treatment of spinal caries by the use of Sayre's plaster-jacket was not so great as that of, at all events, one of the previous speakers, who stated he had had some thousands of cases, yet he had considerable experience of both spinal caries and lateral curvature. He could endorse all that had been said as to its utility in spinal caries, and also of its inutility in lateral curvature. For the latter, he did not think any mechanical apparatus was of any value. Mr. Stokes detailed the particulars of a well marked case of spinal caries in a child, aged 7, who had been under his care during the past year. All symptoms and signs of the disease in an aggravated form were present, and for more than a year the child had never been able to assume the erect position, and used to crawl about on his hands and knees. A more miserable object was rarely seen. Mr. Stokes applied a plaster-jacket, and immediately afterwards the patient was able to walk with a power that could never have been anticipated. Since the application of the jacket, the patient's general health had improved in a remarkable degree.

Dr. ELLIOTT (Bristol) asked Dr. Sayre if he had found it necessary in any way to modify the jury-mast, for he and his colleagues at the Bristol Children's Hospital had been dissatisfied with it. In a case lately under his care, where there had been disease of the lower cervical vertebrae for about two years, he had put a poroplastic jacket on a little patient, and fitted to it an apparatus from which the head was suspended. His apparatus consisted of three hoops (like flattened croquet-hoops), one passing over each shoulder; and the third, with a ring in the centre, passing over the head laterally, and being fastened into the shoulder-hoops. The advantages of his apparatus were these. 1. The patient could lie down and rest on a flat surface at any time, without the necessity of inserting a pillow to protect his head from the jury-mast when in the recumbent position. 2. The apparatus could be taken off at any time by simply unfastening the buckles of the poroplastic jacket, and the necessary cleansing of the body performed. His patient wore the apparatus with great ease and comfort, and was quite well in three months, and, when he last saw him, able to rotate his head from side to side.

Dr. SAYRE, in reply, said: I am very much obliged for this second opportunity of presenting my views on this subject before you. As our time is very limited, let us not quarrel about theories; for, however much we may differ in regard to the pathology of Pott's disease, and the mode of producing the deformity in lateral curvature, our desire is to cure the patient as speedily as possible, and with the greatest ease to him, at the same time allowing him to take exercise. That the method of suspension and the use of the plaster-of-Paris jacket accomplishes all these results, is amply proven by the testimony of the various gentlemen to-day, which fully bears out my own experience. This specimen, which I show you, came from a man whom I put up in 1877 in St. Patrick's Home for Incurables, Cork, with Dr. O'Sullivan. He had been paralysed for three years previously. He had been in the Northern Infirmary for five months and a half, five months in the Southern Infirmary, and finally in the Home for Incurables, where I saw him. He had complete loss of motion and sensation in both legs. The day after the application of the jacket he was able voluntarily to move his feet, and in two days he walked about the ward on crutches, and in a week walked well without any support. He wore this jacket two years and a half, when Dr. Hobart, of Cork, removed it, and applied another; and Dr. Hobart informed me that he at this time found no abrasion of the skin on any part of his body, and that he had never complained of the slightest inconvenience. For some months previous to this time, he had been doing full duty as assistant orderly in the hospital. The jacket applied by Dr. Hobart in 1880 he wore for eleven months; and, when it was removed, consolidation of his spinal column was complete, the patient in excellent health, and the skin free from any abrasion. In 1883 he came to America, and obtained a situation as orderly in the Lunatic Asylum on Blackwell's Island, which place he lost on the burning of the institution in January 1884. He was exposed at this time, and caught cold, and went to St. Francis Hospital on March 6th, where he died suddenly on March 9th, while eating his dinner; the death was caused by heart-failure, as I am informed by the house staff. You will see that the third and fourth dorsal vertebrae are fused together, as are also the sixth, seventh, and eighth. The point to which I would call your attention is the rapidity with which, when the spinal cord was relieved from pressure, the normal functions were restored, and that the man was enabled to earn his living while under process of treatment. A very similar experience occurred in the case of James Halligan, who was sent to Mr. Brodhurst, of the Royal Orthopaedic Hospital of London, by Dr. Macnaughton Jones, of Cork (now of London), and who came into the hospital while we were discussing the subject. He had been disabled for months from Pott's disease of the middle dorsal vertebrae; he could only move about slowly on his crutches,

and that with very great difficulty, and was unable to stand without support. Mr. Brodhurst allowed me to apply the plaster-jacket to him, at the same time expressing the opinion that it would be of no use. Mr. Balkwill went with me and had a photograph taken of the man, and I applied the plaster-jacket in the Royal Orthopaedic Hospital. I went the following day to obtain a history of the case, and learned that the man had left the hospital the evening before, only a few hours after the jacket had been applied, and had not returned. They had taken no notes of his case, and did not even know his name until Mr. Brodhurst referred to the letter from Dr. Jones, which he still had in his pocket. He was much annoyed at the man's departure, and censured himself for having allowed so crude an experiment to be performed in his hospital, and attributed the man's departure to the cruel treatment to which he had been subjected by the American experimenter. Six weeks afterwards I met this man in Cork; and he informed me that he felt so comfortable immediately after the jacket was applied, that he returned to Dublin by that evening's train, and came to Cork the following day, and had been doing his duty at the station ever since, without losing a day from his work. Dr. Macnaughton Jones applied three more jackets to this man during the succeeding eighteen months, by which time he was completely consolidated. I saw this man a few days since at the Limerick Junction, trundling his barrow loaded with trunks and in perfect health. I could mention many other cases precisely similar to these, but I refer to these because all the persons are in your immediate vicinity, and therefore the facts can be easily verified. Any treatment that can give immediate relief from pain, restore the paralytic to usefulness and activity while he is being cured, give to the child the enjoyments of his out-door sports, and ability to attend his school without interruption, and which, if commenced in time, can cure spinal caries without deformity, seems to me to be worthy of commendation, and certainly worthy of a trial. In regard to the treatment of lateral curvature, I regret exceedingly that Mr. Roth was not at my demonstration this morning, as he would then have learned that my views and his own are very similar; namely, that proper physical training and gymnastics are the only real cure for this deformity, and, in the slighter cases, no instrumental treatment is required; but in certain cases, like this (showing specimen), when the bones have become distorted, and the angles of the ribs permanently bent, no amount of voluntary power can ever restore them to position, neither will the plaster-jacket, self-suspension, nor any other treatment completely correct the deformity. In such cases, self-suspension more nearly restores the patient to a normal position than any other treatment; and the plaster-of-Paris jacket, applied as a corset, retains him in the improved position better than any other apparatus that has yet been devised, and is infinitely more comfortable to the wearer. As the time allotted me for discussion has expired, I must defer any further remarks until I apply the completed corset on Friday morning, to the case of lateral curvature which I put up before you this morning.

THE PATHOLOGY AND TREATMENT OF EXTRA-UTERINE PREGNANCY.

Read in the Section of Obstetric Medicine.

By LAWSON TAIT, F.R.C.S. Eng. and Ed.,

Surgeon to the Birmingham and Midland Hospital for Women.

So long as we believed that the process of ovulation occurred at intervals of greater or less regularity, thirteen or fourteen times a year; that its products were carefully guarded by the embracement of the ovary by the Fallopian tube, this embracement being secured by some mysterious and intelligent action of the infundibulum; that the tube guarded each and every ovum to the uterus; and that there they either became impregnated or were thrown out, our views of ovarian pathology were very inconsistent with the facts observed in disease. Nowhere, I think, was this inconsistency more evident than in our notions concerning extra-uterine pregnancy.

I have already published a number of observations which have satisfied me that menstruation and ovulation are, so far at least as time is concerned, perfectly independent functions. Ovulation is going on continuously, and the great majority of its products drop into the peritoneal cavity, and perish there. This goes on from infancy to old age. During the period of life when there is no reproductive activity, the ovary is grasped by the infundibulum at the menstrual period, occasionally and apparently at random; and when it happens that the infundibulum is applied to the ovary at the right place, and at the right time, and the ovum, having safely reached the uterus, is there

impregnated, a foetus *in utero* is the result. At present, I have to deal with that part of the process only in which the ovum is grasped by the infundibulum, and passes down into the uterus; for it is in this stage that the arrest of the impregnated ovum may occur, and result in the formation of an extra-uterine pregnancy.

Concerning the much debated ovarian pregnancy, I need not repeat here what I have said elsewhere at length (*Diseases of the Ovary*, 4th edition, p. 226), save to record my entire disbelief in its occurrence. Nor need I repeat the arguments adduced in the same work to support my belief that, under normal circumstances, it is in the uterus and not in the Fallopian tube that the actual impregnation takes place.

In 1842, Ritchie wrote the following sentences, and nothing as yet appears which controverts in any way the views stated in them. "The positive evidence in favour of the uterus being, at least in man, the normal seat of conception, and its occurrence in the tubes or ovaries exceptional only, seems conclusive; the cases of the latter which take place depending probably on the escape of spermatozoa along the tubes during menstruation, or on some accidental and rare arrangement of the mucus in the uterine ends of these, by which it becomes a conducting medium for the passage of the seminal corpuscles towards the ovaria" (*Ovarian Physiology and Pathology*, p. 138).

From experiments on animals which have practically no Fallopian tubes, whose uteri extend really to the infundibulum, and, therefore, throughout whose uterine tract spermatozoa have been found after coition, it has been assumed that spermatozoa habitually permeate the Fallopian tube in women. Of this assumption, no proof whatever has been established. The presence of ciliated epithelium in the human tubes seems to me to be an arrangement for preventing the passage of the spermatozoa into them, and, therefore, for preventing the occurrence of tubal pregnancies.

One fact made certain by research is that, as soon as actual impregnation takes place in mammals, the altered ovule adheres to the mucous surface with which it is in contact. The very condition, suspected by Ritchie, which enables impregnation to take place, is undoubtedly desquamative salpingitis. If we imagine a Fallopian tube to be wholly, or in part, deprived of its vibratile cilia, it is not difficult to see how an ovum may become impregnated and rest there, becoming attached and developing into a tubal pregnancy.

From my own experience of tubal diseases, I am satisfied that salpingitis is a very common disease, and that it generally results in occlusion of the tube. It is not difficult for us to believe that the cases in which the attack is limited to mere destruction of the epithelium must be very rare, and therefore we have in this the prime factor in the rarity of tubal pregnancies. The great majority of tubal pregnancies occur in women who have either never had normal pregnancies, or who have not been pregnant for a number of years, so that it is certain that in them the reproductive machinery is out of gear.

For clinical purposes—and I think it will be found that our pathological conclusions may be founded on the same fact—extra-uterine pregnancy has two phases. It attracts attention by the very large number of cases of death by rupture of the tube resulting in fetal hæmorrhage, and again, by a few cases in which an ovum outside the uterus goes on to, or approaches, the full term of gestation.

I think it fair to assume that the second class constitutes the survivals of the former. It is certain that Fallopian pregnancy, with fatal tubal rupture, is by no means uncommon. The records of our societies contain large numbers of cases; and in conversation with medical friends of large experience, I find they are well known, and I have seen somewhere about five and twenty cases during the last twenty years. The second class are far less common.

It is, of course, easy to believe that some of the cases of tubal pregnancy which rupture before the thirteenth week, are not fatal; and I shall consider, later on, the kind of rupture which is likely not to cause death, but even of that form of rupture—rupture with extrusion and hæmorrhage into the peritoneum—which is most likely to cause fatal hæmorrhage. Some of the cases may not end fatally; the ovum may be killed and absorbed, or it may go on to maturity, and form a true abdominal pregnancy. Of all the cases whose records I have examined, I am of opinion that only one shows evidence of thus ending, that case recorded by Mr. Jessop of Leeds.

Passing by for a moment the belief that I have expressed, that the full-time extra-uterine pregnancies are the survivals of early tubal rupture, let me point out for a moment that, in none of my own dissections or operations on the earlier cases, was there the slightest doubt, nor could there be, that the site of the pregnancy was the Fallopian tube. Nor, in the record of any of these cases, is there any

doubt about it. In fact, no such thing as an early extra-uterine pregnancy, having any other site than the Fallopian tube, has ever been seen; or, if it has, it has escaped my research. The assumption, therefore, that an extra-uterine pregnancy of the full time has any other source, demands proof, which, so far as I can see, is entirely absent.

When an ovum is impregnated in the tube, it acts precisely as it does in the uterus; it becomes attached to the mucous surface, and a section of its area develops the villous growth characteristic of the placenta. In the uterus, the attachment of the placental site seems to be pretty much a matter of chance; and so, doubtless, is it in the tube. About one-fourth of the circumference corresponds to the relations of the two layers of the broad ligament, layers which are at this point very easily separated. If the rotations of the full time extra-uterine gestations were found to stand to the early tubal rupture as one is to three, I believe the views I am about to advance would be proved to demonstration. In my own experience, it is curious that they do so very nearly, but that is too small an experience from which to argue.

It seems that, when a pregnancy has developed in the tube so far as the twelfth or thirteenth week, the tube can be distended no more, and its walls give way. This rupture may, however, take place as early as the eighth week, though it usually occurs at the tenth or twelfth. Let us suppose that the site of attachment of the placenta corresponds to some part of the three-fourths of the circumference of the tube outside the relations of the layers of the broad ligament, it is not difficult to see that the rupture will inevitably be within this area, for the placenta sinuses will have weakened the walls of the tube, and, when it bursts, they will pour out into the peritoneal cavity the heart's blood of the patient. When the rupture and bleeding occur, there is no provision by thick contractile walls for the arrest of the hæmorrhage, first by the separation and extrusion of the placenta, and then by the occlusion of the vessels. Bleeding goes on continually, till we see the patients die, and, on *post mortem* examination, we find the foetus lying in the abdominal cavity, blood-clot everywhere, and the placenta lying still attached to the inside of the tube. Do any of these cases recover? There is nothing that I know of but Mr. Jessop's case to answer this question in the affirmative.

Suppose, on the other hand, that the site of placental attachment shall be on that fourth of the tubal circumference which corresponds to the relations of the broad ligament, the rupture will take place into the cavity of the broad ligament, and we have at once a natural hæmostatic agency at work. The ovum may perish with the rupture, and then we have only a small hæmatocele, ending in speedy absorption; or the ovum may go on to maturity, and then we have the pregnancy of the broad ligament, which comes to us for surgical treatment during some part of its later history. The foetus often dies about the fifth month, and the cyst suppurates. If it be in the left broad ligament, it bursts and discharges into the rectum, as I have seen in five cases; if it be on the right side, it may burst into the cæcum, as I have seen in one case, or over the crest of the ilium, as I have seen in two cases. When it goes to maturity, the child generally dies after a spurious labour, and before the condition is recognised, unless a correct diagnosis be made and abdominal section performed before the death of the child. This was done in a case under the care of Dr. Lattey of Southam and myself, and a living (still living) child removed. The mother, however, did not survive the operation.

In all the cases I have had of extra-uterine pregnancy going to the full time, there was a clear and indisputable history of tubal rupture, about the tenth week; and the relations of parts observed at the time of operation established the fact that the pregnancy was in the broad ligament. My own experience is, therefore, absolutely conclusive that these extra-uterine pregnancies are all tubal in origin; and in the cases which had arrived at maturity the placenta was always at the very bottom of the cavity, exactly where we might expect it to be if my theory of tubal rupture, as governed by the site of the placenta, were correct. All the descriptions of cases of this kind that I have read, yield evidence in harmony with my view, and in not one is there a statement of a fact out of harmony with it. A point which would upset it is, of course, the existence of both tubes uninjured, and not implicated. In my fatal case, the remains of the injured tube were found on the front and upper part of the cyst.

On the surgery of extra-uterine pregnancy I have already published so much, that I may condense greatly what I have to say here.

In the series of cases recently published in the *BRITISH MEDICAL JOURNAL*, I have shown that a proceeding which I discussed so long ago as 1874, though there I did not pronounce in its favour, may be carried to a successful issue in 80 per cent. of the cases of tubal rupture. Since, 1878 an altogether new era in abdominal surgery has been opened up.

When the diagnosis of extra-uterine pregnancy is made at or near the full time, and during the life of the child, operation is demanded. In Mr. Jessop's case, both mother and child were saved, and in mine the child survived. When the child is dead, operation is still demanded, and has been, in my hands, uniformly successful; the cardinal features of the operation being (1) to stitch the opening in the sac carefully to the wound in the abdomen, so as to close the peritoneal cavity accurately, and (2) to leave the placenta entirely alone, and allow it to be thrown off by nature's own processes.

I have never seen a case of the so-called interstitial variety of extra-uterine pregnancy, but I have just perused an admirable paper on "Interstitial or Tubo-uterine Pregnancy," by that industrious and accurate describer Mr. Alban Doran, and find to my delight that my views obtain from his work most material support. The paper may be found in the twenty-fourth volume of the Obstetrical Society's *Transactions*, and the quotation of one sentence will convey all that I need give here: "Thus, there appear to be six examples of so-called interstitial foetation mounted as pathological specimens in London Museums. It is most significant that, in all those where the conditions of the affected parts has been intelligibly displayed, the tubal origin of the 'interstitial cyst' is self-evident."

Dr. W. L. REID (Glasgow) said that, from his own experience, he had doubt as to the wisdom of operation being had recourse to as soon as extra-uterine pregnancy was diagnosed, and whether the foetus were alive or dead. In the Glasgow Western Infirmary, there was under his care for some time a woman whose case was very peculiar, and had a bearing on the diagnosis. She nearly lost her life from bleeding into the peritoneum and peritonitis, when she was three months pregnant. After the general swelling disappeared, a tumour remained, in which, by-and-bye, the foetal heart was heard, and the limbs of the foetus were easily felt to move. This was regarded—the patient refusing a careful vaginal examination—as the growth of an extra-uterine foetus. She took fright, and left the hospital. About what would have been the full period if she had gone on quite normally, a child was born with a single pain; it fell on the floor. This child lived, and the mother recovered in an ordinary way. Apparently, this patient became pregnant again immediately before or after extra-uterine foetation had been established.

Dr. MURPHY (Sunderland) said that all were very much indebted to Mr. Lawson Tait for the able manner in which he had opened the discussion; but he could not coincide with his views as to the relation between menstruation and ovulation. He believed that menstruation entirely depended on ovulation, and that the fimbriated end of the Fallopian tube only embraced the ovary during that time. In several cases of ovariectomy, when he had looked for it, he had only once seen the healthy ovary grasped by the tube, and in that case the patient was menstruating. Therefore, he could not help thinking that extra-uterine gestation generally was caused by the tube being sufficiently narrow to prevent the egress of the ovum, though sufficiently patulous to permit the ingress of the spermatozoa. It was extremely probable that abdominal gestation might be caused by rupture of a tubal pregnancy; but, in the majority of cases, it was caused by the spermatozoa escaping from the tube, and impregnating an ovum, either on the ovary or loose in the abdominal cavity; and the reason why the abdominal cases were not often recognised in an early condition was, that they were seldom fatal before the sixth month, and did not always give rise to symptoms during the first few months. As regarded treatment, the two forms differed very materially. In the tubal form, the danger of rupture and death, between the eighth and the tenth weeks, was so very great, and the treatment by injections of morphia, or by electricity, was so very unsatisfactory, that most gynaecologists would now admit that it was not only justifiable, but imperative, to open the abdomen in every case of rupture of the tube; and he would go further, and say it would be right to open the abdomen and remove the tube before rupture, if the diagnosis were sufficiently clear. As regarded the abdominal variety, he would wait, in the absence of symptoms, till towards the end of gestation, and then remove the foetus, stitching the cyst to the abdominal wall, and leaving an opening for the ova, and for the subsequent removal of the placenta. The most extraordinary case on record was probably one in which Kœberle removed the uterus, leaving the ovaries, with the result that a fistulous opening from the vagina to the uterus remained, and where extra-uterine, or, more properly speaking, non-uterine pregnancy, occurred.

Dr. WARD COUSINS (Southsea) congratulated Mr. Tait on his success, and said that he feared the proportion of cases in which, after rupture of the ovum, operation was possible, was very limited. In many cases, the occurrence was rapidly fatal. Slow rupture, or rupture

attended with moderate and recurrent internal hæmorrhage, appeared to be the exception and not the rule. The diagnosis of early extra-uterine pregnancy was extremely difficult, but two symptoms appeared to be of especial value: 1, the history of pain and tenderness over the lower part of the abdomen; 2, the results of pelvic examination, in which generally the uterus was found displaced upwards or laterally, and was very imperfectly movable, with the os patent and large. Behind it, a round and fixed swelling was easily detected. It was then the history of a case and the pelvic examination which were the great aids in diagnosis. Mr. Tait's experience warranted his confidence in nothing short of abdominal section; and the gravity of the symptoms in each case must be the guide in practice. When the latter stages of pregnancy were reached, operative procedure appeared to be more likely to succeed after the death of the foetus than before that event, as all vascular activity was then over, and the great danger of severe hæmorrhage was considerably reduced.

Mr. BURTON (Liverpool), referring to Mr. Tait's remarks on the connection between ovulation and menstruation, said that he was inclined to accept fully Mr. Tait's views on the subject; that there was not nearly the connection between the two there was commonly supposed to be, and that the two processes were merely coincident. He had seen two cases quite recently in which menstruation went on regularly; but it was evident that no ovulation had taken place for several months.

The President (Dr. CLEMENT GODSON) agreed with Mr. Lawson Tait that ruptures of the tubes in extra-uterine pregnancy were much more common than was thought. He had seen several cases of pelvic hæmatocele, which he had no doubt originated in this. A short time since, at St. Bartholomew's Hospital, he was on the point of suggesting abdominal section in a case of the kind, but the patient improved sufficiently to render it unnecessary. He quoted a case in which an extra-uterine cyst behind the cervix had been mistaken for a retroverted gravid uterus, and on two occasions reduction had been attempted.

THERAPEUTIC MEMORANDA.

TREATMENT OF SCARLATINA.

IN the number of the BRITISH MEDICAL JOURNAL for July 12th, Dr. Edward Wells, of Reading, solicits the opinion of others with regard to the value of aperients during the eruptive stage of scarlatina. If he would, on my suggestion, adopt the following treatment, I have no doubt that his dread of aperients would cease, and that the results would prove as satisfactory to himself as they have been to me. To expedite the complete removal of feculent matter from the bowels, give two ample enemata of warm water in rapid succession. Then give a dose of castor-oil every five hours, until the evacuations become of a yellow colour. If he will maintain this character by the daily administration of the same remedy in diminished doses (to expurgate the poison), I will guarantee that there shall be less anxiety on his part; that the patient's life shall be more free from danger, and that the dreaded sequelæ shall be conspicuous from their absence. To realise the full benefit of this treatment, it should be adopted at the earliest appearance of the disease. Although castor-oil stimulates the muscular action of the bowels, it powerfully soothes all mucous surfaces, as is proved from its practical value to the eye, when in distress from any cause of irritation.

HENRY ARMSTRONG RAWLINS, L.R.C.P. Ed., Maida Vale.

OBSTETRIC MEMORANDA.

IMPERFORATE HYMEN: DILATED FALLOPIAN TUBE: INCISION: CATHETERISATION OF TUBE: CURE.

ON March 13th I was called to see E. T., a spare and undeveloped girl, aged 15, suffering from colicky pains in the abdomen, and aching in the back and loins. The bowels were confined, and I was told that she had never menstruated. On palpation of the abdomen a globular elastic tumour, about the size of an orange, was discovered in the position of the left ovary, somewhat tender to the touch; this I took to be a small ovarian cyst, and considered that the pains indicated a menstrual molimen.

In the absence of facilities for a hip-bath, she was ordered hot-fomentations of the loins and abdomen. I also prescribed a dose of castor-oil, with small anodyne draughts of opium and belladonna, to be followed by a copious warm enema.

On visiting her again, there had been no menstrual discharge. The bowels had been well relieved, without in any way easing the pain,