The testicular and ovarian tumours associated with macrogenitosomia have, after microscopical examination, been described under various names, but in Mr. R. P. Rowlands's recent case of macrogenitosomia in a boy, aged 9 years, the tumour which he successfully excised was regarded by Professor Adrian Stokes and Dr. G. W. Nicholson as having arisen from the interstitial cells of the testis.¹⁷

SOME ACUTE NASAL AND AURAL CONDITIONS SEEN IN GENERAL PRACTICE.*

BY

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It is becoming increasingly recognized by the profession that acute nasal sinus infection is much more common than many of us have imagined. Cases of influenza that failed to respond to treatment as quickly as they should, and in which the headache and temperature persisted in a most unaccountable fashion, must be familiar to us all. There is no doubt in my mind that in many of these cases the continuance of the symptoms was due to infection in one or more of the nasal sinuses. I shall cite a case in illustration.

A cook went to bed on February 12th with all the symptoms of severe influenza: headache, backache, a temperature of 104° F., general malaise, slight sore throat, and some cough. In spite of skilled treatment the temperature and headache remained a marked feature until February 26th, when her doctor asked me to see her.

The initial temperature had dropped on the second day of the illness, but since then she had persistently run a temperature of 99° to 102° F. The headache was described as "being all over the head," but I elicited the fact that it was felt more in the front than in the back of the head. Examination revealed a considerable quantity of muco-pus in both nostrils, and slight tenderness in the canine fossa on each side. The antra were dull on transillumination, and a diagnosis of suppuration within them was readily made. The usual conservative treatment of inhalations and sprays was tried for three days, but, the condition not improving, the patient was admitted to hospital and, under a general anaesthetic, both antra were opened and drained intranasally. They contained thick pus from which a streptococcus was cultivated. The patient made an uninterrupted recovery.

In considering the nasal accessory sinuses it is necessary to recall that the ostia of them all are extremely small, and that those of the anterior group of cells—namely, the frontal sinuses, the anterior ethmoid cells, and the maxillary antra—open into the nose beneath the middle turbinate bone. Any infection, therefore, of the nasal mucous membrane which causes engorgement of the middle turbinate bone and of the lips of the ostia may lead to the retention of inflammatory products within the sinuses. Should infection have reached the interior—and there is no doubt that in even the common "cold" it usually does—the result will be an ill-defined headache with more or less temperature, depending on the virulence of the infecting organism and the sinus involved.

THE DIAGNOSIS OF ACUTE SINUSITIS.

Usually the sinuses infected are those of the anterior group, and most commonly the maxillary antra and the frontal sinuses.

Acute Frontal Sinusitis.

The most striking feature of frontal sinus suppuration is the pain, which has a definite periodicity. For some reason not satisfactorily explained it starts about 10 or 11 o'clock in the morning and gets progressively worse until it reaches its height about lunch time, after which it subsides, only to start again the following day at the same time. A pain of this type affecting the region of the

frontal sinus is absolutely pathognomonic of infection within the sinus. It never keeps the patient awake at night, and if he complains that he cannot sleep for pain it is certain that the condition has either progressed to an osteomyelitis of the frontal bone, in which case a history of the typical pain would be obtained, or that it is due to some other cause not associated with the frontal sinus.

Tenderness over the sinus is a useful diagnostic sign, but care must be exercised not to press on the supra-orbital and supra-trochlear nerves, which are tender to pressure in all of us. When only one of the frontal sinuses is suspected, it is helpful to exert the same amount of pressure with an index finger over each sinus simultaneously, and ask the patient which is the more tender. It is much more reliable than pressing on the suspected sinus only, pain and tenderness being purely relative. Tenderness over the floor of the sinus—that is, over the area just above the inner canthus—is usually very pronounced, and is, in my experience, a more reliable sign than tenderness over the anterior wall. Discomfort on looking to one or other side is common, and is due to the fact that the pulley of the superior oblique muscle is attached to the periosteum of the floor of the sinus. Temperature is a very variable symptom; it may be absent or it may be as high as 105°. Generally a lower temperature—99° to 102°—is to be expected, but this depends on the virulence of the infecting organism. Oedema of the upper eyelid is not seen until late in the disease, and should not be allowed to develop if the patient is seen in the early stages. Photophobia is not uncommon, but is also usually a late symptom.

It is interesting to note that most of the cases of chronic sinus infection, which are the result of a previous acute infection, give a history of influenza some years previously, accompanied or followed by severe frontal headache which was treated as "neuralgia." In neuralgia, however, the pain is confined to the area supplied by the nerve involved. It has no definite periodicity like the pain of frontal sinusitis; moreover, the nerve itself is actually tender on pressure, whereas in frontal sinus infection it is the bone that is tender.

Another cause of acute frontal headache is acute maxillary antrum suppuration. In this condition the pain is frequently referred to the forehead, but it lacks the periodicity of true frontal sinusitis pain, and, unlike it, often keeps the patient awake at night.

The intranasal signs of frontal suppuration are seldom characteristic, but usually some injection of the affected side can be made out, especially of the middle turbinate bone. Frequently the septum is deflected to the diseased side and, by preventing free drainage, may act as a contributory cause. When pus is seen, it is either under the middle turbinate and farther forward than in the case of antral suppuration, or it is in the olfactory cleft—that is, between the septum and the middle turbinate bone. Often no pus is seen unless the patient is examined towards the evening, after the pain has passed off.

Transillumination as an aid to the diagnosis of acute frontal sinus suppuration is not of great value. The sinuses vary very much in size. In some patients the sinus of one side may be large and the other small or even absent, and it is difficult to be certain whether the failure to illuminate is due to a small sinus or to the retention of inflammatory products within a large one. A radiogram, however, is of the greatest help, and should always be obtained if operation is contemplated; it shows what manner of sinus is being dealt with. The most useful view, in my opinion, is the "nose-chin"—that is, one taken with the patient's nose and chin resting on the plate.

In the surgical treatment of frontal sinus suppuration I would stress the need of doing as little as possible. There is seldom any reason to open the sinus externally; more often than not all that is required is the removal of the anterior end of the middle turbinate bone. We are endeavouring to combat what is generally a virulent infection, and our aim should be to limit it rather than to spread it by opening up fresh bone and other tissues. If the cause of the retention of secretions is a small fronto-nasal duct, and not an enlarged middle turbinate, it can be quite sufficiently enlarged intranasally with a rasp.

¹⁷ By the kind permission of Mr. Rowlands I was able to give illustrations of his case (which had not previously been published) in my paper on Endocrine Tumours, *Proc. Roy. Soc. Med.*, Section of Medicine, 1929, xxii, p. 15.

* A paper read before the Norfolk Branch of the British Medical Association.

Acute Antral Suppuration.

The ostium being situated some distance above the most dependent part of the cavity, drainage of the antrum is inadequate, and stagnation of infected secretions is more likely to take place than in any of the other nasal sinuses. We would therefore expect suppuration within the antrum to be relatively common, as indeed it is.

Most of the acute antral cases that I see are sent to me by dental surgeons. The history is nearly always the same: the patient has had a "cold" or an attack of influenza associated with pain in the cheek, which he attributes to defective teeth and which the doctor has advised he should have extracted. Sometimes the dental surgeon has reported that there are no teeth likely to be the cause of the pain, but more often he has extracted one or more teeth, and when relief has not been forthcoming has passed the patient on to me. I am sure that if we keep the possibility of antral infection in our minds, we shall be less frequently "caught out." As in the case of many other diseases, we have only to realize its relative frequency to be on the look out for it and diagnose it when we see it.

The symptoms are generally as follows: The patient has a "cold" associated with nasal obstruction and discharge, slight malaise, ill-defined headache, and a rise of a few degrees in temperature. A feeling of distension, or pressure, in one or both maxillae is practically always present, and is due at the beginning of the illness more to swelling and hyperaemia of the maxillary mucosa than to the internal pressure of pent-up secretion. As the disease progresses, the feeling of distension, which is increased by the act of stooping or coughing, is replaced by neuralgic pain commonly referred to the teeth of the upper jaw, but frequently to the supra-orbital region of the same side. Killian goes so far as to say "the site of predilection is the supra-orbital area." My experience does not wholly confirm his view, but pain in this site is very common, and many frontal sinuses have been opened needlessly through overlooking this fact. Sometimes there is no actual pain in the upper jaw, but an uncomfortable sensation as if one tooth was loose, or longer than its fellows.

If the maxillary ostium is completely occluded and the infection a virulent one, swelling of the cheek with oedema of the lower eyelid is observed, and great tenderness accompanies pressure on the facial wall of the sinus. In these circumstances absence of nasal discharge is common, but congestion and obstruction in the corresponding nostril is always present, and the sense of smell is either diminished or lost.

On examination one finds an intensely injected nasal mucosa and enlarged turbinates; muco-pus may be seen issuing from beneath the middle turbinate bone, but this may not be possible until the mucous membrane has been constricted with adrenaline or cocaine. The postural test, which consists of inclination of the head forwards and downwards, so that the ostium is the most dependent part of the sinus, may help, but this test is more useful in chronic cases.

Pressure over the anterior wall of the canine fossa will always produce discomfort, and it is most important to compare the two sides by pressing on them simultaneously. Transillumination is of great value and should be practised whenever antral suppuration is suspected; it can be done quite well with one of the small "fountain pen" flash lamps which many of us now carry. Darken the room as far as possible, and make a tent to cover the patient's head and your own; insert the lamp in the mouth, taking care that the upper denture, if present, is removed. The normal light area immediately below the orbit will be absent if the antrum is infected. A good radiogram is useful to confirm the diagnosis, and when the pain is referred to the supra-orbital area it is an essential to exclude frontal sinus suppuration.

Acute Ethmoiditis.

Acute infection within the anterior ethmoid cells is probably very common, but is seldom diagnosed unless complications arise. It is difficult to enumerate the precise symptomatology, for the reason that the condition is seldom

met with alone, but in association with infection of some of the other nasal sinuses, or as a complication of acute coryza. Headache is a constant symptom, and is referred to the region between or behind the eyes, and is aggravated by movement of the eyeball. Tenderness can often be elicited by digital pressure below the inner canthus. (In frontal sinus suppuration the tenderness is above the canthus.) Radiography is valuable, but as the condition usually clears up without undue delay, it is seldom called for.

Acute Sphenoidal Suppuration.

Acute sphenoidal suppuration is a condition of considerable interest to the rhinologist, if not to the general practitioner, for it is a very definite entity and by no means rare, although little or nothing is said about it in any of the textbooks. Briefly, the symptoms are headache and raised temperature. The headache is of a particularly distressing kind, and is deep-seated and intense. Usually it is referred to the occiput, but sometimes to the parietal or temporal region. The patient gets no rest from it, either by night or day, and often screams out unless a sedative is given. The condition is sometimes mistaken for meningitis, and in many cases, unless appropriately treated, it undoubtedly progresses to meningitis. A physical sign that is not easily explained is proptosis of the upper eyelid on the affected side.

TREATMENT OF ACUTE SINUSITIS.

It is a mistake to imagine that most of these cases require surgical intervention; if properly treated in the first place, very few of them will.

Confinement to bed, or at least to a warm room, is most desirable. A dose of calomel should be given, and, the essence of the treatment being to reduce the engorgement of the mucous membrane, smoking and the consumption of alcohol, which increase it, should be forbidden. Heat, either in the form of fomentations or as radiant heat, is most comforting, especially in frontal sinusitis.

Intranasally, inhalations of steam impregnated with menthol are useful, especially when given in the form of an alcoholic solution. Half a teaspoonful, or a little more, of a 15 per cent. solution should be put in a quart jug, the water being at a temperature of 140° to 150° F., and the inhalation continued for ten minutes and repeated every four or five hours. A nasal douche should not be used during the early stages; the patient should be encouraged to blow his nose, though he must take care not to do it so violently as to cause the infection to spread up the Eustachian tube to the middle ear. There is no objection to a warm alkaline spray used in a coarse atomizer, and it is comforting to the patient. Aspirin, phenazone, bromide, and Dover's powder are all useful in relieving the pain.

If in spite of this treatment the symptoms persist for two or three days, it is probable that some slight surgical intervention is necessary. The failure may be due to a deflected septum or an enlarged anterior end of the middle turbinate, which will have to be removed under a general anaesthetic. The earlier diagnosis of sinus suppuration has greatly simplified the operative treatment, and it is now seldom necessary to resort to the mutilating operations of a generation ago. There is no reason to open an antrum through the buccal cavity, or the frontal sinus, externally; they can both be satisfactorily dealt with by intranasal surgery.

ACUTE AURAL CONDITIONS.

The only common acute aural conditions I propose to discuss are acute middle-ear suppuration and acute mastoid disease. I operated on a great many acute mastoids during the recent epidemic of influenza, and what struck me most was the fact that whereas a few years ago it was common to see the old textbook picture of the auricle pushed downwards and forwards, I saw only three or four cases presenting this symptom. The earlier diagnosis of acute mastoiditis, which is often by no means easy, reflects the greatest credit on the care and vigilance of the general practitioner.

Acute Otitis Media.

Acute otitis media is generally an ascending infection, characterized by a sense of fullness going on to actual and very acute pain in the ear. The pain is worse at night and may render sleep impossible. Warm olive oil or, better still, glycerinum acidi carbolici (5 per cent.) may relieve it; if not, I cannot too strongly stress the necessity for an early paracentesis. Many cases of mastoiditis are the result of delay in carrying out this operation, and I am quite certain that we are never justified in waiting for days, as we used to, until the drumhead gives way. After all, paracentesis is a very simple procedure. Anyone, given a good light, an aural speculum, and a myringotome, can do it while the patient is under gas or ethyl chloride. The relief from pain is often instantaneous, the risk of mastoiditis reduced at least by half, and the hearing is less likely to be impaired than if the drum were allowed to rupture on its own. It is better to open a drum unnecessarily than to let the case drift on to mastoiditis.

Assuming the patient has had paracentesis performed, or that the drum has given way, and the ear is discharging freely, how are we to know that all is going well and that the mastoid is not becoming infected? A decision is not always made easily, and there is no one infallible symptom to look for, though mastoid tenderness is significant. Unfortunately some mastoid tenderness is usually present in otitis media. The mastoid antrum being a direct backward extension of the middle ear, pus practically always finds its way into it; but that does not constitute mastoiditis, though it explains why patients with marked mastoid tenderness frequently get completely well in a few days. The tenderness associated with suppuration in the mastoid antrum, as distinct from the tenderness of mastoiditis, is situated over Macewen's triangle—that is, the area above and behind the meatus, and not at the tip of the mastoid process. If, then, it is found that the area of tenderness is extending towards the tip, and the patient's constitutional symptoms are becoming worse, it is safe to assume that the case is going on to mastoiditis. It should be remembered that it is rare for an adult patient to have a temperature of over 100° F. in mastoiditis, and a high temperature is not to be waited for, as it usually means some intracranial complication.

In testing for tenderness it is most important to compare the two sides, and, in a case of suspected suppuration within both mastoids, to compare one mastoid at a time with any other part of the skull. This is done by exerting equal pressure with the index fingers, and, by varying the degree of pressure, it is possible to get a very fair estimate of the degree of tenderness. In carrying out the test do not ask, "Does that hurt?" Rather say, "That does not hurt, does it?" and unless the tenderness is real the patient will agree with you. It is also helpful to watch the patient's face while carrying out the test, as you will often see an uncontrollable frown when you press on a tender area. Pain is a very helpful sign. The pain of otitis media usually passes off soon after the discharge is established. If it persists and robs the patient of a night's rest in spite of free discharge, he is probably developing mastoiditis. The arrest, or diminution, of the discharge followed by increased tenderness is another significant sign, and should suggest the possibility of spreading infection.

Briefly, then, the return of pain in spite of a free discharge, extension of tenderness towards the tip of the mastoid process, and increase in temperature and malaise, may be taken as indications that mastoid infection is taking place. The usual symptoms and physical signs may vary slightly according to the age of the patient.

Mastoid Abscess.

One sometimes meets with a mastoid abscess in a child under 12 months old. Generally the first sign noticed is a swelling behind the ear. The child may have been fretful for some days and its condition attributed to teething. The discharge from the ear is probably ascribed to the same cause, and it may not be until the swelling appears that the mother seeks advice. The constitutional symptoms

are usually slight, and I have seen cases where the house-surgeon has incised the swelling, in the belief that it was merely a post-auricular abscess secondary to a breaking down gland. I always tell my house-surgeons that post-auricular abscesses in children, with or without discharging ears, are mastoid abscesses and the result of extensive bone disease. That may not be strictly correct, but I have yet to see the case in which it is not.

Mastoid suppuration in the aged also presents certain difficulties. Oedema is practically never seen, as the bone is too sclerosed, and tenderness has to be carefully looked for to be found; very often it is confined to one small area. The patient will complain of deep-seated boring pain that robs him of sleep, and, as often as not, the only other evidence of ear trouble will be a profuse discharge from the meatus. The temperature will not be more than 99° or 100° F. at most. The amount of discharge is usually suggestive. The cavity of the middle ear is small and the secreting powers of the lining membrane accordingly are limited; if, then, the discharge is copious, it must be coming from somewhere else, and most likely from a diseased mastoid bone.

In the last few months I have seen several cases of mastoid abscess in which the drum was intact and normal. They were interesting because, otorrhoea being absent, mastoid disease was not suspected. They all gave a history of having had severe earache, which had improved but never completely disappeared. The explanation was evidently that the Eustachian tube was fairly patent and the drum tough. The middle ear and mastoid antrum had emptied themselves through the Eustachian tube, but some residual infection had persisted in the mastoid bone and gone on to abscess formation. Most of the patients were elderly adults, and one of them gave a six months' history, during which she had been labelled "neurotic." She had marked mastoid tenderness and at the time of operation a large perisinous abscess was found. The absence of discharge coupled with the normal drumhead entirely misled her doctor. In this connexion it is useful to remember that there are many causes of mastoid pain not associated with ear disease, but there are very few causes of mastoid tenderness other than the existence of disease within the mastoid bone.

TREATMENT OF MASTOIDITIS.

The classical operation is, of course, the Schwartz, and the ultimate results leave nothing to be desired. Until a few years ago the custom was to leave the wound open and to pack the cavity with gauze. This meant a daily—and painful—dressing for the patients, and the discomfort was often such that they remembered it to the end of their days. Just after the war the practice of rubbing bipp into the cavity and completely suturing it, was tried with more or less success. Unfortunately, although it robbed the operation of the terror of a very painful dressing, quite half of the wounds completely broke down.

A modification, and the method at present generally used, is lightly to pack the cavity with gauze, stitch up the upper two-thirds of the wound and leave it for four or five days. The packing can then be removed without causing much discomfort, but the patient may find its presence distinctly painful. To overcome this disadvantage I have used a piece of rubber tissue in place of gauze. It slips out painlessly and the results have been very satisfactory. Recently one of my hospital sisters noticed that, with the rubber tissue as a packing, one had frequently, on the third or fourth day, to take out one or two of the stitches at the upper part of the wound owing to pus having collected under them. She suggested that this could be prevented by stitching up the wound completely and securely, and passing a small rubber tube with lateral holes, from the extreme upper end of the wound through the cavity and out at the lower end. The tube should be made of rather rigid rubber to prevent its collapsing, and have a total calibre of not more than that of a slate pencil. It is left in for three or four days, during which the mastoid cavity is syringed daily through it from above downwards, and if the discharge is free, the tube is retained a day or two longer.

The cases treated in this manner have, without exception, done remarkably well. In none of them has the wound broken down, and in all of them the convalescence has been considerably shortened. Frequently the wound is soundly healed, all discharge has ceased, and the patient is out of hospital on the tenth or eleventh day. Compared with the old laborious daily packing, which often had to be done for anything up to two months, it is an advance of the greatest importance.

INOPERABLE CARCINOMA OF CERVIX TREATED BY RADIUM TRANSPERITONEALLY.

A REPORT OF THREE CASES.

BY

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THE following record of three cases of carcinoma of the cervix treated by radium intravaginally and transperitoneally is based on the notes published in the annual Harker Smith radium report of University College Hospital, and for permission to use this report I am indebted to the hospital Radium Committee. The patients concerned were all under the care of Sir George Blacker, who operated in each case.

CASE I.

The patient, A. B., aged 49, was admitted on April 21st, 1925, with a moderately advanced cervical carcinoma infiltrating the anterior vaginal wall. Microscopical examination showed the growth to be squamous carcinoma.

On April 24th the abdomen was opened, and four tubes, each containing 10 mg. of radium sulphate, screened by 0.3 mm. of platinum, were embedded in the left utero-sacral fold, in the base of the left broad ligament, higher up and further out in the left broad ligament, and in the base of the right broad ligament respectively. Each tube was tethered by phosphor-bronze wire, the distal ends of the four wires being brought out of the wound through a rubber drainage tube. At the end of ten hours the four needles were extracted by traction on the wires, the drainage tube was removed, and the hole closed by tying a through-and-through suture which had been placed in position at the time of the operation.

On May 6th, the wound having healed by primary union, and the patient having made a good recovery from the effects of the operation, 100 mg. of radium sulphate were inserted in the cervical canal, and 100 mg. placed transversely across the vaginal vault, each being screened by 0.5 mm. of platinum and 2 mm. of rubber. The radium salt was left *in situ* for twenty hours, making a total application of 2,800 milligram hours of element.*

On July 10th the patient was readmitted to hospital; she had been well, gained 4 lb. in weight, and had a good appetite. There was no bleeding, but a slight yellowish discharge. Her bowels were regular. The cervix had been replaced by a depressed area about the size of a sixpenny piece, consisting of red granular tissue which bled on examination. Radium treatment was administered as follows: one tube containing 50 mg. of radium sulphate, screened with 0.5 mm. of platinum and 2 mm. of rubber, was placed into the cervical canal; one tube containing 100 mg. of radium sulphate, similarly screened, was placed transversely across the vaginal vault. The tubes were kept *in situ* for twenty-four hours, involving the application of 2,520 milligram hours of element.

On September 22nd the patient was once more admitted to hospital; she was very well, had a good appetite, had increased in weight, there was no bleeding, and very little discharge. Hot flushes were troublesome. On examination the vagina was found to be shortened and its upper part conical. The vaginal cervix had disappeared and the uterus was fairly mobile; both utero-sacral ligaments were palpable but not thickened or shortened. The abdominal scar was sound; there was no evidence of growth on inspection or palpation.

In November, 1927, the patient complained of pain in the leg and arm; x-ray examination showed the presence of osteoarthritis. No evidence of growth was found on vaginal examination; on rectal examination both utero-sacral ligaments were found to be indurated, though no definite mass was palpable. The mucous membrane of the rectum felt normal, and the fact that the patient was passing clots of blood with her motions was attributed to the possible presence of a radium burn of the rectum.

* To convert radium sulphate to element it is necessary to multiply by the coefficient 0.7.

In May, 1928, nothing abnormal was found on abdominal examination, but the vagina was occluded by adhesive vaginitis. The utero-sacral folds were slightly thickened, but there was no clinical evidence of growth. In March, 1929—nearly four years after the beginning of treatment—the patient was alive and well.

CASE II.

The patient, A. C., aged 52, was admitted on September 7th, 1925, complaining that for four months she had had a watery, and occasionally blood-stained, discharge from the vagina. She had no pain and the bowel and bladder functions were normal. She had had three children (no miscarriages), the last pregnancy having occurred eleven years and the menopause two years before the onset of symptoms. On examination the cervix was found to be enlarged and torn on the left side; posteriorly it was partially destroyed by a friable growth which bled readily. The vagina was not actually invaded, but the cellular tissue on the left side was somewhat thickened and the uterus slightly fixed. Microscopical examination showed the growth to be a squamous carcinoma.

On September 11th, and again on September 14th, acetone was applied for ten minutes, and an operation was performed on September 16th. The original intention was to carry out Wertheim's extended hysterectomy, but this idea was abandoned when it was found that the growth had invaded the peritoneum from the right posterior part of the cervix, causing partial obliteration of the pouch of Douglas, and was just beginning to invade the rectum. Furthermore, the uterus was tethered on the right side by a definite invasion of the broad ligament. The ovarian vessels and round ligaments were tied and, by a technique similar to that used in Case I, five tubes, each of 10 mg. of radium sulphate, screened by 0.3 mm. of platinum, were embedded as follows: one tube in the near end of the base of the right broad ligament; one tube further out between the right broad and utero-sacral ligaments; one tube in the mid-line of the cervix just below the internal os; one tube behind the cervix, half an inch to the left of the mid-line; one tube in the base of the left broad ligament. The tubes were allowed to remain in position for ten hours, the total dose being 350 milligram hours of element. After the operation the patient had an uneventful convalescence, and on October 2nd, and again on October 6th, acetone was applied.

On October 9th radium treatment was resumed. A tube containing 100 mg. of radium sulphate, screened with 0.5 mm. of platinum and 2 mm. of rubber, was placed in the cervical canal, and one containing 50 mg. of radium sulphate, similarly screened, in the right posterior fornix. Both tubes were retained for thirty hours, giving a total dose of 3,150 milligram hours of element.

On June 9th, 1926, there was an extensive papillary recurrence projecting from the cervix; the mass was breaking down, was friable, and it bled on manipulation. The lateral fornices were not involved; the left utero-sacral ligament was normal; but there was marked thickening in the right utero-sacral ligament. An application of 3,100 milligram hours of element was made per vaginam. On July 13th the cervix was largely atrophied and no cervical growth could be detected. The posterior fornix was obliterated, the cellular tissue on the left side was normal, but there was a definite mass in the right utero-sacral ligament.

On November 14th the only abnormal physical sign revealed by abdominal examination was an enlarged and readily palpable right kidney. The cervix was atrophied and flush with the vaginal vault, and there was induration in the right fornix. Rectal examination revealed a large, hard, fixed mass on the right side of the pelvic wall; it was not attached to the rectal mucous membrane. Both utero-sacral ligaments, especially the right, were infiltrated and fixed to the pelvic wall. On November 18th similar conditions were found, and in December, 1928, three years after the beginning of treatment, the patient died.

CASE III.

The patient, F. O., aged 53, was admitted on October 28th, 1925. Examination revealed an ulcer with a thick everted edge and a friable surface, which bled readily on manipulation, replacing the cervix. The uterus was fairly mobile. The left broad and utero-sacral ligaments were to some extent invaded, not the right. There was early extension to the vagina.

On October 30th a tube of radium sulphate, screened with 0.5 mm. of platinum and 2 mm. of rubber, was inserted into the cervical canal, and one of radium sulphate, similarly screened, into the posterior fornix. The tubes were retained for twenty-four hours, giving a total dose of 2,520 milligram hours of element.

On November 13th the abdomen was opened, but the conditions were found unsuitable for treatment by Wertheim's operation. With a technique similar to that used in Case I, five tubes, each of 10 mg. of radium sulphate, screened by 0.3 mm. of platinum, were embedded as follows: three tubes behind the cervix, one median, and one at the extreme lateral margin of each side, a tube in the left utero-sacral fold $\frac{1}{2}$ inches from the