The Endometrium.

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1887.
Introductory Note.

I have examined such specimens of the mucous membrane of the uterus and cervix as have, from time to time fallen into my hands, and I now arrange the observations in sequence and present them under the title: The Endometrium.

This title, however, is selected chiefly for its brevity, and the thesis does not profess to be an exhaustive study of the subject but merely a record of personal observations. The illustrations are all made from specimens of my own preparation. Most of them have been published in "Practical Pathology" by G. Sims Woodhead M.D. 2nd Edition, in the section contributed to that book by me.

The microscopic specimens are all of my own preparation.

I. Lilie Chapman.
Inverness, April 1887.
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Naked eye appearances of the Endometrium.

On examining a vertical section from the fundus to os of the uterine there is seen a lining layer, distinctly different from the main bulk of the uterine substance. In the body this is rose coloured, in the cervix, yellowish-grey, more like that of the subjacent structures than is that of the body. In the body this layer is from 1-2 mm. thick in multiparae, while in the cervix it is from 2-3 mm.

In the body, this layer has a flat surface, with here and there, fine thorn-like papillae or small ridges, and such ridges run clear, like out from the openings of the Fallopian tubes.

To the naked eye there are no openings of glancing visible.
In the cervix this layer is thrown into folds, - the Arbor Viteae. - It is, as already mentioned, thicker than that of the body, generally from \( \frac{1}{2} \) to \( \frac{1}{3} \) as thick. At the folds it is twice as thick, as the outer or it is thinner.

In the lower third of the cervical canal there are projecting papillae formed, apparently, by cross-cutting folds.
Microscopic appearances of the Endometrium.

On examining such a section of the uterine wall as Fig. 1., a drawing of which is annexed, the peritoneal lining is seen as a thin layer covering the outer surface.

We shall not enter into the subject of the peritoneum and its subjacent layer of connective, “cellular,” tissue, further than to say, that, as between the pleura and the lung substance, so between the peritoneum and the uterine, there exist a certain degree of direct connection, which has important pathological bearings to which we may again refer.

The main bulk of the uterine wall is composed of bundles of non-striped muscle, running in various directions.
FIG. 1.—Section from surface to surface of the uterine wall of a girl aged sixteen, who had never menstruated. (x 20.) Logwood and eosine.

c. Uterine glands. f. Muscular wall, with muscle bundles cut in various directions. d. Vessel. e. Lymphatic space. g. The peritoneal surface covered with flattened endothelial cells.

The preparation from which this drawing was made got broken.
with a supporting, but sparse, framework of connective tissues, partly structureless, partly fibrous. On the inner surface is situated what is termed "the mucous membrane."

This differs however, very widely from any other mucous membrane in the body. It has not the appearance or structural consistency that is usually associated with the term membrane, and it cannot be peeled off, being directly continuous with the subjacent muscle, without the interposition of that loose connective tissue which is found under mucous membranes generally, and is termed - the submucous layer.

But, in addition to being directly continuous with the subjacent muscle, it is found, on microscopic examination, to contain exactly the same
elementary constituents, only in very different proportions. This may be called a relative difference. The only positive difference is the presence of the uterine follicles or glands, which we shall describe later on. Even this cannot be quite called a positive difference, because the deep ends of the glands are not situated at a uniform level, some of the tubes being very short, while others have their extremities pushed down among the muscular layers of the ordinary uterine wall.

What is, however, usually described as the "mucous membrane of the uterus," extends for a depth of from 1-2 mm. from the internal surface, and, to the naked eye, the difference of structure is evident.

Microscopically, this portion of the uterine wall is seen to consist
of connective tissue of the embryonic type, with large, nucleated, round or slightly spindle shaped cells.

Hennig describes it as a strong layer of immature connective tissue which is quite continuous with the almost embryonic connective tissue which lies between the muscular bundles.

Here and there, by the aide of a light powder, some non-striped muscle cells and a few ordinary connective tissue fibres may be seen, especially in the deeper layers. According to Hennig, here is elastic tissue, or an embryonic form of it, and pathologically there are sometimes found bundles of elastic tissue especially in the neighbourhood of the oc.

The general arrangement, then, of the three great elements.
components of the uterine wall, -
non-striped muscle, - connective tissue,
and embryonic tissue, - is, - that
while all three may be found at
any point in the thickness of the
wall, the muscular is present in
enormous preponderance from the
peritoneal surface inward as to about
2 m.m. from the internal surface,
while the embryonic connective tissue
is present in enormous preponderance
from the inner surface outward as to the
same point.

The Vessels, Lymphatics, and
Glands of the uterus.

In regard to the two former,
we have no personal observations
to offer.
The anatomical arrangement of
the vessels in peculiar, but well
known. In the muscular
portion of the uterine wall, the vessels—both arteries and veins—are numerous, and comparatively of large size, while the arteries tend to have a corkscrew-like arrangement. In the enclosure, the arteries are smaller and numerous, have a tendency to form corkscrew spirals, which have a vertical direction, and end in horizontal arches of capillaries which then form a net-work parallel to the free surface. The veins are comparatively fewer in number.

The arrangement of the lymphatic vessels in the uterus has been made the subject of elaborate researches by Leopold de Héeymans and Delmilt. According to the former, whose views have been very extensively adopted, there exist in the whole
uterine wall, numerous lymph spaces formed by connective tissue, as described by Rauvier as being the universal arrangement of lymphatics, - lined by endothelium. One of these spaces is indicated in the section among the muscular bundles. Among the tissues of the endometrium, however, such spaces cannot be seen unless an artificial oedema has been produced, and when this is effected by the injection of nitrate of silver, as suggested by Leopold, the endothelial lining cells are stained, and, in his words, the round cells and nuclei, which, in ordinary section appear to be simply crowded together, are found to be spined shaped endothelium, lining spaces formed by an exceedingly fine reticulum of connective tissue.
some of which surround the uterine glands and others the bloodvessels.

"The uterine mucous is to be considered as an extensive lymphatic gland, composed of a connective tissue skeleton, forming spaces lined with endothelial cells, traversed by glands and blood vessels, and separated from the cavity of the uterus by a single layer of columnar epithelium." (Lepold)

This view of the uterine mucous as an extensive lymphatic gland must be looked on, rather as an effective summary of the observers researches, and an emphatic assertion of the existence of very numerous lymph spaces, rather than be taken in a literal sense. He shall have occasion to refer to these lymph spaces when describing the pathological changes.
which occur in the endometrium -

The uterine stances.

These consist of very fine tubes, the lumen usually being less than the size of the lining epi-

thelial cells, single, but occasionally slightly branched into two or three at their deeper ends which sometimes are well-shaped or slightly spiral. They very readily fall out during the manipulation of sections for microscopic examination, being but slightly attached to the surrounding tissue.

Their direction is very varied and a complete section of one of these cannot be obtained. As a rule, they run in various angles, sometimes almost
parallel to the surface. They are lined by a single layer of columnar, non-ciliated epithelium, which is continuous with that lining the uterine cavity. Henning describes a so-called Mehlhens membrane around the glands which, however, he states to be composed of spindle-shaped cells, and which may correspond with the lining cells of Leopold's lymph spaces.

The uterine epithelium.

The uterine epithelium is continuous with that lining the tubes above and the vagina below. Though these differ in character the transition from one to the other is not a sudden one.
Outside the os externum the epithe- 
ilium is squamous, resembling 
that of the skin. It presents a 
continuous surface, and does not dist-
down to form any gland arrange-
ment.

In the crevice the epithelium is 
columnar and in a single layer. 
On the surface of the papillae 
and ridges it is ciliated, in the 
furrows it is not so. Opening 
off both the ridges and furrows 
are numerous glands, similar to 
those of the body but branching 
to a very much greater extent 
and slightly dilated at their 
deep ends, forming, in fact, 
a compound racemose arrange-
ment.

Lining the body cavity the 
epithelium is single layered, 
columnar, and ciliated. Lining 
the glands it is similar but without 


One point in reference to the development of the epithelium lining the interior of the uterus is important as bearing on the clinical aspect of disease of the endometrium or of the ovary. The coats of the ovary and the epithelium of the uterus are both derived from the same foetal structure, and, up to a certain point of development, they both undergo the same changes, i.e., the epithelium forms, in both tubular prolongations into the subjacent tissues, which, in the ovary become constricted and in parts cut off to form closed sacs, the Graafian follicles, but in the uterus remain as the uterine and cervical glands.
The foetal uterus.

On examining the accompanying sections of the uteri of foetuses and newborn children, most of the anatomical points already alluded to may be made out.

1. In the foetal uterus there is no distinction between body and cervix, the same arrangement holds in both, and the Arbor Viteae, which later is confined to the cervix, enters, in the foetus, indeed, in the girl till a variable time usually till a short time before puberty, — up to the functional uterus. In specimens 98, 11, 15, this is well seen.

The ovas are developed by tubular outgrowths of the epithelium, alike in the cervix and body, though the degree...
of development varies to the extent already mentioned.

2. In the foetal uterus the fact of the endometrium and the general uterine wall consisting of the same structures but in different relative proportions is well seen.

Changes in the Endometrium during menstruation.

The lining membrane of the uterus is one of the first structures to undergo post-mortem decomposition, and it is extremely difficult to know to what extent such decomposition may account for the changes usually found on examination of the uterus of individuals who have died during menstruation.
Fig. 2—Section from mucous surface and part of muscular substance of the uterine wall of a girl who died suddenly three and a half days after the onset of an ordinary menstruation. (x 50.) Logwood.

a. Internal surface apparently devoid of epithelium.

b. Uterine glands.

c. Swollen and proliferating muscle cells.

d. Muscle bundles cut transversely.
The accompanying sections and drawing made from one of these shed the appearances found in such cases.

The greater part of the mucous membrane, including its superficial covering of epithelium, has disappeared in the remaining portion of the mucous membrane. The cells of the mastic and of the glands are swollen and granular, while the superficial layers of the muscular cells are actively proliferating. No trace of fatty degeneration can be made out.

John Williams Holmes, M.D.,

During menstruation, fatty degeneration of the mucous membrane and hemorrhage into it occur, followed by complete removal and then regeneration of the mucous layer from the constituent elements of the muscular wall.
Kuncerat and Engeleman, who worked together, describe a doubling in thickness of the membrane, due to proliferation of all the elements of the membrane, with fatty degeneration of, and haemorrhage into, the most superficial layers which alone are shed, regeneration occurring from the remaining cells of the struma and the epithelium of the glands.

Gleppolci's views agree with those of Kuncerat & Engeleman except as to the existence of fatty degeneration, which he entirely denies.

Möricke removes portions of the mucous membrane by the curet during menstruation, & invariably finds the surface epithelium present and intact.

In endeavouring to reconcile these opposing views, the circumstances under which the obser-
ations were made must be taken into account.

The specimens in Williams' cases were removed from the body not less than 24 hours after death, as is customary in this country, and the changes described by him correspond in the main with those shown in our specimens. The uteri from which they were cut having been obtained under similar circumstances.

Kohradt & Eugenmann, working in Germany, were able to obtain specimens at a shorter interval after death, while Mörike kept his during life.

The results of the latter observers require corroboration before being accepted. If accurate they would entirely overthrow all existing ideas in regard to menstruation.
He does not tell us where the menstrual blood comes from, but that the surface epithelium may be preserved while bleeding from the endometrium is found on some of our own specimens, notably No., sufficiently demonstrated.

From an examination of the uteri of two nulliparae who died during menstruation when every care was taken in the preservation, hardening, cutting, and mounting of the specimens, we are disposed to accept the description of Lehfeld as the most correct.

Into the changes which occur in the endometrium during pregnancy and the puerperium we shall not enter, as we have made no personal observations, and are prepared to accept the results of Lehfeld's elaborate investigations.
Pathological changes in the Endometrium:

The pathological conditions to which reference will be made will only be more illustrated by the accompanying specimens.

Cervix.

Caruncleal inflammation of the cervical canal is almost invariably accompanied by a condition of the outer os and a vaginal aspect of the cervix which has been, since the introduction to use of the speculum, spoken of as ulceration of the cervix, or, in popular parlance, “ulceration of the womb.” The only true ulcerations of the cervix are, the syphilis, the lupoid and the cancerous.

Of the first we have no specimen.
FIG. 10—Section of a hypertrophic growth from the neighbourhood of the hymen in a case of lupus vulvae. (× 50.) Logwood.

a. Thickened layer of epithelium.
b. Proliferating mass passing into the corium.
c. Do. do seen in transverse section, both surrounded by proliferating connective tissue cells.
d. Vascular nodule (mass of connective tissue cells around vessels).
e. Do. do without vessels.
f. Mass of disintegrated tissue at the margin of the lupus ulcer.
g.g. Hemorrhages.
The blood-vessels, lymphatics, and diffuse infiltration are all well seen.
Of the specimen we can only show sections made from portions of tissue removed from the vulva and vagina in a case which was operated on when the disease was limited to those parts, but in which it returned three years after operation, then affecting the roof of the vagina and the cervix to an extent which precluded the possibility of operation. Assuming that the microscopic appearances would have been the same we would draw attention to specimens 23 to 25 as illustrating hypertrophic ulceration of the cervix.

Sections 23-25, from which the accompanying drawing was made, are from a finger-like thick hypertrophy which sprang from the inner aspect of the labium. It is seen to be completely surrounded by a thick layer of
epithelium which presents a smooth surface externally, but is, on its deep surface, irregular with here and there branch-shaped prolongations passing into the substance of the mass. The central portion is made up of a mesh work of connective tissue in all stages of development, in which there are numerous spaces, some distended with blood, others containing granular material probably coagulated lymph, while others, especially near the surface, more resemble plasma ducts and are lined by regular epithelium. Immediately under the epithelial investing layer—especially when the prolongations pass inward—there are numerous deeply stained round bodies, which, under a high power, are seen to be nucleated. These are grouped around the
Fig. 4. Specimen 23. X 300.
openings above mentioned and are also sparingly scattered through the connective tissue. The cells of which these are the nuclei are very delicately stained and some of them are of considerable size and contain more than one nucleus, and it is apparently from these cells that the connective tissue is developed.

These cells are very similar to those met with as endothelial plates in cyanumata, tubercle follicles, &c. Section 26.27.28. Taken from different parts of the same case, these a similar condition is evidenced by further advance as the cells being present in greater numbers and in specimen 26 being so crowded together as to have led to breaking down and ulceration. Sections 27-28, made from a hence wart-like
Structure over the mons veneris, has all the characteristics of an ordinary wart or papilloma, with, in addition, a few cells similar to those existing in the other specimens, sparingly scattered through the connective tissue.

In the second volume of Ziegler's Text Book of Pathological Anatomy, there will be found a drawing of a section from a patch of lupus vulgaris which, in every respect, corresponds with the appearances seen in the accompanying sections, and the description given by Ziegler of the changes which occur in lupus of the skin applies perfectly to our own case.
Carcinoma of the Cervix.

One third of all the cases of cancer in women are cases of uterine cancer, and of these, according to Schroeder, over 98 per cent. are affections of the cervix.

All the varieties of malignant disease usually described may occur in the cervix, but clinically and pathologically it is only important to differentiate three forms.

1. The diffuse infiltrative, by far the most common.
2. The sprouting epitheliomatous, or cauliflower growth.
3. When the disease is chiefly confined to the mucous membrane of the cavity.

1. The diffuse infiltrative form is spoken of as Carcinoma, medullary or desquamous cancer,
according to the preponderance of one or other of its constituent elements, - fibrous tissue, epithelial cells, or degenerated softened epithelium.

In this form the cervix is greatly hypertrophied, and the epithelium on its vaginal aspect, early in the progress of the disease, becomes fixed to the subjacent tissues by the formation of downward growths. The pelvic glands soon become affected, and, as the disease progresses, ulceration both of the vaginal aspect and of the cavity occurs, and the vagina and neighbouring organs become implicated. - Peritoneal adherions are produced, which greatly diminish the chance of progress into the abdominal cavity, but the walls of the bladder & uterus are usually involved.
2. The sprouting, epithelialized, or cauliflower form occurs as a projecting mass from one or other of the lips of the cervix, soft, white, and broken up on the surface, so as to present an appearance like that of the vegetable after which it is named. In this form the outward growth is far in excess of that into the substance of the cervix, but the later history of this class of cases is quite similar to that of the diffuse infiltrated form.

3. In the third class of cases, where the disease is chiefly limited to the cavity of the cervix, the amount of hypertrophy of the cervix is not so great as in the other forms, and the disease spreads upwards through the inner os and
into the cavity of the body, which becomes enlarged and elongated, rather than protrudes over the vaginal aspect.

In this form, infiltration of the surrounding glands and organs is of later occurrence, but the ultimate history of such cases is the same as that of the other forms.

The microscopic structure of the diseased parts differs in no respect from that of ordinary malignant growths and infiltrations.

As to the starting point of the disease, there is great diversity of opinion, but Emmet believes, as a result of clinical observation, that, in a large number of cases, the malignant process has been initiated by exposure of the cervical.
mucous membrane to the vagina, and the changes thereby resulting in it which we shall presently describe as following fear and eczepion.

The so-called “ulceration” or erosion of the cervix.

This, as already stated is an almost invariable accompaniment of caruncular inflammation of the cervical canal. To obtain satisfactory preparation of such conditions it is absolutely essential that portions of the cervix should be removed during life and carefully prepared, otherwise the epithelial lining of the canal of the erosions will be lost, and a fallacious appearance
Fig. 65—Cervical erosion.  

a. Point of junction of healthy cervix with eroded surface; to the left of a, squamous epithelium of the vaginal aspect; to the right of a, eroded surface covered by a single layer of cubical cells (slightly diagrammatic).  
b. Normal tissue of the cervix.  
c. New glandular formation, passing at d beneath the healthily covered surface.  

(× 50.) Logwood.

(The specimen from which this drawing was made has unfortunately been lost.)
of true ulceration be produced. This was done in the case from which the accompanying specimen and illustration were made, it being one in which what is known as Emmet's operation was performed.

On examining them the surface will be found to resemble closely the mucous membrane of the cervix, to be thrown into papillary folds, and to be covered by a single layer of cubical epithelium. Deeper down may be seen irregularly shaped spaces lined by similar epithelium, which appear to have been formed from the deep extremities of the foldings between the papilli.

The section has been made at the point of continuity between the erosion and the
healthy vaginal aspect, and it will be seen that the change from the one kind of epithelium to the other is a gradual one; and, indeed, Ruge and Veit believe that such erosions result from a loss of the superficial squamous layer down to the deepest cells, a single layer only being left. It is more probable that the condition arises from a proliferation of the cervical canal epithelium, which thus comes to occupy the place of the squamous on the vaginal aspect.

Such erosions are, as already mentioned, usually associated with casts of the cervix cavity; and the microscopic appearances of the cervical mucous membrane, under such circumstances closely resemble
Those just described as characteristic of erosions.

Another method in which cylindrical or cubical epithelium comes to cover the portion of cervix exposed to the vagina is by the healing of tears occurring at delivery. The pathological history in such cases is somewhat as follows:

On the occurrence of a tear at delivery a condition is produced in which the lower end of the cervical canal is exposed, and flanked on one or both sides by a raw surface uncovered by epithelium.

A natural attempt at repair by first intention occurs, but in most cases is counteracted by the imperfect coaptation of the surfaces and the flowing over them of the

torcular discharges. During the subsequent process of cic.
ablation, a degree of local hyperaemia is occasioned; this interferes with the process of involution; and, as a result, the uterus remains large. The torn surface in course of time becomes covered over by epithelium of the same character as that of the cervix, as the cervical epithelium proliferates much more rapidly than does that squamous covering the vaginal aspect. The new surface comes then in all respects to resemble the cavity of the cervix, being thrown into folds and furrows and covered with a single layer of cubical epithelium, through which the vessels readily shine and hence
the villous vascular appearance.

In those new glandular structures (erosions) on the vaginal aspect of the cervix, however originating, there is, as well as the alteration on the surface, a proliferation of the subjacent connective tissues and it is to outgrowths of this, rather than to foldings from the surface that Pischel attributes the papillary formations.

When the deep ends of the foldings become shut off, retention cysts are produced, which may bulge under the potions still covered by squamous epithelium, reach the surface, burst, and thus occasion an extension of the altered condition.
Note on Emmet's operation.

This operation consists in the removal of the surfaces already described as being covered by newly developed cubical epithelium as the result of imperfect attempts at the healing of a tear, along with the underlying new cicatrical tissue, — the stitching together of the removed surfaces, and the consequent turning in of the exposed cervical canal. We have performed the operation four times the indication for it in each case being tear of the cervix with ecchymosis of the lips and the presence of a large heavy uterus. In the first case union did not occur but the uterus was slightly reduced in size. In two others though union...
occurred, little benefit was derived from the operation. The fourth case was a success both immediately and remotely. We would attribute much more importance to the enlargement of the uterus than to the presence of the tear as productive of suffering in these cases.

The heavy uterine accounts for the backache and other symptoms, while the increased cavity surface occasions the menorrhagia and leukorrhea. The latter condition being further aggravated by the secretion from the surface of the exposed cervix, and the frequently associated condition of cervical catarrh.

The greatest benefit from the operation appears to be derived from the elimination
in the size of the uterus which so frequently results after its performance. It is well known that a process of artificial involution frequently follows any operative interference on the cervix, as, for instance, dilatation by means of tents, and the interference involved in Emmet's operation would seem especially to favour this process.

The operation should, however, only be performed as a last resource in cases which have resisted all ordinary treatment, including the prolonged use of the hot douche.
Some affections of the Corporal Enclometrium.

In dealing with the diseases of the lining membrane of the uterine cavity, we shall make no attempt at an exhaustive consideration of the subject, but, rather, present a short pathological and clinical study of twelve cases where portions of the mucous membrane which were removed by the Curette in course of treatment were submitted to microscopic examination.

Such portions were first washed free from all adhering blood and then hardened in the usual fashion in Müller's fluid. owing to the small size of the fragments, the hardening process can be quite efficiently carried on in moderate
We shall first give a short epitome of the histories and nature of the cases from which the specimens were taken, then classify them into groups according to their etiology, their clinical history, and the pathological conditions observed in the specimens made from them, and it will be seen that the cases arrange themselves into exactly the same groups from whichever of these three standpoint they are viewed.
Table I.

Clinical epidote of twelve cases where curettage was performed.

Case 1. Three months abortion; curetted on the second day after expulsion of the fetus on account of severe bleeding.

Case 2. Six weeks abortion; curetted on one week after the commencement of bleeding.

Case 3. Age 28, seven years married and had four children. She had a miscarriage at the 14th week on August 26th. She was curetted on Sept 15th on account of persistent discharge. There was about a teaspoonful of debris removed.
In months subsequently she had again to be curetted on account of haemorrhage and discharge. The uterus was then noted as being enlarged but the specimen did not fall into my hands.

Case 4. Abortion occurred at the 12th week, and she was curetted 3 weeks subsequently on account of persistent haemorrhage and discharge.

Case 5. Abortion occurred at the 10th week and curettage was performed after a month's bleeding.

Case 6. Age and 32, was married at the age of 18 and had 2 children, while nursing the second she attended regularly. She became
a widow at 21 & married again at 29. During widowhood she menstruated regularly. At 30 she had a child, which she nursed & while nursing she menstruated regularly till the ninth month, when she became pregnant. She miscarried when three months advanced. The bleeding being severe for a week then becoming moderate but persisting for 12 months during which time she “never was dry.” After cursing the attend regularly for two months, she became pregnant and went to term. While nursing this child she did not menstruate.

Case 7. Was twice married. Contracted syphilis during first marriage and had
two still births.
At the date of operation she had been eight years married to her second husband and two years previously she had a miscarriage about the fourth month, the bleeding after which lasted five weeks. During the subsequent two years her menstrual period had gradually become longer while the interval became shorter, till, at the time of operation she was almost continuously bleeding.

Case 8. Previous to marriage she always altered profusely. One year after marriage she had a child which she nursed for nine months and during this time she altered profusely as before. At the end of nine months she had a
very severe loss which continued for 2 1/2 months and was then stopped for 3 weeks by the use of ergot, but returned and lasted till the date of operation - a period of two months, notwithstanding the use of ergot. Then she presented herself she was very anaemic and had a pretty steady temperature of 100°. The uterus was found decidedly large, the cervix soft and pedunculous.

Case 9. A very chronic and intractable case of endometritis in a multipara, with tenorrhoea but no bleeding.

[The clinical histories of cases 10-11-12 will be given separately and subsequently.]
Table showing the relation of the foregoing 12 cases to impregnation.

A. Directly related to impregnation.

1. Abortion.
2. Choriocarcinoma.
3. Abortion at 12th week, continued after 3 weeks.
4. Abortion at 10th week.
5. Abortion at 8th week.
6. Abortion at 6th week.
7. Abortion at 4th week.
8. Abortion at 2nd week.
9. Abortion at 1st week.
10. Abortion at 3rd week.
11. Abortion at 4th week.
12. Abortion at 5th week.

B. Probable relation to impregnation.

Case 9. Chronic endometritis.

C. No relation to impregnation.

Married Case 10. Ovarian.
Unmarried Cases 11-12.
Fig. 6. Case I. X20. Specimen 31.

Fig. 7. Case I. X20. Specimen 31.
Pathological conditions as illustrated by the accompanying specimens made from the foregoing twelve cases.

For descriptions of the specimens see page 55.

In the first two cases (1-2), when curetting was performed as part of the immediate treatment of imperfectly accomplished emptying of the womb, distinct evidences of pregnancy are to be found. In case 1, foetal, — the villi of the chorion (Fig 6-7), in case 2, maternal, the large cells of the decidua (Fig 8). In neither are there any traces of enlarged glands.
Fig. 8—Section of curetted portion from the interior of a uterus, from a case of recent abortion. Stained with picro-carmine.

(a) Large cells of the decidua.
(b) Portion of the non-striped muscular wall.
(c) Blood-clot in uterine vein or sinus.

The specimen from which this drawing was made has been lost.
Fig. 2—Section of curetted portion from case of endometritis resulting from abortion, which occurred prior to the curetting. Logwood staining. (x 50.)
3 weeks
a. Matrix with nuclei deeply stained.
b. Commencing fibrillation of cells of matrix.
c. Dilated glands.
d. Space from which gland has fallen out.

Case III.

The abortion was at the 12th week.
In the next 3 cases, (3-4-5) curettage was performed between three, (Case 3) and six weeks after abortion on account of persistent haemorrhage and discharge.

In these cases all traces of evident signs of pregnancy are lost and in their place we have the ordinary constituent elements of the endometrium but greatly altered in character.

The nuclei are very much enlarged and there is evidenced a tendency to the formation of fine connective tissue.

The vessels are more numerous & larger and there are numerous extravasations.

The glands are much more evident than in healthy endometrium, their walls are not in contact but here is not very marked dilatation. Here and there
They are seen blocked with mucus in a extent almost amounting to the formation of tube casts.

The epithelial cells are very much enlarged, swollen, and cloudy, and in a catarhal condition.

In case 6, which was cured after one year after abortion on account of an almost persistent haemorrhag and discharge which had resisted medical treatment, the four structures already mentioned differ from what is found in the preceding three cases in the following way.

Haeumone. Nuclei, though still larger than normal, are not so decidedly so. The fibrillation and formation of new connective tissue is much more marked. The vessels, while more numerous
and larger than normal, are
not so to such an extent, nor
are there so many or such extensive
extravasations.

The glands are more dilated &
convoluted and, as a result, -
appear more numerous.

The epithelium is decidedly
more caruncular, the cells more
numerous but not so much swollen
or cloudy.

In case 7., where two years
had elapsed between abortion
and curettage, the main points
above referred to as character-
izing Case 6. are all more
distinctly pronounced.
Case 8. was not related to abortion but to full term pregnancy. From the history it will be seen that at the time of curetting there was a condition of subinvolution of the uterus, & from an examination of the accompanying specimens it will also be seen that the endometrium had shared in this process. The condition is as follows:-

Matrin. The nuclei are large & there is a tendency to fibrillation. Vessels. There is general congestion and extravasation. Glands. Are numerous, crowded together convoluted but not dilated. Epithelium. The cells are large & granular.

There may be seen, too, what is noted in the description of the specimens as shown in some of the former cases that where the longitudinal arrangement of
Fig 11. Case IX. X 250.
The cells of the matrix is most marked. There is a disproportion between the size of the glands and their sockets or beds, so to speak, apparently caused by shrinkage of the matrix tissues.

In case 9. There was no apparent connection between pregnancy or abortion and the affection of the endometrium.

Leucorrhoea was the main symptom and there was no haemorrhage, in fact the menses were very scanty. These symptoms had lasted 5 years. Matrix. The matrix tissue is more distinctly visible than in any of the other specimens. The nuclei are irregularly shaped and there is very decided tendency to fibrillation of vessels. There is a marked absence.
of congestion or extravasation though in one specimen, 58, the vessels are tolerably numerous and some of them show considerably thickened walls.

The glands. The glandular spaces are numerous but the glands have fallen out during preparation in a most marked manner.

The epithelium. When preserved, the epithelial cells are seen to be small, with irregular outlines and large nuclei.

[The pathological conclusions of cases 10:11:212 will be considered separately and subsequently.]
Our series of cases and observations is not sufficiently extensive to warrant our going far in the direction of tracing the pathological processes which occur in the endometrium as a result of imperfectly effected abortion, but the following conclusions may with some safety be drawn.

I.
Any attempt to differentiate cases according to the elements supposed to be involved is misleading, unscientific and incorrect, as all elements are more or less involved in each case.

II.
That direct evidences of conception (chorionic villi and decidual cells) very rapidly disappear after the ovum is expelled.
III.

That where bleeding persists after abortion owing to imperfect emptying of the uterus, the mucous membrane very quickly,
a. increases in thickness,
b. entirely loses its decidual characteristics,
c. becomes or remains highly vascular,
d. becomes greatly altered both as regards its glands and its stroma.

IV.

That as time goes on the embryonic tissue shows a tendency to develop into a cord form of connective tissue, and that, later, this tends to shrink and thereby enlarge the gland spaces.

V.

That as seen in case 8, similar results follow imperfect involution of the
enclomethinium after full time labour.

That in some cases of chronic endometritis, (case 9) appearances which would seem to be a result of further development of the same processes are found, which would justify the conclusion that these cases have originated in imperfect involution of the enclomethinium after abortion or full time labour.
Etiology of such cases.

It will be seen that 8 out of the 9 cases are distinctly traceable to in-pregnation, and we have shown that it is open and warrantable to assume that this has been the case in the remaining one. Further, it may be remarked, that along with the condition of the endometrium found in all these cases there was to a greater or less degree a condition of the uterine sub-stance which may be called subinvolu-

The pathological condition resulting from subinvolution is identical with that of chronic uteritis. In this latter affection the embryonic connective tissue, which we have shown as existing all through the uterine wall, is first inflamed, then pro-
liferates, then develops into fiver connective tissue, which shrinks
and as these processes go on more markedly around the blood vessels and lymph spaces, dilatation of the latter is produced. According to Dr. Simety, on whose authority we make the above statements, the muscular tissue takes no active part at all in the process.

Now, as we have shown, the only real difference between the uterine wall and the endometrium, leaving out of account the presence of the glands — is, a relative or quantitative one. There is more of the embryonic connective tissue in the endometrium than in the uterine wall, and hence, when any of the numerous etiological factors which lead to subinvolution of the uterus come into play, they will at the same time act on the endometrium.

We have already stated briefly...
The pathological process involved in subinvolution of the uterus, - proliferation and ultimate shrinking of the embryonic connective tissue especially around the lymph spaces, leading ultimately to their dilatation.

These changes are exactly what are shown in our series of cases, the shrinking around the glands being due to the fact alluded to in the earlier part of this paper, that the lymphatics form networks of spaces around the glands.

When it is remembered that in the earlier months of pregnancy the changes in the endometrium, (the development of the decidua) are much greater proportionately than are the changes in the uterine wall, it will be readily understood that, when subinvolution occurs after abortion at from the first to the fourth month
the effect will be more manifest in the endometrium than in the wall substance.

We would conclude therefore that subinvolution originating in slow or imperfect emptying of the uterine during abortion, is the main physiological factor in the production of the conditions illustrated by our cases. The various other causes which favour the occurrence of subinvolution must also be taken into account, but need not here be recapitulated.
Treatment.

The treatment of the condition under consideration may be conveniently divided into general and local. The general includes such as is directed to the condition of subinvolution. The local includes that directed to the same condition and that directed especially to the endometrium. Only the latter need detain us. As to the treatment of the subinvolution condition whether general or local it differs in no respects from that for subinvolution in general.

Briefly this consists in the use of quinine and ergot along with general tonic treatment, the use of the hot douche, of glycine plugs, and of the application of iodine to the vaginal cervix and vault of the vagina.
The use of glycerine plugs and of iodine, however, had best not be had recourse to when the bleeding is at all profuse or constant.

Local treatment to the Endometrium

The lining membrane of the uterus is not a simple surface but is an enormously convoluted one presenting only a small part of its area to the uterine cavity, and leaving an enormously greater area in the surfaces of the glands.

Any attempt, therefore, to make local applications to the endometrium by means of a sound or intra-uterine applicator only results in reaching a mere fraction of the diseased surface, and, in presence of such gross changes as evidenced by our preparations, must be utterly powerless for good. The
hopelessness of reaching the gland or deep tissues of the matrix by any such means tells decidedly against this method of treatment. — It is like shaving the surface of, or applying caustic to a purging malignant ulcer, — it may temporarily alleviate the urgent symptoms, but these will not be long of returning. — What is wanted is something more radical and this is supplied by the use of the curette, after which intrauterine applications may, with advantage, be employed. — To be of any permanent use however, the application of the curette must be thorough. By it all the redundant, softened and diseased mucous membrane must be removed, and then nature will supply its place by a new and healthy lining developed from the
various constituent elements which even the most vigorous use of the instrument is powerless entirely to remove. Repeatedly we have seen cases such as we have described where curettage has been performed, but not, in our opinion, sufficiently thoroughly and when the symptoms have returned within from one to six months. The curettes used in such cases were Ménélé's dull wire or blunt copper ones, and in some instances the procedure was accomplished without dilatation of the cervix. Such treatment is really only a slight advance or improvement on the intrauterine medication already mentioned. But whether viewed from the standpoint of results or from the pathological standpoint which we have endeavoured to indicate, is quite inadequate to combat the conditions present.
We would summarise the treatment therefore suitable for such cases as follows:

First. General treatment along with the persistent use of the hot douches.

Second. Should these fail and the haemorrhage continue to such an degree as to threaten undermining of the patient’s strength and condition, the thorough use of the curette as described below.

The use of the Curette.

First as to the curette to be employed - after what has been just said it will be readily understood that we advocate the use of a rigid steel curette with a sharp cutting edge, or of a sharp spoon - also that the curetting should only be performed after free dilatation of the cervical canal.
As to the method of accomplishing this latter we have personal experience only of the use of tents, but we feel convinced that they might with advantage be superseded by the more rapid methods such as the slippery elm, nests or Foreell's dilators.

In this connection we may say that only once have we seen troublesome or alarming symptoms resulting from the use of tents. That was in Case 10 as mentioned in the episode of its history, page 75. There however the use of antiseptics completely checked what threatened to be a case of septicemia, or rather what was, — what in ob-stetrics is now called a case of suprerenia. And this leads us to point out that the dangers arising from the use of tents are simply septic dangers.
The following points in regard to the use of tents may be noticed.

1. Its material; bough or tupelo, (Nyssa aquatica) are preferable to sponge, - a: because of the impossibility of getting sponge with sufficient dilating power but small enough to pass through the undilated cervix, - b: because of the great difficulty and uncertainty of having sponge rendered reliably aseptic, and of keeping it so, if got to; - c: because of the very rough surface presented by the sponge when dilated.

2. The tents had best be perforated. With perforated tents, especially when of small size, there is a considerable loss of dilating power, but this is more than compensated for by the security against such an occurrence as mentioned in case 10., when a solid tent was used.
3. Thorough cleanliness should be observed in their preparation, and they should be kept in some antiseptic such as a solution of corrosive sublimate in absolute alcohol.

4. Should an attempt be made to introduce a tent too large for the cervical canal, such tent should not be wiped and put past for future use but should be thrown aside.

5. Tents should only be introduced through a Sims' speculum and when the uterus is under command of a vulgarium, and then with the greatest gentleness and care.

6. Most stringent antiseptic precautions should be observed.

To proceed then with the operative procedure involved in efficiently curvetting the uterus:—
has been employed for some time previous to the necessity arising for curetting. Before introducing a tent an antiseptic douche should be given and then as large a tent as the cervix will contain should be introduced in the manner above mentioned. The tent should be held in position by a cotton-wool vaginal plug soaked in some antiseptic oil. Twenty-four hours afterwards the plug and tent should be removed and first a vaginal then an intrauterine antiseptic douche used. Sim’s speculum having been introduced, the cervix should be grasped by a vulsellum and the uterus steadied. An unbending steel curette with a sharp cutting edge should then be passed into the cavity of the uterus and up to the fundus. The
curette should have a roughened surface on the handle corresponding to the side opposite the cutting edge, and a projecting ring-shoulder on the shaft 2½ inches from the end. Both these points, especially the latter are of very great practical utility. The curette is then to be firmly drawn downwards till, as estimated by the relation of the ring-shoulder to the outer os, the cutting surface has reached the inner os. This manoeuvre has to be repeated several times so as to sweep first the whole of the anterior uterine surface then the posterior and the scraping should be continued till a grating sensation is felt or a corresponding sound heard similar to that experienced when using a sharp spoon to an unhealthy sinus or to a patch of lupus. It is well then to
Note.

Since we have seen and used Bogumil's instrument, we have found it most satisfactory.
finish the operation with a sharp spoon, which from its smaller size and oval shape, is better adapted for scraping the lateral borders & fundus than is the broad ended curette. — The operator being satisfied that a firm hard surface is now left over the entire uterine cavity an antiseptic intraterine douche is given, or this may be preceded by the local application of iodine or carbolic acid. A thorough vaginal antiseptic douche completes the procedure.

As to the method of washing out the uterine cavity we have always used the double channel catheter. This however is not satisfactory and we would prefer some of the appliances which have been recently described but which, not having seen we cannot speak of from personal knowledge. The further treatment of the patient consists in a continuance
Of the general treatment for sub-involution especially ergot and the hot douche, and rest in bed for at least a week.

Such is the treatment which was applied to all the foregoing cases, and, as will be seen from their histories, with nearly uniform success.
Cases not traceable to abortion
- Cases 10.-11.-12.-

It is not our intention to enter fully into the consideration of these cases, but only to indicate one or two points of interest in connection with them.

Epitome of the histories of cases 10.-11.-12.-

Case 10. In this case there never had been a miscarriage. She was 34 years of age and had had three children, the youngest 5 years old at the time of operation. For 10 years she had suffered from ovarian pain, and during all that time her periods—while present—were longer than normal, and she loss greater than usual. During the last two years this had become more decided, and,
at the time of operation the period lasted three weeks and the interval one. The ovarian pain continued, and at regular monthly intervals corresponding with the onset of menstruation was decidedly increased. While the cervix in this case was being dilated by a tent the patient had two rigors and the temperature rose to 105°. When the tent was removed 24 hours after its introduction the temperature was 104°, and behind the tent in the uterus there was found about a teaspoonful of very offensive discharge. The procedure which we have already described as having been adopted in all the cases was then carried out. In 6 hours the temperature had fallen to 100°, and in 12 hours was normal. The subsequent history of this case for two years at least was satisfactory.
Case 11. Unmarried, aged 27, was buffeted about from gynecologist to physician and from physician to gynecologist, the one saying that her bleeding depended upon the uterus and should be attended to by the gynecologist, the other that it was part of a constitutional condition which came under the province of the physician.

She was profoundly anemic, almost constantly bleeding, and, in addition, had a pretty persistent though not severe ovarian pain in the right side. Ordinary medical treatment did not improve her condition a bit.

On examination the uterus was found of normal size, soft and flabby, and the outer os slightly dilated. Curettage was performed and the bleeding ceased; with the exception of the menstrual periods which were normal for six
months, but then returned and at the end of a year was as bad as ever. Curetting was repeated, but this time with hardly any benefit. Medical treatment was persisted in but also with no benefit. Ultimately the ovaries were removed. The bleeding ceased and the patient was restored to health. The accompanying specimens were made from the portions removed on the first occasion. After that she passed from our observation.

Case 12. Unmarried. This case we did not see. The curetted portions were sent us for examination. It resembled case 11. except that it was not so aggravated. There was ovarian pain but the curetting seems to have been followed by a sufficient improvement not to necessitate, as far as we know, any further interference.
Fig. 13. Case XI. X 40.
Pathological condition in cases 10, 11, 12.

On examining the specimens made from these cases it will be seen that the glands are not dilated and are indeed particularly healthy. In case 10, the married case, the epithelium is, however, catarhal and there is an abundance of mucus in the glands. There is great alteration of the mucus — very decided tendency to fibrillation, and a shrinking with the result of loosening the gland attachment. In none of them are there extravasations or other signs of excessive congestion.
Considerations suggested by cases 10 - 11 - 12 -

Dr. Mary Putnam Jacobi has contributed two carefully worked out and highly suggestive papers to the American Journal of Obstetrics for April and September 1886, on "The ovarian complication of Endometritis," and "Menstrual subinvolution or Metritis of the non-paurnent Uterus," and along with these articles our preparations from these three cases might be studied.

In the earlier part of this paper we drew attention to the common origin of the cortex of the ovary and of the endometrium, and clinically the connection of these two structures is abundantly demonstrated.

In our own cases two were un
manic, and in neither was there history of any conception, while in the third, the pregnancies stood in no apparent causal connection to the symptoms.

These cases therefore come under an entirely different category from those already described, in all of which abortion or pregnancy was the starting point of the disease.

The one striking fact of importance in their clinical history is, that in all there was ovarian pain, and that in one resort was ultimately had to removal of the ovaries to check the bleeding, which, though temporarily relieved by the use of the curette, returned and remained profuse.

Another point of interest is, that the use of the curette did good; good which was only temporary however in the one case of which
we have any knowledge of the subsequent history.

We shall not attempt to follow the train of suggestion awakened by these facts further than to surmise, that perhaps some of the class of cases which have been largely subjected to laparotomy for the relief of ovarian pain and menorrhagia might, with advantage, be first treated by means of the curette. The removal of the redundant and fibrous superficial layer of the endometrium might favour the occurrence of a pregnancy after which, in the words of Dr. Jacobi in one of the papers above referred to, "there seems occasionally to be a rectification of the malnutrition of the reproductive tissues which may be permanent, and the patient is henceforth enabled to traverse with impunity both menstrual and parturient cycles, because their evolution has been raised to a more vigorous type."
List of preparations.

1. Human uterus, - age 16, previous to menostatine, transverse section, ipecacuanha.
   The same.

2. Foetal uterus, - 5th month, vertical section.
   Eosine.
   The same.

3. Foetal uterus, 7th month, vertical section.
   Eosine.
   The same.

4. Foetal uterus and vagina.
   7th month, vertical section, ipecacuanha.
   The section is cut near the lateral wall of the uterus and contains the Fallopian tube at the upper end.

5. The same.

   In this section none of the cavity is seen. The Fallopian tube is seen at the upper end.

7. The same as No. 7.
   Eosine + logwood.
   A corner of the upper angle is shown with the projecting
portion of uterine wall like a bridge at the fundal end.

a b. shows the line of section.
The presence of muscular cells goes up to the epithelium is well seen.

10. The same.


12. The same.

13. The same.

14. Jozal uterus, full time, vertical section. Eosine. Included along with this section are the vagina, bladder and rectum.

15. The same.

16. Section from muscular to mucous surface uterus of girl aged 21 who died 3½ days after the onset of
17. The same.  
18. The same.  
19. The same.  
20. Vertical section, cervix and vagina, girl aged 16, spine, logwood.  
21. The same.  
22. The same.  
23. Lupus of the vagina.  
24. Section of hypertrophic outgrowth, logwood.  
25. The same.  
26. Lupus of the vagina, section made from right labium, showing hypertrophy of the epithelium with prolongations downward, and collections of new cells scattered through the deeper tissues, and also, where the epithelium has broken down, leaving an ulcerated surface, logwood.  
27. Lupus of vagina.  
   Section of hard mass, like
Structure over the Mons Veneris. 

38. The same. Logwood.


30. The same. 

Specimens made from portions of the endometrium removed by the Curette.


32. The same. Pierocarmine.

33. Thickened membranes from case of myoma of the chorion. Logwood.

34. The same. Pierocarmine.


36. bo. Logwood.

37. bo. To show the large size of removed portion. Pierocarmine

38. Case 4. Logwood. 

39. bo. Logwood.

40. bo. Pierocarmine.
42. do. do.
43. do. do.
44. do. do.
45. Case 7. Logwood.
46. do. do.
47. do. do.
48. do. do.
49. do. do.
50. do. do.
51. do. do.
52. do. do.
54. do. do.
55. do. do.
56. do. do.
57. do. do.
59. do. do.
60. do. do.
61. do. do.
63. do. do.
64. Case 11.
65. do.
66. do.
67. Case 12.
68. do.

Logwood.
Picrocroamine.
do.
Picrocroamine.
do.