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- Page number 137 is used twice instead of page number 136

LIST OF WORKS CONSULTED.

<u>Author's Name.</u>	<u>Work.</u>
Atthill Loombe.	Lancet, Feb.9, 1878.
Atvard.	Travaux d'Obstétrique, Vol.2.
Bandl.	On Rupture of the Uterus.
Barbour, A.H.F.	Anatomy of Labour.
Barbour, A.H.F.	Lecture on the Third Stage of Labour, /87, delivered at the Post-Graduate rooms, Edinburgh.
Barbour, A.H.F.	The Sectional Anatomy of Labour - Third Stage. Ed.Med.Journal, Oct. and Nov. /87.
Barnes.	Physiology and Treatment of Placenta Prævia.
Barnes.	Lecture on Obstetric Operations.
Baudelocque.	System of Midwifery, Heath's Translation.
Beck, Snow.	Obstetrical Transactions, Vol.13.
Braun.	Die Lage des uterus und Foetus am Endeder Schwangerschaft.
Braun	Lectures, 1869.
Cazeaux.	Traité théorique et pratique de l'Art des Accouchements.
Champneys.	Quoted by Barbour.
Chevalier.	Journal de Médecine Clinicale et Pharmacologie, Vol.21.
Churchill.	Theory and Practice of Midwifery.

<u>Author's Name.</u>	<u>Work.</u>
Cohen	Meine Methode bei Placenta Prævia während der Geburtszeit. Monatsschrift für Geburtskunde.
Dakin	Medical <sup>ANNUAL</sup> Journal /88.
Davis.	Parturition and its Difficulties.
Dempsey.	British Medical Journal, July 26.
Deventer.	Observations importantes sur le Manuel des Accouchements.
Dionis.	Treatise of Midwifery.
Dirska.	Berliner Klinische Wochenschrift, /90.
Dührssen	Sammlung Klin. Vort, No.347.
Duncan, Mathews <sup>t</sup>	Mechanism of Natural and Morbid Parturition.
Duncan, Mathews <sup>t</sup>	Edinburgh Medical Journal, Nov./73.
Duncan, Mathews <sup>t</sup>	Obstetrical Transactions /87.
Earle.	On Flooding.
Favre Arthur.	The Uterus and its Appendages. Cyclopædia of Anatomy and Physiology.
Fergusson.	Introduction to New Sydenham Society's Edition of Gooch.
Foster.	Physiology, 3rd Edition.
Frances.	British Medical Journal, Vol.i, /88.
Fraser, T.R.,	Notes on Lectures.
Fritsch.	Quoted by Dührssen.
Füth..	Centralbl. f. Gynak. /92.
Galabin.	Midwifery.

<u>Author's Name.</u>	<u>Work.</u>
Giffard.	Cases in Midwifery.
Goodall.	American Journal of Obstetrics. Vol.2.
Gooch.	On some of the most important diseases peculiar to women.
Grigg.	British Medical Journal, Vol.1, /84.
Greenhalgh.	Obstetrical Societies' Transac- tions, Vol.6.
Hamilton.	Edinburgh Medical Journal, /61.
Hart & Barbour.	Manual of Gynæcology .
Hart, Berry.	Edinburgh Medical Journal, July /87.
Hart, Berry.	Improved Method of managing Third Stage. Edin. Med. Jour. Oct. 88.
Hart, Berry.	Anatomy of the Post Partum Uterus. Edin. Med. Jour. July /87.
Hart, Berry.	Mechanism of the separation of the Placenta and Membranes during Labour. Proceedings of the Roy. Soc. Ed. Vol. XV.
Helie	Recherches sur la disposition des Fibres musculaires de l'Uterus.
Hicks, Braxton.	Obstetrical Transactions, Vol. XIV.
Hicks, Braxton.	Turning in a deformed pelvis.
Horrocks.	British Medical Journal, /92.
Ingleby.	A practical treatise on Uterine Hæmorrhage.
Kochs.	Annual of universal Medical Sciences, Vol.2.
Küstner.	British Medical Journal /92.



Author's Name.Work.

Küstner.	Das Untere Uterine segment und die Decidua cervicalis.
La Motte.	Treatise on Midwifery.
Lewers.	Medical <sup>Annual</sup> Journal, /91.
Levert.	L'Art des Accouchements.
Madden	British Medical Journal, /92.
Mauriceau.	Traité des Maladies des Femmes grosses.
Misrachi.	Therapeutic Gazette.
Murphy.	Treatment of Placenta Prævia. Transaction Nort. & Durh. Med.Soc. /85.
Murray Milne.	Edinburgh Medical Journal, Sep./86.
Naylor.	India Medical Record.
--	New England Medical Monthly.
Parish.	Annual Universal Medical Sciences, Vol.2.
Playfair, W.S.	Science & Practice of Midwifery.
Pollard	British Medical Journal, Vol.1 /80.
Priestley.	The Gravid Uterus.
Ramsbotham.	Obstetric Medicine and Surgery.
Rigby, E.	Essay on Uterine Hæmorrhage.
Rigby, T.	System of Midwifery.
Robertson.	Diseases of Women.
Routh, Amand.	Lectures on Post Partum Hæmorrhage Clinical Journal, Dec.14th /92.
Ruysch.	Practical Observations in Medicine and Surgery.

<u>Author's Name.</u>	<u>Work.</u>
Schultze.	Compendium der Geburtskunde.
Simpson, Sir J.Y.	Communication to Ed.Med.Chir. Soc./44.
Simpson, Sir J.Y.	Selected Obstetrical Works.
Siebold & Kolliker.	Zeitschrift.
Stricker	Comparative Hystology, Vol.3. Sydenham Societies' Transac- tions.
Sutugen.	Ed. Obstetrical Transactions, 74, 75.
Turner.	Introduction to Human Anatomy, Part 2.
Treube.	British Medical Journal, /91.
Vavra.	Cent. für Gyn. /90.
Von Ritgen.	Monatsschr. für Geburt. Vol.6.
Waldeyer.	Medianschritt einer Ho <sup>ch</sup> schwangeren. bei Steisslage des Fötus.
Walsham.	Theory & Practice of Surgery.
Walter.	British Medical Journal /92.
Whitla.	Dictionary of Treatment.
Williams.	On the circulation in the Uterus with some of its Anatomical and Pathological bearings. Obstetrical Transactions, /85.
Wilson.	Handbook of Hygiene.
Zweifel.	Geburtshülfe.
Roy & Adams	Contribution to the Physiology and Pathology of the MAMMALIAN HEART. PHILOSOPHICAL TRANSACTIONS, Vol.183
Bossi	Zeitschrift für Therapie 1891

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H A E M O R R H A G E F R O M T H E U T E R U S  
B E F O R E A N D A F T E R L A B O U R .

S E C T I O N I .

Hæmorrhage during or after labour is one of the most trying accidents connected with the subject of Obstetrics; whether it occurs before the birth of the Child, or after, when its sudden onset, just as labour seems to be happily terminated, and its alarming effect on the patient, tax the resources of the Obstetrician to the utmost and necessitate the possession by him of the military qualities, calmness and coolness in danger.

Some idea of the importance of this subject may be gathered from the Registrar-General's report. Thus in five years, 1871-1875, 3524 deaths were returned as due to "flooding".<sup>1)</sup> In the year 1871 there was a population in England and Wales of 22,712,266 and in London of 3,254,260 or a total of 25,966,526.<sup>2)</sup> The death rate during this time was 22 per 1000 per annum,<sup>3)</sup> or a total death-rate for the five years of (roughly)

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- 1) Playfair. Science and Practice of Midwifery,  
Vol.II. p.102.  
2) Wilson. Handbook of Hygiene, p.421  
3) Wilson. Op.cit. p.24

2,856,260. By Calculations we can now see that one death in every 800 odd is due to flooding. Similarly, taking the birth-rate as 35 per 1000 per annum<sup>1)</sup> we get a total birth-rate of 4,544,050 and a proportion of one death due to flooding in every 1,289 labours.

It must be remembered that these figures show only the actual deaths due to this complication, and it is probable that only post partum hæmorrhage is included under the term "flooding"; cases of Placenta Prævia etc. being returned under other heads. I know of no statistics that show the number of people who actually suffer from hæmorrhage, not of so severe a degree as to cause death, nor the amount of illness and misery caused by this complication.

The difficulty a student or young practitioner has in treating cases of severe hæmorrhage is much increased by the habit obstetrical books have of looking on Uterine Hæmorrhage as a different thing from ordinary surgical hæmorrhage and entailing a special treatment. But I don't think this is the case at all. The treatment of Uteri<sup>ne</sup> hæmorrhage rests on the same broad principles as that of ordinary surgical hæmorrhage, and differing only in being applied to a special place.

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1) Wilson. Op.cit. p.422.

Let us first look at Nature's Mode of Controlling Hæmorrhage. Temporary Arrest.

1) When an artery of moderate size is completely divided, the cut surface, in consequence of mechanical stimulation, contracts, and thus lessens the size of the opening. Owing also to the state of elastic tension in which arteries normally are, the cut end retracts within its sheath leaving the surface of the sheath rough and uneven and therefore in a condition favourable to coagulation. The slowing of the current due to the smaller size of the orifice also favours coagulation, so that we find a coagulum filling up the sheath around and beyond the contracted artery and forming what is called the external clot. The onward flow of blood being thus prevented, the blood in the artery up to the first collateral branch is in a state of stasis and it coagulates also and forms what is known as the internal clot. It is by this internal clot that permanent closure is effected in a manner to be afterwards seen. If the hæmorrhage is severe two other factors come in, first, the enfeeblement of the heart's action and consequent diminished power of propelling the blood, and, second, the increased tendency the blood has to coagulate in consequence of the change

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1) Walsham. Theory and Practice of Surgery. p. 115

in its composition caused by the absorption of watery fluid from the tissues.

Permanent arrest is due to the external clot preventing the artery dilating when the effects of the mechanical stimulation pass off and the internal clot acting as a sort of buffer in preventing the full force of the blood stream from acting on the cut end of the vessel. Now leucocytes make their way into the clot and new blood vessels grow out from the *Vasa Vasorum* and the granulation tissue thus formed seals up the cut end and the vessel is subsequently converted into a fibrous cord as far as the nearest collateral branch. This temporary arrest is precisely what happens in the Uterus and it is further aided by the fact that, owing to the peculiar relations the bloodvessels in the Uterus have to the muscular fibre, when the Uterus contracts the lumen of the bloodvessels is obliterated. We will see what this relationship is when we come to study the Uterus, and the arrangement of the muscular fibres then. I have been able to gather no information as to the permanent arrest of hæmorrhage from the uterus but I see no reason why it should differ from the permanent arrest in other parts of the body.

Artificial Modes of aiding the arrest of Haemor-

rhage. The agents which a surgeon employs in the arrest of hæmorrhage are 10 in number, 1 Cold, 2 Heat, 3 Pressure, 4 Styptics, 5 Caутery, 6 Ligature, 7 Torsion, 8 Acupressure, 9 Forsipressure and 10 Drugs. The first 4 and the 6<sup>th</sup> and 10<sup>th</sup> mentioned are employed in Uterine Hæ-morrhage.

1 and 2 Cold and Heat. Cold acts by causing the muscular fibres to contract. After the contraction they subsequently dilate owing to the reaction, so that the power of cold as a styptic is only limited. A domestic proof of this contraction and subsequent dilatation we have in the feeling of coldness and shivering which ensues on taking a cold bath, and the reaction and glowing which follow afterwards. However, this temporary contraction may be sufficient to allow of a clot forming in the vessel sufficiently strong to resist the effect of the blood pressure when reaction sets in. The effects of prolonged cold in inducing, and maintaining for some time, pallor of the skin must be born in mind as it is possible it has some action through the nervous system. In Milne Murray's experiments he seems only to have studied the action of the temporary application of cold.

Heat. like Cold also acts by causing stimulation

of the muscular fibres. Milne Murray has worked at the effects of hot and cold water as styptics and his conclusions are:-<sup>1)</sup>

(1). Water, at temperature of 120°Fah. and 10° lower, contracts blood vessels and arrests hæmorrhage from small arteries.

(2). Water, at a temperature of 100°Fah. and 30° or 40° lower, dilates blood vessels and promotes hæmorrhage.

(3). Water, at a temperature of 50°Fah. and 20° under, checks hæmorrhage by constricting the blood vessels, but this is only temporary.

(4). After water at 50°Fah. and 20° under has lost its styptic power, water at high temperature is still effective.

(5). The action of water at a temperature of 110°Fah. and 10° higher is cumulative, that is the second application has more effect than the first and so on. These methods can be used in the uterus by means of the introduction of ice, hot or cold douche, flapping the abdomen with a wet towel, etc.

### 3. Pressure as a temporary means of arresting

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1) Milne Murray. Edinburgh Medical Journal.  
Sept. /86.



haemorrhage is obviously valuable by closing the wound and preventing the outflow of blood. It can be applied to the Uterus either externally by the hand, or by one hand externally and the other internally, pressing the anterior and posterior surfaces of the Uterus together, or by plugging the Uterus with gauze which will press directly on the bleeding point; or by the use of Barnes bags, which press on the bleeding point and certainly leave no place for the blood to escape into. Turning the child and keeping the breech pressed against the lower uterine segment by means of traction on a leg will apply pressure to all vessels which are pressed on by the soft breech. This method we will afterwards see is employed in cases of Placenta Prævia, in which disease the bleeding all comes from the lower pole of the Uterus. Sewing a cervical tear also applies pressure to the bleeding point.

4. Styptics are also used. They are drugs which have the power of coagulating blood and so producing thrombosis in the mouths of the open vessels. The most commonly used one is the Liquor Ferri Perchloridæ Fort, of the London Pharmacopœa diluted one

in six with water. It is employed by means of a Higginson's Syringe, the vaginal piece being carried up to the fundus uteri, and the stream allowed to flow gently over the entire inner surface of the Uterus.

Other Styptics may be used, such as Tincture of Matico, but it is doubtful whether or not it is any good.

The leaf has a haemostatic action, but it is partly due to the mechanical action and partly to the contained Tannic Acid<sup>1)</sup> Strong vinegar has been strongly recommended by Penrose<sup>2)</sup> and it certainly has the advantage of being always handy. Lately, in certain cases of hæmorrhage, vaginal plugs have been used soaked in vinegar. Grigg<sup>3)</sup> believes that vinegar drinks are better than injections. Tincture of Iodine has also been recommended as a Styptic.

Dupierris<sup>4)</sup> has placed on record 24 cases of Post Partum hæmorrhage which he treated with injections of this drug and with a successful result. Alum has also been used in cases of Placenta prævia. This method of treating hæmorrhages from the Uterus, more especially Post Partum hæmorrhage by the injection

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1) T.R.Fraser, Notes on Lectures .

2) Playfair, Science and Art of Obstetrics, Vol.ii,p.123

3) Grigg. British Medical Journal, vol.i. 84., p.56; (see also Francis British Medical Journal, Vol.i, 88, p.295).

4) Playfair, op. cit. Vol.ii, p.123.

of Styptics was introduced into this country by Barnes but long before that it was practised in Germany. The dangers of the practice have been much insisted on, but it must be remembered that it was only proposed to employ it as a "dernier ressort" and after all other means have failed, in which cases the patient is in less danger if one gets the loss stopped, even by an admittedly dangerous method, than if one allows her to bleed till death takes place.

6. Ligatures are also used by the obstetrician to check hæmorrhage from the Uterus. Obviously it is out of the question to tie every bleeding point, but by inverting the uterus and putting a ligature round the cervix, we check the blood supply to the Uterus, which, as we will afterwards see, enters by the broad ligaments.

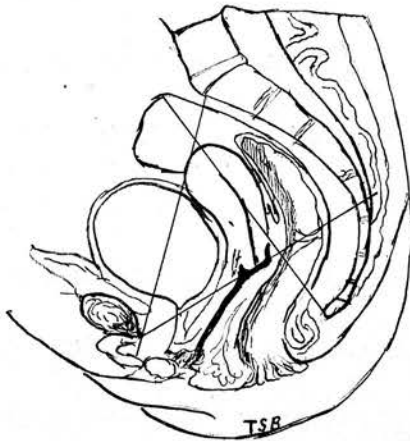
10. Drugs are given internally to check or lessen hæmorrhage. The most commonly used one in bleeding from the Uterus is Ergot of Rye and its active principles. This drug is the sclerotium stage of a parasite (*Claviceps Purpura*) growing in rye grain (*Secale Cereale*) and the active principles are ergotina, ~~ecbolina~~, cornutina and sphacelinic acid, which last is the active principle which stimulates non-striated muscle<sup>1)</sup>.

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1) F.R.Fraser. Notes on Lectures.

One of the actions of this drug is that it possesses the power of first increasing the power of contraction of all unstriated muscles, as the Uterus, Stomach, Bladder, etc., and afterwards of producing<sup>tonic</sup> contraction. It is this action which is used in midwifery, for, - as we will afterwards see, - tonic contraction of the uterus is Nature's Method of stopping hæmorrhage from that organ. The liquid extract of the Pharmacopœa is the preparation most usually employed, but, in my opinion, Liquor Secalis Ammoniata (Richardson's) is better, but, unfortunately, it has a tendency to produce sickness and vomiting. When more instantaneous effects are wanted it is better to employ some of the hypodermic preparations of this drug. Hydrastis Canadensis is also used to check hæmorrhage. I have employed<sup>it</sup> chiefly in threatened abortion and am well pleased with it in these cases. It has been recommended in cases of Placenta prævia. Quinine is also used as a hæmostatic and so are several other drugs which it is unnecessary for me to capitulate.

For a proper understanding of uterine hæmorrhage, we must consider the Structure of the Uterus and the mode of ramification in it of the blood vessels. 'Boss', Zeitschrift für Therapie, October 1<sup>st</sup> 1891



Sectional diagram to show normal position of the uterus in the pelvis  
after tamie

This is not the normal condition as the uterus is drawn back  
by distended bladder.

The Uterus. The Uterus is that part of the generative tract which lies between the lower end of the Fallopian Tubes and the Upper end of the Vagina. In man and the quadrumina it is formed by the complete coalescence of the two uterine cornuæ. Sometimes this junction is not complete and we have a "bicornuate uterus". The degree of the malformation ranges from a simple notch in the fundus uteri up to the complete separation of the two cornuæ. In the perfect woman, it is a single, symmetrical, hollow organ, serving for the passage upwards of the ~~symmetrical~~<sup>seminal</sup> fluid and for the reception, protection, nutrition, and finally expulsion of the mature ovum.

Position. In the adult female, when unimpregnated, it lies deeply in the pelvis, having in front the bladder; behind, the rectum; and, laterally, the ovaries, fallopian tubes and broad ligaments. Superiorly lies the small intestine, and inferiorly, the vagina and pelvic floor. When impregnated, it increases in size upwards until it finally comes to be an abdominal organ. When fully grown it lies forward against the abdominal wall, as far up as the umbilicus, above which it is separated from the abdominal wall by the intestines; behind lies the spinal column, and above and at the sides are the small in-



testines. At this stage it is so arranged as to interfere as little as possible with the functions of the bladder, rectum, and ureters and not to hinder the descent of the diaphragm, or press on the great vessels at the back of the abdominal cavity<sup>1)</sup>.

The Movements of the Uterus do not concern us. It suffices to say that there is a slight upward and downward motion with each respiration, and a forward and backward one as the bladder and rectum are distended and emptied.

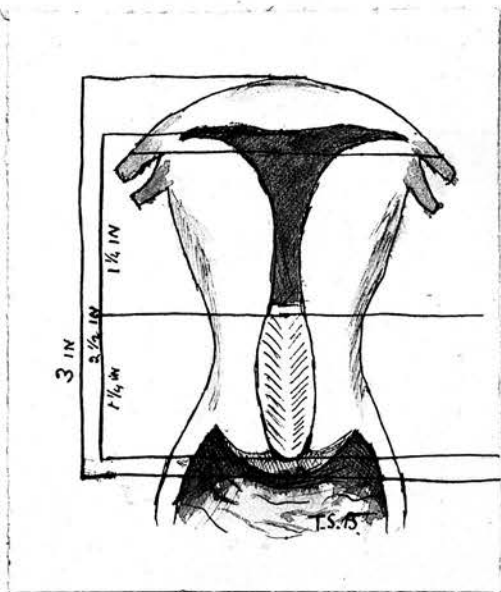
Shape. The normal tonicity of the muscle of the uterus is such as to maintain it at a definite shape. This shape has been expressed by various similes, such as a truncated cone, etc., The best likeness is perhaps to a pear, slightly flattened on its anterior surface. When impregnated, and at full term, it appears in vertical mesial section as an irregular ovoid, its contour being indented by the symphysis and promontory of the sacrum, and further it is moulded posteriorly on the spinal column.<sup>2)</sup>

Regional Divisions. Primarily, the uterus

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1) Barbour, Anatomy of Labour, p.15.

2) ditto. ditto. p.15



is divided into a body and a cervix or neck. Where the body and cervix join is called the isthmus. Each of them is again subdivided, the upper portion of the body being known as the fundus, then the body proper of the uterus, and then the supra; and, finally, the infra-vaginal portions of the cervix. Although this division is to a certain extent artificial, yet it also is important in practical obstetrics, owing to the great difference both in structure and in behaviour during labour, of the body and cervix. Another portion, called the lower uterine segment, we will study later.

The Fundus is that portion of the body that lies above a line joining the Fallopian tubes. It is slightly convex in the nullipara, but becomes very considerably arched and expanded during pregnancy.<sup>1)</sup> This is the part to which the upper portion of the Placenta is most frequently applied.

The Body lies between that line joining the openings of the Fallopian tubes and another drawn through the Isthmus parallel to the first line. This is the most important part of the Uterus. It expands more than any other part to accommodate the growing

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1) Farre. Uterus and its appendages, Cyclopædia of Anatomy and Physiology, June 1858 p.625.

ovum and its walls are freely supplied with blood vessels. The walls are usually half an inch thick, and are separated from each other by the cavity of the uterus.

The Cervix is a cone-shaped prolongation of the uterine body, composed of the same structures as the Uterus, but with a materially different arrangement. Its narrowest portion is at the isthmus. Below that, it expands slightly, afterwards to rapidly contract and end in a rounded extremity that projects into the vagina. It also contains a cavity continuous above with that of the uterus and below with that of the vagina.

Dimensions. The Uterus up to the period of puberty remains in an elementary condition, but after that period it rapidly develops until it reaches the size of the adult organ; then the growth stops, unless impregnation takes place. Roughly speaking, from external os to fundus it measures three inches externally and two and a half inches internally. Across the line marking off the fundus from the body, it measures two inches; across the isthmus, it measures one inch, and from before backwards in all regions it measures one inch. At full time from os internum to outside of fundus it measures nine and a half to

nine and a quarter inches, anteroposteriorly six inches, and it has a vertical circumference of 24 inches or more<sup>1)</sup>.

Appearance on section. On making a vertical mesial section, we observe that we have to deal with a hollow organ with anterior and posterior walls, which are continuous with one another laterally and superiorly. But in order to study the cavity, we must make a coronal section, dividing the uterus into anterior and posterior halves.

Cavity of the Body, we can now see to be a triangular slit, with its apex downwards. At each angle of the triangle we have an opening. At the two upper angles are the openings of the fallopian tubes and at the lower angle, we have the opening into the cavity of the cervix known as the os internum. We now see that the walls of the uterus are not of equal thickness in the unimpregnated condition, since the external state of the organ is pyriform, and the cavity is triangular. The diagram shows that the cavity in this section is bounded by three curves, the degree of curvature varying in different subjects and

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1) Barbour. Anatomy of Labour, p.15.

being greater in women who have borne no children.<sup>1)</sup> In the infantile form of uterus, the walls are nearly straight.

Cavity of the Cervix is said to be spindle-shaped or fusiform. Above, we have seen, it opens into the cavity of the body, and below into that of the vagina. The walls of the cervix differ from those of the body in not being in contact either laterally or antero-posteriorly. Both cavities are lined by mucous membrane, which differs in appearance in the body and cervix. In the body it is pale pink in colour, and is perforated by a number of small openings, the openings of the utricular glands. In the cervix, the mucous membrane is thrown into a number of plicæ or folds. One of these plicæ runs perpendicularly on the anterior and posterior walls, and from it, branches are sent off laterally, which subdivide and spread themselves over the inner surface of the cervix. Other forms which the folds assume have been described. Küstner alleges that for one-fifth of an inch the cervical substance and mucous membrane are like that of the body of the uterus. This part he calls the inferior uterine segment.<sup>2)</sup>

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1) Farre. Uterus and its Appendages. p.628

2) Küstner. Das Untere Uterini Segment und die decidua cervicalis.



Lower Uterine Segment is best considered now before we pass on to the structure of the uterus. This part is not to be distinguished in the unimpregnated organ, but it is important during labour as it joins with the cervix in playing a passive rôle. It is marked off from the rest of the Uterus by the contraction, or, better still, retraction, ring of Bandl. Küstner, as we have seen, thinks it is cervical in origin, and so did Bandl. in his paper on Rupture of the Uterus and its Mechanism.<sup>1)</sup> Barbour, after writing on this subject for some time, says, "After a careful study of these papers, we come to the conclusion that no sufficient evidence has been produced that the lower uterine segment, which resembles in structure the rest of the Uterus, is cervical in origin; and until new evidence is brought forward, we see no reason to ascribe to it an origin different from the rest of the wall of the uterus: We therefore still place the os internum where the canal lined with cervical mucous membrane ceases."<sup>2)</sup>

Berry Hart has lately noticed in a multipara, who died after Placenta Praevia, placental remains

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1) Hart and Barbour Gynaecology, p.18.

2) Barbour. Anatomy of Labour, p.37.

attached to the lower uterine segment, and which therefore must have grown there.<sup>1)</sup> This seems to point to the uterine origin of the lower uterine segment as being the true one. However, I must confess myself very ignorant of this important question, but I would note that there is some difference of opinion as to where the os internum is. Thus, K<sup>u</sup>stner places it at the level of the isthmus, and Barbour where the cervical mucous membrane ceases. The important point to remember is the difference in behaviour between it and the body proper, in labour.

Structure of the Uterus. The Uterus consists of three coats, peritoneal, muscular, and lining or mucous coat, but these three coats merge imperceptibly into one another so that the distinction which is apparent to the naked eye, vanishes when the microscope is brought into use.<sup>2)</sup>

The outer or Peritoneal coat. , is the thinnest of the three. It is of great importance in pathology, but concerns us little, so I will pass over its structure and arrangement.

The middle or muscular coat is of great importance in practical obstetrics, as through it run

<sup>1)</sup> Berry Hart. Edinburgh Medical Journal, July 1887.

<sup>2)</sup> Farre. Uterus and its Appendages, p.631.

the blood vessels of the uterus, around which it is arranged peculiarly - an arrangement which is designed to reduce the danger from haemorrhage to a minimum. This middle coat is built up of certain elements which are<sup>1)</sup>:

- 1st. smooth muscular fibres, called by Kölliker contractile fibre cells, which become greatly enlarged during pregnancy, though Stricker says<sup>2)</sup> that this is only the case with those fibres that play an active part in the expulsion of the foetus; those of the outer and innermost layers not increasing in size.
- 2nd. Round oval nuclei or elementary corpuscles, which Farre<sup>3)</sup> believes to be the elementary form of the muscular fibres just mentioned. He declares he has seen what appears to be the intermediate forms between the two corpuscles<sup>4)</sup>.
- 3rd. Amorphous or homogeneous connective tissue. In the innermost layers of muscular fibres there appears to be little connective substance but this, while in the middle and outer layers there is also -
- 4th Fibrillate connective tissue which connects the muscular bundle together and also forms a sheath for the blood vessels.
- 5th. Elastic Fibrous Tissue is also found, but not in great quantity. These several tissues along with the vessels and nerves make up the middle coat of the Uterus. These elements are arranged in laminae and bundles which are separated from each other in all directions by blood vessels and it is to this that the mottled appearance of the uterus on section is due.

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1) Farre. op.cit. p.631.

2) Stricker, Comparative Hystology, Sydenham Societies' Transactions, vol.iii, p.477.

3) Farre, op.cit. p.632.

4) Farre, Uterus and its Appendages, p.633.

These elements exist in different proportions in the body and cervix of the uterus; in the body the muscular elements are in larger proportion but in the cervix<sup>1)</sup> is the fibrous elements that are most abundant, - a difference of structure which points to a difference in function of the two parts.

ARRANGEMENT OF THE MUSCULAR FIBRES is

difficult to determine in the unimpregnated state, even the separation of the walls of the Uterus into the three primary coats is difficult. Madame Boivin attempted it, but abandoned it, after describing what is seen on the surface when the peritoneum has been separated by prolonged maceration. In the so-called mucous membrane, no definite striation can be made out, the muscular fibres being loosely arranged in an amorphous tissue. The bundles of muscular fibres are situated between the utricular glands and take a course more or less perpendicular to the inner uterine surface. Helié<sup>2)</sup> says that these fibres arise from a triangular layer of longitudinal fibres, which is found on the anterior and posterior uterine walls. This triangular layer has its base above, and its apex below. But at the base of the utricular follicles, where the muscular coat proper is by most considered to begin,

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1) Uterus and its Appendages, p.633. (Farre).

2) Helié. Recherches sur la disposition des Fibres musculaires de l'uterus.

a definite striation can be made out. The strata run for the most part parallel to the walls of the uterine cavity, which is therefore surrounded by them. The strata exhibit certain differences in arrangements sufficient to justify us in arranging them in different groups.

The innermost layer of them may be termed the dense muscular layer<sup>1)</sup>. It commences immediately external to the mucous membrane, and extends outwards through a  $\frac{1}{2}$  or  $\frac{2}{3}$ rd. of the entire muscular coat. When injected preparations of this part are examined by a hand lens, a peculiar mottled appearance is seen, caused by numerous white lines ramifying within a darker substance and dividing it into a multitude of lozenge-shaped spaces. The white lines mark the course of the uterine vessels and of the fibrous tissue which accompanies them. These lozenge-shaped spaces consist of the muscular fibres united by amorphous tissue into short bundles. These bundles are bound together into the lozenge-shaped spaces just mentioned. If one makes a horizontal section of this part of the muscular coat, the bundles may be seen to be arranged in a concentric manner, forming interrupted circles round the Uterine cavity. This appearance

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1) *Fayre. Uterus and its Appendages, p.633.*



is due to the arrangement of the bundles of muscular fibres, not to the arrangement of the individual fibres. Helié says<sup>1)</sup> that these circular rings begin round the openings of the fallopian tubes and form wider and wider circles which eventually interlace with one another. They also form a sort of sphincter to the internal os. Ruysch gave to this layer the name of detruser placenta, attributing to it the function of loosening the placenta. External to this coat and surrounding it may be distinguished a second order of strata, among which the primary and secondary ramifications of the uterine arteries and veins are distributed. This causes sections of this portion of the muscular wall to have by no means the compact appearance of the inner layer, more particularly in a multiparous uterus.

If sections of this portion be made parallel to the broad ligament, the tortuous arteries entering between the folds of the latter may be traced for a considerable distance. Sections made in the opposite direction, however, more frequently exhibit the gaping orifices of cut arteries and veins surrounded by laminae of muscular fibres and of a more lax and fibrillated form of connective tissue than is found in

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1) Helié. Recherches sur la disposition des fibres musculaires de l'uterus.

the inner and denser layer<sup>1)</sup>. The inter-mixture of the larger vessels with the muscular fibres constitutes the peculiarity of this layer which we may look on as the vascular layer. Helié<sup>2)</sup> describes this layer as made up of strong bundles of muscular fibres which run upwards but decussate and unite in a remarkable manner so that those which were first superficial become more deeply seated and vice versa. The muscular fasciculi forming this coat, curve in a circular manner round the large veins, so as to form for them a sort of muscular canal. External to this coat lie a series of sheet-like laminae running parallel to the uterine surface; the most external of these laminae being inseparable from the peritoneal coat. There are from 6 to 12 of these laminae and are extended upon the broad and round ligaments and Fallopian Tubes<sup>3)</sup>. These laminae are said to arise posteriorly at the junction of the uterus and cervix and to be spread in a fan-shaped manner over the fundus. In this layer, there is but little amorphous matrix and the fibres run more distinctly in the direction of the laminae themselves than they do in the other

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1) Farre. Uterus and its Appendages, p.633.

2) Helié. Recherches sur la disposition des fibres musculaires de l'uterus.

3) Farre, op.cit. p.635.

strata described . The individual fibres interdigitate with each other so as to form an imbricated pattern. The course, however, of each individual fibre is difficult to follow on account of the large amount of fibrous connective tissue, by which the layers are surrounded and bound together. From this layer numerous fibres run perpendicularly outwards apparently with the purpose of connecting this coat with the peritoneum. This layer, unlike the other ones, is most easily studied in the unimpregnated uterus and especially in children.

Mucous coat. Snow Beck<sup>1)</sup> describes its existence, but declares that what is generally taken as this is simply a softened portion of the true uterine tissue. All that we need say about it is that it is very well supplied with capillary vessels, which cause the coat to have a brighter red appearance than the rest of the uterus has. These capillaries, which are of large size, descend between the utricular glands, and, having reached the inner surface of the uterus, spread out in a network round the orifices of these glands.<sup>2)</sup>

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- 1) Snow Beck. Obstetrical Societies' Transactions, Vol.xiii. p.294.  
2) Fayre. Uterus and its appendages, p.637.

## STRUCTURE AND ARRANGEMENT OF THE TISSUES

FORMING THE CERVIX - The cervix consists of the same elements that compose the uterus proper, but their arrangement is different. Like the Uterus, the Cervix has three coats but they are not all complete.

Peritoneal Coat exists only on the posterior wall, while the anterior wall and lateral borders remain uninvested.\*)

Muscular Coat has in its substance so large an amount of fibrous tissue that it may be said to be the fibrous coat. The individual elements found here are the same as those in the body of the uterus, but the elementary corpuscle is scantily present. The fibrous tissue is much stronger and tougher than that found in the uterus proper. The strata of muscular fibres are practically the same as those in the uterus<sup>1)</sup> with the exception of the tegumentary layer, which is absent here as it only arises at the junction of the cervix and uterus. Here may be distinguished, therefore, two layers of muscular fibres, - an outer more vascular one and an inner denser layer. The outer vascular layer is traversed by numerous branches of

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+) Farre. op.cit. p.638.

1) do. do. p.638

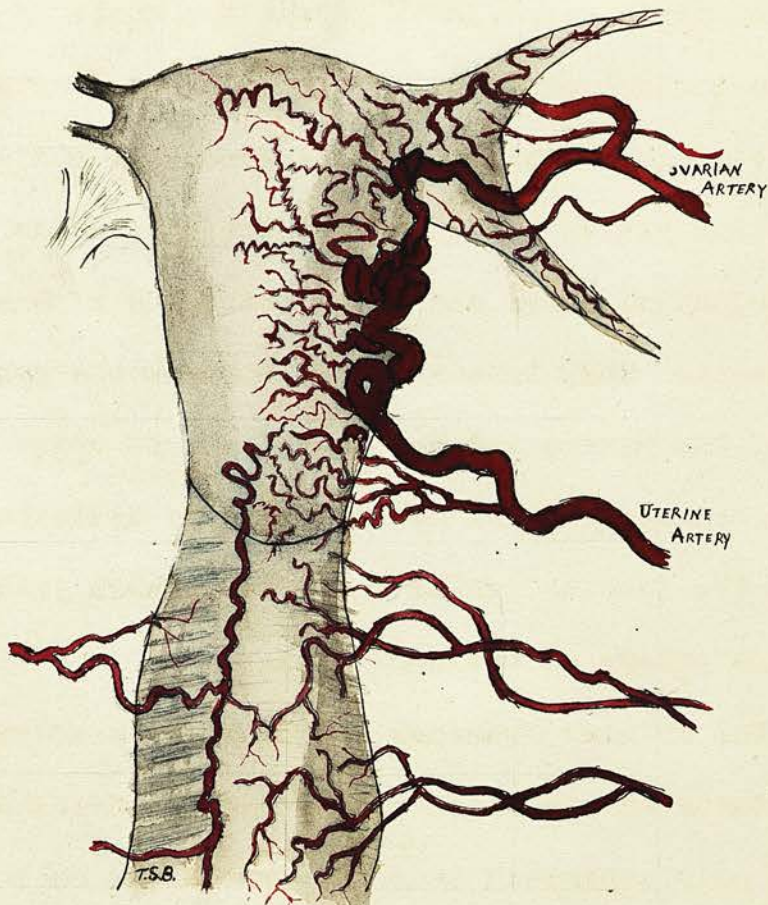
the uterine vessels which run obliquely downwards and inwards. the inner denser layer is arranged, like that of the uterus, in concentric circles round the cavity of the cervix. The vessels here are much fewer in number and of a finer calibre than in the outer layer.

BLOOD VESSELS OF THE UTERUS - The arteries are derived from two sources - the Ovarian and Internal Iliac arteries. The special branch from the internal iliac artery is called the Uterine artery. There are two of them, one on each side, and they arise from the anterior branches of the internal iliac arteries. They pass, between the folds of the broad ligament, downwards and inwards to the cervix. From there they run upwards in a tortuous manner, giving off branches to the vagina, cervix, body, and finally fundus of the uterus.<sup>1)</sup> The branches to the fundus anastomose with branches from the ovarian artery. The branches to the neck and body of the uterus run more or less directly round the uterus, both before and behind, to anastomose with similar branches from the opposite side. In this manner the cervix and uterus are surrounded by a series of arterial loops. The lower branch of the ovarian artery gives off similar loops round the

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1) Farre. Uterus and its Appendages, p.640.





Blood supply of the UTERUS  
(HARTL)

uterus. There is thus a very free anastomosis between the various arteries supplying the uterus, so that it is possible to inject the whole of the uterus through one uterine artery. The tortuous course of the arteries is well seen in Hyrtl's beautiful plate. The Ovarian Arteries arise from the abdominal aorta and enter the folds of the broad ligaments. They take a course towards the upper angle of the uterus and there divide into upper and lower branches. The upper branch is distributed mainly to the fundus; while the lower branch joins the uterine artery of the same side.

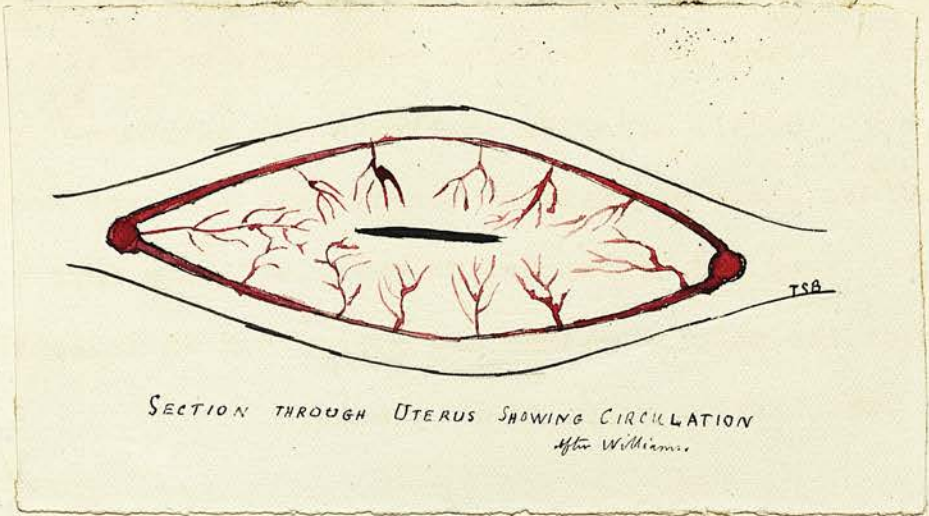
The Primary branches of the uterine artery enter the uterus on its side, but do not penetrate deeply, being only separated from the peritoneum by a thin layer of muscular fibres. The vessels are said by Williams<sup>1)</sup> to run in a distinct layer of connective tissue, which is, he says, more distinct in early life than in the adult condition. He declares that this layer of connective tissue is submucous tissue, and all internal to it - the great bulk of the uterine muscle - belongs to the mucous membrane, i.e., is muscularis mucosae.

From these circles numerous branches are

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1) Williams on the circulation in the Uterus with some of its anatomical and pathological bearings. Obstetrical transactions, 1885.





SECTION THROUGH UTERUS SHOWING CIRCULATION  
*after Williams.*

The uterus is a muscular organ, and its blood supply is derived from the uterine arteries and veins. The arteries supply the uterus with oxygenated blood, while the veins carry away the deoxygenated blood. The blood supply is distributed in a regular manner, and is essential for the health and function of the organ. The uterine arteries branch out to supply the muscular wall and the internal cavity of the uterus. The venous system follows a similar pattern, ensuring that the uterus receives the necessary nutrients and oxygen for its various functions. This diagram illustrates the complex network of blood vessels that maintain the health of the uterus throughout its life cycle.

[1] Williams on the circulation in the Uterus with some of its pathological conditions. 1877.

given off and run in a spiral manner towards the mucous surface in a direction perpendicular to that surface. As the arteries penetrate the substance of the uterus, their sinuosities become less and less marked until they end by running in parallel lines down between the uterine glands and spread out in a meshwork of capillaries round these glands.

The arteries of the Cervix are very similar in distribution but are not nearly so numerous, a special branch of the uterine artery to the cervix joins with its fellow of the opposite side to form the circular artery of the cervix. Braune<sup>1)</sup> in his section does not represent this artery, but Waldeyer<sup>2)</sup> says there are several. Berry Hart<sup>3)</sup> points to the existence of a "Krantz Vene" in the contraction ring of a uterus, the owner of which died of placenta prævia.

THE VEINS OF THE UTERUS have a similar course to the arteries, they are considerably longer and more numerous than the arteries. Playfair says that they are placed in layers in the uterine wall and

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- 1) Braune. Die Lage des Uterus und Foetus am Ende der Schwangerschaft.
- 2) Waldeyer. Medianschnitt einer Hochschwangeren bei Steisslage des Fötus.
- 3) Berry Hart Edinburgh Medical Journal, July 1887.

where the veins of one layer communicate with the next one the opening is semilunar in shape. Within the margin of these apertures are muscular fibres, which, when they contract, will close the opening. They form along the sides of the Uterus in the connective tissue layer already described a plexus called the uterine plexus. The veins are destitute of valves. The uterine plexus communicates freely with the Ovarian vein, veins in the broad ligament, and with the vaginal plexus.

CHANGES IN THE UTERUS DURING GESTATION. The Uterus during this period gains enormously in size. Thus, from 3 inches long by two broad and one in thickness, it comes to measure 12 inches long by 9 inches broad by 8 antero-posteriorly<sup>1)</sup> Braune and Waldeyer measuring from the os inter<sup>n</sup>um to the fundus make it rather smaller, ( $9\frac{1}{2}$  and  $9\frac{1}{4}$  respectively) and an antero-posterior diameter of only six inches. Sutugin<sup>2)</sup>, measuring on the living subject, obtained a mean length of 10.1 inches.

In weight Meckel<sup>3)</sup> has estimated it to increase to 24 times the weight of the unimpregnated

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1) Farre. The Uterus and its Appendages, p.645.

2) Sutugin. Edinburgh Obstetrical Transactions 1874-5, p.44.

3) Farre. op.cit. p.645.



organ (about 2 lbs). Heschl<sup>1)</sup> estimates it to increase to 1 lb 6.7 oz. generally but after twin births he says it reaches the size of 2 lbs.5 to 7 ozs.

The form varies according to the time of pregnancy, but at full term it has the shape of an irregular ovoid.

The Uterine Walls are variable in their thickness. Meckel says that they increase a little in the beginning of pregnancy, but towards the end they become much thinner. Barbour<sup>2)</sup> says, judging from sections by Braune and Waldeyer, that at the end of pregnancy, the average thickness of the uterine walls is about half the thickness of the ~~more~~<sup>unim</sup> pregnant organ. This increased growth is chiefly due to an increase in muscular fibres of the uterus along with an increase in the vascular elements.<sup>3)</sup> This growth consists in an increased development of the pre-existing muscular fibres, as well as an increased new growth. The blood vessels also grow enormously, more especially in breadth during pregnancy. The arteries still have their spiral course through the uterus. The veins are in the shape of flattened chan-

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1) Fayre, op.cit. p.658.

2) Barbour, Anatomy of Labour p.19.

3) Farre, The Uterus and its appendages, p.649.

nels. These muscular fibres already existing in the tunica media increase greatly in size and new muscular fibres appear in the inner and outer coats, but having a longitudinal direction. In the smaller veins there is less proportionate development of muscular fibres, the only exception is in the case of these uterine sinuses, which penetrate the substance of the placenta to become continuous with the maternal sinuses there. These possess only the one layer of muscular fibres, and this notwithstanding their great width<sup>1)</sup>

PLACENTA - The most important change, however, for my purpose is the formation of the Placenta. It is important because at the end of every pregnancy it is thrown off, and this throwing off entails the separation of numerous blood-vessels. It is an organ provided therefore at each pregnancy for the nutrition and respiration of the foetus. To it, the foetus is connected by a cord, the umbilical cord, which springs from the Placenta, generally somewhere near the centre of foetal surface. It may be attached to the uterus <sup>anywhere</sup> from the os inter<sup>n</sup>um uteri to the fundus, but usually is situated, according to Virchow, near the orifice of a Fallopian Tube. Schroeder believes

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1) Siebold and Kölliker's Zeitschrift 1848, p.84.

it to be more frequently situated on the anterior wall.

The Placenta is composed of two portions, a maternal and a foetal. The maternal part is developed from that part of the decidua that lies at the base of the decidua reflexa, that is, the so-called decidua serotina. The foetal portion is formed from that part of the chorion that is applied to the decidua serotina and is vascularised by the allantois. The amnion takes no part in the formation of the placenta, but simply lies on its foetal surface to be reflected on to the cord when that is inserted into the placenta. On the maternal surface we notice sulci dividing the placenta into numerous lobes or cotyledons. In the cotyledons numerous valve-like openings may be seen. These are the openings of the veins which perforate the decidua obliquely and seem to terminate at once on its inner surface. These openings for veins are also found on the decidual prolongations between the cotyledons and on the interrupted marginal sinus, called the circular <sup>sinus</sup> vein, as well as on the cotyledons themselves.<sup>1)</sup> The arteries terminate on the inner surface of the decidua by equally abrupt openings. Before entering they make several sharp turns.

Shape. Usually it is a single discoidal

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1) Farre - The Uterus and its Appendages, p.719.

organ, but it may be irregular in shape. The irregular parts may be even entirely separated from the great mass of the Placenta, forming what are called *Placentae succenturiae*.<sup>1)</sup>

Insertion of Cord is usually near the centre of the foetal surface, but may be anywhere from the centre to the edge of the Placenta. The last form is called the battledore placenta; but the cord may not be inserted into the Placenta at all, but into the membranes at some distance from it, forming a vilamentous insertion of the cord.

Minute Structure of Placenta. Without going into all the theories about the minute structure of the Placenta we may look at what Turner says<sup>2)</sup>. He points out that the *Placentae* of all animals are founded on the same common type in which the foetal portion consisting of a smooth, plane-surfaced vascular membrane, covered with pavement epithelium, is brought into contact with the maternal portion, consisting of a smooth, plane-surfaced vascular membrane, covered with columnar epithelium. The foetal and maternal circulations are thus only separated by two layers of epithelium. In

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1) Playfair. Science and Art of Midwifery, Vol.i, p.105.

2) Turner. Introduction to human anatomy, Part.2.

the human placenta, the maternal capillaries have lost their original shape and are dilated into a system of freely communicating sinuses or dilated capillaries into which the villi project. The existence of maternal sinuses, however, is denied by Braxton Hicks<sup>1)</sup>. The foetal villi contain a branch of the umbilical artery and of the umbilical vein, communicating with each other by means of capillaries. Favre<sup>2)</sup> has described another set of capillaries which exist in the form of a fine network covering each villus, immediately beneath the vascular sheath. These capillaries disappear towards the end of pregnancy, which accounts, he says, for their not having been observed by other writers except Schroeder, Van der Kolk. Priestley<sup>3)</sup> suggests that these vessels described by Favre may be lymphatics. However, the existence of lymphatics and nerves has never I believe been demonstrated. There are various other theories of the minute structure of the uterus, which have been advocated by such authors as Ertolani of Bologna, Goodsir, and John Reid, etc.

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1) Braxton Hicks. Obstetrical Transactions, Vol. Xiv.

2) Favre. The Uterus and its Appendages, p.718.

3) Priestley. The Gravid Uterus, p.52.



## S E C T I O N   I I .

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Haemorrhage. Having now considered the structure of the uterus and placenta with the blood supply and its mode of ramification in these organs, we are in a position to understand the causation of haemorrhage and its treatment. In studying this subject from books or from Nature itself we notice that haemorrhage does not always set in at the same time in different cases. Thus, it may occur either before or after, the birth of the child. Of these two divisions we will first study the first.

### Haemorrhage before the birth of the child.

Rigby, in his now classical work, was the first to point out that this form of haemorrhage depended on two entirely different conditions i.e. the separation of a normally or abnormally situated Placenta<sup>1)</sup> He believed, when he wrote the first edition of his essay, that he was the first to point out that the placenta could be situated as low down as the cervix uteri. But in the 6th. edi-

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1). Rigby. Essay on the Uterine Haemorrhage which precedes the delivery of the full-grown foetus.  
P. 14. et sequa.

tion of his work he only claims a division of priority with Levret. But this abnormal situation of the placenta was well known to older anatomists and obstetricians such as Portal, Fallopius, and Muller, etc. Further Levret<sup>2)</sup> only claims to have epitomised the current knowledge of the time and not to have "communicated a new physiological fact." Most, however, of the older obstetricians believed that the placenta had simply become detached and had fallen to the mouth of the womb; in consequence of which view, many advised the removal of the placenta before the child. Mauriceau<sup>3)</sup> relates a number of cases of flooding in which the placenta presented and in which he found it necessary to turn the child, but he also recommended that the placenta should be treated as a foreign body and removed first. La Motte<sup>4)</sup> relates several cases and, like Mauriceau, believes that the placenta is wholly detached and therefore recommends its removal. Ruysch,<sup>5)</sup>

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- 2). Levret. L'Art des Accouchement... 1766.
  - 3). Mauriceau. Traité des Maladies des Femmes Grosses. 1721.
  - 4). La Motte. Treatise of Midwifery. Translated by Tomkyns. 1746.
  - 5). Ruysch. Practical observations in Midwifery and Surgery. 1751.

Dionis,<sup>1)</sup> Deventer<sup>2)</sup>,<sup>and</sup> Giffard<sup>3)</sup>, all noted cases of this low placentation, and all believed that it had fallen there, first having become separated from the uterine wall. After this slight account of the history of placenta praevia. We will pass on to the study of its causes and treatment etc.

Placenta Praevia. By this term we understand the placenta to be situated either wholly or partially in the "area of spontaneous detachment." But what is this area, and how far does it extend? Barbour<sup>4)</sup> points out that in labour we lose the division of the uterus into body and cervix, and see instead two areas, the upper of which shortens and its walls become thicker, and the lower elongates and its walls become thinner; the upper area playing an active rôle, and the lower area a passive rôle. These two areas are marked off by a thickening in the wall of the uterus, to which has been applied the name of "Bandl's contraction ring," on account of his having been the first to point it out<sup>5)</sup> In normal labour Chiari has shown, in a frozen section of the second stage, that the membranes, which normally present, become separated from the surface of the uterus as far up as this contraction ring.<sup>6)</sup>

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- 1). Dionis. Treatise of Midwifery. 1719.
  - 2). Deventer. Observations importantes sur le Manuel des Accouchements. 1734.
  - 3). Giffard. Cases in Midwifery. 1734
  - 4). Barbour. Anatomy of Labour. P. 81 and 82.
  - 5). Bandl. On Rupture of the Uterus.
  - 6). Barbour op. cit. P.84.

Now when the placenta is situated within this, the lower, passive area, it separates from the uterus in precisely the same manner as the membranes and its separation gives rise to hæmorrhage. The attachment of the placenta, therefore, to any part of this lower passive portion of the uterus constitutes placenta prævia. The next question that arises, after defining what is the area of spontaneous detachment, is to see how far it extends.

Various estimates, founded on various theories, have been given. Cazeaux<sup>1)</sup> speaks of the whole lower third of the uterus as the area of a spontaneous detachment, but supports his view with no good evidence. Barnes<sup>2)</sup> in estimating this area tells you to take a foetal skull and to stretch an indiarubber ring over the greatest circumference of the skull with the left parietal boss as a centre. This ring, he says, will represent the os uteri at the utmost stage of expansion necessary for the birth of the head. To this extent, he says, the os must open, beyond it, it need not, therefore it marks the limit between the cervical, or orificial, and <sup>the</sup> lateral portions of the uterus. If now, we measure the distance between the left parietal protuberance and any part of this line of the greatest circumference, we will have the utmost extent of this cervical zone. This

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1). Cazeaux. Traité théorique et Pratique de l'Art des Accouchements. P. 700.

2). Barnes. The Physiology and Treatment of Placenta Prævia P. 80.

distance measures three inches. Therefore, he says, a circle round the womb at three inches from the os will mark out, what he calls, the "Lower Polar Circle" or boundary line between safe and unsafe placental attachments. Barnes also says that if we examine, after birth, a placenta, which has reached the os internum, we will see that that part, which has been adherent to the cervical zone, and therefore detached during labour, is infiltrated with blood. This part, on measurement, is found to vary from 3-4 inches. Duncan<sup>1)</sup> uses a different method of estimating this area. He first comes to the conclusion that the child can be born through a circle the diameter of which is four inches. Then he shows that  $2\frac{1}{2}$  inches from the os internum, measuring along the uterine wall, the diameter of the uterus is four inches. From this he comes to the conclusion that the area of spontaneous detachment extends upwards for  $2\frac{1}{2}$  inches from the internal os: measuring along the uterine axis it is only  $1\frac{1}{2}$  inches from the os internum to the plane marking off the lower from the upper portions of the uterus. All these methods are very ingenious and pretty near to the truth. Barnes' estimate is obviously too big as he supposes the head to pass through the os uteri fully extended and with well marked Naegle

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1). Duncan. Mechanism of Natural and Morbid Parturition,  
P. 349.



obliquity, both of which suppositions are not now accepted by obstetricians. At the same time he makes the curious mistake of taking the left parietal protuberance for his centre. Left occipito anterior is the most frequent presentation and position and in it, if Naegel<sup>e</sup> obliquity occurred, the right parietal bone would present and should therefore have been taken as his centre. The best way, in my opinion, to estimate this area is to measure the distance between Bandl's ring and the os internum. Barbour<sup>1)</sup> has gathered together the results of several observers and I can do no better than quote sufficient of his tables for my purpose.

Case.	History.	Time after delivery.	Length of flaccid portion.	Average.
1.	Heart Disease, Forceps.	immediately	3 )	2.4
2.	Haemorrhage between 7 and 8 months	"	2.3 )	
3.	Meningitis	"	2 )	
7.	Flat pelvis Cranioclastm. after long labour	3½ hours.	4.8 )	4.1
8.	Eclampsia.	7 "	4.8 )	
11.	Nephritis	17 "	3.6 )	
12.	Rupture of posterior wall, forceps	17 "	4 )	
13.	Eclampsia.	40 "	3 )	
15	Uraemic convulsions forceps.	4 days.	4.5 )	
Here we have a great variability in the length of this				

1). Barbour. Anatomy of Labour, P.119,120 and 150 et sequa.



flaccid lower portion. On looking more closely, however, the first thing we notice is that one of the longest measurements is after a very long labour (case 7). On studying the history of these cases Nos. 1, 3, 8, 11, 13, 15 seem the most suitable to draw an average from, because the cause of death will have had in them the least effect on the uterine contraction; and, although forceps were used in two of them, they seem to have been used, not because the labour was slow, but on account of some other complication threatening life. From these cases we see that the area of the flaccid portion varies from 2 inches to 4.8 inches vertically, with an average of 3.48 inches - nearly  $3\frac{1}{2}$ . But this flaccid lower portion includes the cervix proper, as well as that lower uterine segment about which there is so much dispute. The Placenta cannot, however, be attached below the os internum, so, for the length of the cervix, we must subtract one inch from the above measurements. Thus we see that the area of spontaneous detachment averages about  $2\frac{1}{2}$  inches vertically - exactly what Duncan estimated it at.

Now another question arises - can the placenta in placenta praevia be stripped off from the uterine wall above Bandl's ring? Further on, under the section on Post Partum Haemorrhage, will be found my

views as to the separation of the membranes in the early stage of Labour, and, I believe, that Nature has so ordained it, that when the os is fully dilated and the membranes separated as far up as Bandl's ring, the membranes are no longer able to bear the strain, and therefore give way, being no longer supported by the uterine wall. Even if they don't, it does not affect my argument, because the contents of the uterus are so far lessened by the amount of Liquor Amnii expelled from its cavity, though still contained by the membranes, that the breech of the foetus will press against the fundus and therefore the uterus will act more on it than on the waters. In the earlier months of pregnancy, I am aware that sometimes the whole bag of membranes and Placenta are expelled entire with the foetus inside, but in these cases the foetus has relatively a small proportion to the liquor amnii. Now in a marginal placenta prævia, as soon as the os is dilated, that part of the membranes presenting would give way. But in central placentation, the placenta cannot give way and so, if the woman remains alive and labour goes on without interference, will go on being separated from the uterine wall by the pains of labour even after all that part contained below Bandl's ring is separated.

Placenta Praevia is classified according as

to how much the placenta covers the os internum.

Then it may be central, when the examining finger touches nothing but placenta; marginal, when only the edge of the placenta touches the os; and lateral when the edge does not descend as far as the os.

Causes. Various theories have been advanced to account for this low situation of the placenta. Thus Tyler Smith<sup>1)</sup> suggests that it is due to the ovum not having been impregnated till it reached the lower uterine segment. Naylor of Burmah<sup>2)</sup> records two cases, one of them in a primipara, which he attributed to the patient having to climb a steep bank to town from her residence. The exertion, he thinks, caused the ovum to slip to the lower uterine segment. Cazeau suggests that it might be due to an unusual smoothness of the mucous membranes, so that the ovule is not arrested in its descent, until it reaches the lower uterine segment. One of my cases, I believe, to be due to endometritis following previous abortions, the diseased mucous membranes failing to arrest the ovum until it reached the lower pole of the uterus. Theories of causation, however, are of little practical import-

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1) Playfair. Science and Art of Midwifery, Vol.ii, p.86.

2) Naylor. India Medical Record, December.

ance unless they teach us to prevent the occurrence of this disease. That prophylaxis, however, will ever supersede therapeutics in this disease, I may be permitted to doubt.

Symptoms. The Placenta must necessarily occupy its low position from the very first, but it rarely gives rise to any symptoms until the seventh month. It is not unlikely, however, that this low placentation may give rise to abortion in the early months of pregnancy and the cause be lost sight of in the result. There is only one symptom of this disease and that is a sudden loss of blood without any apparent cause. Usually, the hæmorrhage ceases soon only to recur in a time varying from hours to weeks; each successive hæmorrhage being more severe than the last. Sometimes hæmorrhage does not commence until labour has set in.

As a rule the occurrence of the hæmorrhage causes the patient to seek advice and the condition is recognised on vaginal examination.

Source of the hæmorrhage. It was long ago pointed out that, in this form of hæmorrhage, the loss occurred during a pain, and this was supposed to be diagnostic between the condition and what is called Accidental Hæmorrhage, in which the loss occurs

between the pains. This is altogether a false distinction because when the uterus contracts, it constricts the blood vessels in both cases, and so prevents, rather than favours, hæmorrhage. However, in Placenta Prævia the pain may so far favour hæmorrhage by causing a fresh portion of the Placenta to become detached. In both conditions, the blood escapes from the patient during the intervals of relaxation; but in Placenta Prævia, when the pain comes on, it presses the head into the lower uterine segment, and thus forces out the blood that has already escaped. In this condition, therefore, the loss will appear to be continuous, and will be increased at each pain. In accidental hæmorrhage, on the contrary, uterine contractions force the head into the lower segment of the uterus, where it acts as a ball valve, and prevents the external escape of blood.

The immediate source of the hæmorrhage is the separated part of the placenta and the bared portion of the uterine wall. J.M.Duncan<sup>1)</sup> points out that there are four places from which the hæmorrhage may come.

1st. Gush from maternal sinuses.

2nd. From the separated surface of the placenta.  
This is identical with No.1, but involves continuation of bleeding.

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1) Duncan. Mechanism of Natural and Morbid Parturition.  
Page 380 et sequa.



3rd. Circular sinus opened into at both extremities of separated portion.

4th. Bared surface of the Uterus.

The 1st source is, of course, temporary only, and so is the 3rd, as the circular sinus is not continuous round the Placenta. The 2nd. and 4th seem to be the great sources of the hæmorrhage. It must be remembered that No.4 can only occur if the uterus is relaxed. Dr.Mackenzie<sup>1)</sup> in a series of experiments showed that the blood flowed from the wall of the Uterus and not from the separated part of the Placenta. He took pregnant bitches for his experiments and partially separated the placenta in them.

Causes of the Hæmorrhage. Jacquemier

suggested that it was due to the fact that during the first six months the fundus of the uterus was specially developed, as shown by its pyriform shape, and the placenta, being usually attached there, then attains its maximum of growth and so its relations remain undisturbed. In the last three months, on the contrary, the lower uterine segment becomes specially developed, while the placenta remains stationary in size and so there is a loss of proportion between the two and resulting detachment of the Placenta. This theory does

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1) Playfair. Science & Art of Midwifery, vol.ii, p.90.



not commend itself to me, as there is no evidence to show that the lower uterine segment is specially developed during the last three months. Also the miscarriages that I have attended, do not bear out the supposition, that the placenta grows more in the first six than in the last three months of utero gestation, or, more correctly, the middle three and last three months respectively.

Barnes<sup>1)</sup> supposes that there is excessive growth on the part of the Placenta during the last three months, which thus grows away from its attachments. Neither of these theories fit in with the fact that frequently hæmorrhage does not occur until labour sets in. Matthews Duncan<sup>2)</sup> first points out that hæmorrhage is often monthly in its periodicity and says that there are analogous bleedings to be seen in cases of fibroids in which the hæmorrhage has also a monthly periodicity. He believes there to be four causes for this hæmorrhage

1st. Rupture of the utero placental vessel at or above internal os.

2nd. Rupture of a marginal placental sinus when the placentation is only marginal.

3rd. By partial separation of placenta from acci-

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1) Barnes. Lectures on Obstetric operations, 2ndEd<sup>n</sup>. p.401.

2) Duncam. Edinburgh Medical Journal November 1873.

dental causes, such as a jerk or fall.

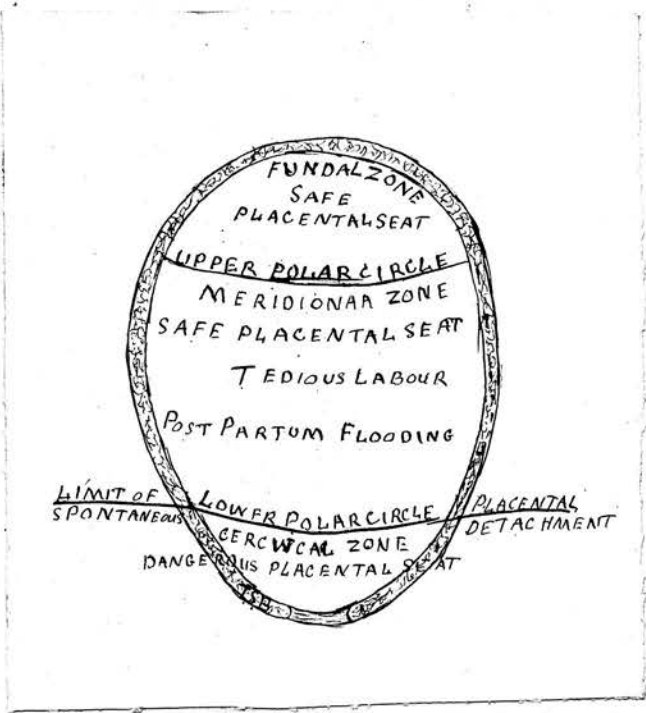
- 4th. By partial separation of placenta, the consequence of uterine pains producing a small amount of dilatation of os.

He adduces as a proof that cause 1 can occur, the frequent occurrences of placental apoplexy, and says that the opening may be produced by violence to, or disease of part, or increased blood pressure. Duncan's third cause is exactly the same as the cause of accidental hæmorrhage and is in no way peculiar to placenta prævia. The fourth cause is simply commencing premature labour. I rather tend to the belief that it is due to an extra strong contraction, which occur all through labour, separating a bit of the placenta. Also Placenta prævia is exceedingly rare in primiparæ, and in multiparæ it is exceedingly common to find the os partially opened out during the last months of pregnancy.

#### Natural termination.

- 1st. The hæmorrhage may be so severe that the woman dies.
- 2nd. In incomplete Placenta Prævia, after the Placenta has been separated from the area of spontaneous detachment, the labour is in every respect a normal labour and may be terminated naturally without assistance.
- 3rd. The Placenta may become entirely detached and the child then born naturally.

The second termination is accounted for by



Barnes' theory<sup>1)</sup> He divides the uterus into three zones by two latitudinal lines or circles. The upper circle he calls the upper Polar Circle, and above it is the fundus, which is, he says, the most natural and safest placental seat. The lower circle is the lower Polar Circle and above it and below the upper polar circle is the meridional zone. It is a safe placental seat, but he gives a long list of evils that may happen if the placenta should be attached here, such as post partum flooding, lingering labour and retention of the placenta.

Below the lower polar<sup>circle</sup> is the cervical zone, or region of dangerous placental seat, because all the placenta attached to this portion must be separated during labour. The lower Polar Circle is therefore the limit of spontaneous placental detachment.

Barnes then enters on his method of fixing the position of this lower Polar Circle, which we have already studied. Case No. II certainly bears out this theory as I did not arrive until the os was nearly fully dilated and probably the child would have been born without assistance had it been lying naturally.

Prognosis varies very much. Thus Read, in

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1) Barnes. On Placenta Prævia, p.77.

his treatise on placenta prævia estimates the maternal mortality as high as 1 in  $4\frac{1}{2}$ . Churchill estimates it at 1 in 3 and Barnes as 1 in  $8\frac{1}{2}$ . Davis<sup>1)</sup> out of 26 cases has only 2 deaths or a proportion of 1 in 13. The dangers to the mother are due to:

- 1st. The severe hæmorrhage
- 2nd. The operative means necessary for her relief.
- 3rd. The possibility of rupturing the cervix.  
This is more dangerous in this disease than it usually is on account of the extra vascularity of the parts.
- 4th. There is greater risk of puerperal septicaemia, both on account of the operative means employed, and because the placental site, being low down, is more exposed to external influences. This last risk is more important on account of the possibility of bits of the placenta being left attached to the uterine walls.
- 5th. There is a risk of phlegmasia alba dolens, which is more prone to occur after severe hæmorrhage.

The dangers to the child need not be specially enumerated. Davis lost 20 in 26 labours<sup>2)</sup> or 76.9%, Schwartz lost 75%, Hecker 67%, Barnes 64%, Mühr, 64%, Fritsch 60%, Spiegelberg 50% and Braun 50%.

Frequency. Davis<sup>3)</sup> met with 26 cases in which

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- 1) Davis. Parturition and its difficulties, p.332.
  - 2) Davis. op.cit, p.332.
  - 3) Davis. op.cit, p.322.



this condition existed, in 13,783 labours or 1 in every 535.2 labours.

Treatment. It may be taken as an axiom that once the hæmorrhage has occurred, the patient's life is in danger until the process of delivery has been successfully concluded; the degree of danger being probably proportionate to the amount of placenta situated within the area of spontaneous detachment. This does not mean to say that the patient's life is not in danger unless hæmorrhage has occurred, for, at any moment, severe and even fatal hæmorrhage may set in; but the condition is not likely to be suspected until it has shown itself by this flooding. The second rule is that in almost every case of placenta prævia active interference is necessary. The reason for this is plain when one remembers that the os must dilate before the child can be born, and dilatation of the os is coincident with separation of the placenta. The first question, in treatment, that arises is, are we at any time justified in temporising? A few years ago most books on Midwifery described means to arrest the hæmorrhage temporarily. Thus, we were told to place our patient on a hard mattress, with a low pillow and without too many bed clothes. We were to keep the room cool and to apply cold cloths

over the vulva, and to give acetate of lead and opium. Sometimes, we were told to apply pieces of alum to the cervix in the hope of it having a hæmstatic effect. Dempsey<sup>1)</sup> relates a case treated in this last way, and claims for it that it:

- 1st. produces constriction of the uterine sinuses by hardening and contracting the muscular fibres in the lower segment of the uterus;
- 2nd. it appears to assist in causing thrombosis of the sinuses;
- 3rd. it produces a tenacious coagulum of the effused blood, which acts as an additional tampon;
- 4th. it does not prevent dilatation of the os;
- 5th. in a limited experience, it appears to obviate the necessity of active interference until the os is sufficiently dilated.

Claims Nos. 1 and 4 appears to me to be contradictory.

All these means for the temporary arrest of flooding may or may not be successful, and even if they are, our patient is no better off. Dr. Greenhalgh<sup>2)</sup> in a discussion before the Obstetrical Society, advised the immediate induction of premature labour in all cases as soon as the condition is ascertained. Six Metropolitan teachers of Midwifery are said to have taken part in the discussion and all agreed with Dr. Greenhalgh. In connection with this question, we must

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1) Dempsey. British Medical Journal, July 26th.

2) Greenhalgh. Transactions of the Obstetrical Society, vol vi, p.188.

consider at what time the condition usually shows itself, and I have already mentioned that it is about the 7th month. At this time also the child is of a viable age and so we may put it out of account in considering the question. Nor is there any reason, apart from the possibility of the child not being viable why we should temporise. Neither the safety of the mother, nor that of the child is likely to be increased by such measures. A live child is much more likely to be born if pregnancy is terminated at once, than if we wait till the mother is exhausted by repeated severe bleedings. I therefore come to the conclusion that we are only justified in temporising if the child is not viable, and then only if the loss is not severe, or if we wish to procure further assistance before bringing the case to a conclusion.

Having arrived at this conclusion, what means are we to take to terminate pregnancy, and, at the same time, to check or control the flooding? The means may be classified as follows:

1. Puncture of the Membranes.
2. Plugging the vagina or cervix.
3. Turning.
4. Partial or complete separation of the placenta.

1. Puncture of Membranes. Barnes<sup>1)</sup> is a strong advocate of this method, which was introduced by Dr. Cohen<sup>2)</sup> of Hamburg. The whole method consists in first finding out to which side of the uterus the greatest bulk of the placenta is attached, separate the placenta from the other side of the uterus, and, as soon as the edge of the placenta is felt, rupture the membranes. This allows the smaller portion of the placenta to be carried over to the other side and the loss of the liquor amnii promotes the uterine contractions and expedites labour. The great objections to this theory are that it interferes with the proper dilatation of the os, and renders Turning, if necessary, much more difficult. It is a well-known obstetrical fact, thoroughly borne out by practice, that premature rupture of the membranes means a slow labour<sup>3)</sup> and in placenta prævia the object is to promote delivery as much as we safely can. The first objection, however, is not of so much importance as the cervix is usually relaxed by the bleeding and therefore dilates easier than it otherwise would, and also we can imitate the action of the bag of waters by means of

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1) Barnes. On Placenta Prævia, p.106.

2) Cohen. Meine Methode bei Placenta Prævia Während der Geburtzeit. "Monatsschrift für Geburtskunde" April 1856.

3) Barbour. Anatomy of Labour, p.57.

Barnes' hydrostatic dilators. The second objection cannot be answered, it does interfere with turning. If one accepts that as a method of treatment, then the membranes ought not to be ruptured until one is ready to turn.

II. Plugging the Vagina, or, much better, the cervix, may be resorted to if the os is not sufficiently open for the operation of turning. Plugging the vagina may be done by what is known as the "kite tail" method and one must be particularly careful to plug thoroughly. The plugs may or may not be soaked in vinegar or other hæmostatic, just as your taste and experience direct you. Moreau advocates the application of the cut end of a lemon to the cervix and kept in its place by vaginal plugs. I am no advocate of plugging with a soft silk handkerchief, as some recommend, as the operation must be done thoroughly to do any good. The great difficulty is to get the vagina completely filled, as towards the end of pregnancy, one could almost get a bed-room towel in as easily as a soft silk handkerchief. I am only in favour of this method if the os is so completely closed that it is impossible to get a Barnes' bag into it. If it is possible to get one in, it is much better to use that than to plug the vagina, be-



cause it dilates the os and so expedites labour and at the same time, controls the hæmorrhage, partly by pressing on the bleeding part, and partly by preventing the blood escaping externally and so only allowing it a passage into a fully-distended uterus. After the plug is in situ, it is as well to promote uterine contractions by means of abdominal friction, or the application of a firm binder, or by the administration of a repeated dose of ergot. Dr. Greenhalgh advises the use of an oblong ball, composed of india-rubber and covered with spongiopiline, as a plug. He dilated it with air, but water is a much better substance to dilate with than air, because it is very much less compressible. There is an imperfection which may as well be mentioned now as afterwards, in the present form of Barnes' bags. On looking at them, we see that they have the vaginal portion of the same thickness as the intra-uterine portion. The effect of this is that when a pain comes on, it compresses the intra-uterine portion, forcing its contents into the vaginal portion, which, consequently gets over distended and the bag assumes a cone-shape with the apex above. The result of this is that the bag is frequently expelled from the cervix, and, therefore, it is our duty to remain by our patient

from the time of the first introduction of the bag until labour is completed.

III. Turning, is the third method of treatment. We limit the turn in Placenta Prævia to the podalic form, or causing the lower extremity to present instead of the vertex. For long, this has been considered the best remedy for this condition, because when once the child is turned, and one leg delivered through the os the soft presenting part acts as an efficient plug in preventing further loss, and, being cone-shaped, it dilates the os quicker than the hard head. Once the child is turned, there is no need to hurry labour, no need to attempt the positively criminal "accouchement forcé", but, keeping the breech gently pressed against the os, we have time to take measures to promote uterine contractions. Amongst many practitioners, the proper treatment for placenta prævia is to "turn and deliver"<sup>1)</sup> based, probably, upon the old highwayman's formula "Stand and deliver!"; and in both cases it is the "deliver" which does the mischief. The best method of performing this version, is by the bimanual method first prominently brought before obstetricians by Braxton Hicks<sup>2)</sup>. This method can be practised as soon as the

1) Whitla. Dictionary of Treatment.  
2) Braxton Hicks. Turning in a deformed Pelvis. p.77.

os is sufficiently open to admit two fingers. There is no more difficulty in turning<sup>in</sup> central placenta praevia than in the marginal form, but the question arises whether it is better to deliver the child through the placenta or to separate the placenta from one side of the uterus and bring the child through between them? Rigby<sup>1)</sup> recommends that the child be brought through the placenta, but I think it is better to bring it between the Uterine Wall, which has the least amount of placenta attached to it, and the placenta.

IV. Partial or complete separation of the Placenta. Sir J.Y.Simpson<sup>2)</sup> from a consideration of eight cases in which he found that hæmorrhage ceased on complete expulsion of the placenta by natural means, advocated the complete separation of the placenta in certain cases. These are:

1. When the child is dead.
2. When the child is not viable.
3. When hæmorrhage is great and the os uteri not yet sufficiently dilated for turning.
4. When the pelvic passages are too small for safe and easy turning.
5. When the mother is too exhausted for turning.

1) Rigby. Essay on the Uterine Hæmorrhage, etc.p.60.

2) Simpson. Communication to the Edin. Med. Chirurgical Society, .1844.

6. When evacuation of the Liquor Amnii fails.

7. When the Uterus<sup>is</sup><sub>1)</sub> too firmly contracted for turning.

Simpson first tried this method on the 1st of October 1844, but the method had been tried before his time. Collins, Ramsbotham, Baudelocque, Lowenhardt, etc., all recorded cases treated in this way. Simpson thought that the placenta was the chief source of the haemorrhage; but this is known not to be the case. It is due to Barnes<sup>2)</sup>, however, that we know that it is not necessary to separate the whole placenta, because there is a spontaneous arrest of haemorrhage when that part of the placenta attached to the area of spontaneous detachment is separated, provided always that contractions of the uterus are sufficiently strong to close up the open mouths of the uterine vessels, just as they do when in a case of twins, the first placenta is born before the second child. This area of spontaneous detachment, as I have already said, comprises according to Barnes and Duncan, all that part of the lower pole of the uterus which must dilate to allow of the passage of the child. Barnes<sup>3)</sup> as I have already mentioned, under puncture of the

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1) Simpson. Selected Obstetrical Works, p.68.

2) Barnes. Obstetrical Operations, p.417.

3) Barnes. On Placenta Praevia.

membranes separates the placenta from one side only of the uterus and then punctures the membrane. If that fails, he advises the finger to be swept round the area of spontaneous detachment, separating the placenta from the uterine wall. Duncan<sup>1)</sup> criticises Simpson's views, that only one in 22 cases bleed after separation of the placenta, and shows that really one in every two bleed. But artificial separation of the placenta cannot be relied on to check haemorrhage as, if uterine contractions are not present, one simply increases the bleeding surface. Natural separation of the placenta implies a certain amount of energy in Labour, which may be relied on to close up the uterine vessels; but artificial separation may be performed with a perfectly passive uterus. Duncan<sup>2)</sup> holds that partial separation joins all the necessary gushes into one, but there is only a questionable advantage in causing a patient to lose, say, one ounce of blood in a short space, instead of distributing the same amount of loss over a longer period of time.

Having considered the various methods of treatment, at our disposal, let us now sum up what we should do in a particular case.

There seems to be a large consensus of opinion

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1) Mechanism of Natural & Morbid Parturition, p.408.

2) Duncan op.cit, p.412.



that the proper treatment is to turn as early as possible with or without preliminary partial separation of the placenta. Murphy<sup>1)</sup> records 23 cases treated this way without one death. Treub<sup>2)</sup> of Leyden, has 13 cases treated between 1887 and 1889 with only one death, which death he attributed to the use of a dirty sponge by a midwife, setting up pyæmic phlebitis. Lewers<sup>3)</sup> also treats his cases in the same way, but recommends the use of hot vaginal douches as an adjuvant to stimulate the uterus, a recommendation with which I do not altogether agree. Dakin<sup>4)</sup> is practically of the same opinion. The practice is to separate version from extraction and not to resort to the old accouchement forçé. The treatment that I personally prefer, largely from theoretic grounds, as I have only met with three cases, but based also on the opinions of others, is as follows. If one meets with a case before we can reasonably suppose the child to be viable, then treat it according to the severity of the hæmorrhage; Thus, if the hæmorrhage is not very severe, we may endeavour to temporise,

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1) Murphy. The treatment of Placenta Prævia read before the Northumberland & Durham Medical Society.

2) Treub. British Medical Journal, Jan. 17th 1891.

3) Lewers. Medical Annual, 1891.

4) Dakin. Medical Annual, 1888.

using for this purpose the various means already mentioned, along with the administration of a drug I have found very valuable in the treatment of haemorrhage of threatened abortion, i.e., *Hydrastis Canadensis*, preferably the Tincture. If, however, the haemorrhage is endangering life either by its amount or long persistence, then treat the case as if the child were viable.

Supposing, however, that we meet with a case after the 7th month, what are we to do? The proper treatment then is, as soon as the case is diagnosed, to make all preparations, procure assistance, if necessary, and to go to the patient prepared to deliver her as soon as one safely can. On arriving at the case, if we find the os large enough to turn, do so, and deliver one leg through the os by gentle traction, on which all haemorrhage may be controlled. Now, by the administration of Ergot, and by the use of abdominal friction, etc., endeavour to secure contraction of the Uterus. There is less objection to giving Ergot in these cases, because there is generally a tendency to uterine inertia. Do not hurry delivery, but leave it to Nature. As soon as the os has sufficiently dilated, deliver the other leg, to be followed by the breech and head in turn, but

above all, do not hurry matters. It is better, as soon as one leg is delivered, to wrap a warm flannel round it, as this keeps it warm and prevents the cold air stimulating the child to breathe, and also allows of a more certain grip on its somewhat greasy surface. If haemorrhage recur after the birth of the child, then treat it as haemorrhage during the third stage, from the common form of which it varies not at all. I am of opinion that the gush immediately after the birth of the child, which one reads about, is due to hurrying delivery, and want of precaution in seeing that the uterus contracts down upon the child.

If, however, the os is not sufficiently open for this procedure, what are we to do? Here arises the question of partial separation of the placenta. (I do not think entire separation of the placenta to be justifiable because it implies the birth of a dead child, and there are no certain means of knowing the child to be dead). Although the placenta must be separated by the force of labour, we have no means of judging how far this separation will extend. Let us look at the analogy of the membranes in normal labour, and we see that stretching and thinning of the lower uterine segment does not necessarily imply separation of the membranes over its whole extent,<sup>1)</sup>

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1) Barbour. Anatomy of Labour p.49.

and with the os the size of the "palm of the hand," the membranes were only separated for 2 inches from the os internum.<sup>1)</sup> In Schroeder's section, from which this last statement is made, the area of spontaneous detachment extends for two and a half inches from the internal os. The membranes, and I believe also the placenta, are separated from the uterine walls by being forced down through the os in a way I will say more on in a later section; but there is nothing to prove that dilatation of the os itself is sufficient to separate the membranes or placenta from the whole of the area of spontaneous detachment. What I mean, and am trying to express, is that the area of spontaneous detachment only exists when the dilating force is the uterine contractions and the membranes or placenta are not necessarily separated from the whole of this area when dilatation of the os is effected artificially. The membranes must of course be detached from part of this area whatever dilating force is used, natural or artificial, and therefore we may artificially separate the placenta from the lowest portion of the area, not more, I think, than 1 inch from the os internum. The partial separation has no effect on the amount of the flooding, as only uterine

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1) Barbour. Anatomy of Labour, p.54.

contractions or some method of sealing up the open mouths of the vessels will check that, but it removes the obstacle of the placental attachment to the dilatation of the os, and allows of the introduction of Barnes' bags which will prevent the flooding in the way mentioned before. That the placental attachment is an obstacle to the dilatation of the os is seen from the fact that students are taught to see that the membranes are not adherent in cases of slow dilatation of the os, and if the membranes, then so much more the placenta. As soon as we have dilated the os sufficiently by Barnes' bag, turn, and treat the case in the way mentioned above.

If the os is not sufficiently dilated to admit a Barnes' bag, then we may either dilate it first with Hegar's or some other dilator, and then introduce the bag, or we may plug the vagina. This plug will control the hæmorrhage, though not so efficiently as the cervical plug, and will set up uterine pains and we hope that in a few hours the case will have sufficiently advanced to at least permit of the introduction of a Barnes' dilator. As a rule, however, the os will generally be found to be so relaxed by the hæmorrhage that it will be possible to introduce one of the hydrostatic dilators.



In some cases of marginal placenta prævia it will be quite sufficient to rupture the membranes and to deliver if necessary with the forceps.

I have said nothing about the use of stimulants, but, obviously, they must be given if necessary. As regards the use of an anaesthetic, each case must be judged on its own merits, - the mere existence of a prævious placenta does not contraindicate its use.

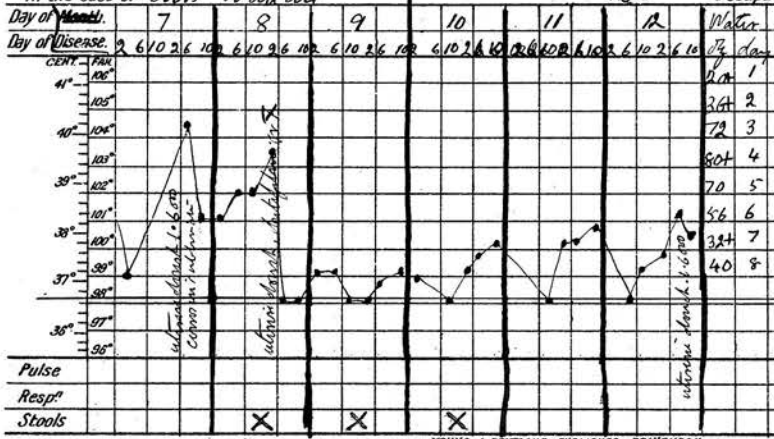
Illustrative Cases.    Case 1. Mrs. Wallace, ii para. admitted May 22nd 1891 to the Royal Maternity Hospital at 5 p.m. Patient states that she is only at her seventh month of pregnancy, and that she has had two severe bleedings. The first was three nights before admission, when she lost "about half a chamber-pot full"; the second was on the morning of admission, this one being not quite so excessive. Patient is fairly stout and markedly oedematous, both upper and lower limbs pitting on pressure. She states that her legs have been swollen for fully a month. Her previous labour was about six years ago, and lasted about 30 hours but was not, so far as she knows, specially difficult, although forceps were used. The child, a girl, was alive and healthy. She was not

dropsical in her first pregnancy, and made a good recovery. During the present pregnancy, patient has never been well, suffering from constant sickness, headache, and general ill-health. She has also been troubled with a nasty cough. For several months past, she has been troubled with frequency of micturition, having often to rise at night to pass water. She has not met with any accident during the course of the present pregnancy. On Tuesday night last (19th instant) a severe bleeding came on, without any apparent cause. She was treated by Dr. Booth, who administered morphia. Again, on the 22nd, hæmorrhage occurred, and Dr. Booth being unable to diagnose the condition on account of the obesity (dropsy) advised her to come to the Maternity Hospital. About one hour after admission, a rather profuse flow came on, and an attempt was made to reach the cervix, but it had to be abandoned on account of the dropsy completely closing in the ostium vagina. Chloroform was suggested, but she refused it, and as the flow ceased she was left alone. Dr. Underhill saw her at 9.30 p.m. Very little more hæmorrhage having occurred. The foetal heart since admission has been quite inaudible and the patient says she has not felt movement for several days. Dr. C. E. U. examined her under chloroform and found the placenta presenting at the os.

There was a good deal of blood clot in the vagina, and the cervix was very soft. He perforated the placenta and felt to which side of the uterine walls least of the placenta was attached. He then separated the placenta from this side of the uterus, seized one knee and brought it down through the os. At the same time, the head was pressed upwards by the external hand. The os dilated fairly well, and in 50 minutes the child was extracted dead. The uterus contracted well, and the placenta was expelled almost immediately after with the membranes entire. Almost no bleeding occurred during delivery and very little post-partum. Patient looked very pale and exhausted afterwards, but her pulse was good - 90 per minute. She suffered a little from sickness during the night but slept well. The urine had to be drawn off next morning, but in the evening, the application of a hot cloth to the vulva, caused her to pass water freely. On the 24th the blood was examined microscopically and there was found to be 2,200,000 corpuscles of good regular shape. There was 45% of haemoglobin.

Puerperium. Patient at first progressed well, the urine became more copiously excreted and the dropsy rapidly diminished. On the sixth day of the puerperium, she felt a little cold, and the temper-

Records of Temperature, Pulse, Respiration and Stools, from Day  
 In the case of Mrs. Wolkow Aged Occupational



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ature rose to 104.6° F.. A uterine douche was given and the temperature fell. The next day, the temperature rose again, and the lochia were noticed to be slightly offensive. A second douche was given and the temperature fell to 101° F. On the eighth puerperal day, the temperature rose again to 103.4° but dropped again after a uterine douche had been given followed by a dose Antifebrin, subsequently the patient did well.

Case II. Mrs. Lawson, Doe Park, Cotherstone.

V para. Age unknown. Patient felt pain on the evening of the 2nd February 1892, being then only at her sixth month. The four previous children had all been born at periods varying from the sixth to the eighth month, and patient has had several third month abortions, she does not know how many. None of the children lived longer than a few hours, except one, born at the eighth month, which lived for a few weeks, and died of "inflammation." Patient is much disappointed with this, as she desires a live child. On the morning of the 3rd February, patient sent to the surgery and obtained from Dr. Sevier a mixture containing nepenthe and bromide of potassium designed to allay the pains. After taking the mixture for the first time, haemorrhage occurred with the pains, and she



sent for assistance. I reached her about 11 p.m. and made a vaginal examination. I found the membrane presenting and the os high up and out of reach but undoubtedly from the size of the bag of membranes well dilated. I ruptured the bag of membranes, but could still feel no presenting part. I then palpated the abdomen and discovered the child lying transversely. I then endeavoured to rectify its position, by external manipulation, but failed. I then gently passed my hand into the vagina and two fingers into the os, which could admit three easily. The first thing I felt was the edge of the placenta presenting and partially detached from the uterine surface. I then turned the child by the bipolar method, caught the right leg and brought it down; the breech acted as an efficient plug and the haemorrhage which had not been severe since my arrival, ceased. The os dilated nicely and soon I was able to deliver the other leg. I then held both legs, like a pair of reins and delivered the body of the child and the arms. There was a little difficulty with the head, which lay occiput anterior, but it came all right. During the birth of the child, which was dead, I gave *3ij* of liquor Secalis Ammoniata, as there was uterine inertia. Having delivered the child, I Credé'd the placenta out, the uterus responding well to stimulation and no

post-partum haemorrhage occurred. When I left the patient she was quite well and comfortable.

Puerperium. February 4th patient had a rigor in the early part of the day. I saw her about 5 p.m. Pulse was then 120 per minute, temperature 100, and no lochial smell, or anything abnormal to be detected except that patient was sweating profusely.

February 5th. Patient expresses herself as much more comfortable. Pulse was slow, but temperature was up to 101.2. No lochial smell. I gave an antiseptic vaginal douche, and ordered for her the following mixture.

Tinct. Ferri. Perch. Edin. Phar.  $\frac{3i}{j}$   
Quinae Sulph.....  $\frac{3i}{j}$   
Acid Sulph. dil. ....  $\frac{q. s.}{j}$   
Aquamad.....  $\frac{3 \text{ vi}}{j}$   $\frac{m. s.}{j}$   
Sig.  $\frac{3}{j}$  ter in die.

February 7th. Pulse 75, temperature 98.4. Has had four doses of the mixture. Lochia normal in odour less abundant and less coloured. Patient perfectly comfortable, but very much cast down over the loss of her baby, which weighs on her spirits terribly. Patient, I hear from Dr. Sevier, is subject to attacks of high temperature post-partum.

Microscopical examination of the Placenta. by Dr. Noel Paton, assisted by Dr. Gulland. "The placenta

has the appearance of one between the sixth and eighth month, the epithelium of the villi being still more or less cubical. Slight fibroid changes are to be observed in the villous stems, etc., but no endarteritis is present.

Case 3. Mrs. Walker Thorngate, Barnard Castle, ii-para, went into labour on the 13th of December 1892. My chief, Dr. Sevier, saw her early in the afternoon, but, she being only in the early stages, he left her, leaving orders to be called again. Later on, as I was passing the door, I was called up and found the cervix nearly fully dilated, the head presenting L.O.A. I left, to tell Dr. Sevier, and while waiting for him at home, patient sent again. I went down and found the os now fully dilated, so I ruptured the membranes. The head descended the pelvic cavity well and quickly, until it reached the outlet, when it was grasped between the coccyx and the arch of the pubis. No rotation had as yet occurred. I tried the method of giving aid known as *expressio foeti*, but failed. Labour pains were not very strong and I found little pressure during a pain exerted on my finger, which I introduced between the head and the ramus of the pubes. I then gave  $\frac{3}{4}$  of *Liquor Secalis Ammoniata*, as only a

little more force was necessary and held the forceps in readiness for use, if need be. The head, which had been nearly stationary for one and a half hours, was born about a quarter of an hour afterwards, rotation occurring on the perinaeum. I have not mentioned that when Dr. Sevier saw her, his hand returned from the vagina quite free from blood, while, when I examined her the first time, my fingers came out all bloody, and on my second visit, I found that a little blood had been lost, about one or two ounces, nothing of any moment. After the birth of the child, which was a male, the uterus contracted well, and twenty minutes after, I expressed the placenta. On examining the placenta, the first thing that struck me was that the membranes were not inverted as usual and the second thing was that the tear was only two inches distant from the placental edge. I think that the placenta had just touched the unsafe zone and the membranes had been separated right up to its edge. Possibly a little of the placenta had been separated also. The entire separation of the membranes below the placenta had allowed it to slip down between the uterine walls and the membranes and not, as is usually the case, through the rent in the membranes; hence we get non-inversion of the membranes.

I have included this case, as it is interesting in its way, and not because it was in any way a difficult case! It is just possible the placenta was slightly prævia.

Case II is also not very bad and in it one noticed that rupture of the membranes practically stopped the bleeding, the turning being resorted to on account of the malposition of the child.



### S E C T I O N    I I I .

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Haemorrhage from a normally situated placenta - commonly called accidental Haemorrhage. Edward Rigby of Norwich applied this term to it because he said the separation of the placenta "must be due to some accidental circumstance."<sup>1)</sup> He was of opinion that this form of haemorrhage necessitated only palliative treatment, an opinion that he subsequently modified.

Definition is practically expressed by its name. It is simply haemorrhage from a normally situated placenta and due to some accidental cause, as a fall or blow.

Frequency. Davis<sup>2)</sup> met with 42 cases in 13,783 labours or one in every 328.166 deliveries.

Varieties are two in number. In the first variety the blood escapes between the membranes and the uterine wall and appears externally. This constitutes the typical Accidental Haemorrhage.

But there is another variety in which the blood fails to find an external outlet and collects internally, giving rise to dangerous symptoms and even proving fatal before the nature of the case is made out. This latter

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1) - Rigby.    Essay on Uterine Haemorrhage    P.14.

2) - Davis.    Parturition and its difficulties.    P.324.

form is not so rare as the small amount of literature on the subject would lead us to think. Dr. Goodall<sup>1)</sup> has collected 106 instances in which this complication occurred. Case IV. started in this way, but subsequently the haemorrhage escaped externally.

Causes may be divided into predisposing and exciting. Amongst the predisposing causes we may include multiparity, as this condition is generally met with in people who have borne many children, more especially if they are of weakly constitution or impaired health. Some constitutional states such as syphilis, albuminuria, or intense anaemia also predispose to it. The local predisposing causes are degeneration and disease of the placenta and old-standing endometritis.

The exciting causes are, in most cases, some exertion or blow upon the abdomen, which the patient has suffered.

Time of occurrence. It may occur during pregnancy or labour. It is seldom seen until the later months of pregnancy on account of the larger size of the placental vessels then.

Symptoms. The external escape of blood, coupled with the absence of the placenta from the lower uterine segment, is the only symptom of the first form of

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1) Goodall. American Journal of Obstetrics, Vol. II.

this haemorrhage. The diagnosis of such a condition is, of course, easy. But it is quite otherwise in the concealed form, the diagnosis of which is often a matter of considerable difficulty. In this concealed form the haemorrhage may form a retro-placental blood clot, or it may separate the margin of the placenta and collect between the membranes and the uterus either towards the cervix, when the presenting part prevents its escape, or fundus. In this latter case the blood is apt to cause very painful distension of the uterus. It is as well to note here that the blood cannot find its way into the amniotic cavity because the pressure on both sides of the membranes are equal. That is, the greater the pressure of the effused blood outside the membranes, the greater is the counter pressure of the liquor amnii inside. Playfair<sup>1)</sup> states that it can become mixed with the amniotic fluid, but that must be due to some further "accidental" cause. The most prominent symptom of this concealed form is extreme collapse, for which no cause can be assigned. There are also the various symptoms due to loss of blood, such as pallor, coldness, restlessness, rapid breathing, accompanied by sighs and yawns, and a feeble, quick pulse. Uterine pain of a tearing or cramping character is nearly always present, and this pain is often localised to one part of the uterus.

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1) Playfair. Science and Art of Midwifery. Vol.ii., p.

Frequently palpation over the seat of pain will reveal hardness or irregularity in the shape of the uterus there. There may be a rapid increase in the size of the uterus, as pointed out by Cazeaux and others. This is not so apparent towards the end of pregnancy, as then an enormous amount of haemorrhage will be necessary before the increased size can be appreciated. Chevalier<sup>1)</sup> records a case in which Post Mortem Caesarean section was performed under impression that pregnancy had advanced to term, but only a third month foetus was found. The only thing that is liable to be confounded with this condition is rupture of the uterus, but in it we have a totally different condition and history and confusion will only arise at first sight of the patient.

Prognosis to the mother is not altogether unfavourable when the blood escapes externally, as the nature of the case is at once apparent and remedial measures may be adopted early. On the other hand, in the concealed form the prognosis is more grave. Out of Goodall's 106 cases, 54 mothers died, a mortality of nearly 50½ per cent. This mortality is quite understandable when one thinks that extreme prostration may occur before the existence of haemorrhage is even suspected. The prognosis to the child,

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1) Chevalier. Journal de Médecine Clinicale et Pharmacologie, Vol. xxi., p. 363.

however, is very grave in both forms. Out of 107 children only 6 were born alive. This foetal mortality is partly due to the effused blood lacerating the placenta and causing the child to die of hæmorrhage, and partly to the separation of the placenta interfering with the proper oxygenation of its blood.

Treatment. When the hæmorrhage is but slight, it is only necessary to maintain a watchful attitude, ready to interfere should occasion arise. But, if the hæmorrhage is at all severe, or if the constitutional symptoms are so, we must endeavour to hasten delivery and to control the hæmorrhage while doing so. In this, as in all forms of hæmorrhage from the uterus, the great hæmostatic agent is uterine contraction. The first thing to do, therefore, is to rupture the membranes, as evacuation of the liquor amnii is the most rapid method of causing the uterus to contract. Frequently after this procedure the case may be left to nature. A firm abdominal binder will help in stimulating the uterus and will also prevent any accumulation of blood inside the uterus, for it must be remembered that, unless uterine contractions set in, there is now nothing to prevent this accumulation of blood. Contractions may also be advantageously solicited by the administration of a full dose of ergot, the use of hot douches into the vagina and by friction with the

hand on the fundus uteri. The easiest method of rubbing the uterus is to grasp the abdominal wall with the left hand and to rub the uterus with this, giving it a circular motion. As a rule anything tending to increase the existing shock must be avoided, but if the hæmorrhage continue, or if we have reason to suspect concealed hæmorrhage, we must hasten the delivery and then treat the case as one of hæmorrhage in the third stage. But before proceeding to operative measures, we must improve the general condition of our patient by the use of stimulants, warmth, &c. As a stimulant in midwifery cases there is nothing better than sulphuric ether given hypodermically. By using it in this way we are quite independent of the state of the stomach and are sure of the full effects of the drug being manifested in the shortest possible time. The buttocks will be found the handiest part for receiving the injection and the use of this part gives the least possible chance of any accident occurring, such as paralysis from the drug dissolving the nerve substance. If necessary, the dose can be repeated as often as the state of the patient demands it. Having got our patient into a satisfactory a condition as possible, we must proceed to hasten delivery. The best method is to turn, as by this way we are less dependent on the size of the os than



if we used forceps. The most preferable method of turning is by the bi-polar method as by its use we can turn earlier than if we had to pass our whole hand through the os. I think it ought to be a golden rule in midwifery never to pass one's hand into the uterus, or even amniotic cavity, unless it is impossible to aid nature by other means. The introduction of two fingers just through the cervix is surely less likely to do harm than the introduction of the hand and arm as far up as to be able to seize the knee. During this little digression we have been turning the child and now have one leg delivered through the os. By traction on this leg we can cause the breech to dilate the os slowly (the soft conical breech acting nearly as well for this purpose as the bag of membranes) and then we can complete the delivery in the usual way. This will leave a simple case of Post Partum Haemorrhage to treat should haemorrhage continue after the birth of the child. There is no necessity in hastening the delivery to descend to the accouchement forcée and drag a child by muscular force through undilated passages. Nor in any complication of labour is there any necessity to use force. I have seen a living child weighing 6lbs 8oz delivered through a flat

pelvis with a true conjugate of  $2\frac{3}{4}$  inches by the pressure of only two fingers on the traction handles of the forceps. If the os be not open enough for turning, then, after rupturing the membrane we must dilate it with Barnes bags and then proceed to deliver by turning as mentioned. Yet another condition arises in which the labour may have so far progressed that the head has descended into the pelvis, in which case the application of forceps will be all that is necessary.

Case IV. Agnes Strickland, age 22, admitted to Royal Maternity Hospital, Edinburgh, about 10 a.m. on 8th of June 1881. Patient was complaining of cramping pains in the lower part of the abdomen. The pains were only felt in front, not at all in the back. The patient's history at this time was very obscure, but next day it was ascertained that she had had one previous child. She had menstruated last about the beginning of January. At no time had she felt life. She also informed us that about three weeks ago she had tumbled down a stone stair on to her back. The cramping pains that she had complained of had begun that morning about 7 a.m. Patient was a very thin pale girl with obviously nothing much to come and go upon. The

face was pale, drawn, and anxious looking, in fact she gave one the impression that she was suffering from some severe shock or loss of blood. Patient was evidently in pain and was continually giving vent to low moans. Pulse was feeble and about 90 per minute. On palpation the uterine tumour was felt to extend to about three inches above the umbilicus and to be quite firm in consistence. The head was felt in the lower segment of the uterus. No foetal movements could be felt, nor could the heart be heard on auscultation. On vaginal examination the os was found to be firm and completely closed. Her water was drawn off and the bowels emptied by means of an enema of soap and water. Thirty minims of laudanum were then administered followed by twenty more in an hour's time. About 12 o'clock she was again examined and the condition found to be the same except that there was more distinct pain over the lower and left side of the abdomen where the placenta was afterwards found to be attached. About 12.30. some haemorrhage was found to have occurred and a diaper was applied to estimate its amount. This diaper, an average sized one, was soaked in 5 minutes. Another vaginal examination was then made and the os found to admit one

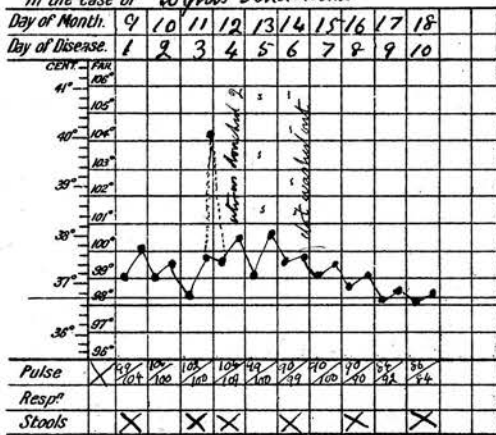
finger with difficulty. The cervix was as firm and rigid as leather. The head was presenting along with something that was afterwards found to be the child's ear and the cord. The vagina was then plugged with a kite tail plug and a full dose of ergot was given. About 2.30 blood was found to be oozing past the plug in considerable quantity so some fresh ones were introduced to keep the vagina tight. This had the effect of preventing the escape of blood for some time, but in about half an hour it again began to ooze out in fair quantity. Dr Milne Murray had been informed of the case and he arrived at 3. 45 P.M. Chloroform was then given, the plugs removed and the os found to be of sufficient size to admit Barnes bags. The membranes were then ruptured and two fingers introduced into the uterine cavity and the foetus turned by the combined method. The left leg was then caught, but traction on it was found to bring the head down as well and on examination both the arm and cord were found prolapsed. This was rectified and the breech kept pressed against the cervix by slight traction on the leg. Twenty minims sulphuric ether were then given and in half an hour another ten minims, both doses hypodermically. The child was ex-

tracted at a quarter to six, accompanied by the placenta, the whole manipulation having lasted about two hours. The difficulty of the case was much increased by the intense rigidity of the cervix. Little haemorrhage occurred after rupture of the membranes until the placenta was expelled, when a good deal of post partum haemorrhage occurred. This was checked by the use of an intra-uterine douch of corrosive sublimate 1.5000 at a temperature of 120 F. Almost immediately the water entered the uterus it contracted so forcibly as to drive the tube into the vagina when the rest of the douch was given. Two and a half grains of ergotin were also given subcutaneously. The post partum haemorrhage then stopped, but in an hour's time it again set in and another douch was given. This had the desired effect of completely stopping the haemorrhage.

Puerperium. I saw the patient afterwards at short intervals and as she was extremely weak an enema of 6 oz milk, one egg and  $\text{ʒ} \frac{1}{3}$  of brandy with forty minims of laudanum was given. The rectum was chosen as the patient was very sick and vomited frequently. Patient complained greatly of thirst so a drink of  $\text{ʒ} \frac{1}{4}$  acid tartrate of



Records of Temperature, Pulse, Respiration &  
In the case of *Agnes Strickland*





potash in a pint of water flavoured with lemon was given as the patient desired it. The patient's water was drawn off and a transfusion apparatus borrowed from the Royal Infirmary and held in readiness. Patient's condition at this time was extremely critical. At 11 P.M. one quarter of a grain of morphia was given hypodermically. At 2.A.M. on the 9th an enema of the same constituents as the last, but with only 10 M. of laudanum, was given. The pulse at this time, was very feeble still, = 106 per minute, but the patient's condition had much improved. I saw her again at 6 A.M. and she was now out of immediate danger. On the 10th and 11th of June she continued much the same. On these days she was given nutrient enemata twice a day and fed as much as possible by the mouth (chiefly with peptonised milk if my memory serves me right). The temperature during this time continued slightly high 99°4 but on the 11th it ran up to 104°F. rapidly falling however to 99°8 four hours later. On the morning of the 12th the lochia were noticed to be slightly offensive and the uterus was douched out. This was followed by a fall of about half a degree. On this day the patient was fed entirely by the mouth, on milk puddings, eggs, milk, toast,

etc. The intra-uterine douch was repeated in the evening. Patient kept better all the 13th and 14th, intra-uterine douches however, being given every 12 hours. On the 12th, slight tenderness had been noticed in the right lateral fornix and hot vaginal douches were ordered every 6 hours for this. On the 14th this tenderness had disappeared but there was still thickening in the posterior fornix. On this day (14th) patient passed a clot and from now onwards began steadily to improve. Patient was discharged on the 22nd, very pale and anaemic, but otherwise well.

Case V. Mrs Macdermott, age 22, resides at 22. South St James Street, Edinburgh. Patient, when about 6 years old, suffered from chorea and this appears to have been the starting point of a heart trouble under which she labours. Patient has had three previous pregnancies and her children are all living. Her last pregnancy terminated on March 10th 1890. Patient's face is much disfigured by a lupus of wide extent, the nose being destroyed and the cheeks covered with the disease. The membranes ruptured on the 19th of June at 11 P.M. without any pains occurring. The liquor amnii had been excessive and had drained away. On June 22nd patient sent to the Maternity Hospital about

5. P.M. and a student and two nurses were shortly after in attendance. Knowing that the patient suffered from heart disease I followed them as soon as possible and found her lying in bed but with no pains at all. On auscultating the heart I found a double mitral murmur and a suspicion of an aortic systolic one. The systolic mitral murmur was well heard over the left auricular appendix as well as in the mitral area. The pulse was quick and weak but fairly regular only every 10th or 12th beat being weaker than its fellows. The legs were markedly oedematous, body less so, and face not at all. There was no evidence of renal disease but the water was not examined just now. Patient was much troubled with a nasty cough. On palpation of the uterus it was felt to extend for two or three inches above the umbilicus. The head was presenting and foetal parts could be well felt in front. Foetal movements could be felt and the heart could be heard on auscultation. Patient told me that she had had one or two pains at 4. P.M. and that some discharge was coming away. She showed me a cloth stained with liquor amnii and some blood. I then passed my hand into the vagina and two fingers into the uterus and felt

for the placenta, but it was out of reach. I then left the patient alone as there were no pains and the discharge was simply blood-stained. At the end of an hour I was going to leave the case, having examined the diaper and found all right, when the patient told me that something was coming away. I looked and found a profuse haemorrhage occurring. I then administered chloroform and passed two fingers through the os and with them pressed the head up and to the right side. There it was held by Mr McClew while I depressed the breech with my left hand. My internal hand now caught an elbow and I delivered an arm in mistake for a leg. I soon discovered my error and by depressing the breech still further I got hold of the posterior knee into which I hooked my finger and then by pulling on it and pressing up the child's head externally I managed to turn. The posterior knee happened to be the left one and by slight traction on it I kept the breech pressed against the os which slowly dilated. I then delivered the right leg and Dr Milne Murray, who now arrived, took the case in hand. Dr Milne Murray delivered the body and arms in the usual manner but the head unfortunately stuck at the cervix and could not be delivered for some time during which

the pressure on the cord asphyxiated the child. So rigid was the cervix that the operation of perforation was entertained for the release of the head. However after twenty to thirty minutes the cervix yielded and a 7½ month foetus was born. While the head was at the os some haemorrhage occurred internally and a little blood gushed out after the head was born. This haemorrhage continued and so a hot intra-uterine douch was given to which the uterus responded nobly. Mr. M<sup>c</sup>Clew found it necessary to give a second douch two hours afterwards as a little more haemorrhage occurred. The head, to start with, was lying occiput posterior and it remained persistent in that position. Patient is not sure of her dates, but thinks she was unwell last in November. I examined the water afterwards and found it quite free from albumin. Patient's recovery was perfect.

These two cases of this form of haemorrhage both illustrate well the intense rigidity of the cervix in this form of haemorrhage in contradistinction to the dilatable cervix of placenta praevia. With regard to the first case there is but little to say. It started, as you will see, as the concealed form but subsequently the haemorrhage



showed itself externally.

The second case (Case V) is however extremely peculiar and I can offer no adequate explanation of it. It is possible, of course, that it was due to a ruptured placental vessel from backward pressure caused by the heart lesion, the counter pressure of the waters being absent. In regard to the treatment of it, I had to make up my mind rapidly as to what to do on account of the suddenness of onset of the loss, and I came to the conclusion that the best means was to empty the uterus as soon as one safely could and then to treat the case as post partum haemorrhage, if it continued. Nor do I think I could have improved on this method if I had had time to think it over.



## S E C T I O N    I V .

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Post Partum Hæmorrhage is by far the most frequent form of hæmorrhage from the pregnant uterus. The suddenness of its onset, its severity, and its alarming effects on the patient just as all immediate danger seems over, make it one of the most dreaded complications that may occur to the parturient woman. There is no emergency in labour which leaves less time for consultation and the patient's life must be saved by prompt action on the part of the accoucheur. Curiously enough this form of hæmorrhage has been noticed to be much more frequent in the practice of one obstetrician than in that of another and from this it has been deduced that its less frequent appearance is due to more skilful treatment on the part of the other obstetrician.

Definition. Properly speaking the term post partum hæmorrhage ought to be restricted to that form that occurs after the birth of the placenta as only then can it be truly Post Partum. But commonly enough the term is taken to include hæmorrhage during the third stage as well.

Frequency. Davis<sup>1)</sup> divides his statistics into

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1) Davis. Parturition and its Difficulties. p.324.

two heads, before and after the expulsion of the placenta. Of the first form in 13,783 labours, 64 cases occurred, or one in 215.359. Of the second form he records 35 cases or one in 393.8... He also records 14 cases of morbidly adherent placentæ in which we may reasonably suppose hæmorrhage to have occurred. If we include these 14 cases we see that hæmorrhage after the birth of the child occurs once in every 121.973 labours.

Varieties are two in number.

1st Hæmorrhage from a flaccid Uterus.

2nd Hæmorrhage from a contracted Uterus.

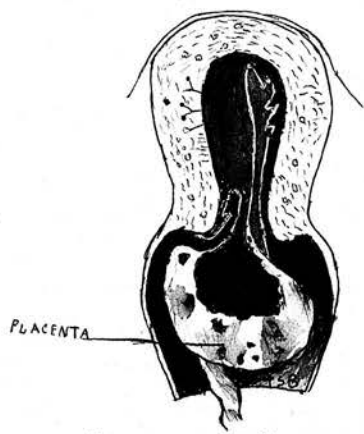
This last form may be again subdivided as we will afterwards see.

Hæmorrhage from a flaccid Uterus.

Source of the hæmorrhage. During the third stage we must remember that the placenta is separated from its attachment to the uterine wall and expelled from the genital tract. This separation entails the tearing through of the venous sinuses. The venous sinuses are, as we have already seen, large and destitute of valves so that if there is not a special means of arresting hæmorrhage from them, women would frequently bleed to death. Fortunately, however, for our patients' lives nature has a mode of arresting hæmorrhage from these

vessels and it is only in case of failure or disuse of this mode that hæmorrhage can occur. Obviously, as it is the separation of the placenta which allows of this hæmorrhage occurring, a knowledge of Nature's method of separating the placenta will help us in our study of hæmorrhage. At the beginning of the third stage of labour we have the uterus containing in its cavity the placenta amnion, chorion, and large and small celled layers of the decidua. At the end of the third stage the placenta amnion and chorion together with part of the decidua are altogether outside the body, and on microscopic examination we find that the line of separation is between the large and small celled layer of the serotina, leaving part attached to the inner surface of the uterus, and part to the placenta and membranes.<sup>1)</sup> The layer through which the separation occurs is termed the trabecular layer. Many of the older writers on this subject contented themselves with describing the mode of expulsion of the placenta. Thus Ramsbotham<sup>2)</sup> says that "the placenta passes through the vagina inverted, so that its foetal surface becomes external". Baudelocque<sup>3)</sup> says

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- 1) Berry Hart. Improved method of managing the third stage of Labour. Edinburgh Medical Journal, October 1888.
- 2) Ramsbotham. Obstetric Medicine and Surgery, p.126
- 3) Baudelocque. System of Midwifery. Heath's Translation. Vol.II, p.4.



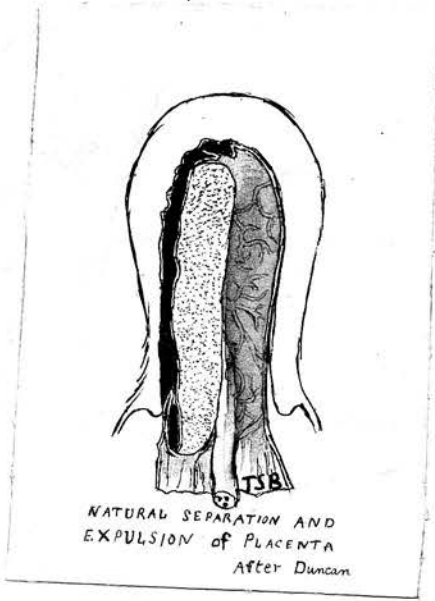
EXPULSION OF PLACENTA  
AFTER SCHULTZE.

that "sometimes the separation begins at the centre of the placenta and sometimes at one point of the circumference, which produce different phenomena. In the former case the middle of the placenta being pushed forward, it forms a bag behind, which fills with blood, and it presents that side to the touch which is covered with membrane and vessels. The placenta forms nearly a similar bag, and presents in the same manner when it begins to separate from the uterus at that part of its edge, which is furthest from the orifice. But things go on differently when the separation begins at its lower part, especially if it be in the neighbourhood of the orifice. In this latter case the placenta rolls itself up in the form of a cylinder, and according to the length of the uterus, so as to present its infractious surface to the touch, and its exit is always preceded by a little blood".

Schultze<sup>1)</sup> describes the hæmorrhage from the uterine sinuses as pushing down the placenta. Rigby<sup>2)</sup> agrees with these writers, but he doubts whether or not this presentation of the foetal surface is due to traction on the cord. This method certainly entails a very consid-

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1) Schultze. Compendium der Geburtskunde. S.84  
2) Rigby. System of Midwifery. p.103.



NATURAL SEPARATION AND  
EXPULSION of PLACENTA  
After Duncan

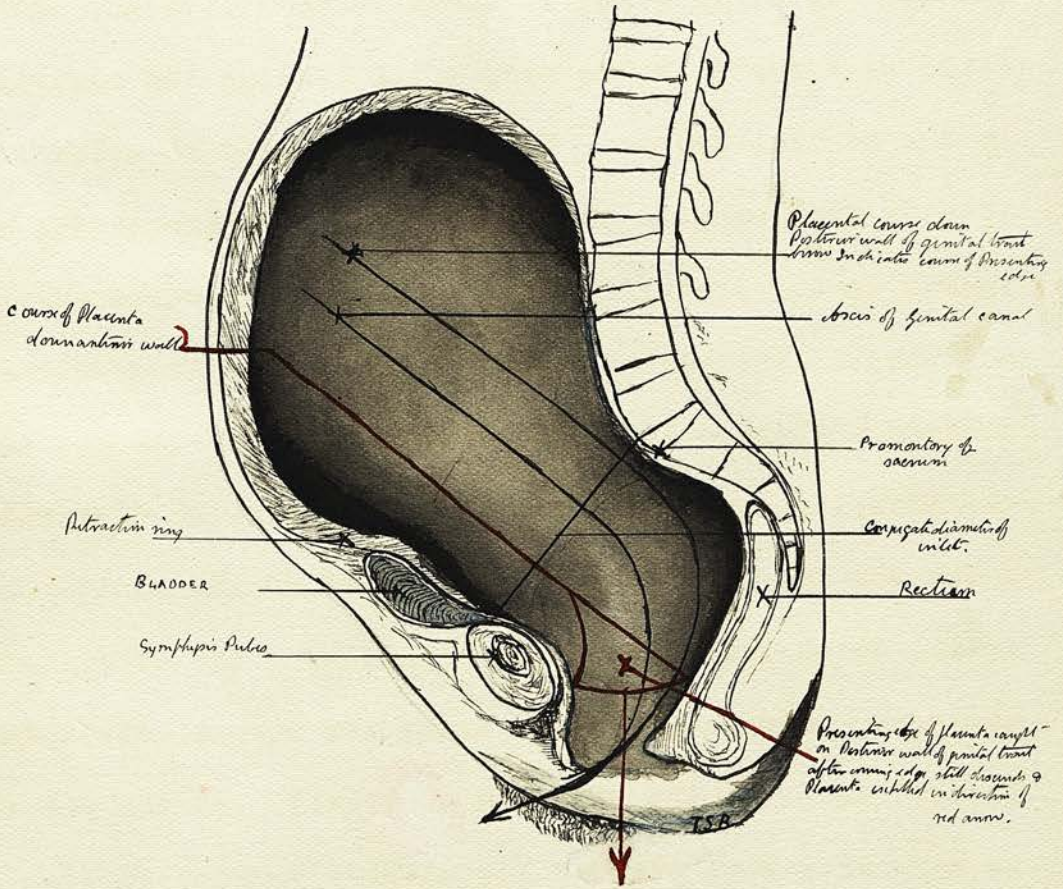
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erable loss of blood. Matthews Duncan<sup>1)</sup> was the first to point out that the foetal surface never presented at the os if the third stage of labour was left to manage itself. He proved his case by wounding the part of the placenta which presented at the os and examining for this wound after birth. He showed that when it was not the very edge of the placenta it was a point very near it, and that this was due to a little of the edge of the placenta being pulled up by the still adherent membranes. Von Ritgen<sup>2)</sup> corroborates Duncan's views. Barbour<sup>3)</sup> declares that although Duncan's way is the most frequent yet the foetal surface does sometimes present. He instances Champneys' observations in which in 85% the presenting part was either the edge or within two inches of it. This presentation of the foetal surface I have never yet had the pleasure of seeing. In all my cases the placenta has been born folded longitudinally to the passages and with its edge first. It passes through the membranes inverting and dragging them after it. It descends the genital tract in the curve followed by the child. The presenting edge appears at the ostium vagi-

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- 1) Matthews Duncan. Mechanism of Natural and Morbid Parturition. p.249.  
2) Von Ritgen. Monatsschr.F.Geb. Band VI. S.273  
3) Barbour. Lecture on the Third Stage of Labour, delivered at the Post Graduate course, Edinburgh 87.



GENITAL TRACT during the second stage FROM CHIARA'S SECTION  
 ILLUSTRATING COURSE FOLLOWED BY PLACENTA

nae and curves forward (upward with patient on her back) bringing more and more of its uterine surface into view until all the placenta is delivered, when it falls back into the bed, leaving the membranes still in the genital tract. At other times it seems to come straight out and falls as a whole in the bed, still leaving the membranes in the genital tract. I have endeavoured to account for this by supposing in the first case the placenta was attached to the posterior wall of the uterus whose curve, and that of the vagina and perinaeum, it follows without meeting any obstacle. If, however, it is attached to the anterior wall the presenting edge will be directed backwards and will hitch on some part of the genital tract, which will retard its progress. The after coming edge, being still acted on by the uterus, descends faster, doubling the placenta on itself, and the placenta is born with some part of its uterine surface first.

We have now seen the phenomena patent to the eye or examining finger of the obstetrician, but these phenomena only appear after the placenta is separated, and help us but little in studying the cause of that separation.

Let us first study the theory advanced by



Berry Hart 1,2,3) to account for the separation of the placenta. He says:-

"The placenta separates during the expansion of the area of placental site after retraction". He further elaborates his views in other papers in one of which he advances the following propositions:-

"4. Separation of the placenta can only take place when there is disproportion between placental area and placental site.

5. The Placenta does not separate during the first and second stages of labour, because all changes in the placental site are accurately responded to by the placenta, owing to the activity of the foetal and maternal blood supplies.

6. During the third stage of labour the foetal circulation is cut off and the villi are closely pressed together, showing obliteration of the intervillous spaces. The increase in placental site following a third stage pain is not followed up by the placental area, as the placenta is now practically a bloodless structure.

7. The placenta does not separate on diminution of placental site to 4" x 4".

8. Any diminution below this introduces no relative change at plane of separation. The area of placental site and placenta still correspond.

9. A disproportion in area between placental site and

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- 1) Berry Hart. Mechanism of Separation of Placenta. Edinburgh Medical Journal, July, 1887.
  - 2) Berry Hart. Improved Method of Managing the third Stage of Labour. Edinburgh Medical Journal, October, 1888.
  - 3) Berry Hart. Mechanism of separation of Placenta and Membranes during Labour. Proceedings of the Royal Society, Edinburgh, Vol.XV p.427 et sequa.

placenta brings about tension on the trabeculae of the trabecular layer, i.e. tears them.

10. This disproportion happens during the Third Stage in the relaxation following a pain, and therefore separation occurs after the pain. During the relaxation the placental site increases slightly, but the placenta, now bloodless or nearly so, does not respond: hence disproportion of area.

12. All separations of placenta or membranes follow one mechanism -

'Placenta and membranes separate when there is disproportion at the plane of separation between their area and their site of attachment. This disproportion is only slight as the trabeculae are microscopic.'"

All this theory depends upon muscle having an active dilating power. It is well known that the left ventricle exerts a negative pressure during diastole, but whether this is due to elastic fibres or to actual active relaxation of muscular fibres is a disputed point among physiologists.<sup>1)</sup> The latest theory is, that it is due to the rebound from forced compression - that "it is the giving up again of force employed towards the termination of systole in stretching and compressing some of the elastic components of the ventricle wall".<sup>2)</sup> Certainly the protrusion of the horns of a snail seem to point to the possession, by muscular fibres, of an active

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1) Foster's Physiology. p.146.

2) Roy and ~~Adair~~. Contribution to the physiology and pathology of the mammalian heart. *Adami*. Philosophical Transactions, Vol.183.

power of elongating themselves. Dr. Horrocks<sup>1)</sup> however has proved to his own satisfaction that muscle has no power of elongating itself, but I, unfortunately, have not had access to any published account of his experiments.

To put Berry Hart's theory shortly, we may say that the placenta is separated in the third stage during the relaxation following a pain and is then expelled by another pain. Then let us note that all through labour, excepting the period during which separation of the placenta is effected, the power of the uterus is exerted by muscular contraction. Surely it is a curious point that the uterus should entirely change its tactics to effect this separation. Even granting, which I am far from doing, that muscle has an active dilating power, what is to fill up the space that will be left between the placenta and the uterine wall? It cannot be the placenta, because if its bulk can expand and contract with each variation in the size of the uterus, ipso facto negatives this theory. Neither can it be blood, because the foetal blood cannot escape from the placenta and the maternal blood is still confined to the maternal vessels because the placenta is not separated yet. Apart from

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1) Horrocks. British Medical Journal, 1892. p.1381



these theoretical objections, this theory as to the cause of separation cannot account for certain vagaries that occur in labour. For instance how is it possible for the placenta and membranes to be born entire with the contained liquor amnii and foetus - a case with no third stage. While I was Resident in the Edinburgh Royal Maternity Hospital, one of the nurses brought up to the hospital a complete bag of membranes containing the liquor amnii and a six or seven month foetus, I forget which. She stated that the foetus had moved inside after it was born but the student in charge had not ruptured the membranes to see if the child was alive. In that case there was no third stage and, if the nurse is correct in saying that the foetus moved after birth, no interference with the circulation through the placenta on which Berry Hart<sup>1)</sup> lays so much stress, and yet the placenta was separated and expelled. Barbour<sup>2)</sup> passed his hand into 8 uteri during the third stage and found that 4, or 50%, of the placentæ were free at their lower borders. The other 4 cases were as follows:- one, foetal surface presenting;

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- 1) Berry Hart. On Separation of the Placenta. Laboratory Reports of the Royal College of Physicians, Edinburgh, p.58.
- 2) Barbour. The Sectional Anatomy of Labour - Third Stage. Edinburgh Medical Journal, October and November, 1887.

two placentæ still attached, and in one the condition was not properly ascertained. If Berry Hart's theory is the true one why should the lower edge be separated first? Then again Berry Hart contradicts himself in first stating that the separation of the placenta is effected by relaxation of the uterus (and consequent enlargement of its apparent size) and then taking as his guide to the period of separation "the marked decrease in the size of the uterus".<sup>1)</sup> This "marked decrease" I have never seen except when the placenta was partly expelled into the vagina.

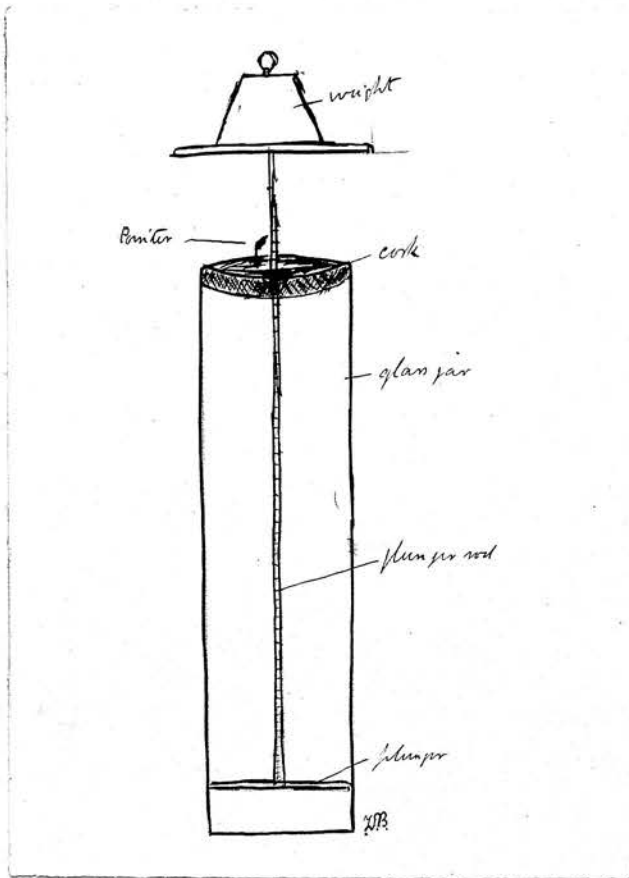
Playfair's<sup>2)</sup> view of this much disputed point is as follows:- "By retraction of its (uterine) internal surface, the placental attachments are generally separated." What this may mean I must confess myself ignorant unless he means to accept the "diminution of placental site" theory.

Amand Routh<sup>3)</sup> believes that separation of the placenta is effected by diminution of the placental site aided by mechanical separation from the pressure of the

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- 1) Berry Hart. Improved method of managing the third stage of Labour. Edinburgh Medical Journal, October, 1888.
  - 2) Playfair. Science and Art of Midwifery, Vol.I. p.312
  - 3) Amand Routh. Lecture on Post Partum Hæmorrhage. Clinical Journal, December 14th, 1892

retro-placental effused blood. He tells us how the placental area is diminished from an area having a diameter of 7 by  $7\frac{1}{2}$  inches to one of 4 by  $4\frac{1}{2}$  inches, and declares that this causes the placenta to become puckered up. But if the placenta is grasped on all sides by the uterus, where is it to become puckered up? Also how is a retro-placental blood clot to form until the placenta is separated? This "diminution of placental site" theory is however better supported by Barbour<sup>1)</sup>. That diminution of the placental site can cause separation of the placenta there can be no doubt because we can suppose that the placental site can diminish down to nothing and the placenta can not be attached to nothing. It has been shown<sup>2)</sup> that the uterus can be so far retracted as to grasp the placenta on all sides, and yet separation of the placenta has not taken place. Now can any more diminution of the placental area take place? Yes, if the placenta is capable of being compressed into a smaller bulk, but not unless, because then we would have to suppose that the placental site went on diminishing and the rest of the uterus relaxed, a condition of affairs

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- 1) Barbour. Sectional Anatomy of Labour - Third Stage, Edinburgh Medical Journal, October and November, 1887.
- 2) Barbour. Anatomy of Labour. p.99



- 1) Anatomy of External Anatomy of Larynx - Third Edition  
Blair, J. H. B. Medical Journal, London, 1910.
- 2) Anatomy of Larynx - Third Edition  
Blair, J. H. B. Medical Journal, London, 1910.

that probably will not occur. Therefore we may say that unless the power of labour is able to compress the placenta into smaller bulk, ipso facto diminution of placental area cannot take place. I have conducted some experiments with the view of finding out if labour can compress the placenta into smaller bulk. The apparatus employed consisted of a glass jar two and a half inches in diameter, and ten inches in length. A plunger, consisting of a leather disc between two plates of brass, fitted into the jar. From the plunger there came a rod which, after passing through a cork in the mouth of the jar, terminated by expanding into a disk, on which weights could be placed. The plunger rod was graduated so that the amount of compression could be read off. Matthews Duncan<sup>1)</sup> estimated the power of labour to vary from four to thirty pounds distributed over the area of a circle with a diameter of four and a half inches. He also shows that the placenta can pass easily through a circle having a diameter of two and a half inches, and that is why I chose two and a half inches as the diameter of my jar. I have supposed that this pressure, produced by a uterus with an internal area of two hundred square inches on a

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1) Matthews Duncan. Mechanism of Natural and Morbid Parturition, p.80.



circle with a diameter of four and a half inches, will be exerted by the much diminished uterus in the third stage on an area of two and a half inches diameter; a quite unwarrantable assumption as this will mean an enormous pressure, nearly six pounds on each square inch of the uterus as against nearly two pounds per square inch in Matthew Duncan's experiments. Moreover the pains of the third stage, in my experience, are not as severe as those that have gone before. However, to use too much pressure is a fault on the right side. Now if we put the placenta into the jar, so as to compress it between the plunger and the jar by means of weights varying from four to thirty pounds applied to the plunger, we will produce the same effect on the placenta as if the power was produced by the uterus. In my experiments I used weights up to fifteen pounds only as I was afraid of my jar breaking - an accident that did happen during my first experiment and which cost me a month's time before I could get the jar replaced. There is a possible fallacy in that contraction of the uterus may empty the placenta of blood by the maternal blood being returned into the mother's circulation and the foetal blood being expelled by means of the cut end of the cord. By this means the bulk of the

placenta might be lessened and diminution of the placental site occur. But as soon as the pulsation in the cord has ceased it is my practice to tie it and therefore the foetal blood cannot be expelled that way. Nor is there any engorgement of the vessels of the cord showing an attempt to expel the blood from the foetal part. On the contrary the cord collapses soon after it is tied. As to the Maternal blood, Berry Hart<sup>1)</sup> has shown that in the third stage, the intervillous spaces are empty of blood and the placenta now practically bloodless.

(It is as well to note here that fresh Haemata were used for each experiment -  
The results of the experiments will be found in tabular form on the next page)  
Y. S. B.

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1) BERRY HART . . . Laboratory Reports of the Royal College of Physicians,  
P. 58

Weights in lbs.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Experiment I.	Compression	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8
	Relaxation	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8
Experiment II.	Compression	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8
	Relaxation	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8
Experiment III.	Compression	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8
	Relaxation	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8
Experiment IV.	Compression	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8
	Relaxation	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8	6 3/8
Experiment V.	Compression	5 7/8	5 7/8	5 7/8	5 7/8	5 7/8	5 7/8	5 7/8	5 7/8	5 7/8	5 7/8	5 7/8	5 7/8	5 7/8	5 7/8	5 7/8
	Relaxation	5 7/8	5 7/8	5 7/8	5 7/8	5 7/8	5 7/8	5 7/8	5 7/8	5 7/8	5 7/8	5 7/8	5 7/8	5 7/8	5 7/8	5 7/8
Experiment VI.	Compression	7 3/8	7 3/8	7 3/8	7 3/8	7 3/8	7 3/8	7 3/8	7 3/8	7 3/8	7 3/8	7 3/8	7 3/8	7 3/8	7 3/8	7 3/8
	Relaxation	7 3/8	7 3/8	7 3/8	7 3/8	7 3/8	7 3/8	7 3/8	7 3/8	7 3/8	7 3/8	7 3/8	7 3/8	7 3/8	7 3/8	7 3/8

# Air was contained in the folds of the placenta.

§ Blood bulged past the plunger.

The experiments were performed as accurately as possible with the rough apparatus that I had made. But there is no need for accurate results as a diminution of only from  $\frac{1}{4}$  to  $\frac{1}{16}$  of an inch will allow of but little retraction of the placental site. The diminution in bulk has always been placed as if it was due to the last pound of pressure applied, but it must be understood that the diminution was spread over the whole series of 15 pounds in so small an amount that only the difference between the 1st and the 15th pound could be ascertained. From these experiments we see that the placenta is practicably uncompressible and that therefore diminution of placental site cannot take place of a sufficient degree to separate the placenta. The German school of Midwifery, as represented by Cohn, Ahlfeld and Stratz, lay great stress on the effusion of blood as an important factor in effecting the separation of the placenta. But a retroplacental blood clot cannot be formed until the placenta is separated.

The most probable cause, to my mind, is that the placenta is separated by the pains producing so much tension on its attachments (the trabecular layer) that they are unable to withstand it, and consequently give way. Let us look at the whole course of labour.

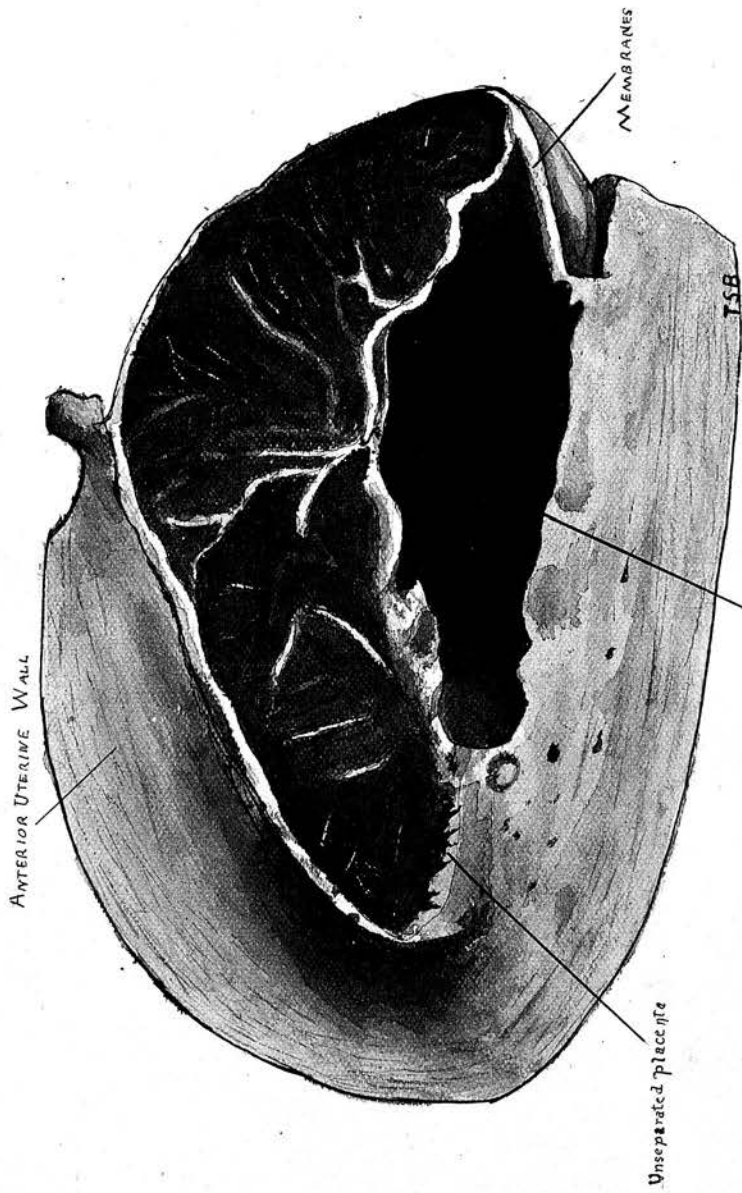
Before labour sets in the uterus contains 1 foetus, 2 liquor amnii and 3 the placenta and membranes. The onset of labour is marked by uterine contractions which press on the contents of the uterus as a whole. The liquor amnii being the most movable of its contents gets pressed down into the lower segment of the uterus where there is least counter pressure. The liquor amnii tries to escape through the os but cannot, as the membranes are entire and the pressure is not great enough to burst them. The attachments of the membranes to the uterine walls, give way under the pressure and the membranes bulge through the os dilating it. The giving way of the attachments of the membranes takes place in concentric circles. No dilatation of the os can take place until the membranes are separated as they are not elastic to any great extent. That the os is principally dilated by the membranes is proved by the fact that their premature rupture means a slow first stage. Dilatation proceeds until at a certain time, when the pressure is so great and the lower pole of the membranes so little protected that they rupture and the liquor amnii escapes. Now the uterine force is expended on the foetus and it expels that body. After the foetus is expelled, the uterus contracts and retracts as much as it can on the placenta, until it "grasps it on all sides." 1)

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1) Barbour, Anatomy of Labour, p.97.



The uterus being partially exhausted and the small stimulus supplied by the placenta, lead to a short period of rest. Soon contractions again set in and press on the placenta in all directions except one - the direction of the genital canal downwards. The power of the contractions, owing to the resultant of forces law, acts directly downwards. Finally, as the uterus gathers strength the strain on the trabeculae gets more than they can bear and the part of the placenta nearest the os is separated. The part separated projects through the membranes. More and more of the placenta is separated and expelled in this way, until finally the whole placenta is thrown into the vagina and from there, expelled by pseudo-voluntary effort. The membranes are delivered inverted by being stripped off the uterine wall by the descending placenta. The reason why they are not thrown off first and the placenta after, is because of their lesser bulk, the uterus acting most on the biggest thing it contains. Thus, in the first stage, the pressure acts most on the liquor amnii, in the second on the foetus and so on. This also explains why the placenta is not separated in the first or second stage - because the power of labour is not exerted on the placenta in these stages. In the same way it explains why retention of part of the mem-



ANTERIOR UTERINE WALL

MEMBRANES

TSB

Unseparated placenta

RETROPLACENTAL BLOOD CLOT

VERTICAL MESIAL SECTION OF UTERUS IN THIRD STAGE (from *Am. J. Obst. & Gynec.*)  
 From *Journal of Obstetrics & Gynecology* by H. H. H.

branes is a cause of after-pains, properly speaking, they are not after-pains but pains of the third stage. This theory explains that case in which the foetus was expelled surrounded by the entire membranes. In the early stages of labour the membranes were separated from the lower uterine segment from below upwards, in the usual manner. The membranes did not burst, as is usually the case, and the foetus being relatively small, the pains continued to act on the liquor amnii, driving it down and separating more and more of the membranes. This separation finally extended to the placenta which also separated until finally the ovum was thrown off entire. Opposite will be found a copy of a beautiful plate of a third stage uterus from a case of Porro's operation. In it I would note that the lower edge of the placenta is separated, that below ~~this~~ lower edge the membranes are still adherent, and that the placenta is being expelled through the membranes. I would explain this specimen by supposing that, during a pain, the lower edge of the placenta has been separated and that haemorrhage has occurred during the relaxation following a pain. The blood is prevented from escaping by the attachments of the membranes and therefore collects behind the placenta. The pressure of the effused blood may or may not have caused further separation of the placenta

there is no evidence before us to prove either point.

NATURE'S MODE OF ARRESTING HAEMORRHAGE. Imme-

diately after the birth of the placenta, the uterus contracts and retracts firmly, and it is this contraction and retraction that seals up the vessels. A reference to the anatomy of the uterus in Section I will show how this comes about. This sealing up of the vessels allows time for the formation of thrombi in their cavities, so that if relaxation subsequently occur, haemorrhage need not necessarily take place<sup>+</sup>.

THE CAUSE OF POST PARTUM HAEMORRHAGE is primarily failure of uterine contractions, that is uterine inertia. Therefore, whatever predisposes to uterine inertia will predispose to post partum haemorrhage. The causes may be divided into general and local.

1. General causes are seen in some constitutional states, such as alcoholism, Bright's disease, systemic congestion due to disease of the heart, lungs or liver. Multiparity, luxury, sedentary habits and residence in a hotter climate than patient is accustomed to, all pre-

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<sup>+</sup> After a brief period of time, varying from 30 to 60 minutes, relaxation does take place and the upper edge of the uterus rises as high as the umbilicus. This relaxation is normal but relaxation before this period is abnormal. What I want to point out is that if thrombi have had time to form, abnormal relaxation is not necessarily accompanied by haemorrhage.



dispose to this form of haemorrhage. There is also a rare class of patients who have a constitutional tendency to Post Partum haemorrhage. Playfair records one case<sup>1)</sup>.

2. Local causes . One of the most frequent local causes is delay in the labour by which the uterus gets worn out. Over distension of the uterus, as in hydramnios and multiple pregnancy, predisposes to uterine inertia. Too rapid emptying of the uterus, as by the use of forceps, will also predispose to it. Another cause is partial or irregular contractions of the uterus. It may be only the placental site that is flaccid, or the whole uterus may be so, except one band across its middle, - the so-called "Hour Glass" contraction. Playfair<sup>2)</sup> thinks this hour-glass contraction to be due to spasms of the internal os, but it is much more likely to be due to a spasm at Bandle's ring. Various causes are given to account for this hour-glass contraction. Thomas Rigby<sup>3)</sup> says that the most frequent cause is "from over anxiety to remove the placenta; the cord is frequently pulled at and at length the os uteri is excited to contract". Duncan<sup>4)</sup> says that this hour-glass contraction

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1) Playfair, Obstetrical Transactions - Vol.I.

2) Playfair, Science and Art of Midwifery - Vol.II p.3.

3) Rigby, Thomas, Midwifery - p.225

4) Duncan, Researches in Obstetrics - p.389



"cannot exist unless the parts above the contraction are in a state of inertia; were the higher parts even in moderate action, the hour-glass contraction would be overcome". This hour-glass contraction is said to be specially frequent in the practice of young practitioners, and, as Braun<sup>1)</sup> says "to diminish in direct ratio with increasing years." One cause of this state which has never been pointed out, is an improper application of Credé's method of expelling the placenta; but we will come to that later on. Adhesions of the placenta if partial, will cause Post Partum haemorrhage, as they prevent retraction of the placental area round the portion not detached. Retention of the placenta need not be mentioned as a cause of post partum haemorrhage, as it is due to inertia uteri and not the cause of it. Dr. Earle<sup>2)</sup> has pointed out that a distended bladder prevents uterine contraction, and so may cause Post Partum haemorrhage; but the bladder has no business to be distended at this stage of matters. Still it is a point worth noting.

SIGNS AND SYMPTOMS. Occasionally, before the loss sets in, the pulse may be noticed to be unduly rapid,

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1) Braun, Lectures, 1869.

2) Earle, On Flooding - p.163.

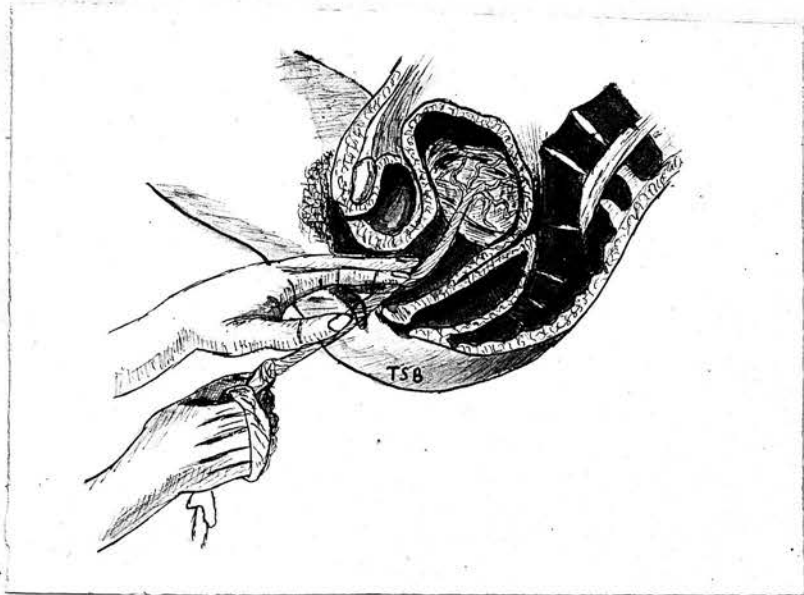
over 100 per minute, and this may be taken as a sign that post partum haemorrhage is threatened. Why this should be, unless the rapid pulse is simply a sign of exhaustion, I do not know. Playfair<sup>1)</sup> and Dr.Madden<sup>2)</sup> note the point, and so we are taught in our lectures. Apart from this, there is only one sign and that is loss of blood. The loss may commence immediately after the birth of the child or placenta, or not till some time after. The loss may be sudden or gradual. In the first case it may be so severe as immediately to jeopardise the patient's life. In either case, if we put our hand on the abdomen, we miss the hard round ball of the uterus which, if we can feel it at all, is soft and flabby. If the haemorrhage be at all severe, constitutional symptoms will soon develop. The pulse becomes rapid and more and more imperceptible. There is a feeling of debility or faintness which may pass on to actual syncope, not always an unfavourable occurrence as it may give time for thrombi to form of sufficient firmness to withstand the increased blood pressure of returning consciousness. The patient becomes restless, tosses her limbs about, more especially the arms, and may even throw

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1) Playfair, Science and Art of Midwifery - Vol.I, p.353  
2) Madden, British Medical Journal, 1892. P.1380.

herself out of bed. The breathing becomes gasping, and the patient often cries for more air. The skin becomes cold and covered with profuse perspiration and if the haemorrhage is unchecked we have convulsions and death. Formidable as these symptoms are, yet if we can check the flow while there is still life, we may eventually save the patient's existence. Sufferers from Post Partum haemorrhage not unfrequently make a speedy recovery, but at other times they may remain blanched and anaemic for a long time afterwards.

PREVENTIVE TREATMENT of Post Partum haemorrhage resolves itself into the proper treatment of the third stage, or more correctly, of all the stages of labour, as a mismanaged second stage will at least predispose to haemorrhage during the third stage. If we can so manage the third stage of labour, either by active interference or by leaving it entirely alone, as to secure the maximum contraction of the uterus, we need have no fear of this form of haemorrhage. Our patients may suffer from it, but we will not be to blame in the matter. In text books on Midwifery, we are told to treat every case as if haemorrhage was impending, but I go further than that. I treat every case as if afterpains were impending, as I believe afterpains to be due to a want of



proper tonic retraction leading to the formation of a blood clot in the uterus. Of course the retention of a piece of placenta or membrane will cause afterpains, but it is not the most usual cause of them. It can be easily understood that, if we so treat the third stage as to prevent the formation of even a small blood clot in utero, we will prevent post partum haemorrhage entirely. In one of the text-books on Midwifery, published some ten years ago, the treatment of the third stage is thus described: "When the binder is applied, the patient may be allowed to rest awhile, if there is no flooding; after which, when the uterus contracts, gentle traction may be made by the funis, to ascertain if the placenta is detached. If so, and especially if it be in the vagina; it may be removed by continuing the traction steadily in the axis of the upper outlet at first, at the same time making pressure on the uterus<sup>1</sup>). This description is accompanied by a diagram, which I have copied, and is as criminally wrong as the diagram is bad and inaccurate. It is wrong, first, in applying the binder before the afterbirth is away, as by doing so we cover up our chief guide in this stage, i.e., the

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1) Churchill, Theory and Practice of Midwifery - p.162



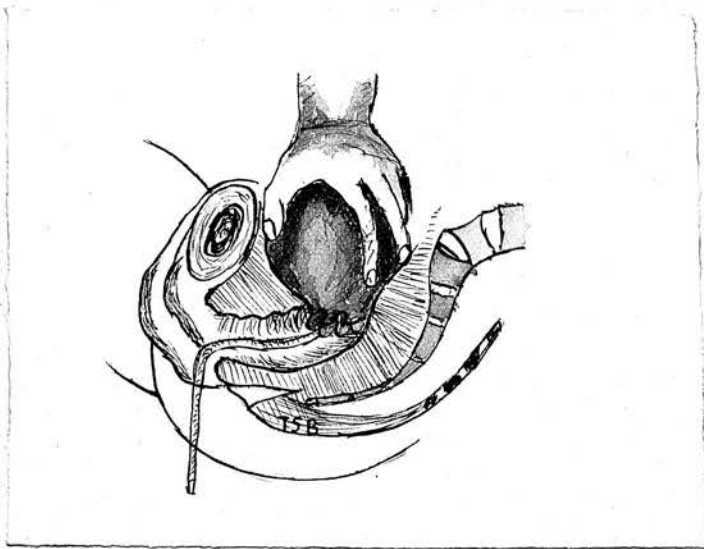
uterus; and if haemorrhage does occur suddenly, we must waste time taking the binder off before we can get at the uterus. It is wrong, second, in pulling on the cord. I am quite aware that the majority of general practitioners do pull on the cord, in fact, I have not yet met the country practitioner who does not, but the practice is quite wrong for all that. Most practitioners will not believe it is possible to remove the placenta except by pulling on the cord or passing one's hand into the vagina; Crede's method they leave to specialists to write about, but not to practise. This treatment is wrong, thirdly, in believing that it is possible to pull in the axis of the inlet or "upper outlet" as it terms it, through the medium of the flexible cord. Supposing the placenta to be still in utero when traction is practised there, do what we will to try and pull in the axis of the inlet, the force will act in a line from the perinæum to the mouth of the womb, the axis of the vagina, in plain language.

Playfair's<sup>1)</sup> method of treating this stage is to "sit by the bedside with your hand on the uterus, to secure contraction and prevent distension". The Patient

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1) Playfair, Science and Art of Midwifery - Vol.I. p.350

I presume, is still on her side, at least the diagram shows her in that position, and we are not told to turn her on to her back. If you try to grip the uterus when the patient is on her side and you are sitting down, you will find that it is not very easy and, moreover, the grip is very inefficient. He goes onto say "When we judge that a sufficient time has elapsed, we may proceed to effect expulsion", but gives you no directions as to what is and what is not "a sufficient time." He then tells you to make "strong and firm pressure downwards and backwards in the pelvic brim", pressure which will simply have the effect of driving the uterus "downwards and backwards in the pelvic brim". Then he tells us to make a vaginal examination if we fail to expel the placenta, to ascertain, if you please, if the placenta be entirely in the vagina. This vaginal examination I utterly abhor, as I believe it to be dangerous in the extreme. We have dirtied our hands in delivering the child and, unless we leave go the uterus altogether, it is impossible to render them aseptic, then we are asked to examine the genital passages in which tears are almost certain to have occurred; all this to ascertain what we can easily feel through the abdominal walls. Surely, if you have your hand on the uterus ever since the child was



born, you will be able to note its diminished size when the placenta is expelled into the vagina. Against his other directions, I have little to urge, except his stating a definite time (10 minutes) during which to knead the uterus.

Barbour's<sup>1)</sup> rules are practically the same as Playfair's. He advises an antero posterior grip of the uterus, which is difficult to get, and will be more apt to catch the ovar<sup>e</sup>s than a lateral one, as the uterus is generally rotated on its axis.

Berry Hart<sup>2)</sup> bases his treatment of the third stage on his theory as to the cause of separation of the placenta. I have tried his method, which consists practically in leaving well alone, and have not had very good results with it. Life is too short to sit by the bedside of a woman for six hours, waiting for an afterbirth and I have frequently had to deliver a placenta six hours after the birth of the child.

The treatment of this stage that I adopt, is as follows:-

- I. When the head is on the perinaeum, apply the left hand over the fundus uteri and with the right hand do anything that is necessary, as saving the perinaeum, etc.

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1) Barbour, Anatomy of Labour - p.107.

2) Berry Hart, Edinburgh Medical Journal, October, 1888



THE PROPER WAY OF GRASPING THE UTERUS



- II. The child being born, lift it with the right hand clear of the bedclothes. Keep the left hand still on the uterus.
- III. When pulsation in the cord has ceased, instruct the nurse how to tie it. Put on two ligatures and divide between.
- IV. Turn the patient on to her back. Sit down by the bedside and bury the ulnar edge of the left hand behind the fundus uteri. Then try and close the fingers and thumb and you will find the uterus between them.
- V. Put a small saucer or other suitable article under the buttocks so as to estimate accurately any loss she may have.
- VI. During a pain do nothing. As the uterus begins to relax, stimulate it by rubbing with the fingers. Increase the rubbing as the relaxation becomes more pronounced, and diminish gradually as the uterus contracts again.
- VII. In a short time you will notice that the contractions become more tonic and the relaxations slighter. Now is the time to remove the placenta.
- VIII. At the acme of the uterine contraction, close the hand firmly and the placenta will slide down the vagina and be born.
- IX. If the patient is a multipara, and especially if there is any difficulty in securing tonic contraction, give a dose of ergot.
- X. Still continue to rub the uterus until tonic contraction is secured.
- XI. Watch that no clot forms in utero as shown by the slightly increased size of that organ.
- XII. Examine the placenta and membranes thoroughly to see that they are entire.
- XIII. Arrange matters for the comfort and safety of your patient, and apply a binder.



THE IMPROPER WAY OF GRASPING THE UTERUS

XIV. During the whole third stage, watch the pulse, as it may give you an indication of approaching haemorrhage.

I was led to study the third stage of labour from the frequency with which I was called to deliver placentæ for students of the Edinburgh Maternity Hospital. In no case did I find it necessary to examine *per vaginam*, the hand on the uterus being enough. I could not make out the reason for this difficulty with the afterbirth, until I took to asking if they had tried Crede's method. I generally got the answer yes, but on asking them to show me the way, they invariably grasped the uterus in the way depicted opposite. The effect of this grip was that when pressure was made, the thumb got pressed into the placenta about its middle and produced artificial hour-glass contraction.

The whole effect of this method of treatment is to promote tonic contraction of the uterus. Berry Hart declares that twice he delivered the placenta minus the membranes, but this can only happen if the force used is too great or too suddenly employed. The hand does not press the uterus out of position, but simply grips it so that the effect is the same as if we increased the contracting power of the uterus.

CURATIVE TREATMENT. If haemorrhage occur before

the birth of the placenta, endeavour to secure tonic contraction of the uterus by means of hand stimulation. If that fails, remove the placenta, whether it be adherent or not does not matter. The mere removal of the placenta will often enable the uterus to contract sufficiently to prevent any more haemorrhage occurring.

After the birth of the placenta, haemorrhage may occur and the various methods of stopping it may be classified under three heads - A. Means calculated to produce contraction of the uterus, B. to produce thrombosis in the womb, and C. to compress the bleeding points.

A. MEANS CALCULATED TO PRODUCE TONIC CONTRACTION is the method most frequently used.

I. Hand stimulation. The easiest way to secure tonic contraction of the uterus is by hand stimulation through the abdominal walls. The practitioner's hand is always ready to do this while everything else takes time to prepare. See, at the same time, that the room is kept cool and the patient's head low. If this fails, introduce your hand into the uterus and remove all clots, pieces of membrane or placenta, etc. from its inside. The function of the internal hand is, if possible, to find out a cause for the haemorrhage and to put that cause right. If a cause is found and removed, the hand stimulation will frequently be enough to check the haemorrhage. The mere intro-

duction of the hand into the vagina is a powerful stimulant of uterine contraction.

II. Injection of hot water. Milne Murray<sup>1)</sup>

has published a paper on the effects of water at various temperatures on unstriated muscular fibres and his results may be tabulated as follows:-

Cold water (32° to 60° F.)	Hot water (110° to 120° F.)
Latent period marked	Latent period absent or very short
Contraction slow	Contraction rapid
Time taken to relax, three times the duration of contraction period	Time taken to relax, twelve to fourteen times duration of contraction period
Loss of initial efficiency in four experiments was 4/5	Gain of initial efficiency in four experiments was 4

Effect on blood vessels, Hot water (110° to 120° F.) contracts blood vessels and arrests haemorrhage from the smaller arteries. Tepid water (70° to 100° F.) dilates blood vessels and promotes haemorrhage.

Cold water (32° to 60° F.) checks haemorrhage but only temporarily. He also took a pregnant uterus (rabbits) and douched one side with water at 115° F. and the other with water at 40° F. The douches were applied for four minutes. At first both sides became pale.

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1) Milne Murray, Edinburgh Medical Journal, September 1886



At the end of four minutes the hot side was still pale, the cold side commencing to redden. In four minutes more the hot side was still pale but the cold side was bright red.

The hot douch, besides its action in promoting contraction will also have the effect of washing out from the uterus bits of membranes, etc., which may be too small to be felt by the hand. There is no need to have the temperature of the water accurate; water just too hot to be borne by the hand will be quite hot enough. If one douche fails, a second will have more effect, as the action is cumulative. I am in the habit of making the douche antiseptic with corrosive sublimate, but Parish of<sup>1)</sup> Philadelphia says that an antiseptic is not considered applicable. Dr. Loombe Atthill<sup>2)</sup> has recorded sixteen cases in which the hot douche checked the haemorrhage at once, in many of them ergot, ice, etc. had failed. Dr. Walter<sup>3)</sup> points out that according to the experiments of Max Runge, if the temperature of the water is raised too high (over 120° F.) it might produce paralysis of the muscular fibres and thus promote instead of checking hae-

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1) Parish, Annual of Universal Medical Sciences, Vol. II J.33

2) Loombe Atthill, Lancet, February 9th, 1878.

3) Walter, British Medical Journal, December, 1892.

morrhage. This danger should be guarded against by the use of the hand, if a thermometer is not handy, to judge the temperature of the water. Dr. Walter also advocates adding vinegar to the water (in equal proportion) after the water has washed out the clots from the uterus.

III. Cold is sometimes used instead of hot water but I am no advocate of it. Milne Murray's experiments show that its effect is much more transient than hot water and, unlike hot water, its action is not cumulative. The effect of applying cold to a patient who is on the point of death from haemorrhage, may stop the flow but is likely to help in killing the patient. It may be used in the form of a cold intra-uterine douche, or lumps of ice in the uterus, etc. Dirskal<sup>1)</sup> recommends the introduction of ice into the uterus.

IV. Electricity has been praised by some<sup>2)</sup> as promoting uterine contractions, but it is not likely to be handy when wanted, and the time necessary to prepare it had rather be spent in trying some readier measures.

These are the various ways of producing direct stimulation of the uterus. We can also stimulate the

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1) Dirska, Berliner klinische Wochenschrift, 1890 - p.173

2) Walter, British Medical Journal, December 24th, 1892  
p.1381

uterus reflexly, either through the skin or the breast.

V. The application of the child to the breast may be tried to induce contractions of the uterus. This method, however, is more useful in keeping up the contractions produced by some other means.

VI. The application of cold cloths to the skin over the abdomen has been recommended, but I do not think it has been shown to be more useful than hand stimulation and certainly it is much more disagreeable to the patient. Pouring a stream of cold water on to the abdomen is a barbarous method of treatment and ought never to be tried.

VII. Drug Stimulation. Ergot is by far the most useful of drugs for rendering tonic contractions obtained by other means. Even if there be no contractions, it will lessen the flow by acting on the muscular fibres in the blood vessels and so lessening their calibre. It also has a valuable use as a prophylactic when, for any reason, we suspect Post Partum haemorrhage to be threatened. Dr. Misrachi<sup>1)</sup> recommends caffen in doses of 12 to 16 grains. There are other drugs, but they are not of the same value as ergot.

1) Dr. Misrachi, Therapeutic Gazette, October, 1890

B. MEANS CALCULATED TO PRODUCE THROMBOSIS IN THE  
VESSELS.

VIII. The Injection of Styptics into the uterus is the most common way in which thrombosis is brought about. Iodine, Turpentine, and Liquor Ferri Perchloridi fort. of the London Pharmacopœia diluted six times its bulk with water<sup>1)</sup>, are all used as injections into the uterus to bring about thrombosis in the vessels. A series of cases have been recorded<sup>2)</sup> in which a piece of lint soaked in spirits of turpentine, was introduced into the uterus and stopped the haemorrhage in every case. Before using this method of treatment we must empty the uterus of all clots, or otherwise the styptic will not act on the bleeding point. We must remember also that all means of promoting contraction must now be stopped, for fear of displacing the clots from some of the bleeding vessels. I am much against this mode of treatment, as it is excessively dangerous.

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1) Playfair, Science and Art of Midwifery, Vol.II,  
p.123.

2) New England Medical Monthly, July, 1890.

Amongst the dangers, may be mentioned the risk of peritonitis from the entry of fluid into the peritoneal cavity through the Fallopian tubes; the risk of detachment of clot, leading to pulmonary embolism, as clot formed in the mouth of a *non* contracted vessel is quite a different thing to one formed in a normally contracted vessel; the risk of septicaemia from putrefaction taking place in the hardened clots in utero. Galabin<sup>1)</sup> states that, out of 12 cases treated this way, 5 died. Pollard<sup>2)</sup> records three cases in which, in spite of this treatment, the haemorrhage recurred.

IX. Compression of the abdominal aorta

may be included under this heading, as it will produce stasis, and so predispose to the formation of thrombi in the vessels. It is only necessary to mention this method.

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1) Galabin, Midwifery, p.694.

2) Pollard, British Medical Journal. Vol.I. 1880



C. - MEANS CALCULATED TO COMPRESS THE BLEEDING POINTS -

X. Plugging the uterus has been lately used in Germany. Dührssen<sup>1)</sup> and Auvar<sup>2)</sup> have recorded cases treated in this way, Dührssen going so far as to recommend prophylactic plugging before the hæmorrhage should become serious. The method of plugging is to seize the anterior lip of the cervix with a volsella and draw the uterus down. The plug, preferably iodoform gauze should then be introduced with a pair of long forceps. This method is certainly preferable to the injection of styptics, although it is not without dangers of its own. Vavra<sup>3)</sup> records a case in which death occurred from the entrance of air into a uterine vein while the gauze was being put in, and Fritsch<sup>4)</sup> has published a case in which death took place from atonic hæmorrhage after the plug was introduced.

XI. Various means of compressing the uterus and so producing pressure on the bleeding points have been suggested. Hamilton<sup>5)</sup> of Falkirk passed his right hand into the posterior fornix and pressed the posterior

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1) Dührssen Sammlung Klin. Vort. No.347.

2) Auvar Travaux d'Obstétriques; Vol.2, Tamponnement intra uterin.

3) Vavra, Cent. Für Gyn. 1890, S.353.

4) Fritsch, Dührssen, Sammlung Klin. Vort. Liepzig, No.347.

5) Hamilton, Edinburgh Medical Journal 1861.

wall against the anterior wall, making counter pressure by means of his left hand laid flat on the patient's abdomen. It has also been suggested to press the uterus backwards against the spinal column or forwards against the symphysis pubis, but these <sup>last</sup> means are not very satisfactory. Zweifel <sup>1)</sup> has advised producing strong anti flexion and so preventing the escape of blood. This method, however, will prevent uterine contractions by keeping it distended with blood. Kochs <sup>2)</sup> recommends inversion of the uterus and placing an elastic ligature round the cervix. He replaces the uterus at the end of six hours.

In treating a case myself, I would first try external stimulation of the uterus by kneading it with the hand and at the same time giving a dose of ergot, preferably, hypodermically. If that fails I would pass my hand into the vagina and if necessary the uterus, and remove all clots, &c., and then inject a hot douch, carrying the tube right up to the fundus uteri. The left hand should be kept on the uterus while the douch is being given. There is no difficulty, as a rule, in allowing the water to escape from the uterus and no need to

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1) - Zweifel, Geburtshülfe.

2) - Kochs, Annual of Universal Medical Sciences, Vol.ii.,  
J. 34.

use a double channelled catheter. If that fails, I think there are only two methods worth trying, plugging the uterus and continuous compression by Hamilton's method, and of these I would try the latter first. If, after a fair trial, haemorrhage continued, I would plug the uterus and apply either the hand or a firm abdominal binder externally. I am not much in favour of plugging the uterus, as if the uterus responds to that form of treatment, it will respond to less severe methods. The worst cases are those in which the uterus will not contract and in these I think firm and prolonged pressure is the only means to save the life of the patient.

Haemorrhage from a contracted Uterus. Haemorrhage appearing at the vulvar orifice of a newly delivered woman may come from three sites, 1st., a torn vulvar orifice; 2, a torn cervix; and 3, the placental site. The first site for the haemorrhage is easily diagnosed by the fingers, or if necessary a visual examination. The other two are not so easy to differentiate from one another, because a torn cervix is often very difficult to detect with one's fingers. But the diagnosis may be materially aided by noticing the condition of the uterus as to hardness. Of course, a soft uterus and haemorrhage does not contra-indicate a torn cervix as its cause; but

a hard uterus I think disposes of the placental site as the cause of the hæmorrhage in most cases. There are, however, cases reported in which the hæmorrhage was supposed to have come from the placental site in spite of the uterus having been hard.

Matthews Duncan<sup>1)</sup> reports a case in which hæmorrhage occurred from the placental site of a tightly contracted uterus. In this case there was "a rigid, spastic condition of the uterus, especially just after delivery without complete retraction." The uterine cavity was said to be "globose" and hæmorrhage was alarming. After a time, ordinary contraction came on and the hæmorrhage ceased. Other Fellows of the Obstetrical Society spoke of having noticed the same phenomena and the treatment adopted in most cases consisted of injecting per-chloride of iron. In some cases of hæmorrhage from a contracted uterus, the hæmorrhage has<sup>been</sup> supposed to be due to a diseased condition of the vessels of the uterus. Futh<sup>2)</sup> of Coblenz records a case which he saw in the Bonn Lying In Hospital. The patient was aged 27, and had borne two children previously. She was very anæmic. When thirteen she was laid up with a right sided hemiplegia and in the 8th. month of the present pregnancy she

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1) - Matthews Duncan, Obstetrical Transactions, 1887, p.362  
2) - Futh, Centralbl, f.Gynak, November 14, 1892.



had had influenza. After delivery of a female child the pulse and temperature rose, the lochia became foetid, a rigor occurred, and the pains became very weak. Forceps were then applied and a male child, larger than its sister, was easily extracted. The right labium majus was swollen at this time. The placenta was expressed and, as other means failed to stop the flooding, the uterus and vagina were plugged with iodoform gauze. It was observed, during the introduction of the plug, that the haemorrhage came from the cavity of the uterus which was, at the same time, tightly contracted. The swelling in the right labium increased, and on the 4th. day it was laid open and a large coagulum extracted from its interior. Haemorrhage followed, but was checked by the introduction of two deep sutures from its vaginal aspect. A large haematoma then formed, bulging into the vagina with which it communicated by a fistulous track. The finger was passed into the track and a quantity of dark blood with a faecal odour escaped. It was mixed with shreds of tissue. The cavity had uncontractile walls so that it required very careful packing with iodoform gauze. For a week afterwards patient's condition was bad, but she eventually recovered. This case was believed to be due to a diseased condition of the vessel walls leading to 1st., the post partum haemorrhage and 2nd., the formation of a haematoma



not due to injury. Küstner<sup>1)</sup> describes two cases of fatal flooding from a contracted uterus. In one an aneurismal dilatation was found on a ruptured vessel the size of the radial artery. In the other case the patient suffered from chronic nephritis and the haemorrhage was said to be due to atheroma of the vessels at the placental site. These cases are peculiar, especially Futh's, but I still believe that the commonest cause is a ruptured cervix, vagina, or perinaeum.

Symptoms are, of course, haemorrhage during or after the third stage. The diagnosis of the condition depends on the existence of the tear, combined with the fact that the blood comes from that tear. The diagnosis of such conditions, as recorded by Duncan and Küstner, will be a matter of difficulty, but we will be materially aided by a system of exclusion.

Treatment of a torn cervix is to sew up the tear and so compress the bleeding point. If, for any reason, you can not sew it up, then compress the bleeding part with your finger and thumb until thrombosis has time to take place. Or, if you prefer it, you may plug the cervix and vagina. There is no objection to plugging the vagina in these cases as the uterus is tightly contracted and so can not distend with blood. If the plug be used

<sup>1)</sup> - Küstner. British Medical Journal, April 30th. 1892.

it will be useful to dip it in vinegar first. This is an excellent domestic haemostatic. It is specially useful to use a haemostatic in such cases, as we can't be sure of stopping the haemorrhage unless we plug the whole pelvis. Braun records the case of a III para, aged 26, in whom he plugged the cervix and vagina as the haemorrhage could not be controlled by other means.

#### ILLUSTRATIVE CASES -

Case VI. Mrs. Bell, Marshall Street, Barnard Castle, VI para. The child, a male, was born L.O.A. on the 6th. of July, 1892, there being nothing remarkable in the labour. After her previous labours she had suffered terribly from after pains. At my visit next day she told me that she had had no after pains and was quite jubilant in consequence.

Case VII. Mrs. Daffney, age 22. Lives at 100, West Bow, Edinburgh. Patient went into labour at 2 a.m. on the 8th. of June and sent up to the Royal Maternity Hospital for assistance. Two students and two nurses were soon in attendance. The labour pains were at first strong, but gradually died away and the labour was allowed to continue its weary length until 10 p.m., when the students sought assistance. I went to see her and found, by external examination, that the child was presenting vertex

L.O.A. The foetal heart was beating vigorously. Just above the symphysis pubis was a firm fluctuating tumour, which I diagnosed as a distended bladder in spite of being informed that the patient had passed water only half an hour previously. On Per Vaginam examination, the vagina was roomy, perinaeum soft, and pelvis in no way contracted. The os was the size of a wine-glass, with thick, moist regular lips and not pressed on by the head. The membranes were unruptured and no pain was caused by the examination. I drew off her water, which was followed by a disappearance of the abdominal tumour. Almost immediately a strong uterine pain came on and I am informed that from that moment they recurred strongly and frequently. The child, a healthy female, was born at 5 minutes past one in the morning of 9th., about two and a half hours after I saw the patient.

Case VIII. Mrs. Gibbon, age 26, ii para, living at Stainton near Barnard Castle. Patient went into labour late in the afternoon of the 5th. of January, 1892, and I was summoned to see her about 9 o'clock in the evening. On arriving I found the head present<sup>ing</sup> L.O.A. The os was fully dilated and the membranes unruptured, so I ruptured them. The child, a well developed male, was born about half an hour afterwards. I never left go the uterus from the moment of birth. A short time after the birth

of the child I noticed a little hæmorrhage occurring, the uterus being quite firm. I further stimulated the uterus to contract by pressure and rubbing with my fingers and administered  $\frac{3}{ii}$  Liquor Secalis ammoniata. I gave it before the birth of the placenta because I was of the opinion that the placenta would be born before the medicine had time to take effect. The hæmorrhage still continuing and increasing in volume, I removed the placenta by Credé's method, hoping that it would then cease. After the birth of the placenta, the uterus contracted as well as before, but the loss continued. I then gave  $\frac{1}{150}$  grain ergotinin hypodermically and gave a hot douche into the uterus. The hot (about 115°F.) douche had no effect on the flooding, and was repeated 3 times and  $\frac{1}{75}$  grain of ergotinin was given. The flow still continuing I passed my right hand into the vagina, and found it oozing away from the loose and patulous cervix, which seemed quite entire and not torn. The flow seemed to come from the left posterior part of the cervix. I endeavoured to compress that with my fingers, but as that failed to stop the flow, I got a clean napkin and soaked it in water about 120°F. as I had no antiseptic left, and with it plugged the lower segment of the uterus. The patient by this time was very pale, and inclined to talk nonsense.



The breath was sighing, the pulse 130 per minute, and the arms were being thrown about, and patient was very restless. The plug had little effect on the flow, being as I now think, not tight enough. I then gave  $\frac{1}{150}$  grain ergotinin, removed the plug and gave another hot douche which finally arrested the hæmorrhage.

Puerperium was normal. Patient made a good recovery under the ordinary treatment for severe losses.

Case IX. Mary Ann Barret, age 22, 1 para, admitted to the Workhouse, Barnard Castle on the 27th of February, 1892, having been all the previous night in labour. The previous day she had spent on a "walking tour", which she continued after the puerperium. I was called to see her about 10 p.m., and found the head presenting L.O.A. The child was born at 10 minutes to 11 and the placenta ten minutes later. After the birth of the placenta, the uterus was very soft and did not respond quickly to stimulation by rubbing, so I gave  $\zeta$ ii Liquor Secalis ammoniata and subsequently  $\frac{1}{150}$  grain ergotinin. Up to this time little or no hæmorrhage had occurred, although the pulse was 130 per minute. I then had occasion to leave go the uterus in order to tie the child's cord myself as is my custom. On returning, I found the uterus distended by blood clot, which I expell-



ed by pressure. The pulse had now fallen to 120. By rubbing I got the uterus fairly tight, no hæmorrhage occurring. I then had to leave go a second time, and this time I instructed the nurse how to hold on. In spite of this precaution, the uterus again distended with blood clot, which I expelled by pressure. From this time on to 12 p.m. I never left go the uterus and no hæmorrhage occurred. At that time the pulse having dropped to 110 and the uterus being as firm as a rock, I judged it safe to leave my patient alone. No more bleeding occurred.

Puerperium was normal. Patient although on a walking tour was well "put on", and seemed a cut above the tramp class. She was very fairly developed.

Case X. Mrs Taylor, age 28, ~~iii~~ para residing at Galgate, Barnard Castle, sent for me in a hurry on the evening of the 11th of April, 1892. She had been seen the previous evening and that morning by Dr. Sevier, who treated her for threatened abortion, she being then at the 7th month. In spite of treatment she went into labour and the child was born shortly before my arrival.

Patient's previous obstetrical history is very bad. Her first child was difficult to deliver, but I could get no definite history about it. Her second pregnancy was a case of central Placenta Praevia and after

both her labours she gives a history of rigors and feverishness.

When I arrived I found the patient lying across the bed with her buttocks at the edge and the dead child, still unseparated, lying almost off the bed. She was a thin pale girl and looked half-starved. There was a fair pool of blood in the bed and the hæmorrhage was still continuing. On feeling for and auscultating the foetal heart, <sup>it</sup> ~~the hæmorrhage~~ was quite inaudible and obviously the hæmorrhage was the first thing to treat. I turned the patient in bed on to her back and into a more comfortable and seemly position. I then gently rubbed and stimulated the uterus to contract, and put a saucer under the buttocks to estimate any further loss. Pulse at this time was 120 per minute. In a short time the hæmorrhage ceased but the uterus seemed to contain more than placenta, so I examined and found the membranes presenting and filled with blood clot which I allowed to escape by rupturing the membranes. I then tried to express the placenta by Crédé's method but failed. I came to the conclusion that I had to do with a case of adherent placenta and so sent for my chief Dr. Sevier in order that we might give chloroform. In a short time he arrived and we administered chloroform and then attempted

Credé's method, but it failed, so Dr. Sevier passed his hand into the uterus and scraped the placenta off, little hæmorrhage occurring.

Puerperium. Next day the lochia were sweet, temperature normal and but little pain. On the second day temperature was 99 and the lochia were offensive. Temperature subsequently rose to 100°F., lochia continuing offensive, though less so than they were. No drugs were given to bring down the temperature as it afforded a valuable indication and was not very high. The offensive lochia were treated by antiseptic vaginal douches of corrosive sublimate and water, but they were not completely effectual in checking the fœtor. I did not give an intra uterine douche, as, keeping in mind the patient's surroundings, it would have been too risky unless the indications became more urgent.

Cases VI and VII are only illustrative of the conditions in each case and in no way peculiar. Plenty of cases of the same class might be given but there is no benefit to be gained by repetition. Case VIII was a severe case and I have little doubt that the cervix was torn, although I was unable to feel it. It was my first and only case of bleeding with a contracted uterus, and the plugging was contrary to all I had been taught. I

have no doubt, however, that it would have succeeded if it had been done tightly. I had ridden to the case and my obstetric armamentarium was extremely small. Case IX is very interesting as illustrating the fact that hæmorrhage may be prevented even when the tendency to it is great. In this case the actual loss, when I left go the uterus was but trifling. Case X is illustrative also of its condition and is in no way peculiar.

Post Scriptum. The following note was mislaid and not found soon enough to be used in its proper place. Gooch<sup>1)</sup> is responsible for the belief that hæmorrhage may occur from a contracted uterus, founding his belief upon one case in which as Robertson<sup>2)</sup> pointed out dilatation came on although the uterus may have been contracted at first. Robertson proved that dilatation must have occurred because Gooch passed his hand into the uterus which he could not have done had it been contracted. Amongst the followers of Gooch are Rigby<sup>3)</sup> and Ingleby<sup>4)</sup> and against Fergusson<sup>5)</sup> and Barnes.<sup>6)</sup>

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- 1) Gooch On some of the most important diseases peculiar to women.
  - 2) Robertson. Diseases of Women. p.362
  - 3) Rigby. System of Midwifery. p.218
  - 4) Ingleby. A practical treatise on Uterine hæmorrhage.
  - 5) Fergusson. Introduction to New Sydenham Society's edition of Gooch. p.XLI.
  - 6) Lectures on obstetric operations. p.455.