the patient still complains of nausea: she loathes food; the pulse continues frequent; the skin is hot, although the patient may feel cold; the tongue is white and slimy, and she has great thirst. The intestines are generally distended with flatus; and, consequently, she experiences frequent griping pains in the bowels. The evacuations are usually dark and very offensive. The secretion of milk is scanty, but not altogether suppressed, neither is the lochial discharge generally interfered with. The patient rests badly, and is often tormented with night-mare; but, in some instances, the amount of nervous irritation is most distressing, the patient starting constantly from her sleep, and when awake attacked with palpitations. The abdomen is sometimes very much distended by flatus; and when this is the case, if care be not used, it may continue permanently enlarged. Thus some women after delivery are nearly as large as they were before it. This fever lasts about a week, but may extend to a fortnight, or even to three weeks.

The treatment must be directed to alter and improve the secretions from the bowels, without acting too violently upon them. For this purpose hyd. c. cretæ, soda exsiccata, and Dover's powder, may be combined, and given in small but repeated doses. An aperient may be administered on alternate days. A draught of infusion of rhubarb with magnesia, or the powdered rhubarb with sulphate of potass, in any of the aromatic waters, will be found useful. Diaphoretics are also serviceable in exciting the capillaries of the surface. When the patient is much distressed from tormina, turpentine may be given with advantage. Two drachms of castor oil, and the same of turpentine, in mint water, often gives immediate relief; or, if the irritability of the stomach will not admit of this, an enema of turpentine with assafœtida will answer the purpose. When the fever subsides, and the patient is recovering, it will be necessary to restore, as far as possible, the tone of the intestines. Astringents, tonics, and wine, are indicated. The infusion of quassiæ, with the tincture of myrrh and vinum ferri, forms a good combination; or the compound myrrh pill with sulphate of iron. Attention should also be paid to the state of the abdomen. It should be again enclosed in a broad flannel bandage until it has in some degree recovered its contractile power.

The miliary fever was ushered in by very unfavourable symptoms; great anxiety, oppression at the præcordia, sighing, and dejection of spirits. These were accompanied by quick pulse, white tongue, thirst, and other febrile symptoms, of which the most characteristic was profuse and irregular perspirations that were not critical, and were followed by a great amount of depression. An eruption then appeared, of a vesicular character, sometimes having an inflamed base, sometimes without any, which was called the red eruption. A number of pearl-coloured vesicles appeared about the upper part of the body, which was called the white eruption. These presented themselves with the sweats, continued for a day or two, and then faded away, perhaps to return again. The time of its appearance was variable. Some perceived it as early as the fifth day; some on the seventh; others on the tenth; and others, again, as late even as the sixteenth and twenty-eighth days. The earlier it appeared, and the more abundant the crop, the greater was the danger to the patient.

The cause of the disease may be learned from the following graphic description of the management of a woman in labour in the last century, as given by Mr. White:—" When a woman is in labour, she is often attended by a number of her friends in a small room, with a large fire, which, together with her own pains, throw her into profuse sweats. By the heat of the chamber, and the breath of so many people, the whole air is rendered foul, and unfit for respiration. . . . . If the woman's pains be not strong enough, her friends are generally pouring into her large quantities of strong liquors mixed with warm water; and, if her pains be very strong, the same kind of remedy is made use of to support her. As soon as she is delivered, if she be a person in affluent circumstances, she is covered up close in bed with additional clothes, the curtains are drawn round the bed and pinned together, every crevice in the windows and door is stopped close, not excepting even the key-hole, the windows are guarded not only with shutters and curtains, but even with blankets, the more effectually to exclude the fresh air, and the good woman is not suffered to put her arm, or even her nose, out of bed, for fear of catching cold. She is constantly supplied out of the spout of a tea-pot with large quantities of warm liquors, *to keep up perspiration and sweat*, and her whole diet consists of them."[*]

* White's Treatise, etc., p. 6.

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LECTURE XXIX.

PUERPERAL FEVER.

PUERPERAL FEVER is the next subject of our attention, and one
surrounded by difficulties of no ordinary character. Whether,
on the one hand, we consider the opposite opinions that have been
entertained respecting it, and the contradictory experience of very
distinguished practitioners, or on the other the frequency of its
occurrence and its frightful fatality, we must look upon puerperal
fever as the most important and at the same time the most diffi-
cult question that we have to discuss.

In order to make an approach towards the truth, and to eluci-
date in some degree its nature, it is necessary to determine what
we mean by the term "puerperal fever." We must give some
history of the disease it represents, describe as nearly as we can
the general character of its symptoms and the morbid appearances
that are observed, and then endeavour to deduce from the facts
thus brought before us the nature of the disease. We may also
be enabled to appreciate the value of the different doctrines
maintained respecting it, and to determine more accurately the
best means of arresting its course and preventing its diffusion.

Puerperal fever, in the sense that we understand it, is a disease

not constantly met with, but 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 is sometimes more protracted. It generally pursues a very destructive course, and is attended by a mortality that always excites the utmost alarm: the peritoneum is the tissue chiefly *but not exclusively* attacked. The causes that produce it, the manner of its progress, and its effects 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, cholera Asiatica, plague.

The history of puerperal fever properly commences a little more than a hundred years ago. Previous to 1746, this disease was never distinctly described. Plater (1602) confounds it with inflammation of the uterus, and under the name of " child-bed fever," several authors included every form of inflammation and fever to which the parturient woman is liable. Strother (1716) was the first who adopted the name " puerperal fever," in place of child-bed fever; but it is quite uncertain whether it was meant to express what we now understand by this disease, or whether it was equally comprehensive as the former term, " child-bed fever." The first accurate account of puerperal fever was given in 1746, by M. Malouin, who described very faithfully a frightful epidemic that then appeared in Paris, especially at Hôtel Dieu, which was so fatal that scarcely one woman recovered. Previous to this period, in 1644, a similar epidemic seems to have raged in the same hospital. Peu* alludes to it, but so obscurely, that all we can learn is, that the women were attacked with hæmorrhages. They died, and on opening their bodies " they were found full of abscesses." M. Malouin thus describes the epidemic of 1746:—
" The disease usually commenced with a diarrhœa, the uterus became dry, hard and painful; it was swollen, and 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 of the head, and sometimes cough. On the third and 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 hypogastrium; a similar fluid was

* Peu, Pratique des Accouchemens, p. 263.

found in the thorax of certain women, and when the lungs were divided they discharged a milky or putrid lymph. The stomach, the intestines, and the uterus, when carefully examined, appeared to have been inflamed. According to the reports of the physicians there escaped clots on opening the vessels of this organ." *   In 1750 the fever reappeared in Paris and Lyons with equal severity. At that time an account of it was published by Doulcet, who treated it by emetics, recovered several patients, and, like many others, believed that he had discovered a specific. Its returns to Paris became more frequent, and at length it seems to have taken up its permanent residence at Hôtel Dieu. " This terrible disease," says M. Tenon, " has shown itself at different epochs, and its returns have been more frequent than ever: it reappeared every winter from 1774. It commenced usually about the middle of November, and continued till the end of January. It is met with also at the other seasons of the year, even during spring, for it has come to prevail more and more, and to be, *as it were, natural-ised*." †   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. Two distinct forms of it were successively observed, one a simple form, which was cured by ipecacuanha (the practice of Doulcet) the other a complicated form for which there was no remedy." " In the complicated puerperal fever the pyrexia is more intense, with exacerbations; the tongue is black and dry; the belly is tense, distended tympanitic, and slightly painful. In some women the lochia have been either wholly suppressed or only diminished, others have experienced attacks of ophthalmia; in some, respiration was difficult; in general, the blood showed the buffy coat." The following were the morbid appearances: — " On opening the abdomen, the stomach, the intestines, particularly the small intes-tines, were inflamed, adhering to one another, distended with air and a yellow fluid matter. The uterus was contracted to its or-dinary dimensions, and was seldom inflamed. I have had occa-sion to dissect two; in one the uterus contained a coagulum of blood. An infiltration of a milky appearance or whey-like fluid existed in certain women in the cellular membrane surrounding the kidneys. Sometimes also a thick white cheesy matter was met with.

* Mémoires de l'Académie des Sciences, 1746.
† Important Diseases of Females, p. 6,

When the lungs were gorged with blood, or inflamed, or emphysematous, an effusion of serum was found in each side of the chest. We did not observe the hæmorrhages which occurred in the epidemic of 1664, and the uterus was not found dry, hard, and tumefied, as in that of 1746. In the epidemic of 1774 the lochia flowed, but they did not flow in 1746."* Such was the progress of this disease in Paris: at first returning after long intervals, then more frequently, and ultimately becoming an annual affliction. Its appalling fatality may be estimated by the fact, that while the average mortality in child-birth in London is about 1 in 150, and in lying-in hospitals varies from 1 in 70 to 1 in 100, the mortality at Hôtel Dieu and the Maternité is 1 in 20, and sometimes so great as 1 in 13,† chiefly caused by puerperal fever. We have reason to think, that, even at the present time, there is very little improvement in this respect. Time would not permit us to enter upon the details of its progress in other parts of the Continent; but we have sufficient evidence that it is perfectly similar in its general characters, and has been equally fatal. Dr. Routh, in a very valuable paper on puerperal fever,‡ as it appeared in the Vienna Hospital, mentions that the mortality was as high as 1 in 10, and even 1 in 6 cases. In one division of the hospital, the average number of deliveries was from 250 to 300 cases monthly, and the deaths varied from 30 to 70: from one in ten to one in four cases nearly!

The first distinct epidemic in London seemed 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 the exact mortality was: 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 the 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 this month he himself delivered six women in a short time in the hospital of natural births, and they all died. He was so shocked with the loss, that he desired the gentleman who had the care of

* Important Diseases of Females, p. 8.
† Rapport fait au Conseil Général des Hospices.
‡ Medico-Chir. Transactions, vol. xxxii. p. 28.

the hospital to deliver some of those 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*."* It returned again in 1768, when Denman's essay appeared. He found that depletion on the appearance of the very first symptom of the disease, and afterwards tartar emetic given to produce vomiting, had a beneficial effect; he considered it, therefore, as of an inflammatory character, but admitted that in many instances it soon changed its type, which rendered bleeding dangerous if adopted at a later stage. "For when the fever has remained for a very few days, *the putrid symptoms*, which are usually according to the degree of the preceding inflammation, advance very rapidly, and its continuance depends upon causes which bleeding cannot remove, and will certainly increase."† 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.‡ Dr. Leake, who was the attending physician, described the fever in his diseases of women, gave statistical proof of its great mortality, and considered that its cause was inflammation and gangrene of the omentum. His contemporary, Dr. Hulme, then presided over the City of London Lying-in Hospital, and I believe was the originator of this view of puerperal fever. He complains that Dr. Leake had appropriated his discovery. He published, in 1772, a very excellent essay in which he gives a most accurate account of the disease, and the post-mortem appearances then observed. He generally found the omentum inflamed, and frequently black and gangrenous: hence he considered inflammation of the intestines and omentum to be the cause of the disease. His treatment was guided in a great degree by these views: he recommends depletion in the first instance, when the pulse is firm under the finger, but objects to large bleedings.§ "An error on either side may be hurtful, for if bleeding be neglected when necessary, it may increase the great tendency which we find to inflammation, not only in the omentum, but in the lungs and other viscera; but if too much blood be taken away, it may weaken the patient so much as to prevent her supporting the other evacuations. He believed that Nature endeavoured to throw off the disease by a diarrhœa and a sweat,

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* White's Treatise, p. 165.   † Denman's Introduction, p. 441.
‡ Mackintosh's Essay, p. 4.   § Hulme's Treatise, p. 7.

both of which he encouraged, but when these means failed in their object, he was equally cautious not to go too far. 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 that 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."* For this purpose he recommends Peruvian bark, opium, and aromatics. Dr. Hulme does not state the precise mortality in the City of London Hospital; but it is evident from his account that it must have been great. We have, however, from Dr. Joseph Clarke,† some information respecting the mortality of other hospitals, at the same period, 1770-71. In the Westminster Hospital, between November, 1769, and May, 1770, the deaths we have mentioned took place, being nearly one in four cases. "In the British Lying-in Hospital, of eight hundred and ninety delivered in the course of this year, thirty-five died, or one in fourteen and a half."

In 1773, the fever showed itself in the lying-in ward of the Royal Infirmary, 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." The Dublin Lying-in Hospital was founded in 1757, and in ten years afterwards this fever showed itself. It returned again after an interval of seven years (1774), was then absent for thirteen years, when it re-appeared in 1787; eleven women were seized with the fever, and seven died. "In November, 1788, the same fever appeared for the fourth time since the institution of the hospital; . . . . seventeen were attacked by this fever, and fourteen died."‡ Since then it has returned to that institution at intervals varying from one to seven years. Dr. Collins gives the dates of several of these endemic attacks, thus—1774, 1787, 1788, 1803, 1810, 1811, 1812, 1813, 1818, 1819, 1820, 1823, 1826, 1828, 1829.§ But to return to London. Dr. John Clarke states—"In the year 1787 and 1788, the same year in which the

* Op. cit. p. 86.   † Medical Commentaries, 1790.
‡ Medical Commentaries.   § Collins' Treatise, 382.

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, which gave occasion to great alarm in the minds of women and those engaged in that department of medicine."*   Dr. Clarke found it to be quite a different disease to any that he had been accustomed to meet.   " In many of its symptoms, and through its whole course, it seems to differ materially from any disease which has been described by authors as attacking women in a parturient state; and, notwithstanding, that in some respects it is analogous to the diseases described in the former sections of this essay, yet still there is so material a difference in the nature of its attack, in its general progress, and in the manner of its termination, that I think an essential difference will be found to exist between them."†   Further than this, Dr. Clarke has made a very important observation with regard to those first attacked with the disease, which from my own experience I can fully confirm.   " The first case I met with was in the month of July of the year 1787, in which I was astonished to observe the rapidity with which it ran its course, and the very extraordinary manner in which the woman was destroyed by it."‡ We have no accurate account of this disease in London from the time that Dr. Clarke's essays were published (1793), until the appearance of Dr. Gooch's valuable papers on peritoneal fevers, who commenced his observations in 1812; but in other quarters, Aberdeen, Leeds, and Sunderland, this visitation elicited writing of considerable ability, and also no small degree of controversy. This malady visited Aberdeen in 1789, and continued more or less till 1792, when it finally ceased.   Dr. Gordon published an excellent essay in 1795.   He describes the fever as following a different course from what had previously been observed.   " The puerperal fever, according to the account given of it by authors, is more frequent and fatal in large towns, and in hospitals, than in country and private practice.   But that under consideration was not confined to the town of Aberdeen, but extended to the suburbs and contiguous country, where it proved as fatal as in the heart of the city.   It was not peculiar to any particular constitution or temperament, but promiscuously seized upon women of

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* Clarke's Practical Essays, p. 110.   † Op. cit. p. 112.
‡ Op. cit. p. 119.

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."*

Dr. Gordon also observes, that " It prevailed 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 attended any patients labouring under the disease.*" And as a confirmation of this mode of communicating the disease, he states, " That I could venture to foretell what women would be affected with the disease, upon hearing by what midwife they were attended during their lying-in, and almost in every instance my prediction was verified." He quotes several examples to prove that the cause of its being in the country as in the city indifferently, and affecting all constitutions alike, was the fact that the disease was directly communicated from patient to patient by the attending practitioner or midwife. Dr. Gordon considered it to be inflammatory rather than putrid, and that the type of the inflammation was erysipelas.

The treatment that Dr. Gordon found to be most successful was a bold depletion, not adopting, like Dr. Hulme, a middle course, but taking twenty or twenty-four ounces at once, and then, if necessary, ten more. He laid great stress, like Dr. Denman, on the importance of *early* depletion, and followed it by a free use of purgatives. In this consisted the chief points of his treatment. " When I took away only ten or twelve ounces of blood from my patient she always died, but when I had 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 bleeding, it was my practice to give some active purgative, on purpose 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." Between the years 1809 and 1812, puerperal fever visited Leeds and its vicinity with very great severity. Mr. Hey, jun., son to the eminent surgeon, gave an interesting account of it. He says—" For some time after the commencement of this dreadful malady, it proved fatal in every case that

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* Gordon's Treatise, p. 2.   Op. cit. p. 3.

Gordon, pp. 77, 78, 80, 85.

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."* Mr. Hey perceived the difference between this new disease and ordinary inflammation of the uterus and peritoneum. "He was alarmed by the extreme rapidity with which the disease ran through its course, and by its almost constant fatality, unlike any thing which had ever been known in Leeds." He thought that it approached the nearest to Dr. John Clarke's "low fever of child-bed," and to that described by others as the puerperal fever which has a strong tendency to the typhoid type. "For although it differed from them in some respects, yet it resembled them in its general character, *and differed far more widely from simple inflammation of the uterus and peritoneum.*"† The essential difference in his mind consisted in the greater severity of the disease; and its distinguishing feature was its epidemic character. There was no important difference in the symptoms from those detailed by Hulme, Clarke, and Gordon. Its duration varied from forty-eight hours to several days, although in some instances its progress was much more rapid. In one case the fever went through its course in eighteen hours. Mr. Hey's treatment at first consisted chiefly in active purgatives, by which a diarrhœa was established. The first fourteen cases he details were treated in this way, but he only saved three of them.

Dr. Gordon's practice of copious depletion was then tried, with even more boldness than its originator. "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 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, forty, and in one instance more than fifty ounces, in proportion to the urgency of the symptoms and the 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." This was certainly heroic practice, which

* Hey's Treatise on Puerperal Fever, p. 2.　　† Op. cit. p 10.

we dwell upon more especially in this history, as we shall have again to refer to it on a future occasion: it was as successful as it was bold. Mr. Hey observes—" 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 whom we attended only three died; the last twenty-six recovered in uninterrupted succession."* Mr. Hey's work appeared in 1815, and was followed in 1819 by Dr. Armstrong's " Facts and Observations," in which he gives an account of the puerperal fever which prevailed epidemically in the counties of Durham and Northumberland in the year 1813, and, among other places, at Sunderland, where he resided. This complaint generally occurred 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, and without 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; consequently, Dr. Armstrong had no opportunity of knowing what morbid changes took place. It appeared that, from all that Dr. Armstrong could collect, this disease existed for more than two years in the counties of Durham and Northumberland. In the year 1811, it arose in Stockton-upon-Tees; but " at Sunderland the first case of puerperal fever happened in January, 1813, apparently under a sporadic form, and the few cases which appeared throughout the winter assumed the same character, the majority being so mild as to yield to brisk purgatives and a spare regimen. In the spring of the year, however, the disease became much more formidable in its character, and about this period five patients fell victims to it in rapid succession. In all, forty-three cases occurred from the 1st of January to the 1st of October, when it ceased. Of this number, forty were witnessed by Mr. Gregson, and his assistant, Mr. Gregory, the remainder having been separately seen by three accoucheurs;"† thus proving the same fact previously observed by Dr. Gordon, that this scourge selected particular accoucheurs as their attendant,

* Op. cit. p. 160, 168.   † Armstrong, p. 11.

and followed their practice with fatal strides. He remarks, also, as a diagnostic symptom of this fever, the peculiarly offensive character of the evacuations. "I have generally found them dark, slimy, fetid, and unexpectedly large. Indeed, excepting that they are commonly mixed with hard pieces of scyabala, 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 considerable quantity in the course of this disease."* Dr. Armstrong confirms the observations of Clarke, Gordon, and Hey, as to the rapidly fatal course of puerperal fever: "it is certain, from indubitable facts, that it sometimes destroys as rapidly as the plague itself." He found that a diarrhœa coming on in the first stage sometimes carries off the disease; whereas, on the contrary, costiveness is always an unfavourable circumstance, increasing in no inconsiderable degree, the difficulty of cure: on the contrary, a diarrhœa in the last stage was a most formidable symptom. Dr. Armstrong considered puerperal fever and puerperal peritonitis as being the same disease, only that the former was generally much more intense, so as completely to prostrate the powers of the constitution. "I have no objection to grant that the inflammatory character of this disease sometimes conceals, and even appears to lose itself in an almost unequalled prostration of the powers of the system. What I wish, however, particularly to insist upon, is this, *that the low child-bed fever and the puerperal peritonitis are so far the same as to require the depletory practice :* only in the former this practice must be more promptly and powerfully applied, as the time in which the professional man can be useful is much shorter, on account of its greater intensity."† He cautions the practitioner against being deceived by the apparent debility of the patient. "In the epidemic which occurred in the north of England, there was an appearance of excessive debility in many cases soon after the attack, *but in all it was purely an appearance of debility in the beginning*—in a word, oppression dependent upon the general excitement and topical inflammation. In the last stage, however, the debility was altogether of a different description, being then connected with general exhaustion and general irritation—the mere consequences of the unrestrained excitement and inflammation which had previously taken place."‡ The

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* Armstrong, p. 27.   † Ibid. p. 71-72.   ‡ Ibid. p. 84.

treatment adopted by Dr. Armstrong was in principle the same as that of Dr. Gordon and Mr. 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, suspended in mucilage, given immediately afterwards, and two ounces of strong infusion of senna, containing two drachms of the sulphate of magnesia, ordered to be taken every hour, till copious evacuations should be produced. The attendants were directed to allow the patient barley-water, agreeably 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 medicines began to operate, and several copious, dark, fetid stools were discharged. From that time considerable relief was obtained; and a regular perseverance in purgations, with mucilaginous drinks, and a small quantity of exceedingly weak chicken broth, completed the cure in five days."* Of the forty-three cases of the disease already alluded to, in which this treatment was adopted, only five died. It is worthy of remark, for a reason which we shall presently explain, that Dr. Armstrong quotes Dr. Gooch as an authority in favour of this practice. " From all he (Dr. Gooch) had seen of the disease, he has been led to the conclusion that the only effectual remedies are bleeding and purging, very boldly and very early employed; but he considers that these measures used moderately at this period do little or no good, while used late they do harm, especially bleeding."† As an exception to this treatment, 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 reaction 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 suddenly suspended, and the patient sinks with rapidity."‡ These symptoms were evidently new to Dr. Armstrong: he took the opportunity that was afforded to him of investigating the post-mortem appearances, and found them equally exceptional as the symptoms. " In such cases, dissection does not reveal, so far as

* Op. cit. p. 92.   † Op. cit. p. 151.   ‡ Op. cit. pp. 182, 183.

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."* It was just such a case as this, that first directed Mr. Mackintosh's attention to the subject of puerperal fever. He wrote a very elaborate essay on the subject, and even exceeded Dr. Armstrong in his advocacy of the same principles of treatment,—that is, bold depletion and purgatives. He insisted that puerperal fever and peritonitis were precisely the same disease, the only difference being the greater intensity of peritonitis when it assumes the form of puerperal fever. Even the " peculiar congestive disease" of Dr. Armstrong he considered to be only peritonitis of such intensity as to prostrate the vital powers and to overcome all reaction. The first case of this kind that he met with happened at Woolwich, in 1808. " The unfortunate person was the wife of a soldier in the Royal Artillery . . . . 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 body, there was great tumefaction from flatus; the uterus was ill contracted, but it contained no coagula; and I 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."† This case produced at the time a deep impression on his mind: he considered it as perfectly analogous to venous congestion produced by other causes; by sudden changes of temperature, as taking ice or very cold water when heated; by certain diseases, as yellow fever, dysentery, cholera, beriberri. In all these cases, he quotes evidence to prove that the treatment by bold depletion was essential to relieve the congestion and the oppression of the disease, and hence infers that the congestive form of puerperal fever should be

* Op. cit. p. 184.   † Mackintosh's Treatise, p. 34.

relieved in the same manner. In his reasoning, however, he seems very like one *litem cum lite resolvens.* The treatment of the collapse of cholera and yellow fever by depletion is just as warmly disputed as this treatment in puerperal fever. The argument that the collapsed stage of cholera and Armstrong's "congestive disease" agree in being inflammations in their climax of intensity to be relieved by bold depletion, falls to the ground when submitted to the test of experience. The treatment of cholera by depletion and by large doses of calomel had been brought forward with the same energy, and supported by the same arguments, as Dr. Mackintosh advanced for puerperal fever, but it was soon found to be a most fatal practice, and has long since been given up. The same, I believe, applies to yellow fever; and hence these parallel diseases give no support to the theory that the form of puerperal fever described by Armstrong is only peritonitis in its highest degree of intensity. Dr. Mackintosh's views of treatment met with a warm opponent in the late Dr. Hamilton, a controversy of course springing up, and, as in too many instances, a discussion commenced with arguments finished amid the personalities of a dispute. Dr. Mackintosh's essay was published in 1822; and, consequently, forms the last link in the chain of experience that connects the researches of Dr. John Clarke with those of Dr. Gooch.

From 1792 to 1822, a period of thirty years, the doctrines and practice of Gordon, Hey, Armstrong, and Mackintosh, more or less prevailed, 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 was appointed physician to the Westminster (the General) Lying-in Hospital in 1812, and had ample opportunities of observing the diseases of lying-in women among the poor of London and its neighbourhood. He remarked how much more healthy the hospital was at one time than another, and that at particularly unhealthy seasons numerous cases of decided puerperal fever presented themselves. The disease generally began very suddenly, and he soon found that he had to deal with a very fatal one. When he saw the patient after it had been going on two or three days (which was no unusual circumstance among the out-patients) he seldom or never saved them. Within the hospital he saw it

earlier; and, when the patient was seen soon after the attack, he found a different—a more inflammatory group of symptoms. He therefore resorted to general bleeding and purging, " 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."* By the treatment of Dr. Gordon, Dr. Gooch found that, provided he saw the patient within a few hours of the attack, he could generally arrest the disease. " Thus, the conclusion to which I came was, that the puerperal fever which prevailed on several occasions between 1812 and 1820 was a fever attended by acute inflammation of the peritoneum; that the inflammatory stage was often very short, soon terminating in great and irremedial effusion into the peritoneum; that the disease was curable only in the inflammatory stage by active bleeding and purging; and that, although it was difficult to draw the line, and say where the inflammatory stage terminated in that of effusion, because it differed in length in different cases, yet that it was often incredibly short, and that the treatment had not a fair chance of success unless begun during the early hours of the disease. Thus my experience agreed in all the principal points with that which had been so forcibly stated to the public by Dr. Armstrong and Dr. Hey."†

However, notwithstanding his strong convictions in favour of their practice, cases afterwards came under his notice that excited his suspicions that, at least, there were some exceptions to bleeding and purging. The first was an hysterical lady, who got a dose of salts and senna on the second day after her delivery. She was attacked with a violent diarrhœa, followed by pain and tenderness over the abdomen. Her medical attendant insisted on bleeding her, which Dr. Gooch with much difficulty prevented. Fomentations and Dover's powder, ten grains every four hours, relieved the symptoms, and she recovered. This case was not exactly puerperal fever, although somewhat allied to it. Several other cases afterwards occurred to him of a similar undecided character, but resembling puerperal fever sufficiently closely to be mistaken by a practitioner of average observation. In all these cases depletion and purging were highly injurious; opiates and fomentations were the most serviceable. In the winter of 1824 puerperal fever was prevalent and fatal in London and its neighbourhood,

* Gooch, p. 44.   † Ibid. p. 60.

and Dr. Gooch saw the disease repeatedly in consultation. Like Dr. Gordon, he found the pestilence fastening upon some unfortunate practitioner and ruining his reputation; but the character of the disease was altogether different from what he had before observed. The first case (Case IX.) showed its symptoms the day after delivery. " She was found complaining of considerable pain in the abdomen, great tenderness, oppression at the præcordia, and difficult breathing. The pulse was rapid; but the most remarkable symytom was immense distension of the abdomen."* She was not bled: a gentle purge was given, and afterwards opiates, but she died on the third day. " The body was opened the next day. The intestines were found enormously distended with air; but in the peritoneum there was neither redness, adhesion, nor effusion of any kind. The second case (Case X.) was more conclusive. After a common labour of the fourth child, the patient, on the evening of the third day, was found to have a diffused pain and tenderness of the belly, with a pulse of 140, *not weak.*" The symptoms had not lasted six hours; the bowels had been emptied by a purgative; fourteen ounces of blood were taken away immediately, and two grains of calomel, with five of compound powder of ipecacuanha, were given every four hours. She was again bled, and relieved by the abstraction of ten ounces more blood. The next day she was not so well, and died on the third day. " There was neither redness nor adhesion of the peritoneum, nor effusion of any kind into its cavity."

These cases Dr. Gooch saw in consultation; but he relates one interesting case (Case XIII.) that he saw from the beginning to the end of the attack. 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 the diffused pain and tenderness of the abdomen, with a rapid pulse; she could neither turn in the 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:

* Gooch, p. 73.

" the prevalent state of medical opinion on the subject determined us to use it."*   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.   She became much worse, and died in less than forty-eight hours from the commencement of her symptoms.   " In all these cases (Dr. Gooch remarks) 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 hour by hour, and then died."†   Dr. Gooch quotes the experience of Mr. Dalrymple, of Norwich, as being similar to his own, and also that of Mr. J. A. Hingeston, resident house-surgeon to the Westminster Lying-in Hospital, who kept a journal of cases, which were afterwards published.‡   " These cases were all 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 till 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 had subsided."§   In one case of a more inflammatory character, depletion to twenty ounces were drawn from the arm, and mercury was given.   " After the bleeding she had frequent fainting for several hours, and life was reduced to a low ebb. . . . . A striking contrast this (Dr. Gooch observes) to the way in which bleeding to double the extent was borne in the puerperal fevers from 1810 to 1820."

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* Gooch, p. 78.   † Ibid. p. 80.
‡ Medical Gazette, No. XI.   § Gooch, p. 82.

LECTURE XXX.

HISTORY OF PUERPERAL FEVER, CONTINUED.

Dr. Ferguson's Account of the Fever of 1827-1828 to 1838.—Dr. Copland's Description of the Fever of 1823 in the Queen Charlotte's Lying-in Hospital.—His Treatment of it.—Views of Dance, Tonnellé, and the French Authors.—Dr. R. Lee's Experience of Puerperal Fever between 1827 and 1832.—Dr. Collin's Account of the Fever in the Dublin Lying-in Hospital, from 1826 to 1829.—His Prophylactic Measures.—Disappearance of the Malady.—Great Diminution of Mortality during the years 1830-31-32-33.—Cause of the Return of the Fever in 1834.—Its re-appearance in 1835.

DR. Gooch's interesting paper on peritoneal fevers met with an able expositor in Dr. Ferguson, who has published a most valuable essay on puerperal fever, that will aid us considerably in unravelling some of the knotty points of this entangled subject. He has fully confirmed the truth of Dr. Gooch's accurate observation, that this disease, so far as it can be recognised by its symptoms, or even by its post-mortem appearances, is by no means uniform.   That if we consider the treatment of a disease the test of our accuracy as to its character, a fever will sometimes occur (and it has been observed both by Drs. Gooch and Ferguson) that presents many of the leading symptoms of that described by Gordon, Hey, and Armstrong, that produces precisely the same post-mortem appearances, and yet cannot be treated in the same way.   Gooch met with an epidemic fever that was attended with diffused pain and tenderness of the abdomen, which became quite tympanitic; a rapid pulse, and laboured respiration, that was arrested only by Dover's powder and local fomentations.   Dr. Ferguson describes the same:—" 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

Lying-in Hospital, with whom it obtained the name of 'false peritonitis.'"* Its epidemic character is shewn from the fact that, " in the epidemic winter of 1827-28, this form was so prevalent along the banks of the Thames, that, being worn out with the 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 to 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."† This obvious difference led Dr. Ferguson to examine more carefully the varieties that this disease exhibited, and he divides them into four classes—1st, The peritoneal form; 2nd, the gastro-enteric; 3rd, the nervous; and 4th the complicated. He makes a more important step towards the elucidation of the subject in his attempt to shew that all these varieties spring from one source and cause. Dr. Ferguson's views of causation are embodied 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 child-birth. 3. The various forms of puerperal fever depend on this one cause, and may readily be deduced from it. Dr. Ferguson has given the details of a large number of cases in support of his views, and also in a tabular form, the leading particulars of 205 cases that came under his notice between the years 1827 and 1838. Of these sixty-eight died, or one in three. The periods thus included, however, were not all epidemic years. In some the disease was sporadic, and therefore much milder in its character; while in others (especially 1838) it was exceedingly fatal. Dr. Ferguson observes—" The malady commenced in January, in which month Dr. Rigby saved only one out of nine. The hospital was closed for a month, and opened again in March, when he succeeded in rescuing only two in eight. Thinking that another mode of treatment might be more successful, I determined to bleed largely and to salivate. This plan was fairly tried under the constant attendance of Dr. Cape, and with my supervision, but three only in nine lived. Seeing that no treatment was of avail, the hospital was closed from May till

* Ferguson on Puerperal Fever, p. 11. † Ibid, p. 16.

November. I may add that the present year, 1838, has exercised an exceedingly fatal influence in every species of fever, all of which were of the low or typhoid fever."* This evidence, in addition to what we have already related, proves the pestilential character of puerperal fever,—a malignity that has baffled the most distinguished practitioners, even William Hunter himself.

Dr. Gooch found that, " in the winter of 1824, puerperal fever was prevalent and fatal in London and its neighbourhood. I had resigned my office at the Westminster Lying-in Hospital, and did not know, or do not remember, what was going on there."† In his consultation-practice, however, he soon discovered the impropriety of depletion and purging. Dr. Copland supplies the experience that Dr. Gooch required. He was appointed consulting physician to the Queen Charlotte's Lying-in Hospital in 1823, and describes, in a letter to Dr. Ferguson, the disease that soon afterwards broke out there, and was scourging that, and I presume other metropolitan lying-in hospitals:—" The disease was most malignant, and often ran its fatal course within 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; the 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 the other abdominal organs, and even in the heart itself."‡ 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,

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* Ferguson on Puerperal Fever, p. 277.　　　　† Gooch, p. 71.
‡ Ferguson, p. 284.

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 about half an ounce of spirits of turpentine, and an equal quantity of castor-oil, were 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 or triple quantities 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 subsequently 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. During the two months I treated about thirty cases, and only two died, one of the two having refused to take medicine."* In the years 1826-27 Dr. Copland met with a different disease. "The cases which occurred were less malignant, and commenced very differently,—with less violence and malignity, more insidiously, and often in the uterus, and thence extending to the peritoneum."† It seemed to be the fever described by Dr. Copland, in his valuable Dictionary of Medicine, as the "synochoid puerperal fever,"—the link that connects the inflammatory and the malignant forms of the disease. The prominent symptoms of synochoid fever were sometimes those of metritis, more frequently metro-peritonitis, occasionally peritonitis alone, and very often uterine phlebitis." With regard to treatment, Dr. Copland found, that, " whether this form of the disease originate in the uterus or the uterine vessels, or in the uterine appendages,

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* Op. cit. p. 287.   † Op. cit. p. 288.

or in the peritoneum, as shewn both here and in other places to be probably the case in many instances, or whether it proceed from a constitutional infection, received through the avenue of the respiratory organs, the local affection or affections being secondary or contingent as contended for in respect of other instances, *there is certainly no remedy so efficacious as a decided and judicious use of spirits of turpentine.*"* This remedy was first proposed by Dr. Brenan, of Dublin, had been treated with too much neglect, and has now found a warm and able advocate in Dr. Copland.

Thus far, in our history, we have spoken of puerperal fever as an essential disease, varying in its character and most destructive in its results. It was considered to be the primary source of the different morbid alterations in the tissues that post-mortem inspections revealed. We have now, however, to present a different view of this subject,—to consider the group of symptoms that constitute the disease as the effect, not the cause of the local derangement. We can no longer speak of them as " peritoneal fever," but as fever symptomatic of peritonitis: we are to discard the term "typhoid or adynamic fever," and look into the veins and absorbents for the inflammation that these asthenic symptoms indicate. Among the improvements in medical science nothing has been more remarkable than the rapid advance of pathology. The precision that it has given to our knowledge of disorders previously but obscurely guessed at, has tended to make pathology the basis of all medical reasoning upon the nature of diseases; and hence the physician, in his order of causation, does not proceed from symptoms to post-mortem appearances, but conversely looks among morbid lesions for the true interpretation of the symptoms. In this mode of reasoning it must, however, 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 wandering of Broussais with regard to fever, will sufficiently illustrate our meaning. Dance, Tonnellé, Duges, and we might say generally the French school, have viewed puerperal fever as being only symptomatic of some previous inflammation existing in some one or other of the uterine tissues. Tonnellé especially has taken great pains to point out from post-mortem inspections (he made **222** dissections)

* Copland's Dictionary of Practical Medicine, part iv. vol. iii. p. 534.

the comparative frequency of the different morbid lesions. He found the following results from his inquiries in the dead-room:—

Alterations of the uterus and appendages . . . 197
Peritonitis 193
Combined lesions of uterus and peritoneum . . 165
Peritoneum alone affected   28
Uterus alone   29

He gives fuller and more accurate details of the several lesions, and from collective tables infers, " That the uterus is more frequently attacked than the peritoneum by a slight excess in relative numbers. 2. That these two lesions are mostly combined. 3. That each in turn may fail. 4. That in 222 cases pus was found in the vessels 134 times." The term " puerperal fever" is therefore discarded, and all the varieties which this disease presents is attributed either to metritis or to peritonitis, metroperitonitis or to uterine phlebitis. Dr. Robert Lee is a disciple of the French school. He thus relates his experience of puerperal fever between 1827 and 1832:—" From the 1st January, 1827, to the 1st October, 1832, one hundred and seventy-two cases of well-marked puerperal fever came under my immediate observation in private practice and in the British Lying-in Hospital, and other public institutions in the western districts of London. The symptoms and progress of these cases were watched with close attention. The effects of the different remedies employed were observed; and, where death took place, I carefully examined the alterations of structure in the uterine and other organs. Of 56 cases which proved fatal, the bodies of 45 were examined, and in all were found some morbid change decidedly the effect of inflammation, either in the peritoneal coat of the uterus or uterine appendages, in the muscular tissue, in the veins, or in the absorbents of the uterus, accounting in a most satisfactory manner for the constitutional disturbance observed during life. The peritoneum and uterine appendages were found inflamed in 32 cases; in 24 there were uterine phlebitis; in 10 there was inflammation and softening of the muscular tissue of the uterus; and in 4 the absorbents were filled with pus. These observations are therefore subversive of the *general opinion now prevalent*, that there is a specific, essential, or idiopathic fever which attacks puerperal women, and which may arise indepen-

dent of any local affection in the uterine organs, and even prove fatal without leaving any perceptible change in the organisation of their different textures. As the constitutional symptoms thus appear to derive their origin from a local cause, it would certainly be more philosophical, and more consistent with the principles of nosological arrangement, to banish entirely from medical nomenclature the terms ' puerperal or childbed fever,' and to substitute that of uterine inflammation, or inflammation of the uterus and its appendages, in puerperal women. Puerperal peritonitis and peritoneal fever are terms not less objectionable than puerperal fever, for in many fatal cases there is no proof whatever of the existence of any morbid affection of the peritoneum."* Dr. Lee consequently sets aside all such terms, and only describes "inflammation of the uterine system in puerperal women;" and, inasmuch as, " like inflammation of other organs of the body, that of the uterus varies greatly in severity in different cases." Dr. Lee varies his treatment accordingly. " At particular periods I have remarked a disposition to the disease in some puerperal women, evinced by tenderness of the uterus and acceleration of the pulse; but, where it has taken place in so slight a degree as to yield readily to the exhibition of opiates and the application of fomentations and cataplasms to the hypogastrium;"† but in other cases, " when the symptoms of puerperal peritonitis manifest themselves as before described, in a *violent* form, twenty or twenty-four ounces of blood should be immediately taken from the arm by a large orifice, while the patient has the trunk and shoulders considerably elevated in bed. We should not be deterred from employing the lancet because the pulse is small and contracted, provided it does not exceed 110 or 115 pulsations in the minute . . . . The venesection should be followed, without loss of time, by the application of one, two, or three dozen of leeches to the hypogastrium, proportioning their number to the urgency of the symptoms. When the leeches have come off, the bleeding should be promoted by warm fomentations, or by a thin warm linseed-meal poultice applied to the hypogastrium. . . . . . . At the same time eight or ten grains of calomel in combination with five grains of antimonial powder and gr. j. or gr. ij. of opium, or with ten grains of Dover's powder. should be administered, and this should be repeated every three or four hours until the

* Lee's Diseases of Women, p. 34. † Op. cit. p. 101.

symptoms begin to subside."* Dr. Lee has given in a tabular form, the report of 100 cases of uterine inflammation in puerperal women, which occurred from March, 1827, to May, 1831. Of these cases forty died, or in the proportion of one in two and a half; but it is remarkable that fifteen of them occurred in the British Lying-in Hospital, and ten died— just two-thirds. It will be observed that Dr. Lee has found the practice of Gordon, Hey, and Armstrong, of considerable service in puerperal fever when the peritoneum was chiefly attacked by the disease; but at the same time he admits that there are exceptions even to this rule of treatment. " In no inflammatory affection of the internal organs are the good effects of blood-letting, general and local, more strikingly displayed than in puerperal peritonitis; but the results of my experience do not confirm the accuracy of the opinion that in *all* cases, by the employment of these means, we can always succeed in arresting the progress of the disease, which is always attended with the greatest danger, and not unfrequently runs its course to a fatal termination in spite of the most prompt and copious depletion, and the application of other remedies.†

Having given in outline a history of this disease from 1746 to 1832, and pointed out the opinions and treatment of those who have given the most attention to this fatal malady, I shall conclude this part of our subject with some account of my own experience respecting it, as it occurred in the Dublin Lying-in Hospital, where its true characters could be best observed, and were least likely to be mistaken. The experience, however, of Dr. Collins must precede mine. Dr. Collins had been master of that institution from 1826 to 1833, and during the first three of these seven years puerperal fever was rife. Eighty-eight patients were seized with the disease: thirty-two recovered, and fifty-six died. In his observations of this disorder, Dr. Collins soon found that " the extreme difference of opinion, and the very opposite measures recommended by practitioners, arise chiefly from their treating every variety of puerperal fever as one and the same disease; whereas there is, perhaps, not any other which exhibits a greater diversity of character in different situations, and even in the same situation at different periods. In some the fever is accompanied by symptoms indicative of the most active inflam-

* Op. cit. p. 103.   † Lee's Lectures, p. 564.

mation, such as forbid the least delay in the free use of venesection, and the decided employment of antiphlogistic measures. This form of disease, which is by far the most manageable, is generally met with in private practice. Puerperal fever, when epidemic in hospital, is directly the reverse; at least, in four epidemics which I have witnessed, the symptoms were usually of the lowest typhoid description, the pulse being so feeble and indistinct as to make you dread in many even the application of leeches; the patients in several instances of this form of disease exhibiting somewhat the appearance of those labouring under cholera."* In such cases as these, resembling the congestive disease of Armstrong, and the intense peritonitis of Dr. Mackintosh, Dr. Collins found depletion anything but a judicious practice. He observes— " When I was assistant-physician in 1823, puerperal fever raged to an alarming extent. The master of the hospital, at the commencement of the attack, was a strong advocate for the removal of blood *generally*. With his approbation it was resorted to with great frequency, and in the *promptest manner*. The effect on the patient and the mortality was such as to satisfy me fully of the inexpediency of adopting this line of treatment."† The years 1822 and 1823 were those in which the treatment of Armstrong prevailed in London, and the period when the controversy between Hamilton and Mackintosh in Edinburgh raged in its highest fury. You will not, therefore, be surprised that they could not agree, and that the treatment by a bold depletion, which Mackintosh found to be so successful in *private* practice, Hamilton dare not adopt in his *hospital* practice. It is probable that the cases each had to treat were totally different. The treatment of Dr. Collins consisted in a dose of castor oil and turpentine, half an ounce of each, " when the attack seemed threatening. . . . . In some cases, where the bowels had been tardy previous to the attack, we gave twice the quantity mentioned. Where the state of the patient was such as to encourage bleeding, we used the lancet. I am satisfied, however, that in *hospital* the immediate application of three or four dozen leeches, followed by the warm bath, in which the patient should remain as long as her strength will bear it, will be found in the great majority the most judicious means of removing blood." This was followed by hot fomentations frequently repeated. " The frequent use of the

* Collins' Practical Observations, p. 391.   † Op. cit. p. 392.

bath, when thus managed, and the constant application of flannels (fomentations) as above mentioned, are of great utility." Dr. Collins then endeavoured to bring the patient as speedily as possible under the influence of mercury, but found that " to accomplish this in the low species of fever was *extremely difficult* in almost every instance, and in many impracticable, the system appearing to resist its effects in every form and quantity. In general, I ordered four grains of calomel with as much ipecacuanha powder to be given every second, third, or fourth hour. This combination I found, after the *most extensive trial*, to excite less uneasiness, and act with better effect and speed, than any other with which I am acquainted." When ipecacuanha sickened, calomel and opium were substituted, but this was seldom necessary. " The ipecacuanha, when it does not sicken, seems to have the best effect in preventing calomel exciting irritation in the bowels and producing moisture over the surface. The quantity of calomel and ipecacuanha taken in this way in many instances was very great, to the amount of three, four, five hundred grains, or upwards. With some, in order to hasten its effects on the system, friction with strong mercurial ointment was diligently employed, and the blistered surfaces dressed with the same."* Dr. Collins sometimes gave scruple doses of calomel with no better effect than small doses, and found that even salivation by no means insured the recovery of the patient. He thus sums up the result of his experience:—" The result of my observations upon the treatment of puerperal fever is, that general bleeding, except when there is a strong full pulse, and the symptoms are of a highly inflammatory character, is injurious. On the contrary, local depletion, by the application of three or four dozen leeches, followed by the warm bath and stuping (fomenting), all of which should be repeated according to circumstances, as often as the strength will permit, seemed most beneficial. These means, together with the active employment of calomel conjoined with hippo (ipecacuanha) or opium, aided by mercurial frictions, offer the best prospect of relief. Blistering the entire abdomen, *after* leeching had been pushed as far as it could be, was found service-able. In some instances, the debility from the very commence-ment was so excessive, as to induce us to apply the blister at once, using calomel and stimulants at the same time."† The

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* Op. cit. p. 395.   † Op. cit. p. 396-7.

most important part, however, of Dr. Collins's treatment was prophylactic. He assumed it to be an endemic disease communicable by infection, and therefore put in force the most rigid measures to secure perfect cleanliness in the wards of the hospital; each, in its turn, was kept empty for a fortnight, fumigated with chlorine, washed with lime, and the beds changed before new patients were admitted: every suspicious case of fever or erysipelas was carefully excluded; and by this watchfulness, aided by a very efficient mode of ventilation, the disease diminished every year until it had disappeared; and during the last four years, from 1829 to 1833, the hospital was quite free from it.

I had been appointed assistant-physician in November, 1832, and therefore had the fullest opportunity of observing the strictness with which these sanitary measures were carried out. I can testify, also, to their effect in the success of Dr. Collins's practice. In the year 1833, the last year of Dr. Collins's superintendence, 2,138 women were delivered in the Dublin Lying-in Hospital, and of these only 12 died,—being about 1 in 178 cases. To place this question in a clearer light, I shall place before you, in a statistical form, a review of the whole period of his mastership, giving you the state of the hospital before his appointment, and when it expired:—

Year.	Women delivered.	Deaths.	Proportion, one in	Year.	Women delivered.	Deaths.	Proportion, one in
1826	2440	81	30 nearly.	1830	2288	12	190 nearly.
1827	2550	33	87 ,,	1831	2176	12	181 ,,
1828	2856	43	66 ,,	1832	2242	12	187 ,,
1829	2141	34	63 ,,	1833	2138	12	178 ,,
	9987	191	52 ,,		8844	48	184 ,,

You will perceive that the highest number of deaths (81) happened in the year 1826, being in the proportion of 1 in 30 cases, —a mortality which, although severe, is still much less than that of Paris or Vienna. The total proportionate mortality during the four years that the puerperal fever lasted, was 1 in 52 cases; but in 1829 Dr. Collins carried out his sanitary measures: puerperal fever disappeared, and the number of deaths at once diminished to 1 in 190, 181, 187, 178, or, of the total number, 1 in 184 cases; thus proving that, if hospitals can be kept free from this pestilence, the mortality may be less than in out-door

practice: it also shows the success of Dr. Collins's general treatment, which on more than one occasion has been severely attacked.

In 1833, there was no puerperal fever in the Dublin Lying-in Hospital; but among the post-partum seizures of the patients three cases came under my notice, to which I shall have again to refer: one was a case of peritonitis, another of erysipelas, and a third of low fever, with sero-purulent effusion into the peritoneum, and a putrid uterus. In 1834, the fever appeared in August, introduced in the following manner:—Typhus fever then prevailed in Dublin, and two women were unfortunately admitted, being in the first stage of the attack. As soon as it was possible to do so with safety, they were transferred to the proper fever hospital, but too late to save the lying-in hospital from contamination. A case occurred on the day after their admission, August 19, presenting symptoms of acute puerperal mania, which died in about four days. In this case the peritoneum was softened, and contained sero-purulent fluid, although no prominent symptoms of peritonitis showed themselves. This obscure case excited alarm, and with justice; for in ten days afterwards the fever burst out in its full force. A patient was seized with rigors, violent stitches through the sides, tympanitic distension of the abdomen, extreme pains in epigastrium, and general prostration: she died in thirty hours. The day after, the woman in the next bed exhibited symptoms of uterine phlebitis, with erysipelas of the vagina, extending over the right buttock. Another in the same ward had peritonitis, but the attack was milder, and she escaped. The pestilence then flew to a distant ward in another part of the building, and patient after patient was sacrificed. It now became general through the hospital, and all further admissions were prohibited. About 26 women were attacked, and of these 16 died. The fever continued more or less until November, when it disappeared for a time. The manner of its incursion, and the general characters of the disease, made a strong impression on my mind, and satisfied me that we had to deal with a malady of a very different character from any that had been before observed, or from the ordinary affections of parturient females. The hospital seemed to be approaching a condition to favour the production of an endemic disorder; patients did not recover quite so favourably; and in the beginning of the month of August, just

before the attack, some women who had rather severe labours, were seized with erysipelatous inflammation, and extensive sloughing of the vagina. The last case, also, that occurred in November, was a case of diffuse inflammation. It seemed to me, therefore, that erysipelas was its companion, or rather its attendant: it was the harbinger of its approach, the last trace of its presence; and although the two diseases (if I am correct in dividing them) sometimes were found to co-exist, yet when the fever was at its highest intensity erysipelas was absent. The first cases attacked were struck down at once. The first stage of the disease seems to merge immediately into the second, a rapid pulse (140 to 160), cold surface, livid expression, clean tongue, with a bluish hue in its centre, a perfect apathy or indifference, if not dislike to the child, a very slight tenderness of the abdomen, with or without tympanitis, a laboured respiration and great thirst, were the only urgent symptoms. All these combined to characterise the highest intensity of the fever. Having seen a large number of cases of cholera in 1832, the resemblance between these cases and the collapsed stage of cholera was most remarkable. In one case, there was no sero-purulent effusion, nor any evidence of those morbid changes we attribute to peritonitis: there was simply venous congestion, giving the intestines a livid aspect, and distending the larger veins considerably. In another a dusky serum was effused, and the uterus so infiltrated that it was like a wet sponge: there was also considerable serous infiltration beneath the pelvic peritoneum, which, when cut into, was like a mass of soft jelly. In a third case, there were the usual sero-purulent effusion in the peritoneum, and pus in the uterine veins and absorbents, and yet, during life, no tenderness or swelling of the abdomen.

In another class of cases, which were much the most numerous, all the symptoms of peritonitis were present. Generally on the second day after delivery, but sometimes within 24 hours, the patient was seized with a severe rigor, followed or not by perspiration; the pulse varied from 120 to 140; the tongue was clean or covered with a creamy fur; the countenance collapsed rather than anxious, and exceedingly expressive of the malady; there was generally, but not always, vomiting. Tenderness commenced in the region of the uterus, which soon spread over the peritoneum; the abdomen became distended, and then the patient's

sufferings in truth commenced: respiration was most painful; every effort to inspire was accompanied by shooting pains through the ribs, and were especially severe at the scrobiculus cordis; the skin became hot and dry; the patient lay on her back with the knees drawn up; the lochia were sometimes arrested, but often not so. This state would last perhaps twelve hours, when the last stage supervened, the pulse beyond counting; the extremities cold; vomiting without effort; the pain of the abdomen gone; some slight wandering, and death. In a third variety, the patient had also a severe rigor, but always followed by profuse perspiration: some pain in the region of the uterus generally preceded the rigor: this pain often changed its seat from the right to the left iliac region and back again; the abdomen was not at first engaged, but was soft and free from pain; there was usually vomiting and diarrhœa; motions green; the lochia was not arrested, but often very offensive. The countenance from the beginning had the usual collapsed expression, but more listless; the tongue was dry, brown, and furred; the patient wandered, and sometimes she lay in a delirium, muttering to herself, just as in typhus fever; but this seldom happened; the intellect was usually clear enough to answer questions; but when left alone the patient seemed quite unconscious. Sometimes an evidence of what was going on showed itself on the surface in a local inflammation. A diffused dusky redness of the buttock, or inside the thigh, or on the instep, appeared. One patient had paralysis of the right hand, which came on in the course of the night without any apparent cause: the hand swelled up, and about the wrist was the diffused redness. In these cases, purulent deposits were occasionally found at the back of the orbit. In the post-mortem inspections of the former class of cases, the uterus was frequently unaffected, while the peritoneum contained sero-purulent effusion: in these, however, the uterine veins, and sometimes the absorbents, were filled with pus. In one case the sinuses were coated with a layer of pasty lymph, and so filled with pus that a section of the uterus resembled more a phthisical lung than anything else, when it is studded over with small aggregated tubercles in a state of softening.

In a fourth class of cases, which became more numerous towards the conclusion of the attack, the rigor occurred on the third or on the fourth day, and sometimes was absent; there were the

same pains about the ribs and epigastrium; the same tension of the abdomen, but less in degree; respiration was easier; the agonising pains were absent, but a general diffused tenderness of the abdomen remained; there was some vomiting; the lochia were not altered, and milk sometimes secreted; the pulse was usually 120, and more resisting than in the former cases; the countenance was not so collapsed, but more anxious. Altogether they seemed to be less under the influence of the disease, and were much more amenable to treatment. These cases generally recovered. In all instances, from the beginning to the end of the visitation, a peculiar odour was observable about the patients that was very characteristic: it was a faint acid, almost cadaverous smell, that attracted attention even before the leading symptoms presented themselves.

In consequence of the fatality of the disease in one ward (No. 11), it was closed altogether in October 1834, and not re-opened until January 1835. The very first case then admitted was seized with puerperal fever, and died in sixty hours: thus it again returned, and continued for some time in the beginning of 1835. Unfortunately I have lost the notes of these cases, and therefore can give you no accurate information about them. Speaking from recollection, the general appearances and character of the fever was very similar to the attack in the previous year. Patients were seized quite irrespective of their labour, the only difference being, that unmarried women, those who had causes of mental despondency, or those that were submitted to any, the most trifling operations, were sure to be selected, while healthy women, who had no cause of anxiety, generally escaped, or were able to resist the attack. In some of the worst cases, a most deceitful rally sometimes took place a few hours before death. One patient, with a rapid tremulous pulse, cold surface, and cadaverous countenance, suddenly burst out into a profuse perspiration; her cheeks became suffused as in blushing; the pulse full and regular, but still beating at the former rate, 160, and easily compressed; no pain was felt anywhere, and a momentary gleam of hope lighted up her countenance: it soon, however, faded, she sunk into her former state, and died soon afterwards. The treatment of these cases was conducted on the same principle as that adopted by Dr. Collins. As to its effects in cases of the first class, I might say with William Hunter, no matter what was

done, they died.   The second and third varieties were somewhat
more within reach of treatment, and patients who had strong
constitutions, and cheerful dispositions, recovered, while those of
an opposite temperament sunk.   The fourth class of patients were
generally saved.   The post-mortem appearances we shall have
to allude to more particularly in another lecture.   It is worthy
of observation, that in the year 1835, when the fever was
absent, erysipelas seems to have remained behind; cases of severe
labour were more exposed to inflammation of this character; the
patients generally recovered, although extensive sloughs of the
vagina sometimes took place.   The mortality of the hospital in
the years 1834 and 1835 was nearly trebled.

Year.	Total cases delivered.	Deaths.	Proportion one in
1834	2025	34	60 nearly.
1835	1902	33	56 „

Since then, epidemic attacks of puerperal fever have fallen
under my notice in London, the symptoms of which were chiefly
those of peritonitis; but the cases being scattered, it was more
difficult to trace the cause of the attack, or to take a comprehen-
sive view of the course of the disease.

LECTURE XXXI.

PUERPERAL FEVER.

Symptoms of the most intense Form of Puerperal Fever, chiefly those of the second Stage or Stage of Collapse.—Symptoms when the Disease is less intense, the most prominent being those of Peritonitis.—Symptoms of Erysipelas or Diffused Inflammation.—Diseases modified by Puerperal Fever.—Gastro-enteric Fever.—Erysipelas.—Puerperal Mania.—Classification.—The Puerperal Disease.—Erysipelas and Puerperoid Diseases.—Pathological Appearances in the more intense Forms.—Venous Congestion.—Serous Effusion.—Sero-purulent Effusions.—Fibrinous Depositions.—Less intense Forms.—Sero-purulent Effusion, with Adhesive Lymph.—Softening of Tissues.—Of the Peritoneum.—Of the Uterus and Ovaries.—Of the Liver and Spleen.—Morbid Alterations from Erysipelas—Slough of Mucous Membranes.—Depositions of Pus in the Veins.—In the Substance of the Uterus.—In the Ovaries.—In the Inter-muscular Cellular Tissue.—The Joints.—The Orbit.—The Sub-Peritoneal reticulate cellular Tissues.

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 was unavoidable. A brief outline, also, of the treatment adopted by the different distinguished physicians who have given us their experience of it, was also necessary: nevertheless, at the risk of repetition, we must enumerate more precisely the symptoms of this disease, and the morbid changes it produces, in order to determine, if possible, what puerperal fever is, and especially to decide upon what principle 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.

The symptoms, then, 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. Simultaneous with, or subsequent 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: *respiration* 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, the drink 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. I have not observed much alteration in the *lochia;* in some instances it was suppressed at first, and returned again; in others, 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 failing 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 may be accompanied by a 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 which came under my 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 that the majority of these writers confess to be different from the puerperal affections that 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 that the patient is seized

˙seems to exert an important influence. As far as my observation has given me 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 presented symptoms of collapse throughout: the countenance 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 oppressed and hurried from the commencement of the attack, which usually began with twitches in the sides 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 sunk 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 myself 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 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, because 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 consider 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.

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 shrunk 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 lochia 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, the joints, 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 the former disease: the frequent absence of abdominal pain, 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 ileum 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."*   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,—relieved by opium and fomentations; injured by depletion and purgatives: and in which, 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.

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 that, 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 me 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 what is 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

* Ferguson's Essays, p. 11.

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 furred in the centre, and red at the margins and tip. It afterwards grows dry and brown, as in typhus. The skin is dry, hot, and 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, she 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. Pulse 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 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 becoming 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 it became suddenly quite distended. From this time the change was remarkable. The extremities were cold and clammy; the face collapsed, covered with a greasy perspiration; the pulse 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 sunk, 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 along with it there was great congestion of the vessels of the brain; 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. I am 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 was 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 is 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."*

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 inflammation fails, pus circulates with the blood, and a fatal phlebitis is the result. This may happen when no puerperal fever exists, but is sure to occur if that disease be present. The symptoms are of a typhoid character, commencing with rigors that recur from time to time, followed by partial sweats, a dry brown tongue, sallow aspect, incoherency or delirium, subsultus tendinum, fetid lochial discharge, and great prostration; the white swollen limb may exhibit some patch of dusky redness on its surface, or a local inflammation, with deposition of pus, may occur in some other part. Thus far the symptoms indicate phlebitis, but along with these tenderness of the abdomen, tympanitis, vomiting, and diarrhœa, the evacuations being very offensive, and sweats having that peculiar odour we have mentioned, all characterise the epidemic which exerts its fatal influence on this disease.

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, I 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

* Ferguson, p. 25-26.

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 division: *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.

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 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 the same class of cases, the peritoneum is filled very abundantly with sero-purulent fluid: flakes of creamy lymph are found on the intestines, that frequently form a fringe along their margin; the folds are filled with the same, dissolved, and looking like pus; the uterus and liver are frequently covered with it, and the pleura is often found in the same state as the peritoneum. This 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 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 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 lymph 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 de-cided 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, abun-dantly in the lungs; and I have seen an abscess even in the substance of the heart. It is found in the intermuscular cellular structure, aud 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, the odour extremely offen-sive. 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 doubt 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 XXXII.

NATURE OF PUERPERAL FEVER.

Distinct from Puerperal Peritonitis.—In the worst form there may be no Peritonitis.
—Mackintosh's Theory of latent Peritonitis invalid.—Importance of distinguish-
ing the Terms "Puerperal Fever" and "Puerperal Peritonitis."—Equally dis-
tinct from Phlebitis, Metritis, etc.—Cause of the Difference the presence of a
Morbid Poison.—Puerperal Fever obeys the same Laws as other Zymotic Dis-
eases.—It has a definite Action—a Period of Latency.—The Dose varies.—It
observes a Law of Incubation.—Vitiation of the Blood, by a specific Morbid
Poison, by the Cadaveric Poison, by Erysipelas.—Treatment, Prophylactic and
Remedial.—Chlorine.—Principle on which Depletion, Emetics, Purgatives, and
other Antiphlogistics, have their Effect.—Stimulants.—Turpentine.

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 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 peri-
tonitis one and the same disease? If we are able to maintain the
negative of this proposition, and to 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. I hold, then, 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, that 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 is over-heated and given 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 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 develop 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 disappear, and after death the peritoneum 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. 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 for 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.*"*

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

* Armstrong, p. 187.

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 ask me for a diagnostic symptom, I 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.

The morbid appearances, like the symptoms, will admit of a distinction being drawn between them; for instance, 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 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.   I 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.   I 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 I 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 perito-nitis, 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 treat-ment, 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 un-necessarily, and may be the means, perhaps, by injudicious treat-ment, of losing a patient who otherwise might be saved.

If the observations we have made in reference to peritonitis are correct, we may *a fortiori* apply the same line of argument to metritis, phlebitis, and to the inflammation of such of the tissues as are involved in the destructive course of puerperal fever. In-flammation of the veins, however, presents the greatest difficulty in drawing the line of distinction; and for an obvious reason. In both diseases the blood becomes poisoned,—by pus in phlebitis, by a special morbid poison in puerperal fever: the symptoms, therefore, of blood-poisoning are the same in both, and the morbid appearances are very similar; nevertheless, it appears to me that a line may be drawn between them. In phlebitis some of the uterine veins present distinct evidence of being inflamed: they not only contain pus, but their coats are thickened and florid; the inflammation is also confined to certain of them not extending through the uterine veins, but rather passing outwards and involving the hypogastric and pelvic veins. In puerperal fever, the uterine veins, especially in the neighbourhood of the broad ligaments, are very commonly filled with pus, or, at least, with a purulent-looking fluid: 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 between them and the uterine fibres. The same kind of pus is contained in the walls of the uterus, forming small abscesses: the quantity of this fluid varies, but in some instances is very abundant. In the case already alluded to, the whole uterus was so infiltrated as to present the appearance of a phthisical lung. It appears to me, therefore, that although the symptoms and morbid alterations produced by phlebitis have some resemblance to those which are caused by puerperal fever, there is still a sufficient difference not to confound one with the other. It is important, therefore, to use the same strictness in language here as in peritonitis. Puerperal phlebitis and erysipelas are not the same thing. Puerperal phlebitis and puerperal fever are different diseases. To some it may appear as unnecessary refinement to make this distinction between diseases that resemble each other in so many leading points. The question may be asked, what is the essential difference between them? To this I would answer — the essential difference exists in the presence of a new element in puerperal fever, not met with in ordinary inflammation. When simple inflammation affects any of the tissues, a reparative process is set up to circumscribe the disease and to prevent its extension: this is remarkably the case in inflammation of the veins where the diffusion of pus in the circulation causes so much mischief. The moment pus mingles with blood, coagulation takes place: the clot becomes adherent to the sides of the vein, and pus is confined. If this attempt be not successful in the first instance, a second and third effort is made to accomplish the same purpose; and thus along the line of the veins, even to the capillaries, we find circumscribed abscesses formed to get rid of the pus. So also in peritonitis, adhesive lymph is thrown out, uniting the different surfaces, in order to limit the inflammation. But when inflammation attends puerperal fever, the process is altogether destructive of the tissues engaged. In the peritoneum the lymph is not adhesive: the inflammation is never circumscribed, and the peritoneum is softened, sometimes to such a degree as to appear gangrenous. In the womb a similar process of softening takes place, and in the veins pus is diffused without limit, and is found deposited more or less in all the tissues. Thus, then, the essential difference between puerperal peritonitis and puerperal fever,

between puerperal phlebitis and erysipelas, is the same as exists between union and disunion, between building up and taking to pieces, between reparation and destruction. I feel it the more necessary to point out this distinction, because I find some even popular writers still insist upon calling this fatal zymotic disease a simple local inflammation. They describe puerperal fever under the name of peritonitis, phlebitis, etc.

It remains for us to consider what is this new element that is present in puerperal fever. We have already alluded to a special morbid poison. This poison we believe to be the agent which exerts its fatal influence over all the phenomena that are observed in this disease. Assuming such to be the case, puerperal fever forms one of the class of zymotic diseases, and we shall find in it as complete an illustration of the laws of morbid poisons as in any other of these disorders. First, *it is a 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 an 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 the public. Its disappearance was just as sudden and as unexplained as its advent. Such is the manner of its approach and departure in the present day. In this respect, it resembles typhus fever, yellow fever, cholera, and other diseases that are known to be produced by morbid poisons. Again, when the poison is present, the most trifling causes will produce the disease; when it is absent, causes much more exciting have no such effect. *The poison has a certain and definite action.* The poison of typhus acts specially on the glands of the small intestines. Cholera on the whole gastro-intestinal mucous membrane. Influenza on the pulmonary mucous membrane. Scarlatina and measles on the skin. The definite action of puerperal fever seems to be on the serous surfaces. The peritoneum is chiefly engaged, because absorption goes on much more rapidly in that than in other serous membranes. During pregnancy the peritoneum has been gradually stretched to its utmost extent. After delivery it rapidly returns to its original dimensions, and therefore is much more readily exposed to the absorption of any poison. Beside this, the

uterus and vagina are undergoing the same rapid changes, and quickly convey any poison to the serous membrane that is in immediate relation to them. The peritoneum is, therefore, most commonly affected, but the pleura does not always escape, and in a few instances the arachnoid is engaged. *Morbid poisons have a certain period of latency.* So also the symptoms of puerperal fever do not show themselves until a certain period after the absorption of the poison. It is difficult to determine precisely the interval of latency, because it is not easy to decide in all cases when absorption took place; but if we take as examples the instances in which it seems to have been directly communicated at the time of delivery, forty-eight hours seems to be the period which the disease takes to develop itself. *The dose of the poison varies.* This law will assist us considerably in removing some of the difficulties that surround this subject. If the dose of a poison be excessive, its specific action may not be exhibited. Thus the mineral poison, arsenic, that acts so violently on the mucous membrane, may destroy without a single symptom of inflammation during life, or a single morbid appearance after death, if the dose be so excessive as to paralyse the nervous function. It is well known that a patient may fall prostrate from the typhus poison, and present no other morbid change than cerebral congestion: so, in puerperal fever, patients have been promptly killed by it without producing any alteration in the tissues; the veins, as in the former case, being alone distended. It is not necessary, therefore, to assume that Armstrong's " congestive disease " must be a latent peritonitis in order to explain these appearances. When the dose of the poison is not so intense, the specific form of inflammation becomes manifest, in which excessive effusion of serum and non-plastic lymph, with softening of the tissues, form the characteristic features. Lastly, the dose may be such that the constitution has the power to throw it off, and the patient will recover; or, if death take place, evidences of true inflammation will be observed mixed up with the special effects of the disease. *The law of incubation is the same in puerperal fever as in certain other zymotic disorders.* The same causes that generate typhus fever, imperfect ventilation, foul air, an epidemic constitution of the atmosphere, will produce puerperal fever; but besides this, the direct absorption of putrid matter

will do so. Drs. Routh and Arneth* have pointed out the effect of cadaverous effluvia in exciting and increasing to a frightful extent this fatal malady. Those who are in the habit of dissecting, know how difficult it is to remove the smell of the dead body from the hands. They may be washed again and again, and yet the smell remains: this proves the tenacity of the effluvia. These physicians have shown 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 cases of labour. They did not use sufficient precaution to prevent contamination, and puerperal fever was the result. I have been informed by Dr. Routh that the same effect was observed in one of the Paris hospitals, but produced in a different manner. The hospital is situated near one of the great abattoirs, and the presence or absence of puerperal fever depends almost on the point from which the wind blows. The hospital is safe so long as its direction is towards the abattoir; but when the current is reversed, and the cadaveric effluvia is blown over the hospital, then puerperal fever begins. From these facts, it will be admitted that puerperal fever is the result of the absorption of a morbid poison. The phenomena sometimes exhibited also prove that the poison and consequent fever may be present without any local inflammation; and hence we must infer, that the inflammations observed are secondary: that being caused by the operation of a poison, they are of a specific character, and therefore differ totally from inflammations of the same structures that are not produced by vitiation of the blood. We are indebted to Dr. Ferguson for a very able chain of proofs which demonstrate 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 of vitiated blood, and are readily deducible from it." The causes that vitiate the blood we believe to be various. One of them, and the leading cause, is the specific morbid poison to which we have alluded, which will act quite independently of local causes. Another is the cadaveric poison, which includes the absorption of putrid matter from whatever source it may be derived. A third cause of vitiation is the poison of erysipelas:

* Med. Chir. Trans., vol. xxxii. Monthly Journal of Med. Science, June, 1851.

we know that two morbid poisons may coexist and be in operation at the same time, yet cannot be considered identical. Thus typhus fever and erysipelas frequently go together: measles and scarlatina often accompany each other. So it may be, that while the poison of puerperal fever is acting chiefly on the serous membranes, we find the poison of erysipelas also pursuing its definite course on the skin, cellular tissues, and veins. These several poisons may each vitiate the blood and produce the variety of symptoms that are met with in this disease, and are classified into forms and varieties of puerperal fever.

The treatment of puerperal fever must be considered in reference to the views of the malady which we have placed before you. It divides itself into two questions. First, the prophylactic treatment,—the means of preventing the diffusion of the poison. In discussing this question I shall not draw you into the perplexities of contagion or non-contagion, which have been quite as warmly debated in puerperal fever as in cholera. I must ask you to assume with me that it is contagious, not only because of many stubborn facts that cannot otherwise be explained, but because it is the safer view for you to take. If it be not contagious, any precautions you take may be unnecessary, but they can do no harm: on the other hand, if it be contagious, the neglect of such means of prevention would do infinite mischief. We have already alluded to the rapid diminution and ultimate disappearance of puerperal fever in the Dublin Lying-in Hospital, when Dr. Collins put into force active sanatory measures. The chief agent employed by him was chlorine. Dr. Routh gives an interesting account of the means adopted by Dr. Semelweiss, for preventing the spread of the disease. "He recommended all students frequenting the division (the labour-wards) not to handle dead matter, or if they did, he forbade them to make any examination till the following day. In the second place he directed all the 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.* The result of these precautionary measures was that the number of deaths at once fell to seven per month.* They had been from thirty to seventy per month, and we can assign no other cause for this great difference of mortality than the means used by Dr. Semelweiss for preventing the communication of the

* Medico-Chir. Trans., vol. xxxii. p. 36.

disease. The prophylactic was chlorine, and hence, comparing the facts related by Dr. Collins with those of Dr. Semelweiss, this gas seems to have the power of destroying the poison. In order, therefore, to prevent the diffusion of puerperal fever, solutions of chlorine should be freely used, the hands washed, and the sheets of the bed sprinkled with it, even at the risk of damaging their texture. The vapour of chlorine should also be diffused through the apartment. I am inclined to think that the chlorates of soda or potass taken internally would be useful on the same principle. Besides these means the practitioner should also be careful, if in attendance upon a case of puerperal fever, to change his dress before he visits another patient in labour. The fomites of the fever have been known to lurk about the dress of the attendant, and reproduce it after a period much later than might be imagined. In one ward of the Dublin Lying-in Hospital, the fomites remained for months, and renewed the disorder. If proper precautions be used, I am satisfied that there is no danger of communicating puerperal fever; but I fear that in some instances a want of caution has had this effect. The practitioner may have been led astray by the authority, who tells him that puerperal fever is nothing but peritonitis, a local inflammation, which we know is not contagious; or he may imagine that there is no risk because some of his patients may have escaped contamination. Errors of this kind, we have reason to think, have led to the dissemination of the poison, and should be carefully guarded against.

The remedial treatment has been a warm subject of controversy, chiefly arising from the different views of the disease that have been advocated. Those who hold the doctrine of local phlegmasia defend an active antiphlogistic treatment, while the advocates of the epizotic character of puerperal fever maintain the importance of supporting the constitution against the attack. It appears to us that the treatment of both, to a certain extent, is correct, although the principle on which the antiphlogistic plan is founded we believe to be erroneous. Depletion, purgatives, emetics, certainly reduce inflammation, because they diminish the quantity of the blood and the velocity with which it is impelled by the heart; but the very same means, by lessening the quantity of poisoned blood, and by acting as evacuants to discharge a poison from the circulation, render the blood more pure and less dangerous than it was before. These remedies are beneficial, there-

fore, not as antiphlogistics, but as antiseptics. If we act on such a principle the only question we have to decide is—Can the patient bear the treatment? Has the constitution sufficient power to recover itself from the loss thus occasioned, when it is already prostrated by the influence of a poison? We believe that this question will admit of no general answer; we can only speak with a special reference to the constitution and the conditions in which it is placed. If the dose of the poison be excessive, evacuants are inadmissible, because the constitution has no power of reaction. On this principle we object to depletion in Armstrong's "congestive disease," and consider Mackintosh's doctrine of "latent peritonitis" altogether fallacious when applied to puerperal fever. If but little be absorbed, and the prominent symptoms are of a sthenic character, evacuants are the most efficient, because the poison is rapidly removed, any local inflammation is promptly subdued, and the constitution soon recovers itself. Between these extremes there is every shade of intensity in the disease, which almost renders each case a separate subject of consideration. In some the evacuant treatment, in others the stimulant, is successful. In those situations where the poison is concentrated, as in hospitals, or in places where it suddenly appears and commits great devastation, we think that the stimulant practice is most advisable. The remarkable success of Dr. Copland's practice in the Queen Charlotte's Hospital, is a sufficient illustration of this truth, and may be contrasted with the total failure of Armstrong's treatment in the Dublin Lying-in Hospital, about the same period. On the other hand, when the poison is diffused, as in private practice, evacuants may be employed with advantage: at the same time it is right to observe, that the natural strength of the patient's constitution forms an important element in determining this question. It is very well known that the strength of constitution varies with the locality. The inhabitants of London, for instance, do not bear the same activity of antiphlogistic treatment as those of Dublin or Edinburgh. The residents of a country district, breathing a purer air, and enjoying active exercise, or occupied in rustic duties, have stronger constitutions than citizens; and thus, when we would wish to form a fair estimate of any proposed treatment by the evidence of its success which is adduced, it is very important to inquire where the cases treated have lived. Dr. Gordon's and Mr. Hey's were

chiefly rural practices. Dr. Armstrong's and Dr. Mackintosh's scattered over a town; and although each met with cases of intense puerperal fever, they were the exceptions, not the rule: we have every reason to think that their "clientelle" consisted of patients with naturally strong constitutions that would admit of free evacuation. You may meet, however, and in cities often will meet, with patients whom you cannot bleed, and who require stimulants: we cannot, therefore, lay down a general rule, unless it be that of Sydenham—"to study the constitution of the year," and we should add, "of the place." Having premised these general observations, we shall proceed to consider separately the remedies usually employed; and first with regard to evacuants.

Depletion is more generally employed than any other mode of treatment. Dr. Ferguson, after a most careful and cautious inquiry, gives the following as the sum of his experience of bleeding as a remedy in puerperal fever:—" Of all the means we possess of arresting this malady, I believe bleeding, general or local, to be by far the most extensively applicable. The cases in which it is not so are exceptions to the rule."[*] We fully agree in this opinion, but we do not consider depletion efficacious because it is an antiphlogistic, but because it is a most rapid evacuant. On this principle alone can we explain the efficacy of the very bold depletion sometimes employed. We do not treat peritonitis by taking away very large quantities of blood, and there are some forms of it in which we cannot bleed at all. Yet in puerperal fever Hey took twenty, thirty, even fifty ounces of blood from the arm. Mackintosh says—" In some fortunate cases, the histories of which were lost in my travels, I can well remember abstracting between forty and fifty ounces at one bleeding."[†] In order that depletion be efficient, it should be promptly undertaken the moment that a rigor gives evidence that the poison is absorbed: the removal of blood then is attended with the best effects; but at a later period, when time is given to alter its properties, and to soften the tissues, when effusions take place, depletion has a contrary effect; the strength of the patient at once gives way, and death rapidly follows. Such we believe to be the principle on which depletion, when it may be adopted, is useful; but you must always bear in mind that it may be quite inadmissible,—you must carefully inquire into the character of

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* Ferguson, p. 152.   † Mackintosh, p. 264.

the epidemic, the constitution of your patient, and, as I have said, the constitution of the place. If you seek among the symptoms for a guide to determine your practice, I know of none we can depend on but the pulse, and even that is uncertain. If the pulse be firm and wiry, you may bleed, but if it be compressible and unsteady, you cannot do so. In the former case the constitution is struggling against the disease, and manifests a degree of vigour that will admit of depletion. In the latter, it is rapidly giving way under the attack, depletion only hastens debility and its consequence, death: but although this is generally true, there are often exceptions in both cases, which may deceive you. Depletion, therefore, sometimes must be tried as an experiment, and if so, should be had recourse to as soon after the rigor as possible; at a later period it should never be employed. In hospital practice, and with women in the lower walks of life, who have been subjected to privations or causes of mental depression, we should not think depletion as a general rule advisable.

Purgatives, also, act as evacuants, and those that have had the most power in this respect have always been the most efficient. The hydragogue cathartics, which produce the most rapid and abundant discharges from the intestines, are preferred. The object is not merely to unload the intestines, but to produce catharsis. In one case, Dr. Armstrong having taken twenty-four ounces of blood from the arm, so as to induce fainting, gave a scruple of calomel and two ounces of strong infusion of senna, containing two drachms of sulphate of magnesia, every hour till copious evacuations should be produced. " In about four hours the medicines began to operate, and several copious, dark, fetid stools were discharged: from that time considerable relief was obtained, and a regular perseverance in purgatives, with mucilaginous drinks, and a small quantity of exceedingly weak chicken-broth, completed the cure in five days."* This certainly is not the treatment of peritonitis. If this active practice overcame the obstinate constipation that attends this inflammation, it would have the effect, not of reducing, but of greatly increasing it: but as a means of purifying the blood, by exciting an active excretion from the intestines, the practice is intelligible.

Emetics were among the first remedies discovered for the treatment of this disease. In 1782, Doulcet at once checked the

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* Armstrong, p. 92.

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 them, and she recovered. This practice was repeated in every case, and with such remarkable success, that it was supposed Doulcet had found a specific; a second visitation, however, afterwards presented itself, and Doulcet's specific was found to be 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 true 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 puerperal fever I have already noticed the frequency of nausea, biliary derangement, dusky staining of the skin, and jaundice; and it must not be forgotten that Gaspard and Cruveilhier have proved that one of the modes by which infection of the blood is relieved is through the liver. On these grounds, and within these limits, the use of emetics will be found rational and beneficial."*

Diuretics have received very little attention in the treatment of puerperal fever; yet, as evacuants, I believe them to be very efficient. In some cases I have found the free use of nitrate of potass of great value; and although as yet my experience of it as an evacuant in puerperal fever is too limited to speak with sufficient confidence, I am inclined to think that it is well worthy of a more decided notice from 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.

Mercury is the only medicine that may be considered strictly as an antiphlogistic, and it is the only remedy of doubtful efficacy. Patients have been salivated with mercury, and no remission of the symptoms followed. Dr. Ferguson says—" With regard to the use of mercury in puerperal fever, I think that as a purge it may be used in all the forms with advantage, but not as a means of affecting the constitution."† Dr. Collins used mercury in combination with ipacacuanha in large doses, four grains of each, every second, third, or fourth hour. " One patient took more than an

* Ferguson, p. 204.   † Ibid. p. 223.

ounce." Dr. Collins further remarks—" I could not observe any better effect from the large doses than the small: the system was not more speedily influenced; and when they did so act, it was often with violence, so as to endanger the destruction of the soft parts about the palate." In a note he observes—" It is supposed by some practitioners that when we can get the system under the influence of mercury recovery is certain. *This is not the fact, as I have seen in several cases where death took place under these circumstances.*"* Mercury, therefore, seems to be the least efficient of the remedies employed.

Antimonials have been also administered. Boer used an unknown preparation extensively in the Vienna Hospital. Dr. Gooch supposed it to be " Kermes mineral"; Dr. Ferguson, " James' powder." Its action was chiefly on the skin, and was found to have a most beneficial effect. Dr. Denman derived considerable advantage from tartar emetic in the treatment of puerperal fever, acting both as an emetic and in increasing the action of the exhalants.

In the treatment, then, of puerperal fever by evacuants, the first question to decide is—Can the patient bear any evacuation? The extreme degree, the ataxic form of the fever, admits of none. In the less severe varieties we may use some one or other of them, and it only remains to determine which we shall select. If the pulse justify depletion, it is the most efficient when promptly adopted. Active saline purgatives may also be used in such cases with advantage. In more severe cases the lancet may not be employed, and yet other evacuants may be useful, which nature herself will sometimes indicate. The fever may commence with an attack of diarrhœa, and if in place of checking it, we rather maintain the evacuation, the patient will recover. Bilious vomiting taught Doulcet the value of emetics, and so, with regard to the efforts to throw off the disease by other channels, the symptoms will point out the treatment. There are cases, however, in which no evacuation dare be attempted,—in which stimulants alone will save the patient; and when this course is pursued it must be a bold one—a hesitating practice is perfectly useless. Dr. Copland gave from eight to sixteen grains of camphor every four or five hours. On the same principle, opium may be given to any extent short of narcotism; but by far the most efficient

* Collins, p. 396.

stimulant is turpentine, because it combines in itself a double power. It supports the constitution, or rather rouses its energies against the poison, while it acts as an evacuant in removing it. Turpentine may be combined with castor-oil, in half-ounce doses, and given every three or four hours with great advantage. As a local application, also, it contributes greatly to relieve the abdominal pain which the patient experiences. With regard to this medicine, I have no hesitation in stating, with Dr. Copland, that " *there is certainly no remedy so efficacious as a decided and judicious use of spirit of turpentine.*" With these observations, we shall conclude the discussion of this perplexed subject, fully aware that in our attempts to unravel some of its difficulties we originate new questions for discussion and controversy. If, however, we have succeeded in rendering intelligible to you the principles upon which it appears to us the most efficient plans of treatment have been successful, our object has been fully accomplished.

LECTURE XXXIII.

PUERPERAL MANIA.

Nature of the Disorder.—Predisposing Causes.—Exciting Causes.—Symptoms very irregular may last for Months or be rapidly fatal.—In the latter Case, it is generally a form of Puerperal Fever.—Importance of attending to the State of the Circulation.—Treatment.

PUERPERAL MANIA is one of the most distressing of the disorders that follow parturition. It may last only a few days or 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 intercouse 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.

The causes of puerperal mania are necessarily very obscure, they may be divided into *predisposing* and *exciting* causes. The former 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 having 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.

The symptoms of this melancholy disorder are too varied to give 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 piano-forte 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."* 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 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 I 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.

The most important of these symptoms, as a guide to our prognosis, is the pulse. If the pulse is regular, or only moderately excited, the patient will recover; but if 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." I should wish, however, to confine your attention to the attack that may take place soon after delivery, those that happen after the patient has recovered from her confinement do not belong to our present

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* Gooch, Diseases of Women, p. 104.

subject. What does this difference in the condition of the circulation indicate? The presence or absence 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. Beside 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 had first pointed out, is a most valuable guide to assist us in the determining the character of this disorder.

The treatment must be governed by the kind of case that we have to deal with. I 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 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

* Page 316.

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. Having this cause of irritation 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.

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, and Drs. Hardy and M'Clintock; 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 præternatural 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. The first division gives the comparative frequency of natural and other labours: the second, the rates of mortality both to mother and child. The difference observed in the total numbers of the first columns arises from some omissions in the reports. For instance, the total number of natural labours given are 149,733, but the mortality is stated in only 5,852 cases. Some notes are appended to these tables, which will explain the cause of other irregularities that may be observed in the numbers stated. The author cannot conclude, without returning his warmest thanks to Dr. Routh, for the kind assistance he has rendered him in forming these tables.

LONDON AND DUBLIN.

	Dr. Ramsbotham, 48,996 Cases, in 22 years.					Dr. Collins, 16,414 Cases, in 7 years.					Drs. Hardy & M'Clintock, 6,634 Cases, in 3 years.				
		Mothers.		Children.			Mothers.		Children.			Mothers.		Children.	
	Total Cases.	Living.	Dead.	Living.	Dead.	Total Cases.	Living.	Dead.	Living.	Dead.	Total Cases.	Living.	Dead.	Living.	Dead.
Natural Labours	48,160	—	—	—	—	15,397a	—	—	—	—	5,852	5,836	16	—	—
Forceps	73	70	3	56	17	24	20	4	16	8	18	14	4	10	8
Vectis	—	—	—	—	—	3	—	—	—	—	16	16	—	7	9
Crotchet	60	54	6	—	60	79	64	15	—	79	52	44	8	—	52
Breech	1,220	—	—	967	253	242	241	1	169	73	101	98	3	64	37
Feet	158	—	—	60	98	127	127	—	65	62	38	37	1	20	18
Shoulder						40	36	4	20	20	26	24	2	14	12
Unavoidable	82	—	—	32	50	11	9	2	6	5	8	5	3	5	3
Accidental	159	—	—	74	85	13	11	2	12	1	29	25	4	18	11
Between Birth & Placenta	—	—	66	—	—	64	57	7	55	16	31	26	5	27	5
After delivery of Placenta	—	—		—	—	43	39	4	38	5	25	24	2	23	5
Retained Placenta	268	—	—	—	—	66	60	6	56	14	28	18	10	20	9
Convulsions	43	40	3	35	18	30	25	5	14	18	13	10	3	7	6
Ruptured Uterus and Ruptured Vagina	8 1	—	9	—	9	34	2	32	2	32	9	—	9	1	8
Inverted Uterus	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—
Prolapsed Funis	—	—	—	—	128	97	97	—	24	75	37	37	—	12	25
Twins	536	—	—	—	7	240	233	7	422	58	95	92	3	171	19
Triplets	3	—	—	—	1	4	4	—	12	4	1	—	—	—	—
Boys	25,629	—	—	—	—	—	—	—	—	—	3,551	—	—	3,291	260
Girls	23,909	—	—	—	—	—	—	—	—	—	3,151	—	—	2,944	207
Both Sexes	49,538	48,776	220	46,815	2,723	16,654	—	—	—	—	6,702	6,569	65	6,235	467
All cases of Labour	48,996	48,776	220	46,815	2,723	16,414	—	—	—	—	6,634	6,569	65	6,235	467

Side groupings: Difficult Labours (Forceps, Vectis, Crotchet); Preter-natural Labours (Breech, Feet, Shoulder); Haemorrhage (Unavoidable, Accidental, Between Birth & Placenta, After delivery of Placenta); Complex Labours.

Not Stated marked by a —.

a This number is obtained by substracting the sum of the difficult, preternatural, and complex labours, from the whole number of labour cases, viz., 16,414.

PARIS.

		MADAME BOIVIN. From 1797 to 1811. 20,357 Cases.					MADAME LACHAPELLE. From 1812 to 1820. 22,243 Cases.				
		Total Cases.	Mothers. Living.	Mothers. Dead.	Children. Living.	Children. Dead.	Total Cases.	Mothers. Living.	Mothers. Dead.	Children. Living.	Children. Dead.[b]
	Natural Labours	19,810	—	—	—	—	20,801	—	—	22,034	773
Difficult Labours.	Forceps	96	—	—	73	23	77	—	—	59	18
	Vectis	—	—	—	—	—	—	—	—	—	—
	Crotchet	16	—	—	—	16	12	—	—	—	12
Preter-natural Labours.	Breech	373	—	—	—	—	492	—	—	421	59
	Feet	238	—	—	—	—	307	—	—	263	46
	Shoulder	80	—	—	60	10	118	—	—	70	38
Hæmorrhage.	Unavoidable	8	—	—	5	3	12	—	—	5	7
	Accidental	3	—	—	—	—					
	Between Birth and Placenta										
	After delivery of ditto										
Complex Labours.	Retained Placenta	—	—	—	—	—	—	—	—	—	—
	Convulsions	17	—	—	14	3	8	—	—	6	2
	Ruptured Uterus	1	—	—	1	—	—	—	—	—	—
	And Vagina										
	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

b These numbers in Mad. La Chapelle's table, do not include deformed or premature children.

VIENNA.

		Dr. ARNETH. 2nd Klinik. 1847 to 1849. 6,527 Cases.					Dr. KLEIN, quoted from Dr. ARNETH. 1st Klinik. 35,417 Cases.				
			Mothers.		Children.			Mothers.		Children.	
		Total Cases.	Living.	Dead.	Living.	Dead. e	Total Cases.	Living.	Dead.	Living.	Dead.
	Natural Labour	6,080	—	—	—	—	33,658d	—	—	—	—
Difficult Labours.	Forceps	45	38	7	25	21	730	—	—	—	—
	Vectis	—	—	—	—	—	—	—	—	—	—
	Crochet	4	2	2	—	4	53	—	—	—	—
Preter-natural Labours.	Breech	113	110	3	76	37	583	—	—	—	—
	Feet	59	56	3	38	21	193	—	—	—	—
	Shoulder	32	32	—	22	20	133	—	—	—	—
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	—	—	—	—	—
Complex Labours.	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	55f	—	—	—	—
	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	—	—	—	—

e These cases include children who died within nine days after birth.

d This number is obtained by subtracting the sum of difficult, preternatural, and complex labours, from the whole number of labour cases, 35,417.

e Derived from 11,410 cases.

f Derived from 5,490 cases.

GENERAL CONCLUSIONS FROM THE PRECEDING TABLES.

		Proportional frequency of Natural, Difficult, Preternatural, and Complex Labours.			Rate of Mortality.					
		Calculated on			Mothers.			Children.		
					Calculated on			Calculated on		
Category		Total number of all cases of all presentations and accidents.	Cases of special presentations and accidents.	Proportion of special presentations and accidents to 1,000 of all presentations and accidents.	Cases of special presentations and accidents.	Deaths in special presentations and accidents.	Deaths in 1,000 special presentations and accidents.	Cases of special presentations and accidents.	Deaths of children in special presentations and accidents.	Deaths in 1,000 special presentations and accidents.
	Natural Labours	156,588	149,758	956	5,825	16	2.7	20,501	773	37
Difficult Labours	Forceps	156,588	1,067	6·8	160	18	112	333	95	285
Difficult Labours	Vectis	23,048	19	·8	16	—	—	16	9	562
Difficult Labours	Crotchet	156,588	276	1·7	305	31	101	403	403	1,000
Preter-natural Labours	Breech	107,472	1,905	17·	456	7	15	948	206	217
Preter-natural Labours	Feet	107,472	962	8·9	224	4	17	531	147	276
Preter-natural Labours	Shoulder	156,468	587	3·7	98	6	61	444	88	198
Haemorrhage / Complex Labours	Unavoidable	110,338	129	1·1	39	8	205	129	79	612
Haemorrhage / Complex Labours	Accidental	72,044	201	2·7	42	6	142	201	97	482
Haemorrhage / Complex Labours	Between Birth and Placenta	29,575	105	·4	95	12	126	95	21	221
Haemorrhage / Complex Labours	After delivery of Placenta	29,575	142	·5	42	7	166	142	20	140
Complex Labours	Retention of Placenta	78,571	393	5·	125	21	168	94	23	245
Complex Labours	Convulsions	121,171	124	1·2	153	31	202	124	53	427
Complex Labours	Ruptured Uterus	78,571	54	·6	55	53	963	52	48	923
Complex Labours	Inverted Uterus	48,996	1	·002	2	2	1,000	—	—	—
Complex Labours	Prolapsed Funis	77,665	286	3·6	167	1	5.8	231	133	575
Complex Labours	Twins	156,255	1,710	10·	416	14	33	416	108	259
Complex Labours	Triplets	149,728	17	·1	4	—	—	4	4	1,000
	Boys	84,400	44,023	521·	—	—	—	6,949	378	54
	Girls	84,400	40,978	485·	—	—	—	6,361	313	49
	All Cases of Labour	—	—	—	61,887	412	6·6	84,400	4,271	50

INDEX.

DIRECTIONS TO THE BINDER.

Plate 1   to face page 182.
  ,, 2   between pages 298 and 299.
  ,, 3 ⎫
  ,, 4 ⎬ between pages 310 and 311.
  ,, 5 ⎭
  ,, 6   between pages 330 and 331.
  ,, 7   to face page 434.
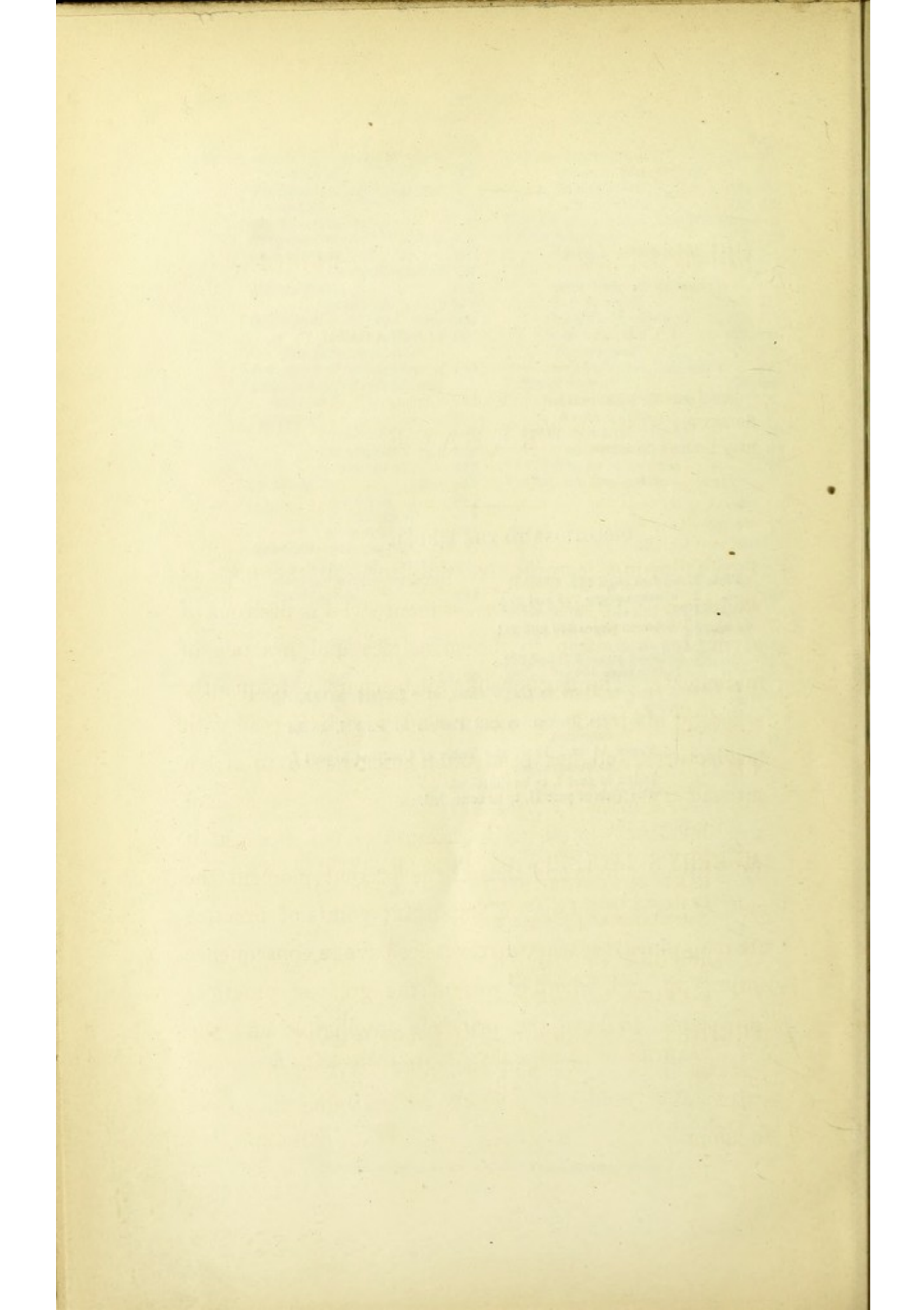
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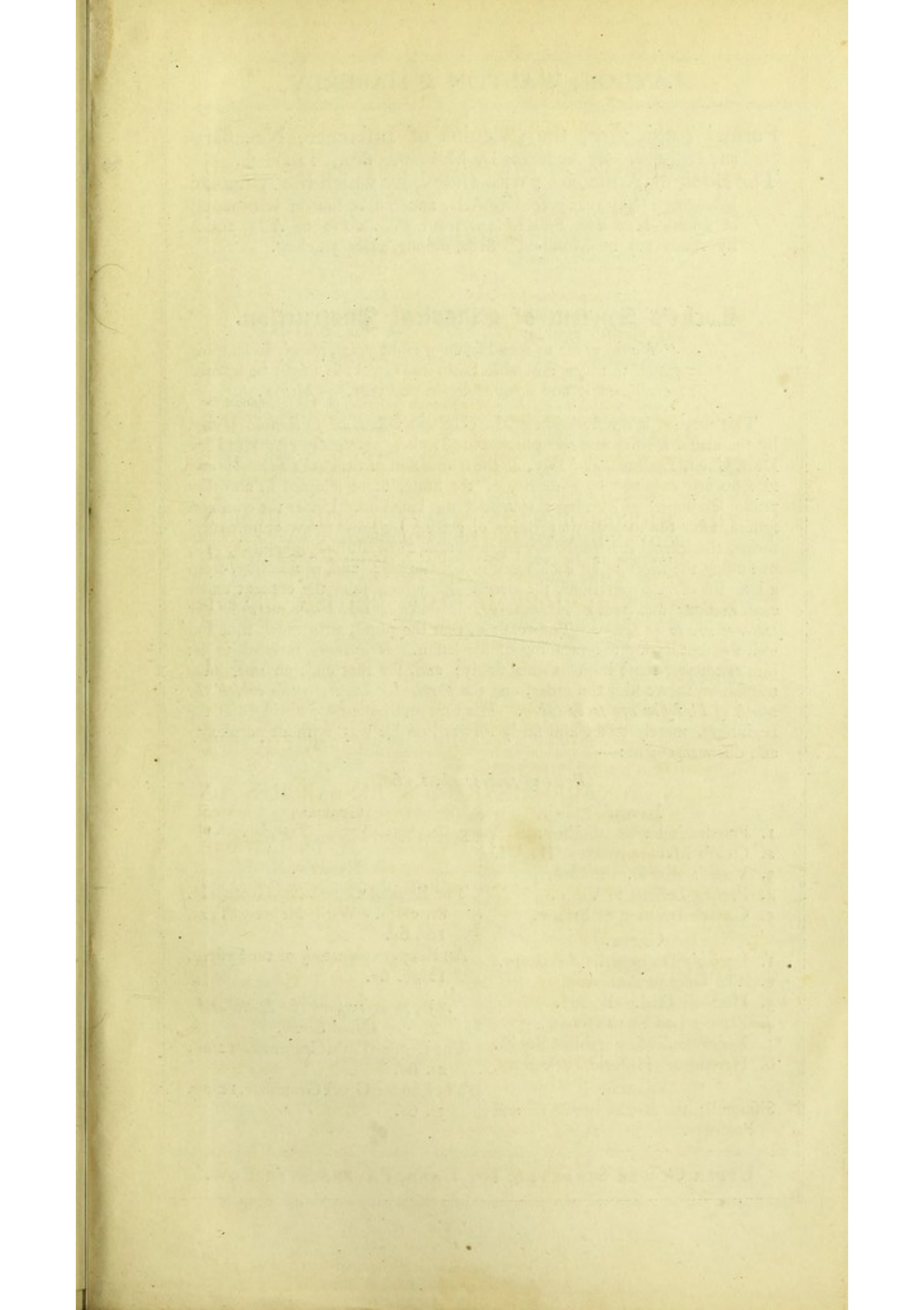
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