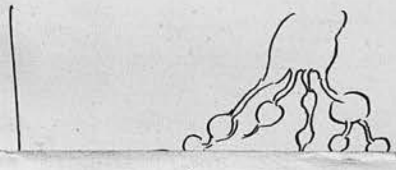
With Thesis for MD. 1892

Hydatidiform mole

B. J. Morison

Chorion with dependent villi in a vesicular state.



Manner in which villi branch & be[illegible]

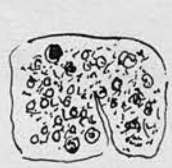
Ovum probably dead at 3 or 4 months - carried till 7 months very marked fatty changes.

B. J. Morison

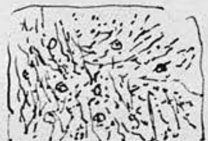
Chorion outer surface

chorion inner surface

Amnion outer surface



Amnion inner surface



Intermediate mucoid layer

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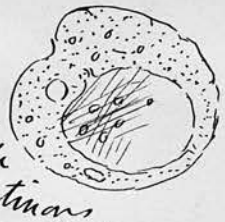
With Thesis for M.D. 1892.

Hydatidform mole

Chorion villi dependent within a vesicular state.

manner in which villi branch & become vesicular.



Transverse microscopic section of vesicle showing gelatinous wall with cavity partly filled with mucoid jelly

Small cells like leucocytes interspersed.

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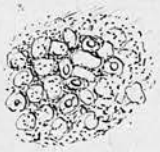
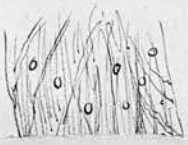
Microscopic appearances from specimen of abortion showing appearances like cloudy swelling

Approximately normal specimen



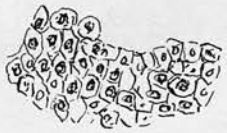
Cells of amnion. Cloudy swelling



Intermediate

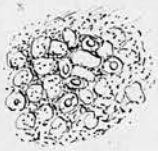
Abortion (3½ mo) ascribed to intemperance

Normal endothelium lining amniotic cavity.

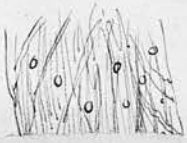


Small cells like leucocytes interspersed.

Microscopic appearances from specimen of abortion showing regressive cloudy swelling



Cells of amnion. cloudy swelling



Intermediate

Abortion (3½ mo) ascribed to intemperance

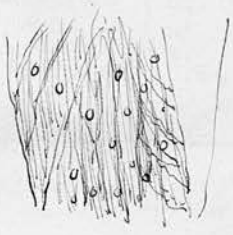
Chorion with cells degenerating, granular, & shreds of amnion from intermediate uncord layer

Decidua from same case - large epithelioid cells - granular & degenerating - small cells like leucocytes interspersed.

Microscopic appearances from specimen of abortion showing signs of little cloudy swelling

Approximately normal specimen

Cells of amnion. cloudy swelling



Intermediate mucoid layer

covering of cord (continuous with amnion)

1. Piece of villus slightly granular surface epithelium

2 Subepithelial layer (connective tissue)

connec- ich pos- general that of its can- its path- ent, we to the life, as proces- rse, de- d forth al qua- e. The be stu- logy & exami-

nation of its anatomy and physiology, & it will therefore be advisable in the first place to glance at these fundamental considerations. It will be remembered how the mammalian ovum after its discharge from the Graafian follicle, passes along the Fallopian tube, undergo-

The Pathology and Treatment of Abortion

There is perhaps no subject connected with his proper work which possesses more interest for the general practitioner in medicine than that of abortion. Whether we consider its causes with a view to their prevention, its pathology, its mechanism, or its treatment, we shall find much to instruct us as to the influence of social usage on human life, as to the true meaning of the natural processes of development and its converse, degeneration, and much also to call forth in practical application the personal qualities of skill, judgment, and resource. The subject is one which can hardly be studied with reference to its pathology & treatment without some prior examination of its anatomy and physiology, & it will therefore be advisable in the first place to glance at these fundamental considerations. It will be remembered how the mammalian ovum after its discharge from the Graafian follicle, passes along the Fallopian tube, undergo-

-ing the whole the earlier stages of segmentation & shortly enters the uterus - Here a continuation of the same process divides its primary substance into the epiblast & hypoblast layers with the mesoblast intervening, the whole being surrounded by a capsule composed of the zona radiata with the remains of the zona pellucida. Then follows the differentiation of the mesoblast, its division into somatopleure & splanchnopleure, the former rising upwards over the body of the embryo which has already become defined and is budding out the allantois from the hypoblast at its hinder end, the latter passing downwards along the splanchnic stalk and over the yolk sac which from this time undergoes rapidly progressive atrophy and absorption by the embryo. Matters of special importance with reference to the future development of the ovum & the process of abortion are the formation of the amnion and chorion, the growth of the placenta, & I would add the composition and significance

of that mesoblastic coat which clothes the amnion, separates it afterwards from the opposed inner surface of the chorion, & passes upwards along the allantoic cord to the central mass of mesoblast in the body of the embryo. "

"The Amnion or true amnion, formed by the coalescence over the embryo of the inner most sheet of the somatopleure, consists therefore of a layer of mesoblast lined with epiblastic epithelium continuous with the embryonic epidermis.

The Chorion is formed, it will be remembered, of the outer layer of epiblast belonging to the somatopleural & splanchnopleural folds applied to the zona radiata, is lined by the corresponding mesoblastic reflexion, and is further strengthened at a later period by the mesoblast of the allantois. The branching chorionic villi consequently owe their epithelial covering to the zona radiata & the epiblast, & their vascular core of connective tissue to the allantois & splanchnic mesoblast. The disproportionate development of a number of these

with to form the placenta, the relation of that body to the foetus and to the remains of the umbilical vesicle which adhere for a time at least to its surface, are generally understood. We have still to deal with the expansion of the amnion which at an early period in the history of the embryo has proceeded so far as to provide an investment of the whole inner surface of the ovum, the amniotic layer being separated from the inner surface of the chorion by a layer of gelatinous tissue of mesoblastic structure & furnished by the allantois & partly also in all probability by the mesoblast which covers the outer surface of the amnion. To this layer I would direct especial attention and I may for convenience of description term it, the intermediate mucoid layer.

We shall have occasion afterwards to return to this structure and to note that it undergoes important changes in many if not in all cases of abortion.

Changes in the uterine mucous membrane.

We need not occupy much space in describing

these. The process of overgrowth by which the mucous layer comes to form the decidua vera, its application round the ovum as the decidua reflexa, its great development opposite part of the allantois as the decidua serotina to form the placenta are familiar facts in the physiology of the pregnant state. It may be noted in passing that the fusion of the decidua reflexa and the decidua vera consequent upon expansion of the growing ovum is not completed till the third month of pregnancy. The manner of attachment of the chorionic villi is a matter of much greater importance. The old view that these were inserted within the glands of the uterine mucosa has now been discarded by the great majority of observers in favour of that explained by Turner, namely that the branching villi are contained in crypt-like depressions consisting of the venous sinuses of the mother into which they pass, pushing before them a layer of flat maternal epithelium. Each villus contains a capillary loop embedded in connective tissue derived as

we have seen from the allantoic meso-
blast and coated with epithelium sup-
plied by the subzonal membrane
blended with epiblast, though this ap-
pears to be replaced by or fused with
that of the maternal sinuses in the later
stage of pregnancy. The villi which at first
covered the whole ovum and are inserted
at all points of the inner surface of the
decidua reflexa become practically obli-
terated by atrophic changes over the
greater part of this area & cultivated
by special development to relatively
gigantic growth in the serotina to form
the placenta. Their attachment even here
is by no means firm at all events till
the third month especially if through any
cause of malnutrition their growth be
more languid than usual. It follows
therefore that should abortion occur
expulsion of the ovum with only part of
the decidual structures or without
these altogether is rendered probable
& this is what does actually take
place. In accounting for this fact which

is one of no small moment in connection with the question of treatment, we must remember also that atrophic or degenerative changes in the non-placental decidua are not limited to those connected with the disappearance of the early villi, for with the continued expansion of the foetal membranes the decidua vera & reflexa also become blended & atrophied and are not expelled at birth at all events as definite structures. It is to such atrophic or degenerative changes that we must in all likelihood ascribe the apparently easy & natural separation of the foetal membranes and placenta at full term, & there is no change so marked as this in the membranes which enclose the foetus in the majority of cases when that is prematurely expelled. The presence or absence of a sufficient degree of this separative degeneration appears therefore at the earlier as well as at the later period of pregnancy, to have a most important influence in deciding how far the evacuation of the uterus will be complete or par-

tial, and its bearing upon the measures advisable in treatment & their probable effects is also obviously very important. In particular we may note the distinction which the degenerative process establishes between those cases in which abortion comes about as one might say, by natural causes, that is, without the exciting action of any mechanical shock, and those in which it is distinctly traceable to some form of violence and particularly where a woman generally healthy & likely ~~to~~ in ordinary circumstances to complete her term of pregnancy is subjected to artificial measures designed either indirectly as when drugs are used or directly by means of instruments to precipitate abortion. In the former class the ovum is more or less ready to be cast off & spontaneous evacuation of the uterus will probably occur, in the latter, adhesion is firmer and it is common to find that some part of the uterine contents is retained and becomes the seat of a septic process.

The Pathology of Abortion

Having dealt with the details of structure & relation connected with the normal growth of the ovum we shall be able to follow the more easily the perversions of development due to disease which result in its expulsion. Among these details it will be well to bear in mind as particularly necessary for the explanation of the subject the relations of the chorion, the amnion, & what has been above described as the intermediate mucoid layer, which is continuous with the mesoblastic connective tissue & through this with the rudimentary lymphatic system of the embryo. It is necessarily in these tissues or in one or other of them that the morbid changes observable in abortion and which appear to bear a causal relation to it usually show themselves. These are for the most part changes of an atrophic or degenerative character except as has already been stated, where accident or mechanical injury is directly accountable for the miscarriage. During several years I devoted a part of the

leisure obtained from intervals in the work of general practice to the examination of specimens of abortion. Material of this kind can fortunately nowhere be found in great abundance, consequently the observations which I have been able to make do not rest on so wide a statistical basis afforded by cases examined as to justify in themselves any conclusive statement as to the pathology of abortion. Nevertheless it may be claimed for them that as far as they go, a reasonable amount of care has been taken to read aright the suggestions which they afford, & knowing that even a dim & partial light such as they can give is not without its value in a study so obscure, I now offer them for comparison with the views of others who like myself are interested in this subject.

The total number of cases examined was 28. Of these, three must be deducted as incomplete, one of six months, & one of four & a half months development of which the details of examination are very meagre & another which was represented merely by a fragment retained in utero but was noted on

account of its bearing on the question of treatment. A foetus was present in fourteen of the remaining twenty-five cases, there were obscure signs of one in one other, in another case no note on this subject has been made, and eight were moles. The degenerative changes noticed were, as might be expected those of fatty or mucoid metamorphosis or a combination of these two conditions. The subjoined table contains a statement of their relative frequency.

Fatty metamorphosis prevailed in	4
Mucoid " "	3
Fatty with mucoid change "	3
Atrophy was the most marked feature in	2
Of carneous moles there were	2
(though both of these showed also fatty changes)	
Of normal or almost normal specimens there was (a case of accidentally induced abortion)	1
	25

The cases tabulated above being unselected, these cases if they teach anything, show the existence of a practically constant relation between abortion and atrophic or degenerative changes in the ovum & its

attachment. It will be best to study in detail the character of these pathological changes but in order to do this a clear understanding of the normal microscopical structure of at all events the chief structures in the ovum & of the decidua, is necessary. Taking first the decidua, one finds that this presents on the surface next the ovum a layer of epithelial scales, oval, several times the size of a red corpuscle, having one round nucleus and embedded in a glutinous but granular intercellular substance; deeper at the uterine surface are spindle-cells of connective tissue along with some muscular spindles. At both surfaces there are also seen a number of smaller round cells resembling leucocytes. The outer surface of the chorion is coated with flat epithelial scales 2–4 times the size of a red corpuscle and with one round nucleus, and the inner aspect of the same surface shows in addition to these an arrangement of hazy fibres containing ovoid spindles about as large as epithelial cells. [I have noted in connection

with one specimen of abortion that the characters of these spindle-cells are such that they seem to represent an intermediate stage between the cells of connective tissue and those of epithelium as if the latter were developed by gradual transitional changes from the former]. An essentially similar epithelial covering encases the villi & underneath this also is a delicate fibro-cellular connective tissue.

The "intermediate mucoid layer" consists of a gelatinous substance with spindle cells and a few round or oval epithelial cells.

Most internally there is the true amnion which, presenting on its outer surface, ie that next the chorion, traces of the hazy muco-fibrillar structure of the mucoid layer just mentioned in a stratum of round or oval cells of considerable size in a delicate stroma, is lined on the foetal side by a most beautiful and exactly fitting pavement of epithelial scales from 2–4 times the size of a red corpuscle & having each, one nucleus. At some parts a jelly-

like matrix intervenes. This layer it should be remembered is continuous with the cuticle of the embryo & its cord, while the mucoid layer at once forms the substance of the cord & by it becomes continuous with the foetal connective tissues that is with ~~the~~ what really constitute the capillary sources of the lymphatic system. This fact is noteworthy as bearing upon embryonic nutrition.

The amniotic fluid as one usually sees it in cases of abortion is slightly turbid, & of a grey or yellowish colour. That contained in one of my specimens in which atrophic change was the most marked feature, was found to be neutral in reaction and contained albumen in moderate amount, chlorides 1/12, a small quantity of phosphates, and epithelial debris. There was no mucin. That from two other specimens is noted as having been examined microscopically but nothing was found save granular debris. On examining the foetus there are two points which merit particular attention. These are, — 1. The rela-

tively advanced development of the glandular organs which, especially at this early stage, are concerned in the formation of the blood, and— 2. The preponderance of connective tissue in the embryonic viscera. I shall illustrate these points by reference to the structure of a foetus taken from an abortion at 3½ months, which having been passed by an apparently healthy woman, and being indeed accidentally "procured" may be taken as fairly representative of normal development at that period. The history was as follows,— The patient had had intermittent haemorrhage for about ten days and this continued in spite of medical treatment. Judging from her statements and by vaginal examination &c that the ovum had already passed but that some part of the placental structure remained in utero I inserted a tangle tent with the result that the foetus with its capsule was expelled within 24 hours. The comparative weights of the viscera in this case were;— Brain about 160 grains (including the weight of a small piece of thin muslin wrapped round it). Liver 45 grains, Lungs

right- 21½ gr., left- 18 gr., Kidneys each 4½ gr., Suprarenals each 2 gr., Spleen 1 gr., Pancreas 1½ gr., Thymus gland 1 gr., Heart- 5 gr. The liver as is usually found in such cases till an even later period of foetal life appeared disproportionably large, extending as low as the right groin and the umbilicus. The suprarenals, it may be noted, were half as large as the Kidneys and twice the size of the spleen. The active or epithelial tissues of the liver, Kidneys, suprarenal capsules, and lungs were considerably advanced in development and the abundance of interstitial tissue in the viscera generally attracted attention. In the lobules of the liver it could be seen passing between the individual secreting cells and this was also noticed in the suprarenal bodies. The observations on the relative development of the glands are borne out by examinations of several other embryos and appear to be fairly constant- up till even the fifth month of intrauterine life. I would draw attention to their important bearing upon the nutrition of the foetus and this is the

more evident when we remember that the intermediate layer of the enveloping foetal tissues the mucoid layer above referred to which lines the inner surface of the chorion and is no doubt brought in communication through the villi with the products derived through the maternal blood, is continued as wharton's jelly along the umbilical cord into the body of the foetus and is by means of its rudimentary connective tissue as above said, brought into relationship with the lymphatic system generally and with the glandular structures in which it exists in a more condensed form. No lymphatic vessels have yet been demonstrated in the umbilical cord and this to my mind increases the significance of the continuity of structure by which the mucous tissue of the foetal membranes is connected with that of the foetus itself. Nourishment is doubtless conveyed to the latter by the umbilical veins but it is I think reasonable to suppose that in the absence of a regular lymph vascular communication, the nutritive function of such a system is carried out by the lymph spaces of the tract of connective tissue to

which I have referred. If we regard this as being the case we can understand how degenerative changes arising in the foetal membranes, such for example as that excessive formation of mucoid tissue which gives rise to the hydatid mole, must interfere with the growth of the whole ovum, & must tend to cause its untimely expulsion. The foregoing remarks have paved the way for entering upon the study of our proper subject:—

The Pathology & Treatment of Abortion.

With regard then to its pathology, the first thing to be noticed is that, as already said, the morbid changes most usually found in cases of this kind, are those of atrophy & degeneration. These changes occur so regularly in aborted ova that I cannot but regard them as having much to do with the causation of miscarriage. The point at which they begin and the influence of the factors in the matter is often very difficult if not impossible to determine. In moles, where the embryo has either never been formed or has

died & become disintegrated the enveloping membranes commonly remain attached to the uterus for a longer or shorter time, it may be for several months, undergoing the while atrophic, fatty, or mucoid changes, till these result in their expulsion as foreign matter. Here the early death of the foetus would account for the morbid appearances & their effects but that frequently the absence of any sign of an embryo makes us question whether it has ever been truly formed. Sometimes a condition is met with which appears to mark a transition stage between moles & those aborted ova which contain an embryo. As an example I may mention a specimen of my own apparently cast off at the third month of pregnancy & measuring when unwrapped 3½ by 2 inches. The foetus was only ½ an inch in length & though entire looked soft & sodden. There was marked excess of mucoid tissue in the membranes. Had the ovum been retained much longer I doubt if any foetus would have been found in it. Probably its death at the fifth or sixth week of intrauterine life would account for the imperfect development of the membranes

and this in turn for the miscarriage. We may now study in detail the various Kinds of degeneration which coexist with abortion & their effect upon the tissues of the ovum taking first in order that which is at once the most common & the most characteristic.

Fatty degeneration. In my own experience as mentioned above this is associated with the great majority of cases of abortion. It is a true metamorphosis affecting the cell-protoplasm & nuclei both of the epithelium & the connective tissue spindle cells, as well as the intercellular substance of the structures which make up the ovum & the decidua. So far as my own observations go it is more prone to occur in the chorion than the other tissues though sometimes very marked in the latter; and I am bound to admit some uncertainty as to the condition of the decidua in a majority of cases as this structure has not received from me the same degree of attention as the ovum itself. The change presents itself in various degrees of intensity from a mere granularity of the cell-substance to its total or nearly total conversion into oil-globules. Usually it is well marked. It is often associated with a morbid process which at all events in its advanced

stage is much less commonly met with, namely Mucoid degeneration. As might be expected one finds that the structures chiefly implicated in this condition are the layer of gelatinous tissue intermediate between the chorion & the amnion, and the villi which contain a prolongation of the same substance. The undue development of the mucous material does not in all cases result in an overgrowth so palpable as that of the "hydatid mole" nor indeed is it limited to those specimens of abortion which contain no foetus. In its less evident forms it amounts to nothing more than a distinct though not great excess of mucous tissue in the intermediate layer and the villi. The other foetal membranes likewise afford evidence of a mucoid transformation & this does not seem to be limited to the intercellular substance but the cell-protoplasm also presents a granular appearance, the granules being hardly dark enough in their outline to be fatty but suggesting rather a mucoid or albuminoid structure. The possibility that they consist of mucin is further commended to us by the fact that some of them have a vacuolated appearance not the least interesting feature about these examples

of early mucoid change is noticed in the villi which, as in one of my own specimens, are studded over with minute translucent bladder-like dilatations & these in turn are seen throwing out still smaller pediculated buds from their substance exactly after the manner of the large-sized globules of the hydatid mole to which I shall shortly refer. The explanation of this state of matters is not difficult. If one examines under a low power of the microscope the structure of villi which are free from this mucous change, they are seen to possess rather swollen and clubbed extremities while their stems are not every where of equal diameter & present lateral branches with here & there undeveloped bud-like offshoots. Every such dilatation without doubt becomes under the influence of mucoid degeneration a small cyst of gelatinous substance & some of them in like manner the parent cysts of other smaller processes of the same kind. These observations naturally lead up to the consideration of the more advanced phase of this morbid process which is easily recognised as the hydatid mole. Most of us

are familiar with the two rival theories which have been brought forward to explain the pathology of this singular formation namely that which maintains that the hydatid form appearance is due to a mucous polypoid condition originating in the uterine glands and on the other hand, that which assigns as its cause, mucoid degeneration of the villi. It is not difficult to understand how this difference of opinion should have arisen when one remembers that the jelly-like swellings are in these cases, so entangled in the decidua, that one tissue can hardly be distinguished from another. As regards the first mentioned theory however, it must be evident that we do not know of any pathological change which is likely to bring about especially within the short period of pregnancy such widespread perversion of the uterine glandular structure, unless indeed we conclude that the mucous glands serve as receptacles for the villi & this view as already stated is not borne out by the results of investigation. Were it not so, it would indeed I allow be difficult to avoid the impression that the blocking of the glands by

villi must lead to the formation of retention cysts in the decidua, and this not as an occasional and diseased condition but as a normal occurrence. Apart from any theoretical reasons, however, there is I think more than enough of positive evidence derived from direct observation to convince us that the second of the two explanations referred to is that which truly accounts for the structure of this kind of mole. By way of illustration I may be allowed to give in some detail the particulars relating to a specimen the examination of which removed from my mind all doubt as to the true meaning of this form of abortion.

Structure of the hydatid mole.

In the specimen referred to the foetal surface consisted of a moderately tough but smooth membrane while the uterine aspect was covered with gelatinous globules. These latter on dissection were found to be connected with others embedded in the decidual mass intervening between the two surfaces by narrow membranous cords or bands. These bands present a branched appearance and evidently consist of the villi which are beaded here & there with

mucoid dilatations, these in turn being connected by fine stalks with small bodies of the same kind. On injecting one of the larger globules with carmine solution, the fluid was found to pass into the smaller cystic buds attached to it and also to travel some distance along its stalk and into one of the secondary branches of the latter, though not into the globule in which this terminated. A transverse section of one of the globular cysts showed under the microscope

1. a delicate homogeneous outer membrane.
2. within this a granular fibrillated stroma containing a number of small rounded cells with a single nucleus, the cells being about the size of ordinary leucocytes &
3. a central cavity partly filled with similar fibrillated & cellular tissue, resembling mucous material.

A chemical examination was made of some of the viscid fluid contained in the globules, which however was not quite pure but was mixed with a little blood & some of the substance of the globules themselves, gave on heating & on the addition of dilute acetic

acid, a milky reaction which partly disappeared on adding an excess of the acid. It appears therefore to have been composed partly of albumin & partly of mucin. From these observations I conclude that the hydatid mole consists for the most part of villi which have undergone mucoid degeneration with the formation of cysts which like the stalks supporting them are filled with the mucilaginous product of the degenerative changes & that this product is structurally continuous with the mucous tissue outside the ammion which has been seen to be increased in quantity in those cases where the morbid change is less marked, but still shows in a slighter degree the hydatidform appearance in the villi. A slight degree of degeneration which consists in granularity of the cellular & intercellular protoplasm & so far resembles cloudy swelling, is met with in some cases. I doubt whether this is sufficient to lead to abortion. It existed in the specimen which I have mentioned as an example of an approximately normal ovum prematurely expelled.

Atrophy of the ovum appears to account for a certain number of miscarriages, or at all events it is the principal change observable in them. In such cases one finds a granular change in the cell protoplasm of the chorion and amnion, and I have noted in one case, of the decidua also. The protoplasm is also diminished in quantity so that the cell-nuclei appear to be less covered than usual. It is also significant that the intermediate mucoid layer is scanty & this I am disposed to think accounts in some cases at least for the fact that the amnion is dragged away from the chorion on the forcible exit of the foetus and forms a collapsed balloon at the end of the umbilical cord. This occurred in one of my ~~foetal~~ atrophic cases. I have noticed total detachment of the ovum in two other cases where the mucoid layer was the seat of marked fatty change.

Cavernous Mole. This product of miscarriage though it owes its causation to another agency than degeneration - namely, haemorrhage may also show signs of the first-named morbid change in the foetal membranes and

decidua. The principal feature is however, the effusion of blood between the villi and decidua in such quantity as practically to form outside the ovum an investment of partially organised blood clot. The ovum thus invested is not necessarily at once thrown off, but may be retained for a longer or shorter period. It then appears to act somewhat as an irritative foreign body which stimulates the growth of the decidua or some part of it so that it forms an adherent coat covering the villi. This, at any rate, I would suggest as one explanation of the structure of the thick fleshy coat possessed by some shrivelled specimens of this kind of abortion. I have seen one specimen of haemorrhagic abortion which was not a mole but contained a disproportionately small foetus and might therefore be regarded as marking a transition stage, the ovum clearly having been retained long after the death of the foetus. In this case a truly carneous condition did not seem to have been reached but the clot surrounding the expelled ovum had a somewhat recent appearance. The

microscope in this class of cases reveals as might be expected the presence of a number of small round cells resembling red corpuscles though not always readily recognisable as such, in the clot area, & as has been said, sometimes signs of a fatty change in the foetal membranes.

The Etiology of abortion. It is no simple matter to penetrate the obscurity which surrounds this subject - and to expose an undoubted cause for the expulsion of the ovum. As regards the mechanism of the process, there is no great difficulty in understanding how the mere presence of what has come to be virtually a foreign body in the uterus, may set up contraction of that organ either as has been shown by Basch & Hofmann through the hypogastric plexus or through the centres of the sacral nerves, and also how strong emotion acting through the central nervous axis may induce the same effect, but we look for more by way of explanation than this. In searching among more obvious conditions for the probable cause or causes of miscarriage apart from actual violence, one observes two factors as

commonly present which afford at least some foothold for the further progress of investigation in this direction. These are (1) the fact already insisted on, of a retrograde change tending to loosen the attachment of the ovum to the uterus and ——— (2) some act of indiscretion on the part of the mother, some excitement or shock which has the effect of a direct stimulant of uterine contraction & which is the more potent because of the change referred to. Notwithstanding that this defect in development may be attributed to a variety of circumstances arising in one case as the sequel of inflammation, in others from specific taint, the failing sexual power of middle age, from anaemia or other form of general weakness & the like, it proves in every case the existence of malnutrition and consequent impotence in the ovum and its uterine adjuncts, & this state of malnutrition once established, abortion is no remote possibility. The question now arises Whether this failure of nutrition is to be attributed primarily to a defect in the growth of the foetus or its enveloping membranes or in that of the maternal structures. In modern

may take it as certain that the absence of the foetus is to a greater or less extent accountable for the pathological changes apparent in the ovum. So in cases where a foetus has been formed but is small out of all proportion to the amount of its membranes, or to the stage of pregnancy, there can be little doubt that early death of the foetus, by removing the natural stimulus of growth, has ~~been~~ encouraged the progress of degeneration in the membranes. In all such cases indeed the nutritive efficiency of the maternal tissues up to a certain point is proved by the fact that the attachment of the ovum to its decidua is maintained, and that its development though accompanied by degeneration, continues for a considerable period after the foetus has perished, and this would seem to indicate that normal growth has been first arrested at the latter. It does not necessarily follow however that it has been arrested by a cause primarily operative within the foetus alone or even within it at all. In some cases the cause of this arrest is rather to be looked for outside the ovum itself as for example in the carneous mole where decidual

haemorrhage is the first evident sign of diseased action, the ovum being subsequently retained in utero & undergoing the while regressive changes. May, in the case of moles generally, the very frequent absence of any specific taint or any other clue which might guide one in blaming a cause first active in the embryo for the subsequent steps of disorder in the ovum, leads me to think that these have another explanation. They seem to depend upon a process affecting simultaneously the different structures of the ovum, a languor of nutritive action in the maternal tissues which, sufficient to maintain a sluggish growth for a time does not suffice for foetal development. Constitutional feebleness in one or both parents, an unhealthy state of the uterine mucous membrane, syphilis, renal disease, the failure of sexual function at the menopause, are among the causes which tend to bring about this condition and there is little reason to assign to one or other, a special tendency in this particular.

In passing from the mole formation to those cases in which the ovum is found to contain a foetus of size proportionate to it, one has to be guided in determining the original seat of

destructive changes by noting the point at which these are most advanced & as far as possible by the parental history, and though it is not always possible to decide this point clearly, the chances are that as a rule, failure of nutrition has begun at the attachment of the ovum in utero and in the maternal tissues. In considering the various causes which tend to induce abortion, it will be best to take them in order as they particularly affect (1). the foetus

(2). the uterus & decidua

(3). the system of the mother generally.

1. Causes acting through the foetus. (1). Preeminent among these is Syphilis. It is possible, certainly that an infected mother may communicate this disease to her offspring still in utero, but we have also without doubt sufficient proof to show that the foetus in other cases is itself directly inoculated by a Syphilitic father. The frequency with which the signs of the disease appear in the mother two or three months after conception, the fact that these are of the secondary character & further that the fact embodied in

Colles's law such a mother even though she
have herself shown no syphilitic signs does not in suckling
contract the disease from her syphilitic offspring
while healthy wet nurses have been known to
acquire it in this way, all point to the conclu-
sion that the semen of a syphilitic father can
& sometimes does exert its morbid action first
upon the foetus. It follows therefore that those
cases of premature birth in which the latter
exhibits at the seats of bone growth, in the
skin, or viscera, in fact in any or all of its more
actively growing tissues the signs of syphilis, are
not uncommonly due in the first instance
to foetal inoculation by the father, the accom-
panying signs of disease, inflammatory or de-
generative, in the placenta or decidua being in
these cases consequent upon the former. With re-
gard to other disorders which injuriously af-
fect the foetus in the first place, our in for-
mation is still far from definite & my own
experience tends rather to confirm the view
that the morbid influence at work on the
foetus acts by lowering the vitality of the
maternal tissues.

2. Causes referable to the uterus or decidua. Without considering morbid

influences which affect the uterus secondarily as a part of the general system of the mother, one may easily find certain fruitful causes of abortion in the immediate neighbourhood of the uterus. Uterine displacements for example are certainly answerable for a proportion of cases of miscarriage. The history of one such which I have noted records that eleven successive pregnancies had been prematurely terminated at from three to six months after conception & that the only cause discoverable, & that a sufficient one was retroflexion believed to have existed before marriage. The passive congestion of blood-vessels which is chronic in such cases, its tendency to exaggeration at the menstrual periods, its influence in impairing the nutrition of the uterine mucous membrane taken with the fact that the gravid organ does not readily rise above the pelvic brim as in the due course of development, will explain the rationale of abortion due to this, & indirectly of the same event when associated with other forms of displacement.

Accidental haemorrhage - which may be due to constitutional or local disturbance but

practically signifies detachment of some part of the ovum or ~~decidua~~ placenta, should that structure be formed, from the uterine surface, is as already mentioned another cause of abortion. At the same time it should not be forgotten that the tolerance of the uterus in such cases is considerable & one should therefore within reasonable limits give a preference in treatment to those haemostatic measures which do not tend to induce labour. Endometritis is blamed & probably with justice for a certain proportion of early abortions as well as of premature births at a later stage. Particularly is this tendency observable when it coexists with a condition of general physical weakness. In one of my own cases, the mother was a flabby woman of Strumous type & leucorrhoea, absent in the intervals, appeared to be regularly induced by pregnancy. She had nine miscarriages or premature births out of eleven pregnancies & only two living children. In two of her pregnancies she suffered from psoriasis though not subject to this at other times & was not Syphilitic. Evidently here a uterine mucous surface of low tone cooperated

with a weakly irritable nervous system in preventing full development of the ovum.

Local mechanical inducements to abortion call only for a passing notice. They naturally operate with greater effect when the attachments of the ovum are loosened by disease or constitutional weakness & in those persons in whom an irritable nervous system too easily responds to almost any stimulus of uterine contraction & their mechanism depends upon partial detachment of the ovum with haemorrhage, or upon escape of the liquor amnii, either of which occurrences by giving to the ovum the effect of a foreign body would cause its expulsion.

Inflammation at the placental site or in the decidua if the former structure be not yet formed has been regarded, & justly, as another cause of miscarriage. In examining the structures in cases belonging to this category it is somewhat difficult to arrive at certainty as to the presence of inflammation, the tissues being disorganised by degeneration. The condition is to be recognised by the characteristic presence in the decidua & membranes of the ovum of leucocytes & of proliferated cells belonging to those tissues

with some local hardening & calcareous change in the blood vessels. I must admit that as regards my own specimens, the only clue to inflammatory change, has been the presence of cells resembling leucocytes in the decidua in two cases & some signs of cell-proliferation in the foetal membranes of a third. That inflammation plays a more important part in the production of abortion than is generally understood is however very probable, since several of the admitted causes, as fever, syphilis, & endometritis, in their uterine or foetal manifestations are allied in character to or are identical with inflammation.

3. Causes acting on and through the general system of the mother. In this connexion, the maternal age is a factor which should not be overlooked. As one cannot, in the majority of cases, exclude the possibility of the action of other causes it is difficult to assign to this its precise significance but it is at all events reasonable to suppose that the period of the menopause is prejudicial to the development of the ovum. Certainly at that period the

uterus of multiparae is particularly liable to endometritis, irregular & profuse menstruation, & other adverse conditions combined with an abnormal nervous irritability affecting the whole nervous system, but the contrary influence which these exert on early pregnancy, it cannot be doubted, is strengthened by a parallel process of decay in the uterine function with its associated constitutional conditions. When again, it is found that the subject of a miscarriage is suffering from anaemia or from some exhausting disease, phthisis for example, & the tissues of the ovum are in a state of degeneration, whatever the direct stimulus may have been one must allow that the general want of maternal tone has told against the growth of the ovum & so has contributed to its premature expulsion. The influence of continued mental strain such as, that of anxiety to which abortion appears to be in some cases distinctly traceable is probably of the same sort, while fright & other sudden emotions act in all likelihood more directly as stimuli of uterine contraction. Alcoholic excess is in some persons associated

with so marked a tendency to abortion as to suggest the strong probability of it being a predisposing if not even an exciting cause. This may be attributed in some cases to passive congestion affecting the uterus & decidua & due to cirrhosis of the liver, in others to accidental falls or strains, but with every allowance made on these grounds, the fact that the nervous ~~condition~~ centres are undergoing frequent or constant stimulation by alcohol while the mucous membrane of the uterus is not only irritated by the same means but is subjected to the impulse of a too rapid blood-stream driven by the over-excited heart is sufficient to account for this tendency. The same explanation suggests itself as that most suitable to the case of acute fevers, the influence of which in cutting short the course of pregnancy is well known. In all such and in ordinary inflammatory states also there is as is now well known a marked tendency to cloudy swelling of the cell-elements of the active tissues & there is also the congestive effect of a turbulent circulation which

is the vehicle of poisonous particles & which in consequence of its very rapidly cannot rightly oxygenate the tissues it supplies. These in consequence are undernourished & prone to degenerate. The analogy of syphilis which research has shown to exert a selective faculty in attacking the seats of active growth, teaches us that all such morbid processes as those above mentioned will tell with double force where development is going on. This probably explains why fevers, notably small-pox, frequently exert their influence so injuriously upon the growing ovum & its attachments. Here to it must be remembered that the sympathetic & cerebro-spinal nerve centres connected with parturition are subject to trophic changes & direct irritation induced by their morbid blood-supply. The prostration which precedes death has been known to set up uterine contraction & to cause abortion. In such cases muscular contraction may best be explained by regarding it as a form of asphyxial convulsion similar in origin to the

spasmodic seizures consequent upon extreme loss of blood. The internal use of drugs with a view to procure abortion is a subject with which most practioners are familiar from having had to treat unfortunate women who have seriously injured their health by meanes of self medication which have even often prove unequal to detaching the ovum which is the real cause of their anxiety. Colocynth, ergot, savin, & the muriated tincture of iron are among the substances most commonly used for this purpose.

I may here again briefly refer to my own cases in order to obtain whatever data these afford with regard to the question of etiology. The causes at work in 21 cases as far as they could be arrived at from the history given by patients were as follows:—

Fright- 2 cases, worry or anxiety- 2 cases, overexertion 3 with mental excitement in one of these, advancing age (34-45 yrs) with leucorrhoea, ~~phthisis~~ chronic renal disease, phthisis, or injudicious exercise respectively in 4. Syphilis in the father in 1, drunk in 1, retroflexion 1, anaemia or general weakness 5.

In one of these there was cardiac disease in both parents, in another phthisis in the mother, one was procured, another probably so induced also.

The treatment of abortion

"From the above-mentioned pathological conditions it follows that notwithstanding a certain sameness as to general procedure, the details of the management of abortion must vary not a little according to the causes operative in different cases, the stage of pregnancy & the point arrived at in the process of expulsion of the ovum. Bearing this fact in mind we shall best understand the subject if we study it first in its prophylactic aspect & afterwards take up the practical measures imposed upon us when the miscarriage is evidently unavoidable.

The prevention of abortion.

When a tendency to miscarriage is known to exist, it is our duty if we can to trace it to its source. The ovum perishes from some cause of malnutrition. What is this cause? Are we to look for it in a malposition of the

uterus, in persistent endometritis, or in some form of constitutional taint or weakness in either parent. Whatever its nature the principal aim of rational treatment with a view to maintaining the course of pregnancy must be its removal. As regards malposition, the success which attends the wearing of a pessary necessarily depends upon the mobility of the uterus & somewhat on the duration of the displacement, as the presence of adhesions outside or of a marked degree of chronic congestion of the organ is sufficient to defeat the salutary effect of the instrument. Otherwise, much may be hoped from its use as common experience testifies. Persistent endometritis is certainly a barrier to success in child bearing but one is sometimes astonished by apparently glaring exceptions to this rule. I can recall the case of a patient of my own who in addition to having an anteverted uterus had copious leucorrhoea with a granular state of the os uteri. She wore a Graily-Hewitts pessary for some years

and in spite of the leucorrhoea bore three or four living premature children which died a few hours after birth & one at full time which lived. The treatment of the various constitutional states which tend to cause abortion since these act largely by lowering the nutrition of the ovum, should include as a prime requisite the administration of a liberal though judicious dietary, moderate exercise in the open air, & such medicinal remedies, if any, as are likely to strengthen the general tone. When we find the subject of a miscarriage as happens not unfrequently, to be a weak & anaemic person whose pregnancy has been abruptly terminated by some trivial shock or change of emotion which appears quite unequal to the result we can hardly avoid the conclusion that had the patient's powers been assisted by such measures as the above, the full period would probably have been reached. Of course there must also be when required the means of treatment needful to combat any particular dyscrasia or ailment such as cardiac, pulmonary, &c

venal disease, or Syphilis which if present cannot but impair the tone & function of the uterus as of any other organ. The injurious influence of syphilis can certainly be controlled during pregnancy by specific treatment. This fact which is now commonly accepted by the judgment of medical practitioners is one of much practical value. In common with many others I have had occasion to endorse its truth in the course of my professional experience although it has not fallen to my lot to note that anti Syphilitic treatment has distinctly obviated a tendency to abortion. At the same time, the proved curative value of mercurials in this disease & their apparent efficacy in securing the live birth of children to syphilitic mothers who without such treatment have repeatedly had still born offspring should suffice to recommend their use when Syphilis appears likely to cause miscarriage. We may now pass on to consider a further stage of procedure than that of prevention.

The treatment of Abortion when imminent or when actually progressing. Among the earliest

premonitions of a coming miscarriage are haemorrhage, & slight though repeated pains resembling in their seat & character the pains of labour. The haemorrhage may be only an effect of uterine contraction which in obedience to another cause, is detaching the ovum from its seat of growth or it may be if not the primary cause of abortion, at all events the earliest step in the process & the stimulus of contraction. The os uteri at this stage is not dilated & the ovum cannot be felt through it. The object of treatment in the circumstances is really to prevent miscarriage & on this account should include such means as are most likely to keep the uterus at rest & exclude those which have a contrary tendency. The recumbent position persistently maintained, the hips being raised, & bland & cool diet without stimulants, & a low bedroom temperature are measures of obvious value. As to drugs it is pretty generally admitted that none are likely to prove more serviceable than opium & chloral, preferably the former both as being a more efficient anodyne &

chiefly in consequence of its action as a means of ensuring quiet & sleep. As the opiate may have to be given for a considerable time it is best combined with a somewhat smaller dose of belladonna to mitigate its troublesome interference with digestion & the regular movement of the bowels. Rest though given as a matter of routine practice in such cases is, even when guarded by the opiate, subject to this disadvantage that it can only arrest haemorrhage by exciting uterine contraction & even then its action as a styptic cannot always be relied upon. I doubt much if at any stage in the treatment of abortion this drug need now be employed & certainly in case of haemorrhage at an early stage there is much to be said in preference of other agents especially hamamelis, which is not only a much more effectual styptic but is free from any oxytocic action. I have also used acetate of lead with evident benefit. When at a later stage, the process of abortion has really set in, & somewhat different line of practice becomes necessary & is naturally de-

visible into two parts. 1. the treatment of abortion that has fairly commenced before the expulsion of the ovum
2. the treatment of the patient after its expulsion.

"The treatment of actually progressing abortion: Examination at this stage reveals under the symptoms of increasing pain & bleeding, an os uteri commonly patent through which the finger can feel the soft protruding amniotic sac. There is little likelihood at this stage that miscarriage will be averted. In the haemorrhage we have proof of partial detachment of the ovum from its decidua while its presentation accompanied by recurrent pain proves that uterine contraction has advanced considerably in the work of expelling it. If the ovum be well felt we are still justified in waiting for further indications & relying meantime chiefly upon rest & opiates. If on the other hand it be distinctly recognisable, if as may happen early the amniotic fluid has escaped, & especially, if haemorrhage be a marked symptom, stronger measures are imperative. In select.

ing these however it should be remembered that abortion at whatever stage in pregnancy is but a mimic labour & that whether the attachments of the chorion be loosened by degenerative change or no, but particularly in view of the probability that this has occurred, it is well to let nature expel the uterine product if she can without directly interfering with her efforts. Even where, as in the case of the hydatid mole, there is close & sometimes deep adhesion between the uterus & ovum, the jelly-like & dilated villi penetrating deeply into the muscular substance it is well to trust largely to the natural ~~conditions~~ contractions. The effect of the steady, undulatory, & repeated contraction of what is practically a muscular sac must, if they be maintained for a sufficient time, accomplish the evacuation of such a sac more cleanly & effectually than if its contents be sought for and uncertainly stripped off with forceps or even with the finger working more or less in the dark through the orifice of a narrow tunnel such as the passage through the cervix ut-

-eri. If the ovum be ruptured, there is the more reason to postpone any attempts at mechanical extraction. The contractions of the uterus drive it as an elastic pad against the dilating cervix and the conditions are identically those of the first stage of labour at full term with this difference, that there is a strong probability - that if the case be left to nature the amnion will remain entire to the last, & as not uncommonly happens, the complete ovum when expelled will bring with it a considerable part - if not the whole of the decidua. If on the other hand, the amnion have given way, the ovum no longer acts as an elastic dilator & the purchase which it afforded to the uterine contractions while still entire, is reduced ~~to~~ in proportion to its diminished bulk. Even thus, however, its presence as a foreign body cannot fail to stimulate the expulsive power of the uterus & materially to assist its own exit & it is therefore in my opinion, good practice to wait for a time in such cases & to rely upon the efforts of nature. There are however, a few cases, & these of

critical importance, in which pain or other evidence of such efforts is practically absent, and the uterine inertia is associated with firm adhesion of the placental & membranous tissues to the uterine wall. One cannot in presence of such a condition long defer interference lest the next indications be those of septicaemia. In such circumstances it is best to clear the uterus of its contents early with the finger & if needful, as is almost certain to be the case, with the aid of chloroform. The ovum forceps under such conditions ought I think to play but a subordinate part since it can never equal in accuracy of result the more sensitive & mobile fingers, & its use is apt to cause bleeding without removing enough of the ovum to do real good. In all our waiting too, we must be guided & governed by an all important consideration the amount & duration of haemorrhage & its effect upon the patient. Fortunately, the uterus being comparatively small, the haemorrhage which accompanies abortion during the earlier months of pregnancy is

not as a rule difficult to control, a vaginal plug if carefully applied being quite sufficient to arrest it, and possessing moreover this advantage that it encourages the uterine contractions. Even if the haemorrhage be slight it is, I think, desirable to apply this form of plug in any case of a portion which it is intended to leave for a time to itself since the process of detachment of the ovum may at any moment lead to serious bleeding. Various ready methods of plugging have been used with effect & indeed the simplest & readiest are in so far the best in an emergency. The insertion of a soft handkerchief entire or torn in strips or of a sponge which has been kept in an antiseptic solution (a hint for which I am indebted to a brother practitioner) are methods which, if not elaborate, are most easily applicable. It is certainly preferable however to use when possible, an absorbent material such as lint torn in strips about a foot long and one & a half inches wide moistened but not soaked in carbolised oil, for this purpose. The

Strips should be somewhat dry so as to preserve their absorbency. Care should be taken in packing the uppermost pieces to fill the fornices and to smother the os uteri in order to gain the full benefit of local pressure in arresting the bleeding - With this object it will be found that a Marion Sims' Speculum is most useful in dilating the vagina & thus guiding the Operator in his manipulations. This form of plug need not be removed within a less period than 10 – 12 hours but it will not uncommonly be found that after remaining in situ for a considerably shorter time it has been expelled by the uterine contractions & bears upon its summit the expelled ovum - Haemorrhage now ceases or is greatly abated and a second plug is usually ~~was~~ unnecessary, but one should be inserted if the appearance of parts seems to indicate that part of the ovum or decidua remains undischarged & is likely to be expelled naturally. The haemorrhage not being as yet entirely controlled. In the cases of uterine inertia however, above mentioned I should prefer not to wait nor to use a plug

which by retaining discharges is apt to encourage a septic process but as already said I would interfere early & decidedly in order to remove the probably adherent ovum. In any case where the plug has been used its removal with that of the clots adherent to it should be followed by douching the vagina and interior of the cervix uteri with an antiseptic solution, preferably one of carbolic acid or of a mixture of this with tincture of Iodine. Further details relating to the mode & the materials most suitable for the douche may in the meantime be deferred. If haemorrhage be severe & the amnion ruptured but the os uteri still undilated, or if it have been severe & still continues to flow though less freely the patient being exhausted & the ovum still retained in utero, more active measures are called for. In such cases it becomes necessary to plug the cervix for the double purpose of guiding the escape of the retained ovum by forcible dilatation & of preventing any further loss of blood. Attempts to introduce a tent into the cervix without previously fixing it need not be persisted in as

however, apt to end unsuccessfully. The state of the patient, the mobility of the uterus, & the disadvantage of having to rely for guidance only on an uncertain sense of touch combine to render another less ready method more practically useful. This consists in exposing the os uteri with the help of a speculum (though this part of the process may sometimes be dispensed with), fixing & drawing downwards the anterior lip of the cervix with a volsellum or sharp hook, & with an ovum forceps or tent introducer, passing through the cervical canal a sponge or tangle tent moistened with an antiseptic lubricant, & as nearly as possible, just thick enough to fill its lumen. The tent which must traverse the whole length of the canal should be prevented from slipping out by placing behind it at the os uteri a plug of absorbent wool soaked in Glycerine alone or what is better in some one of its stronger antiseptic combinations such as glycerole of corrosive sublimate (1-2000). The patient may now be left at rest, a 1/4 gr morphia suppository or a dose of laudanum

(about m xv) being administered, & repeated if needful to allay pain while dilatation is proceeding. It is a practice with some to assist the action of the vaginal plug or the tent with a full dose of ergot by the mouth or with a deep intramuscular injection of ergotine. Such a proceeding I do not consider really necessary, the stimulus of the plug or tent being sufficient to maintain uterine contraction, & some practitioners object, not without reason, that any advantage obtained by the use of this drug in such cases is counterbalanced, at any rate except where dilatation is ensured by the tent, by its tendency to cause tight constriction of the os and thus to interfere with the extraction of fragments of the ovum should this be necessary. As regards the use of the tent, one or two points are noteworthy. The tangle tent from its less absorbent character is in my opinion preferable on the whole to one made of sponge as being less likely to retain uterine discharges. Its disadvantage is its usually small size though this may be obviated by ~~using~~ inserting more tents than one or by using a thicker kind composed of several.

al narrow tangle strips rivetted together. Another point of manifest importance alike in case the plug or the tent is used is that care be taken to secure the latter or the pieces ~~of~~ which compose the former with a ligature to prevent it from slipping into the uterine cavity & so giving rise to mischief later. The use of the vulsellum or sharp hook to fix the cervix is a practice which cannot fail to commend itself. By traction on the anterior lip it straightens the cervical canal, ~~and the~~ overcomes the difficulty arising from the naturally somewhat anteverted position of the uterus, & thus facilitates in a marked degree the passage of the tent which on the withdrawal of the hook is ~~left~~ held in position by the forward inclination of the liberated organ. In carrying out these manipulations skilled assistance can usually be dispensed with, a matter of some consequence to practitioners in isolated situations. An intelligent female attendant can usually be taught to render all help that the practitioner will require. After twelve hours the tent will have accomplished the work of dilatation, & ~~&~~ traction may be proceeded with.

If however the canal be not yet sufficiently patent there is nothing for it but to introduce one or two sponge tents of sufficient size to guarantee its complete patency having first applied an antiseptic douche to the interior of the uterus & await the result. The os being fully dilated ~~the~~ extraction should be carried out with the finger or partly thus & partly with the ovum forceps, the uterus being at the same time pushed downwards by anterior abdominal pressure with one hand. If as in the case of some multiparae the vagina be sufficiently dilated to allow the introduction of one hand a further advantage is obtained, & it may be possible without much difficulty to detach & remove any remains of the ovum or decidua with the finger alone. In such a case I prefer the left hand for introduction as being the smaller. In many cases of abortion either from narrowness of the cervical canal or from its high position in the pelvis, it is impossible to extract the entire ovum with the hand without inflicting great pain or indeed to extract more than part of it at all in this way.

In such a case the administration of an anaesthetic is of the greatest service & is sometimes indeed, an imperative necessity both in order to obviate syncope which readily occurs in the circumstances in a weak patient & also to facilitate manipulation by relieving uterine spasm. It should be remembered that especially in cases where as above noticed the placenta is formed & is adherent, no instrument is so reliable either for diagnosis or detachment as the finger passed into the uterus & up to its very fundus. It will often be found that some fragment of the ovum, decidua, or placenta remains adherent in the uterus in spite of all ordinary efforts to remove it but we have reason to believe that it is neither large nor firmly attached. In such a case the ovum forceps is most useful. In employing it, the vulsellum & if needful the speculum, should be used to fix & expose the cervix uteri. In using the forceps care must be taken to sound well the depths of the uterus with it & to detach every adherent fragment, the instrument being used partly as forceps, partly as curette

scraping the uterine interior at all points till it is felt every where to scrape upon the hard resisting structure of the organ. The curved forceps described below is for this latter purpose & for general use much better adapted than the ordinary straight instrument. It is true that such fragments do not always become the starting point of serious septic changes but sometimes remain quiescent until they are separated from the uterine wall by a slow & trifling inflammatory process. This happened in a case for details of which as well as for the opportunity of examining the specimen obtained from it I am indebted to the kindness of a brother practitioner. In this instance a fragment of the chorion was retained in contact with a part of the decidual layer by a clot of blood interposed between the two till the latter was detached as above described & the whole was cast off some seven weeks after the rest of the ovum.

~~It will however be found however that one or at most two careful explorations will suffice to prevent the onset of such complications. The evacuation of the hydatid form~~

~~whole must be carried out on the same general principles~~. Had any suspicious symptoms appeared to indicate that this body was retained in the uterus & was causing irritation it would certainly have been sought for and removed. As it was we have in the details of this case a proof of the occasional tolerance of the uterus with reference to fragments of this description. It is certainly better however as a rule to remove as far as possible every portion of the ovum & decidua which is not early cast off by a natural process. At the same time excess of manipulation is to be deprecated & one must carefully distinguish between adherent portions of the ovum & mere roughnesses of the uterine interior which obviously should not be interfered with If after careful manipulation there only remain a few light shreds & pieces of blood-clot - it is better to allow the uterus to cast off these than to harass it by continued interference. Should any sign of uterine or constitutional disturbance indicate the beginning of septic mischief

in any such retained portions there will as a rule, still be time to complete what little remains of the work of evacuation. It will commonly be found however that one or at most two careful explorations will suffice to prevent the onset of such complications. The evacuation of the hydatidiform mole must be carried out on the same general principles. It is particularly necessary however in this case to remember that too much force must not be used in extraction as some of the mucoid vesicles are apt to be deeply embedded near the peritoneal aspect of the uterus and we must therefore while extracting all we can rather avoid than seek to remove such deeply-seated portions lest we encounter the risk of causing peritonitis or even actual rupture of the uterine (wall.

Before leaving this subject a word on the structure of vorsum forceps may not be out of place. The ordinary straight-forceps is a useful and efficient instrument. When the uterine cavity is more or less straightened by the vulsellum fixed in the cervix it is perhaps not much inferior to that

which I shall now describe. The latter possesses in its greater length, its greater ease in introduction, & conformity to the normal uterine curve, certain advantages which deserve notice. It is an instrument designed by my brother Dr Alexander Morison & consists of an ordinary pharyngeal forceps opening laterally. The blades terminate each in a loop-like extremity which is grooved round the inner surface in order to enable it to grasp more severely any captured shreds of tissue. Throughout the course of treatment just described, antiseptic precautions are very necessary in order to prevent the conveyance of contagion by tents instruments or hands. More particularly however, are they called for when the uterus has been cleared of its contents & there is no more rational proceeding than the antiseptic irrigation of the uterine cavity at this stage. Some caution I consider, should be used in regulating the strength of the solutions used. I cannot but think that the repeated use of injections of the strength of 1 part of carbolic acid in 40 of water is to be recommended. As an occasional applica-

-tion, this strength is doubtless useful, but where the douche has to be repeated frequently, 1 in 100 should be amply strong enough, & I commonly use a mixture containing ℥j of Carbolic acid to ⊙j of water. A very effective solution can easily be prepared by adding to the latter ℥j of Tincture of Iodine. The advantage possessed by somewhat weak but effectual solutions like those above mentioned when used in large quantity ~~above~~ over others of the same kind but more potent is that they irritate comparatively little, while they effectually remove noxious discharges. I think I have observed distinct benefit from the substitution of the weaker for the stronger solutions & should certainly prefer to use them as a rule rather than run the risk of setting up an irritative even if an aseptic inflammation. None of these douches however so suitably unites a strong disinfectant property with a minimum of irritation as the 1 in 2000 or 3000 solution of corrosive sublimate. It should not be forgotten, moreover, that much of the value of irrigation depends upon the quantity of the

solution used & the fact that it is hardly possible to exceed in this respect - is an additional reason why injections ought to be weak rather than strong. For the purpose of irrigation through a patent cervix such as is now supposed to be under treatment, the ordinary Higginson's enema syringe, with a vaginal tube preferably one of glass, is as useful an instrument as need be employed. When the cervical canal is imperfectly dilated, other appliances are sometimes more convenient. One or two of these will be shortly described.

Septicaemia & its treatment - constitute the most important subdivision of our present subject. Mention has already been made of the close connexion existing between the premature ovum & the uterus. It may easily happen especially in the placental area that this connexion is not completely severed when the bulk of the ovum is detached. Small adherent shreds, clots, or intrauterine lacerations easily become under the poisonous action of lochial discharge the seats of septic infection, or unhealthy at-

-mospheric surroundings apart from the retention of any of the ordinary products of abortion may easily induce a similar morbid change. The symptoms of high temperature preceded by rigors but not necessarily attended with marked change otherwise, & foetid vaginal discharge are the familiar indications of the onset of this morbid process, though singularly enough with the exception of fever, its manifestations are apt to subside somewhat as time goes on. Local pain if present previously, & the odour of the discharge, never a strong diagnostic feature since the lochia after the first day are in any case malodorous, cease to attract notice. This subsidence of symptoms is not however a favourable sign in many cases since it is compatible with the transference of septic mischief from the uterine lining which has in great measure passed away in the discharge, to the intricate network of blood vessels which are more deeply placed & in fatal cases the latter are often found to contain septic thrombi while the site of placental attachment shows only a

granulating appearance with slight purplish discoloration. It is well both in point of treatment & of diagnosis when fever suddenly developes after abortion & is not accounted for by extra uterine causes nor can be distinctly traced to the uterus to try the effect of the antiseptic douche. If this check the rise of temperature decidedly, the existence of septic change is practically certain. The practitioner must then proceed to combat the evil. Douches may possibly suffice, but should the temperature continue to rise during the intervals of their administration it is clearly advisable to explore the interior of the uterus & remove any remaining traces of the ovum with the forceps or curette, or of decomposing blood-clot. Irrigation may have to be kept up till a continued abeyance of symptoms have rendered them unnecessary. It is in such cases that another form of injector than Higginson's syringe is useful. The os uteri even if patent to begin with, soon contracts & a narrow tube is therefore advantageous. A very ready & efficient method consists in

attaching to a No 10 or 12 gum. elastic catheter ~~a~~ long india rubber tube of corresponding thickness the opposite end of which is fitted with a simple glass or metal syphon, so that the apparatus, previously filled throughout with an antiseptic fluid may be used as an easily applied & continuously acting irrigator for any length of time that may be desirable. My own ordinary practice is to fit an ordinary gum. elastic catheter by means of tubing to the enema nozzle of a Higginson's Syringe, & inject a pint or two of the required solution. For cases such as those now under consideration, that of swabbing the interior of the uterus with strong antiseptics such as the tincture of Iodine undiluted has been advocated & the utility of this method is manifest in cases where septic mischief has advanced & a more tedious mode of procedure is not desirable & it is necessary to place an immediate check upon the morbid action. Such interference however is not unlikely to cause considerable uterine irritation without accurately

reaching the part which it is designed to treat & it does not except in such an extreme case as I have referred to, possess any distinct advantage over the irrigation plan but rather the reverse. Where the urgency of septic symptoms calls for their immediate relief & the contracted condition of the cervical canal requires its rapid dilatation, the use of graduated bougies or of Sims's uterine dilator as indicated, & anaesthesia is a practical necessity. In the great majority of cases however, there is time enough for the gradual action of a tent & this plan where it can be carried out is certainly less trying to the patient. The use of the curette in removing septic materials from the uterine surface has of late years undergone a process of evolution which has resulted in the introduction among some gynecologists of a still more heroic mode of treatment. This consists in the forcible introduction through the undilated cervix uteri of a sharp spoon which is used to scrape the interior of the cervical canal & uterus as

the muscular layer. Good results have been claimed for this mode of treatment - but they should I think in almost every case be at least equally attainable by less forcible methods.

2. The treatment of abortion after evacuation of the uterus. In so far as this subject is connected with the detection & cure of septic processes it has been already fully discussed. As in the puerperium, during while the patient is confined to her room must be light & nutritious. The lying in period must be regulated entirely by the presence or absence of complications as the return of the uterus to its normal size must evidently depend upon its remaining quiescent either as regards the influence of disease or surgical manipulation. The time allowed should be little if any shorter than that of women confined at full time. After all that has been stated above, the necessity of maintaining thorough cleanliness of the patient's person & surroundings need hardly be insisted on. In conclusion, I would sum up very

briefly my views on the pathology & treatment of abortion, & the observations contained in the foregoing paper will bear me out in saying that whatever its cause the cardinal point in the pathology of this condition & its predisposing cause is degeneration of the ovum & adjacent maternal tissues while the great object of treatment where prevention is impossible (and this is often easily accomplished by the unaided uterine efforts), is the complete removal of the ovum & its appendages.

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M.B. C.M
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