The Diagnosis of Extra-Uterine Pregnancy Before Rupture, and its Treatment.
Much attention has in recent years been directed to the interesting and fortunately rare affection of extra-uterine pregnancy, especially to its diagnosis and to its pathology, as well as to its treatment. Much literature, chiefly of a fragmentary description, has appeared on the subject: some of it of considerable merit and some, which leaves room for doubtting its usefulness in furthering the elucidation of so difficult a subject. It is within a comparatively few years since the whole subject has been, as it were, unravelled. Since Lawson Tait achieved such wonderful results by treating cases of ruptured tubal pregnancy by abdominal section, much information has been gained about the pathology of this dangerous condition.

It is becoming more and more evident that early diagnosis and removal...
before rupture is what we have to aim at. And yet how little we must know when Lawson Tait, with his enormous experience, says that we may guess that an ectopic pregnancy exists, but that there can be no certainty in the diagnosis. He forcibly asserts that "any man who gives an opinion that he diagnosed a tubal pregnancy, or any other lesion, and that its course was this, that and the other, merely upon the unaided discrimination of symptoms, or the dim light of a pelvic examination, I regard with so much suspicion that I do not accept his evidence for argument save under exceptional circumstances." Still, when we consider the enormous strides that have been made in comparatively recent years,
there is good reason to hope that, in the near future, criteria will be obtained which will lead to the saving of the lives of many women, who a few years ago would have died without an effort, worthy of the name, being made to save them.

Our knowledge of the affections of the uterine annexa, which formerly existed largely in theory, has been enormously increased by the truly brilliant results of abdominal surgery, which has been raised to a high point of perfection.

There are many reasons why I should have chosen this subject for a thesis, but it was principally because I had been fortunate in making a correct diagnosis before rupture, and also because the cases on record are...
few, where a diagnosis
has been made before
that alarming calamity
has happened, and where
the correctness of the
diagnosis has been verified
by successful removal of
the foe.

The history of my case is as follows:

Adelina Poustie, aged 23,
had been married for
eighteen months, during which
time, although regular in her
periods, she had suffered a
good deal of pain, before
and after the discharge had
become established. Although
at this time she missed a
period, it did not occur to
her that she might be
pregnant. A fortnight later,
while cleaning a window,
she had a nasty fall off
a table after which she
suffered excruciating pain in
the right ovarian region,
and was hardly insensible
for a day and a half.

This pain gradually diminished
and there were no other symptoms till a fortnight later, when she had a pretty diffuse bleeding accompanied by clots. She called on me at night, and as I considered that an abortion had occurred, I sent her home so that I might examine her in bed. I had not seen the patient previous to this.

When I visited her the following morning she informed me that she had had intermittent pains, and that in addition to smart bleedings she had passed streaks and clots. She was positive that nothing the least like a child had come away.

On vaginal examination, I discovered that the uterus was slightly enlarged, and the cervix soft and flabby enough to admit the point of the finger.

The breasts were swollen, the areola dark, and Montgomery tubercles very prominent.
These mammary signs were much more prominent than would be expected in a woman only two months pregnant. The pains at this time were paroxysmal such as would occur in an ordinary abortion. I visited her for a few days, and although she did complain of the former pain returning, I did not attach much importance to it. Thinking that the fetus might probably have been expelled unknown to the patient, I determined to wait for some time before doing anything further.

Some days afterwards, I again called on her, when I found that she had been almost continually in bed, and that the pain in the ovarian region had been gradually increasing and becoming more constant. Bleeding, which varied in intensity, had also occurred; some of them were very profuse.
She described the pain as being a "severe throbbing accompanied with an unbearable heat." The simple weight of the hand, she said, greatly intensified the pain, and she had the feeling as if the whole region swelled up under it.

At this time she had a great inclination to have water and to have ease of her bowels.

I again made a vaginal examination to ascertain, if possible, the reason of this pain which I considered was probably caused by something resulting from the fall. I also wished to ascertain what was the condition of the uterus.

The cervix was in almost the same condition as when I had felt it ten days previously. At the same time I had the impression that the uterus, which I had no difficulty in defining bimanually, had also become
a little larger. In the region of the right Fallopian tube, I felt a mass which was distinctly separate from the uterus, and which caused severe pain to the patient when manipulated. It was circumscribed, tense, semi-inflating, and slightly pulsating. It displaced the uterus towards the left side and slightly forwards.

An interval of between nine and ten weeks had now passed since the patient had had what was to her a normal menstruation; and it was now that it occurred to me that I had to do with an ectopic pregnancy.

It will be seen from the above history that the patient presented all the symptoms, which are considered at the present time to be important.
Varieties

Tait, during the five years ending 1888, has had the opportunity of examining a total of seventy-six cases of ectopic gestation. Abdominal section, either ante- or post-mortem, was performed in all these cases, and it was found that every one of the pregnancies had been primarily tubal. He has great doubts about the existence of the ovarian variety, and he altogether refuses to believe in the existence of primary abdominal foetation, for the reason that, as soon as the impregnated ovum drops into the peritoneal cavity, it is quickly absorbed owing to the great digestive power of the peritoneum. The existence of the interstitial variety is admitted, though it must be rare. It is generally admitted that it is impossible to determine what variety of extra-uterine pregnancy exists in any case where
That condition has been diagnosed.

As the discussion of the varieties hardly comes within the province of this paper, it may be well to accept at once Tait's classification, which appeared in the Lancet of 1st Sept. 1888 page 409.

"Scheme of Ectopic Gestations in Tubo-ovarian Tract?"

1. Ovarian: possible but not yet proved.
2. Tubal, in free part of tube; and is—
   (a) contained in tube up to the fourteenth week, at or before which time primary rupture occurs, and then the process of gestation is directed into—
   (b) abdominal or intra-peritoneal gestation.
   (c) Broad Ligament or Extra-peritoneal Gestation
   (d) may develop in broad ligament to full time, and be removed at viable period as a living child.
   (e) may die and be absorbed.
   (f) may die and suppurating ovum be discharged.
   (g) may remain quiescent, as a lithopœdisco.
   (h) may become abdominal by secondary rupture.
"3. Sub-uterine, or Interstitial"

Caution:

The description of this must also be brief. It was at one time held that the spermatozoa penetrated as far as the ovaries themselves. It was indeed thought that all or nearly all extra-uterine pregnancies were ovarian. This of course is now known not to be the case. It has been suggested that small polypi or fibroids might hinder the descent of the ovum. Peritoneal adhesions may cause twisting or contraction of the Fallopian tube, and thus the ovum might not be allowed to descend into the uterine cavity. Endo-salpingitis, which causes distinction of the epithelium and shedding of the cilia, is now generally admitted to be the main factor, which causes tubal pregnancy. The spermatozoa are thus allowed to enter the tube, a circumstance which according
to fail. [3] It would not happen otherwise. Not only is the male element allowed to enter, but the ovum is also hindered in its descent to the uterus. It might be inferred, from the history of Mrs Poulter, that she suffered from this condition. Bland Sutton however asserts that he has had the opportunity of making microscopical examination in several cases, where the tube has been removed, and that in some of these cases the endothelium and the cilia were in a normal condition.

Changes in ovum and tube

The ovum lodges in one of the numerous folds of the tube, and undergoes development as if it were lodged in one of the fissions of the uterine cilia. Chorionic villi appear and attach themselves to the wall of the tube. Those, which do not atrophy, ultimately form the placenta. At the site...
of attachment the tube undergoes important changes; some authorities saying that a hypertrophy results, and some saying that there is only swelling due to turgescence. It is generally admitted, however, that the muscular fibres are markedly increased, and also that the tube takes no part in the formation of the placenta, thus differing from the uterus. There is a difference of opinion about the existence of a decidua, but the consensus of opinion seems to be that it does exist, although not nearly as well developed as in a uterine pregnancy.

As development of the fetus advances the tube becomes more and more distended, and the muscular bundles become more and more stretched, till at last rupture takes place as a natural consequence.
While these changes are going on outside the uterine cavity, the uterus itself undergoes a certain amount of evolution and development. The cervix, as in normal pregnancy, becomes shortened and softened, and after a time becomes patentous to a certain extent, and remains so. The uterus itself enlarges and undergoes changes in structure. decidua are also formed in its interior.

After this necessary brief introduction we arrive at the important subject of diagnosis.

**Diagnosis**

At the very outset we have to face the question—is it possible, from the symptoms to diagnose, with certainty, the existence of an ectopic pregnancy before rupture has occurred? Tait says that it is not possible, although he admits that a lucky guess may be made. There was
only one case, in his series, which came under his notice before rupture, and he says that it presented absolutely no other symptoms than those of tubal occlusion and distension. His description of this case certainly testifies to the truth of what he alleges. The patient had never missed a period, nor had she the slightest suspicion of pregnancy. An obscure pelvic pain of some months duration was the only symptom she had.

Fair's views are strengthened by Dr. Helman, who says "that the diagnosis has never yet been made and confirmed by operation before rupture. A few cases have been cured, before rupture, by operation but in them it was not possible to make any clear diagnosis than that there was some disease of the Fallopian tube."

After hearing the opinions
of these authorities, there will be a natural disinclination to accept in full the views of Dr. Avellino. He asserts that "an extra-uterine pregnancy has so many prominent and characteristic symptoms that its detection is more easy than that of ordinary pregnancy in the early months." But this author's assertion receives a considerable amount of support from Dr. Winkel (1) who tries to prove that the symptoms are so clear that a correct diagnosis should be made in nearly every case. He remarks that "various efforts have been made to make the diagnosis of extra-uterine pregnancies especially in the earlier stages, appear very difficult if not impossible."

"The very fact that such widely different opinions are held, is proof that there must be a certain amount of obscurity and confusion about this condition. Were I asked my opinion, which would be based on one or an-
case, and on a pretty extensive study
of the literature bearing on the
subject, I would say that, were
the opportunity given, some cases
would present difficulties well
high, if not entirely, insurmountable,
and that others would show
symptoms, so well marked and so
characteristic, that a confident
diagnosis of extra-uterine pregnancy
could be given.

Undoubtedly many cases occur
which present no symptoms,
and therefore do not come
under the notice of the
physician until rupture has
taken place.

A fact.
The Symptoms will be considered 1st before rupture, and 2nd immediately after that undesirable accident has occurred.

Before Rupture

The existence of pregnancy must not only be determined, but we must also make sure that its location is outside of the uterine cavity. Though there are sometimes great difficulties in making sure that pregnancy exists, still as a rule, even in the first few months, the symptoms are tolerably certain.

In the case of Mrs. Poulten no doubt could be entertained, as the signs were well marked: so much so indeed that pregnancy seemed to be further advanced than it really was.

In a healthy woman, who shows no signs of anaemia or other condition which might interfere with the regularity, the cessation of the menses...
excites strong suspicion that impregnation has occurred. Many cases, no doubt, have occurred where menstruation has been present during the whole period of gestation, but as a rule the intervals are not so regular. Then again pregnancy either normal or ectopic might occur during the period of lactation when amenorrhoea exists.

Morning sickness associated with the cessation of menstruation is very often present. It usually occurs about the second month, but may occur from the very beginning of pregnancy.

Another valuable symptom is that known as Hegar's sign, which consists of a thinning and softening of the lower segment of the uterus. Like the other symptoms this one is not always present.

The fetal heart cannot be heard in the early weeks, though a souffle is said to be sometimes audible.
her vagina. Hyperaemia and lividity of the vagina is usually present early.

After this brief and incomplete consideration of the symptoms of pregnancy, we will take it for granted, that in any case under consideration, we have been able to make out the existence of that condition.

A point, to which prominence has been given, is the long interval, which usually elapses before impregnation occurs. The subjects of this affection are generally women, who have borne children and who have been sterile for a lengthened period, or who, though married for a considerable time, have never been pregnant. Parry says that "women who have become pregnant with children outside their uterine cavities frequently show previous inabilitie for conception—the interval between marriage and the first impregnation is frequently long. My patient had been married
for a year and a half. It appears to me that too great stress cannot be put on the suggestion that in every case where the symptoms of abortion are present, the existence of an extra-uterine pregnancy should be carefully excluded. Many cases, which otherwise would be allowed to go on to the period of rupture, might be early detected if this suggestion were kept in mind. Had I acted on that advice in my own case, I might probably have been able to detect the true state of matters nearly a fortnight sooner than I did. The fact that coagula and decidua have been expelled, and that expulsive pains have been well marked, is very apt to lead us into the belief that an actual abortion has occurred. Even when there are doubts about the expulsion of the fetus, we
generally rest contented, and wait for symptoms, which might prompt us to dilate the cervix and explore the uterine cavity to make sure that nothing is retained. But the serious consequences, which may ensue during the gravy period, which is meanwhile passing, are only too well known. No doubt it might be urged that, if we have seen masses of decidua passed without the appearance of a foetus, we should fuss a sound to make sure that the uterus is empty. But what would lead us to do so, if we thought that we had to do with an ordinary abortion, and had no suspicion of an extra-uterine gestation? How often would an obscure anemia be detected if it were not suspected and looked for? Yet a diagnosis of their existence can be often given with great confidence.
The decidua, which are expelled either en masse, as a cast of the uterine cavity, or as strips, are the decidua of pregnancy. They are distinguished from menstrual decidua by their greater thickness, and by the presence of the characteristic deciduall cells. 

Winkel (1) says that "in two thirds of his cases the decidua were expelled within the first four months, not only after the death of the foetus, but also when it survives.

The character of the haemorrhagic discharge is of some importance; for even after the decidua have been shed, it often occurs in an irregularly profuse manner. Sir Barnes attributes this later discharge to the detachment of some of the chorionic villi.

Sir Aveling (2) says that "necrorrhagia is important when occurring with the usual signs of pregnancy.

Pain in the groin, and perhaps shooting down the
Thigh, is usually well marked and varies greatly in intensity. Sometimes it is so great, that the patient has to have recourse to opiates before she can obtain sleep. Often it is of a peculiarly agonizing description, and an opinion may be formed that some circumscribed acute inflammation or suppuration is the cause of it. The description of the pain given by my patient, was, though strong, very lucid.

In the later stages, before rupture, the bladder and uterus suffer from the effects of pressure. The patient is annoyed by the constant desire to pass water and to relieve her bowels. Now if the opportunity were given of making a pelvic examination in a patient who considered herself pregnant, and who had all the other symptoms already described, there would be no difficulty, if a cystic mass were found near to, but distinct from the uterus, in arriving
at the conclusion, that the pregnancy was extra-uterine.

This mass has distinctive features, which arrest attention as soon as it is felt. A suspicion at once arises that some active process is going on. If great gentleness be not used, when manipulating this mass, much unnecessary pain may be caused. A feeling of obscure fluctuation, and a tense cystic feel is imparted to the finger, when the examination is made bi-manually. There being a much more excited vascularity of the parts at this time, an impression amounting to pulsation is also imparted. Strachan(1) while describing this symptom says "a rounded elastic semi-fluctuating tumour, behind and to one side of a slightly enlarged and laterally displaced uterus, if found to be rapidly increasing under circumstances which permit the possibility of extra-uterine pregnancy, could hardly be mistaken for anything else."
Unfortunately, the cases, where the symptoms are well marked, are in a decided minority. It does more harm than good for surgeons who have not had considerable experience, both in the diseases of the uterine, annexa, and also of ectopic pregnancy, to make dogmatic assertions about the comparative easiness of diagnosis of this serious affection. Much harm has been done, and the elucidation of the subject hampered, by descriptions of the symptoms of cases being given, where the diagnosis had not been verified by abdominal section. American physicians especially have taken credit for successful diagnosis, because after passing an electric current through a suspected mass shrinkage had taken place. But so many difficulties surround the whole subject, that the existence of an ectopic gestation cannot be held as proved, till the mass has been removed by abdominal section.
Many of the older pathological specimens, which were considered to be specimens of extra-uterine pregnancy, have been proved to have no claim to be considered as such. Where the fetus has disappeared by absorption, the presence of chorionic villi must be demonstrated. The symptoms immediately after rupture are so well marked and so characteristic, that there is an almost unanimous opinion that a diagnosis can be made with almost absolute certainty. The advantages of early detection, before rupture, are enormous when we consider the tremendous risks to which the patient is exposed, when once extravasation has taken place into the peritoneal cavity. The dangers of removal before rupture are insignificant in comparison.

Rupture usually occurs at or before the twelfth week. By the encroachment of the chorionic villi into the wall of the Fallopian tube, the
site of attachment of the placenta is, in reality, the weakest part. As distension increases some of the villi become separated and as a result haemorrhage into the sac occurs. The walls of the tube, owing to the continual growth of the mass, become thinner and thinner until rupture, hastened by spasmodic contraction, occurs. There is then considerable and alarming haemorrhage into the peritoneal cavity, or between the folds of the broad ligament.

When the broad ligament is the seat of the effusion, there is considerably less bleeding, because coagulation is favoured by the meshes of the cellular tissue, and also because the space is much more contracted.

Unfortunately in the great majority of cases rupture takes place into the cavity of the peritoneum. Searle has found, during his extensive experience, that rupture
of a gravid tube is the most common cause of extravasation of blood into the pouch of Douglas. He suggests that the phrase pelvic haematocoele should be retained to cover all such effusions which have their origin in the pelvis.

When rupture occurs into the cavity of the broad ligament, the symptoms as a rule are not so severe as when it occurs into the peritoneal cavity. But still they may be sufficiently alarming.

When the effusion is large enough a swelling is found above the brim which may displace the uterus more or less. Generally the danger is comparatively slight, unless secondary rupture of the broad ligament ensues.

When however Douglas' pouch is the seat of effusion, the symptoms are very grave and the patient may die in a relatively short period. There appear pallor, sighing respiration, depression of temperature, rapid and feeble pulse, and all the symptoms of severe haemorrhage.
and of intense collapse. Previous to this the patient has had
a feeling of something giving way in her "inside".
A soft elastic swelling with no
defined outline is found bulging
the posterior wall of the vagina.
As the discussion of
the symptoms after rupture hardly
come within the scope of this
paper, the subject will not be
pursued further.

**Differential Diagnosis.**

There are ten conditions,
given by Thorburn, which are
liable to be taken for extra-
uterine pregnancy.

I Normal Pregnancy.
II Normal Pregnancy, with retroversion
or retroflexion of the gravid uterus.
III Pregnancy in one wing of a bifid
uterus.

IV. Ovarian Tumour.
V Cyst of Broad Ligament.
VI Fallopian Distension.
VII Uterine Outgrowths.
VIII Pelvic Haematocèle.
IX Pelvic Inflammatory exudations.
or Abscesses

Cancer of the pelvis or peritoneum.

I Normal Pregnancy.

Although bimanual examination might reveal the presence of a swelling in close proximity to the uterus, it is manifest that it would not be wise to give a diagnosis of gravid tube, unless all of the other symptoms were present. Dr. Halliday Croome (1) mentions a case where the patient had missed two periods, had had irregular haemorrhages, and a well marked fluctuating mass was present. The souffle was well heard per vaginam, and the only symptom that seemed to be absent was the shedding of decidua. A diagnosis of ectopic pregnancy was made, but operation revealed that the case was one of haematocele. This case bears out what has been said about the difficulties of diagnosis, and it also demonstrates the fact that a
deinite opinion should not be
given unless every one of the
symptoms is present.
If, by bimanual examination,
the presence of a characteristic
mass, at the side of or behind
the uterus, he determined in a
patient, who considered herself
pregnant, and who has had
irregular haemorrhages with the
discharge of decidua, there should
be a considerable amount of
certainty in giving a diagnosis
of extra-uterine pregnancy.
Mr L. P. Cooke has reported a
case, where both tubal and
uterine pregnancy existed at the
same time, at the full term
The foetus in utero was removed
after great difficulty. The mother
died in two days, and at
the post-mortem examination, a
foetus was discovered outside of
the unruptured womb.
Cases of this description must be
extremely rare; and the difficulties
of diagnosis in the early stages
must be very great. Were this
condition suspected an exploratory
abdominal section would be justifiable.

Normal pregnancy with retroflexion or retro-division of the gravid uterus. The continuity of the uterus should be easily made out, when the bimanual method of examination is used. Confusion could only arise where the examination is made by the vagina alone. The history of sudden pressure, and the presence of more or less retention of urine are usually well marked. There is an absence of the usual symptoms which are present in extra-uterine pregnancy.

Pregnancy in one horn of a bicornate uterus. When the horn is not well developed, the pregnancy is practically extra-uterine, and rupture is certain to ensue. The difficulties of diagnosis are admittedly great; but if a double cervix were found with a swelling at the side of and attached to the uterus, dilatation for the purpose of exploration would be the course indicated.
IV Ovarian Tumours.

The history of ovarian tumour is very different from that of extra-uterine pregnancy. As a rule no great difficulty will be presented. But were the symptoms so obscure that only a suspicion of gravid tube could be entertained, laparotomy should be resorted to as being the best treatment for either condition. It is unnecessary to discuss the various symptoms of these two conditions.

V and VI Cysts of the Broad Ligament and distension of the Fallopian Tube. What has been said about the differential diagnosis of ovarian tumours applies to these diseases. There is no history of pregnancy and the other signs of ectopic gestation are absent.

VII Uterine outgrowths should not be confounded with the subject under consideration. By bi-manual examination the relation to the uterus could be found out. They have not the cystic feel, but give the impression of solidities.
When haemorrhage is present, it generally has continued for a lengthened period. The growth is slow, and the symptoms usually differ much from those of tubal pregnancy.

III. Pelvic Haematoccele. This affection is generally easily diagnosed when it arises. Whether it is caused by the rupture of a gravid tube or otherwise is what we have to determine. When the symptoms are at all serious the abdomen must be opened and the source of the haemorrhage found out.

IV. Pelvic Inflammatory Concretions and abscesses, and Cancer of the pelvis. These diseases could only be confounded with ectopic pregnancy in the later stages. It is unnecessary to discuss them in this paper.

When we consider the possible combinations of these conditions, with pregnancy, either intra- or extra-uterine, it must be admitted that Taut is not far wrong, when he says that
If a successful diagnosis be made once, in other fifty cases we would either be wrong or else in a state of great doubt. Still I submit that, had he had the same opportunities that I had in my case, where the history was so well marked, and where not one of the known symptoms was absent, I think that he would have modified his opinion, and admitted that in some cases at least a diagnosis could be made with a considerable amount of certainty.
Treatment

Dr. Groome, after keeping Mr. Poulton under observation for nearly a week, performed laparotomy and removed the sac entire. Having made the usual small abdominal incision, and having carefully opened the peritoneum, the mass was brought into view. To give more room, it was found necessary to enlarge the original opening. There were many adhesions to separate but the haemorrhage was slight. The mass was ultimately separated between double ligatures, and removed. The abdominal cavity was thoroughly flushed with very hot water, and all clots removed. It was fortunate that the tube did not rupture during the operation, for the many adhesions caused a considerable amount of difficulty, and rendered a good deal of manipulation necessary.

The length of time that had elapsed since the last
Menstruation was between ten and eleven weeks.

The patient recovered without a bad symptom, but a small sinus remained for some months afterwards.

Had this case occurred ten years ago, the patient almost to a certainty would have died from the results of rupture. Parry in 1876 wrote, "From a careful examination of this subject, it must be acknowledged that a happy termination of the rupture of the cyst is exceedingly rare." He says that out of one hundred and forty-nine pregnancies only four recovered. What a contrast to Dr. Judd's experience, who, having operated on forty-two women, had the satisfaction of saving them all except two. In one of the fatal cases, where the operation had been too long delayed, the patient was in articulo mortis. The other death he attributes to his want of the proper appreciation of the proper...
principle of the operation.

The possibility of stopping
the haemorrhage, by getting to
its source by opening the
abdomen, had certainly been
suggested before Yats's time,
but to him belongs the
credit of having done the
operation first. "If," he says, "a big
branch of the femoral artery
were bleeding, my colleagues would
cut down and tie it. Why
should Poupart's ligament be a
dline of demarcation, within
which this writ will not run."

Opinion has so far advanced,
that it is now held that,
if rupture, with alarming symptoms,
happen, operation should un-
hesitatingly be undertaken by
the ordinary physician, if a
skilled abdominal surgeon be
not available. When it is
considered that the mortality
is practically a hundred per
cent., when abdominal section
is not performed it will
be admitted that interference
by a physician, who should
be thoroughly conversant with the technique of the operation, is demanded, when more
inexperienced aid is not at hand.
In spite of the brilliant results which have followed abdominal section, there are
not wanting those, who advocate other means. The principle of these other methods is to destroy
the foetus in situ, and to allow absorption to complete the cure. But Lawson Tait says
that "If ever I should make a diagnosis of tubal pregnancy, before rupture, I should advise
its immediate removal by abdominal section, as being more certain and far more
safe than the fancy methods of puncturing the cyst and injecting poisonous fluids, or
passing through it some kind of galvanic current........ There can be neither certainty nor
safety about them." (7)
That there is a considerable amount of truth in what Dr
Tait has written, is shown
when the advice of Dr. Thomas, who strongly advocates the use of electricity, is considered. Thomas recommends, that when there is a suspicion that a child is developed outside the uterus, a strong electric current should be passed through the suspected mass. "Then the surgeon should wait for bad symptoms. If symptoms of septicemia should occur, and if it be regarded as probable that the retention of the foetal mass is the source of trouble, laparotomy is as much at our disposal as it was originally and will be attended by less danger." It is unnecessary to criticize the weak points in the above sentences.

Now, even though the destruction of the foetus could be accomplished with certainty, which is very doubtful, it is evident that the mother must be exposed to many dangers.

It has been said that, when an extra-uterine foetus dies, there is an attempt, as in natural
frequency, to get rid of it, as being a foreign body. If the sac has become very thin owing to the continual pressure from within, haemorrhagic contractions may arise, which will bring about the bursting of the tube. The probability of the above happening is strengthened by the evidence of Professor Edward Hoffman, who, in two cases of recent tubal rupture, found the foetus in a macerated condition.

Although it is maintained that, after the death of the foetus, it is mummified, and that the liquor amnii is absorbed, and that the placenta atrophies, yet it has been proved that the latter may continue to grow. Jaffé describes a case where the pregnancy was supposed to be of ten or eleven weeks duration, and where the placenta, which was partly attached to the tube, was about as large as a cricket ball. The mass, which had escaped into the peritoneum, was
found to contain a small quantity of liquor amnii, but there was no trace of a foetus. In another case, where the foetus had evidently been dead for some time, he found that the placenta had grown quite as large as that of an intra-uterine foetation of four months. Hart and Barbour, give an interesting case, where the foetus having died, the placenta continued to grow till nearly the whole of the pouch of Douglas was occupied by it. The patient died with symptoms of internal haemorrhage, after a puncture had been made into the mass. Other similar cases are given by Tait in page 14 of his work.

Another objection to destroying the foetus in situ is that inflammation and suppuration in the sac may ensue, even though the changes...
most favorable, should ensue, the mother is constantly menaced as long as she has what may be termed the foreign body in her abdomen. "Violent exercise, injuries, blows, strainings and similar mechanical irritations may be the exciting cause of inflammation of the sac at any time."

Then lastly, the uncertainty of accomplishing the death of the foetus by any of the expectant methods militates greatly against their general employment. Thus dwells on the cases of Matthews Duncan, reported in Bartholomew's Reports, 1883, where electricity, both with and without puncture, was tried several times, as well as aspiration of the liquor amnii, and injection of morphia into the sac. Death of the foetus was ultimately brought about, but it was only two days before the death of the
mother. Many other cases have been reported, where the employment of these methods has ended in failure. It may be well to discuss the various methods in detail.

Electricity

It is generally admitted, at the present day, that the only justifiable way of treating a case, when rupture has occurred, is by opening the abdomen. It is also admitted that, if the sac is near the time of rupture, electricity would be a dangerous agent to employ. Powerful contraction of the abdominal muscles, and also contractions of the muscular fibres of the tube might be caused, and the accident which is most to be feared brought about.

There have been reported many cases, where it has been claimed that, after the use of electricity, social life has been destroyed, and subsequent
shrinkage has ensued. But as it has been asserted by authorities, who are most able to give an opinion, that the difficulties about making a correct diagnosis, in the pre-rupture stage, are in the majority of cases very great, it is evident that about the nature of many of these cases a great amount of doubt must be entertained.

In the years before the introduction of abdominal section for the removal of extra-uterine pregnancies, electricity was without doubt a valuable advance on the expectant treatment, which in most cases ended in disaster.

In 1853 Buchetii passed two needles into a suspected mass, and after passing shockes by means of an electro-magnetic machine, he claimed that death of the foetus had resulted. In 1866 Braxton Hicks used electricity without puncture unsuccesssfully; but in 1869 Dr
J. G. Allen of Philadelphia, after using the same means, claimed to have been successful. This method of employing electricity does not seem to have met with much favour until the American Surgeons took it up. Within the last fifteen years many cases have been reported, where it has been claimed that success has followed its employment. But, while reading the records of many of these, one cannot help having some doubt about the correctness of diagnosis, especially when he considers the mistakes of skilled operators, who in recent years have opened the abdomen expecting to find ectopic pregnancies, but only discovering some other pathological conditions.

Dr. Landis (1) gives the following rules for guidance when electricity is employed: 1. In using the Faradic current the application ought to last an hour, if the patient
can bear it. 2. The current should be repeatedly applied in order that the viability of the foetus may be completely exhausted. 3. For at least one seance the current should be of great strength. The current probably acts on the placental circulation as well as destroying the foetus.

Dr. Rockwell of New York, a famous electrician, says that an intra-uterine pregnancy is a somewhat rare occurrence, the general interest taken in it is comparatively slight, and the exact method of using electricity is limited to a few. He declares that "the treatment of tubal pregnancy, by electricity, is a subject of the greatest interest, and were it a condition at all frequent, it is safe to say, no therapeutic procedure of the century would take precedence in point of importance and renown." The insertion of needles into the sac, as recommended by Apostoli,
finds no favour with him. He objects to the dangers to which the mother must be necessarily exposed. The method is so simple that any physician should now be "able to render tubal pregnancy as harmless as it was formerly dangerous". The galvanic is preferred to the faradic current, because its physical, chemical, and physiological effects are far superior to those of faradism, and the mechanical effects are as potent. It is claimed that the electrolytic effects start a process which continues long after the current has ceased to flow, and that it aids nature in absorbing the foetal mass. In thirteen cases, twelve of which were entirely successful, the results were rapid and little pain was inflicted. The diagnosis of these cases was confirmed by eminent medical specialists.

Method of application. When the position of the mass is accurately
located, the positive electrode, covered with well moistened absorbent wool, is placed on the abdomen directly over the distended tube. The negative electrode is applied to the most prominent part of the mass. It has been found that slow interruptions in the current (about twenty in the minute) are more agreeable to the patient. The strength of the current must be varied according to conductivity, and the temperament of the patient. A strength varying from twenty to forty milliamperes is usually employed.

If there is any suspicion that rupture is imminent, a broad external electrode should be used, so that by diffusing the current powerful contraction may not be induced.

When the Faradic current is used, the operator should be guided by the effect produced, taking care to administer all the patient can suffer without
marked discomfort.

The employment of electricity with puncture, although advocated by such an authority as Apostoli, does not find much favour in the present day.

As the objections to its use are the same as are applicable to the other methods, where puncture is employed they will not be discussed at present.

Puncture of the pac.

The introduction of a trocar into any part of the body is generally considered such a simple operation, that this method of accomplishing the death of the foetus might recommend itself to many physicians. Still there might be some difficulty in passing a needle into a distended tube, either by the vagina, or by the rectum. Barnes prefers this method to all others.

Many well authenticated cases of recovery have been reported
after the employment of this method of procedure. But death has occurred in other instances, where this treatment has been put into use by so well qualified men as Sir J. Y. Simpson, Braxton Hicks &c. Neither is it at all certain that death of the foetus always results when the liquor amnii has been drawn off. Dr. Herman of the London Hospital has known the liquor amnii to have been drawn off in a five or six months pregnancy, without foetal death ensuing. Jair maintains that the dangers of puncture are quite as great as the dangers of laparotomy, and that the results are not nearly so certain. It is claimed however that, where a mistaken diagnosis has been made, no harm can result. But Parry says "few, very few, women have long survived its use." Then it must be remembered that in an early tribunal
pregnancy the blood vessels enter from below, and that therefore there is great danger that fatal, or at least alarming, haemorrhage may result from their injury.

It would appear, from the arguments for and against this method of destroying the foetus, that the only recommendations it has are that of comparatively simplicity of accomplishment, and that, if failure or disaster occur, blame will not be so apt to be bestowed on the physician as when an unsuccessful major operation had been performed.

**Injections into the sac.**

"An equally certain method, (as electricity) and one which appears to me less dangerous, is the injection of drugs for the purpose of killing the foetus." (Knickel). Jollin, who introduced this manner of treatment in 1862, suggested injecting a solution of atropine into the sac, by means of a hypodermic
springs with an extra long needle. Friedrich, in 1864, first put it into practice by introducing the needle through the abdominal wall, and injecting a fifth of a grain of morphia, which he preferred to atrophiine. The injections were recommended to be made every two days, till shrinkage indicated that foetal death had occurred.

Pinckel collected eleven cases treated thus, six of which occurred in his own practice. Three of these were fatal, as this gives a mortality of over twenty seven per cent., it is difficult to become reconciled to this authors assurance that the operation is perfectly innocuous to the patient. If his optimistic opinions could be credited, hysterectomy, as a curative agent for unruptured tubal pregnancy, would sink into obscurity. He practically says that symptoms and mass gradually disappear, and he leads one to believe that
the parts are left in a condition, as if no ectopic gestation had existed. But, unfortunately, as we pursue the reading of his rosy narrative, we come to the inevitable "if:"
"If peritonitis should appear;"
"If hemorrhage should occur, and if debility and pyrexia should arise, we are to treat the patient symptomatically. If an abscess should occur, wait till it points, and then let it out. Lastly, if a fatal issue threatens, laparotomy for the purpose of extracting the tube should be undertaken." 

**Elytrotomy.**
This is really a clumsy alternative to removal of the focus by abdominal section. It is recommended that, by means of a Paquelin's cautery, a road be cut from the vagina into the sac, and the mass removed. It is manifestly a difficult operation, and it is also dangerous and unscientific. It is quite
unnecessary to discuss it in detail.
It is certainly a matter of regret that, in the matter of treatment, the opinions of many brilliant authorities should be arrayed against each other. Each author seems to have his own pet plan, and rigidly excludes all other methods of treatment as being inferior to his own.

In conclusion it may be said that laparotomy, which in this country at least, takes precedence of all other operations, has shown by far the best results. Even, after rupture, when life seems to be slowly but certainly ebbing away, a considerable amount of hope can be held out if operation by abdominal section be fearlessly undertaken. Many women have been saved from encountering the terrible dangers which accompany rupture, and many have been saved after the abdominal cavity has been filled with
extravasated blood. It has shown what can be done when, with a mortality of little over four per cent., he operated on forty-four women who, after rupture, were in conditions which, in former years, would almost to a certainty have ended in death. No amount of argument or theory can overcome the facts, which are shown in his Table of cases. His experience, added to that of other abdominal surgeons, is far greater than that of those who advise the destruction of the foetus in situ; and experience, with such brilliant results, must ultimately bear down all opposition. Criteria, which will strengthen our powers of diagnosis in the pre-rupture stages, are what are most anxiously sought after now, so that extra-uterine pregnancy may be robbed of many of the terrors which usually accompany it.
Knowledge in this direction is certainly advancing, and it may be asserted with a considerable amount of confidence that the time will come when, with our increased accuracy of diagnosis, the difficulties, which enshroud this dangerous pathological condition, will be greatly lessened if not entirely removed.

**Operation in the Pericardium Stage.**

If there is reasonable ground for coming to the conclusion that an extra-uterine pregnancy exists, no time should be lost in opening the abdomen, and effecting its removal. Even though the tumour be of a different nature, there can be no harm done for, excepting cancer, removal is the proper treatment.

Having rendered the skin asepctic, the usual small incision is made in the middle line, midway between the pubis and umbilicus. When the peritoneum is reached, and all bleeding points having been secured, that membrane is opened.
by being caught up with forceps, 
& carefully incised by means of a scalpel.
The fingers are then introduced, and
the relation of the parts made out.
Many adhesions have usually to be
separated. When this has been
satisfactorily accomplished, the tube
has been well isolated, double ligatures
are applied & the mass carefully
separated with scissors.
After the haemorrhage has ceased,
the peritoneal cavity is flushed
with very hot water and all
clots are removed.
The ligatures are then inserted, and
if a drainage tube is thought
unnecessary, the wound is closed.
Having dusted the wound with
boracic acid, and applied some absorbent
wool, the binder is finally applied.

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Galashiels
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