tion. When the drug to be experimented on is not a solution but a vapour, it must be passed into the lungs by the method already described (BRITISH MEDICAL JOURNAL, May 20th, 1871).

In this way, I have found that muscarin causes contraction of the pulmonary vessels, and produces dyspnoea (see BRITISH MEDICAL JOURNAL, November 14th, 1874), although the heart continues to beat, and artificial respiration is vigorously kept up. The lungs become pale, the right side of the heart swells up, and the left side and arteries become empty, as represented diagrammatically in Fig. 4.

Fig. 3.

Fig. 4.

Fig. 3.—Diagram representing the normal condition of the circulation. Both the veins and arteries are moderately full: the two sides of the heart are of much the same size, and the circulation through the lungs is free.

Fig. 4.—Diagram representing the condition of the circulation after the administration of muscarine. The veins are distended, the arteries empty; the right side of the heart is much enlarged, the left side collapsed, and the circulation through the lungs almost entirely arrested.

The vapour of chloroform blown into the lungs causes a similar appearance, but it arrests the cardiac pulsations more or less completely at the same time.

The action of drugs on the pulmonary capillaries in the frog may be observed directly by means of the microscope. A frog is curarised, and a glass cannula, to which a short piece of India-rubber tubing is attached, is tied into its larynx. An incision is then made into the side of the frog a little below the arm, care being taken not to injure the lung in dividing the thoracic wall; and, the lungs being inflated through the cannula, one of them protrudes through the opening. The piece of India-rubber at the end of the cannula must then be clamped, so as to prevent the air from escaping and the lung from collapsing (Fig. 5).

Fig. 5.—Form of tube for insertion into the larynx of the frog. It is made by drawing out a piece of tubing to the size marked *a*, heating the end and pressing it against a piece of metal, so that it assumes the shape *b*. *c* is a piece of India-rubber tubing, which must be closed, either by a ligature, as shown in the drawing, or, what is still better, by a clip, so as to prevent the escape of air from the lung.

The whole frog is then placed on a glass plate, which is fixed with a clip to the stage of the microscope. The lung is brought under the objective, and supported, if necessary, by a cork ring fixed to the glass plate with sealing-wax. Any changes in the calibre of the pulmonary vessels are then readily observed by means of a micrometer placed in the eye-piece.

Four years ago, I attempted to ascertain by this method the effect of sudden changes from heat to cold on the lungs; and I have found that, if a stream of warm moist air be first directed on the lung, and immediately afterwards a stream of cold moist air, the capillaries sometimes contract as much as one-third of their diameter under the influence of the cold.

Dr. Sharpey informs me that the lung of the toad, unlike that of the frog, does not collapse even when no obstruction is offered to the escape of air; and therefore, if toads be used, the India-rubber tube and clamp on the cannula are unnecessary.

THE LATE DR. PICKFORD.—At the annual general meeting of the Brighton and Sussex Infirmary for Diseases of the Eye, the following resolution was passed. "That the Governors of this Charity desire to offer to Mrs. Pickford their sincere expression of condolence in the loss of her late husband, Dr. J. H. Pickford, to whose exertions the Charity mainly owes its foundation, and who, during a period of more than forty years, exerted his best interest in its behalf."

REMARKS ON THE LOCAL USE OF LIQUOR FERRI PERCHLORIDI IN CANCEROUS ULCERATIONS OF THE UTERUS.*

By CHARLES J. GIBB, M.D.,

Consulting Surgeon to the Newcastle-on-Tyne Infirmary.

CANCEROUS diseases of the uterus have generally progressed so far before they come under professional observation, as to pass as incurable from one medical man to another, and it thus happens that I see a large number in my consulting-rooms. It is rare to find the disease so superficial and purely epithelial in character, or, if interstitial, so confined to the mouth and neck of the uterus, that the diagnosis can be made with such certainty as to justify the surgeon in excising it; and, in the advanced stages, the foul discharges make the patient so loathsome, that, in spite of the keenest feelings of pity, the surgeon is inclined to view the case as utterly hopeless, and to leave all manual treatment to the nurse. When we remember how much relief can be given to the worst symptoms of the most incurable cases of external cancer by operation, or by other measures calculated to remove fungoid or sloughing surfaces or masses of the disease; how pain can thus be relieved; bleedings prevented; foul discharge moderated or made less disgusting in character,—it is not surprising that surgeons should strive to give similar relief to the worst cases of cancer of the womb, and be more or less successful in their efforts. From time to time, I have tried the various local applications I have seen recommended; have made use of many caustics; have been taught by painful experience that caustic potash, or caustic potash and lime, are unmanageable, and too dangerous to the surrounding parts to be used with the freedom requisite to be of service; that the actual cautery is too fear-inspiring; that nitric acid or acid nitrate of mercury (which had to be used with great care) are inefficient; and that lunar caustic and powders or points of zinc or alum are useless as caustics.

About two years ago, I had occasion to dilate the uterus in a very obstinate case of menorrhagia proceeding from large vascular granulations in the cavity of the enlarged organ. The strongest pharmacopoeial solution of the perchloride of iron (being in fact iron dissolved in pure acid) was injected into the open uterine cavity, and a piece of sponge soaked in the solution left there for twenty-four hours. This treatment was perfectly successful, and I viewed with surprise the efficient way in which the soft and vascular growths were destroyed, while the normal structures of the uterus and vagina were but little inconvenienced, and certainly not in the least eroded. Since that time, I have been accustomed to use this solution in many cases of cancer of the uterus; and, having promised our secretary to read a few notes at this meeting regarding its usefulness in my hands, I jotted down the histories of the following four cases, being the cases of cancer in which I used it in my consulting-rooms during the week succeeding the day I made that promise.

CASE I.—Mrs. B., aged 36, a shopkeeper, married five years, without children, was a strong powerful woman until fourteen months ago, when she was seized with menorrhagia, followed by the foul sanious discharges and other symptoms of cancerous ulceration. She came to my office six weeks ago, anæmic to the last degree, from almost constant hæmorrhage and putrid discharge. On examination, the mouth and neck of the uterus were found destroyed, and their place occupied by a large, deep, sloughing, cancerous sore. The body of the uterus felt greatly enlarged, and as hard as a cricket-ball, whilst the vagina was quite free from disease. Profuse hæmorrhage attended the examination. The sore was filled with cotton-wool soaked in the solution of the perchloride, and the vagina stuffed with tow. She came from a distance by rail, and was ordered to remove with her fingers, or allow the lady who accompanied her to withdraw, the stuffing of tow next morning, and trust to the injections of zinc and alum to wash away the cotton-wool; and appropriate blood-making and aperient medicines were prescribed. On her second visit, she expressed herself as much stronger, very little bleeding having taken place during the week. The application of the perchloride was repeated; and I did not see her for the next ten days, in consequence of a severe pain compelling her to remain in bed. The sore was much healthier in appearance; there had been very little bleeding, and the discharge had become scanty and semipurulent in appearance, without any of the old putrid smell. She was, however, very feeble, and made the journey with great difficulty. Instead of placing the cotton-wool soaked in the perchloride over the sore, I elevated her breech, half filled the vagina with the solution for a couple of minutes, then sucked it up with a syringe and left a plug of tow in the vagina, to be removed next day. The improvement was

* Read before the Northumberland and Durham Medical Society.

marked on her fourth visit, and on this, her sixth, I found there had been a little bleeding once during the week, whilst forcing away a very costive motion. The ulcer was perceptibly smaller, and free from slough, the circumference of the vagina having contracted considerably around it. A small quantity of oil-like pus lay in the vagina; but the examination still caused the ulcer to bleed slightly. The ulcer was again bathed with the strong perchloride, and she returned home, expressing herself as twice as strong as when she first called upon me, and very much relieved from the local misery.

CASE II.—Mrs. R., aged 36, an innkeeper, with several children, the last 7 years old, commenced to have menorrhagia, and the ordinary symptoms of cancer of the womb, nearly a year ago. She began to attend my offices four months ago, and was found to have a large, soft, bleeding epithelioma, covering the swollen and apparently destroyed vaginal parts of the uterus, and extending along the front wall of the vagina to within an inch and a half of the orifice of the urethra. She came in a cab, and her linen was drenched with blood. She was exceedingly anæmic, with daily hæmorrhage, and was evidently in the last stage of the disease, the sore bleeding on the least examination. A large piece of cotton-wool, soaked in the perchloride, was placed over the diseased part, and the vagina was stuffed with tow. On her second visit, a week afterwards, the hæmorrhage had almost ceased; the sanious putrid discharge was much lessened, and, though there was little change to be seen in the appearance of the sore, the finger felt it to be less fungoid and pultaceous in consistence, and less blood followed the examination. I may here remark, that the bleeding fungoid sores were so extensive as to make it utterly impossible to use any speculum, and the oiled finger of myself and assistant had to be used to open the vagina and make the necessary examination and applications. The same examination was made weekly during the nine successive visits, by which time she had regained much of her lost strength, walking a considerable distance to my rooms, and experiencing but little pain or inconvenience, except in passing urine and feces. The hæmorrhage had ceased after the third application; the foul sanious discharge had given place to a scanty oil-like purulent matter without smell; the fungoid vaginal sore was healed, or rather, converted into a thick nodulated, gristly, cicatricial substance, covered with a thin smooth membrane, whilst the deepest part, that corresponding to the uterus, alone presented a chink-like ulcerated surface. It was difficult to see or reach the deepest part, on account of the remarkable contraction that had taken place in the calibre of the vagina, which, from being very capacious and soft, admitting several fingers, had become changed to a rigid tube, that would scarcely allow more than one finger to pass along the upper part of the canal. At this period, some of the children became ill of fever, and she did not visit me for six weeks, having gone through much fatigue in nursing them. On again examining her this week, on her return, I found she was again suffering from a recurrence of the hæmorrhage, consequent, as she asserted, upon the menstrual flow; and I found also that the disease had again opened out the deepest part of the cicatrix, and formed an irregular foul ulcer nearly the size of a crown-piece. The front part of the cicatrix remained in much the same condition. I covered the sore with wool soaked in the perchloride, and warned her against such negligent attendance in future.

CASE III.—Mrs. B., aged 46, a stout healthy-looking lady from the country, the mother of several children, called upon me about a year ago, having slight discharge and bleedings in the intervals between the monthly periods, as well as excessive monthly flow. Her other symptoms were so slight, that her husband, who was also a patient, had difficulty in persuading her to see me. The mouth and neck of the uterus were found to be red and raw-looking, bleeding on the slightest touch, also hard and considerably enlarged, and there was an ulcerated crack at the orifice of the organ. She attended my rooms once a week for about two months. Lunar caustic was applied at first; but, as it produced little change, the perchloride was used a few times with such good effect, that, considering herself quite well, she did not return to see me until to-day, when, she tells me, the bleedings have again returned lately, and she feels a heavy uncomfortable weight in the uterine region. On examination, the whole organ is found greatly enlarged and very hard, being evidently infiltrated with scirrhus disease. The old ulcer is again open, bleeds freely on examination, and there is considerable discharge. The perchloride has been applied.

CASE IV.—Mrs. F., aged 69, from the sea-coast, consulted me about eight years ago for a discharge, occasional menorrhagia, and the uncomfortable bearing-down and other symptoms indicative of uterine mischief. The uterus was found atrophied, and the os and neck almost destroyed by a chronic canceroid ulcer, in appearance like lupus; the whole case reminding one strongly of a similar condition of the breast which I have often seen in old people to continue in a chronic state for years. Potassa fusa and other caustics and injections were used for

more than a year, the result being the total destruction of the vaginal part of the uterus and the formation of a deep sulcus there, which, after remaining healed for some months, again opened out, and has ever since compelled her to attend my rooms two or three times a year for a month or two together. A slight bloody discharge is the only symptom that now tells her the cicatrix has given way, and of this discharge she has the greatest dread. Lunar caustic or nitric acid, with the use of injections, were generally successful after a time in healing the sore, or rather, crack in the cicatrix. I am now accustomed, however, to fill the wound with a small piece of wool dipped in the perchloride, and retaining it there for the first day by a plug of tow in the vagina: find it frequently, in spite of the use of injections, to stick in the place until next visit, a week afterwards, when I remove it. I find the perchloride to be by far the most effectual means of healing the scar when it cracks and bleeds; and on this occasion I made the usual application.

In reviewing the above cases, I have to remark that, since the first case was committed to paper, the patient has visited me twice, and on each occasion has reported large losses of blood, although, on examination, the sore looks clean, and the discharge remains a thick brownish pus quite devoid of smell. What remains of the uterus is infiltrated with cancer; and, although the treatment has greatly relieved the most distressing symptoms, it is evident that a fatal termination cannot long be delayed. Indeed, I have seen that, where the form of cancer is hard, and embraces the whole of the uterus, the destruction of the enlarged organ often takes place by a rapid disintegration attended with alarming gushes of blood, and all that can be done only lengthens the downward path, and makes it less foul and painful. It is different with that class of cases of which the second is a good example. Here there was as pure an epithelioma as is met with in the uterus, spreading over the adjoining surfaces of the vagina, and not infiltrating or running deeply into their structures, but throwing out surfacewards exuberant vascular fungoid granulations, quickly renewed as the older parts sloughed away. Into this soft albuminoid structure the acid solution of iron sinks, destroys, and disinfects; and, strong as it is, it only hardens and tans, but does not in the least destroy the healthy mucous membrane of the vagina. A few applications of the cotton-wool soaked in the solution suffice to clear away the greater part of the diseased growth. Reparative efforts are then made by the comparatively healthy structures underneath, and the further applications appear to hasten cicatrization, as well as to eradicate the remains of the disease. In one case very similar to the second, the lady has now been quite well for some months, and the resulting cicatrix, when she ceased to attend upon me, had so narrowed the upper third of the vagina, that the finger could not pass along it, and was so thick, and hard, and tubercular, that I could not resist coming to the conclusion, that, in the process of cure, a large amount of albuminoid matter had exuded into, and become solidified in, the structures surrounding the disease. Whether the thickening and solidification of the cicatrix and immediately adjoining parts is what naturally takes place in this region when epithelial cancer is destroyed by other caustics, I have no experience to know; possibly it may partially result from the action of the solution left for so long a time on the highly vascular structures supporting the diseased growth—structures that have been so long accustomed to throw into the diseased mass the large supply of albuminoid food necessary for its support. In another case of apparent cure, where the epithelial disease was confined to the uterine structure, I did not observe this condition of the cicatrix; and it may be that the presence of so much connective tissue in the vaginal wall is the cause as well as the seat of this peculiar formation, reminding one of a bad case of keloid growth in the skin, or the hard irregular cicatrix of a bad burn. The course of cancer in the womb is sometimes so rapid, from the quick disorganisation and sloughing of the uterus, and the sufferings of the patient so great, that it is impossible, in a dispensary practice like mine, to see such cases as often as necessary, and to follow them out satisfactorily, or to persuade a sensitive woman to have repeated applications of an agent which does not give immediate or permanent relief. In such cases, indeed, no remedies can be of much avail. It is when the disease is purely epithelial, and chronic, and rodent in character, and confined to the surface, that the treatment I have described does most good, and, as I have said, appears to cure even bad cases. The application of the perchloride rarely causes pain. On four or five occasions, a patient, on returning home, has been confined to bed for a few days, and, in one of the successful cases, for upwards of a fortnight, in consequence of a severe colicky pain in the region of the uterus, lower abdomen, and back. I am inclined to think that the wool had been oversaturated in the perchloride in such cases, as it has occasionally happened that the solution has flowed from the vagina over the vulva after the patient has left my offices, and those

parts been blistered and painfully excoriated as a consequence. On this account, I am now very careful to wash away with a syringe all discharges from the surface of the cancer, and to raise the breech of the patient to prevent any overflow of the solution over the vulva, and, after applying the perchloride, to suck up with a sponge from out of the bottom of the vagina any superabundant solution which a slight pressure on the saturated wool over the sore may cause to flow out; after that, to retain the wool in its place by a loose plug of tow in the vagina; and, lastly, to dry and oil the vulva before the patient rises from the couch.

I have always used the strongest pharmacopœial solution undiluted, as I have only used it to secure a caustic action. At first, I applied it on a piece of sponge or lint; but finally found cotton-wool to answer best, as it sucks up any quantity that may be required, parts with it easily, and can be moulded into any form, so as to fill a cavity or cover over and adhere to any growth. It has happened occasionally that I have found the cotton-wool still adherent over the sore a week or more after its application, and, when removed, it is always a black or chocolate-coloured mass, frequently quite solid, from the quantity of blood or albuminous matter absorbed in its meshes and clotted therein; indeed, one patient gravely told me she had passed a solid brown egg a few days after one of her visits. No doubt it was the hardened wool, although she declared she had cleared out the vagina the day after her visit.

I have kept no record of all the cases I have treated with the perchloride; but, as I have generally had six or eight under treatment at one time, I must have used it in twenty or thirty cases; and its beneficial influence has been so marked, that I would strongly recommend its trial in suitable cases.

CASE OF LARYNGITIS: TRACHEOTOMY: RECOVERY.

By SURGEON-MAJOR J. H. PORTER, Assistant Professor of Military Surgery, Army Medical School, Netley.

IN this case, an acute attack supervened on the disease in a chronic form.

Gunner T. W., Royal Artillery, aged 30, of thirteen years' service, was invalided from India in February, 1874, after a residence there of seven years, on account of extensive syphilitic disease, affecting the bones of the left foot. When he arrived at Netley on April 23rd, 1874, he was suffering from hoarseness of voice and irritative cough, which had first attacked him on board ship, immediately after entering the Mediterranean. Inhalation of the vapour of turpentine and creosote was ordered, while iodide of potassium was given internally; and under these remedies the laryngeal symptoms had so nearly disappeared, that the usual arrangements were made for him to leave the hospital on the 8th of July. On the 3rd of the month, however, the laryngeal symptoms suddenly became aggravated, his voice became weak and hoarse, and he was troubled by cough of a croupy character. The treatment which had relieved him before had now no salutary effect, but appeared rather to aggravate his symptoms. Minute doses of antimony were then administered, the temperature of the ward was kept high, and under these circumstances the patient experienced relief, and appeared to be progressing satisfactorily, when, at 2 P.M. on the 7th of July, he became much worse. His countenance became livid, his skin was bathed in cold perspiration, and he suffered greatly from hoarse cough, accompanied by bloody sputa, and a sense of impending suffocation. He complained of great pain on the right side of the larynx, which was swollen. The pharynx was greatly congested, and the epiglottis could be felt enlarged and thickened. The highly sensitive condition of the parts prevented the use of the laryngoscope. He obtained comparative relief at intervals, but at 4 P.M. his symptoms assumed such a threatening character, the patient being almost asphyxiated, that it was decided to open the trachea.

The condition of the larynx precluded direct surgical interference so far as it was concerned. Chloroform having been administered, the patient was placed in position for the performance of tracheotomy. The knife had already touched the upper rings of the trachea, when the patient ceased to breathe, became quite black, and was apparently dead. Without delay the scalpel was plunged into the trachea, and, with considerable difficulty, a tube was introduced. Artificial respiration was then adopted by means of Silvester's method, and in about ten minutes animation was restored. In half an hour he was breathing easily, and expressed himself in writing grateful for the relief he had obtained.

Under most careful nursing by the sisters of the hospital, and the administration of iodide of potassium in large doses, he steadily improved. The tube was removed on July 16th, on the ninth day after the operation, to ascertain if he could breathe without it; but in less than five minutes breathing became so distressed that it had to be at once replaced. The tube was taken out on several occasions between the above-mentioned date and July 24th, but it was found that he could not remain long without it. On and after the 24th, however, the forty-fourth day after the operation, it was not found necessary to replace the tube, as his breathing continued quiet and easy without it. On September 8th, the wound had completely healed, and his voice had nearly recovered its former strength, and he was discharged from hospital.

There are two points in cases of laryngitis which frequently cause the surgeon much anxiety. The first is, to decide on the proper moment for surgical operation, when it has been determined to operate; as after each spasm there is temporary relief, and this may induce the surgeon to hope that the threatening symptoms of the disease have subsided, so that the need for the operation has passed away. Under these circumstances, the operation may be postponed till perhaps it is too late. The safest plan is no doubt to operate early. The second point is, to determine the proper time for the removal of the tube. This can only be settled by attention to the feelings of the patient, and observation of his power to respire without it.

ON THE MANAGEMENT OF LABOUR AS FAR AS REGARDS THE PREVENTION OF HÆMORRHAGE AND SEPTICÆMIA.*

By I. HARRISON, F.R.C.S.,
Fellow of the Obstetrical Society.

It was well remarked by a speaker in one of the great discussions which took place at a metropolitan Society, that it was needful to have a clear and distinct understanding of what they were talking about. The remark holds good in a debate on obstetrics, and fifty applies to our doings in its practice. It is a mistake, I contend, in the practice of obstetrics, to look upon it as a series of regulation-formulæ, to be treated after a set and recognised fashion, rather than as a natural process, modified as it may be, as it must be, and as it is, by varied accidental complications. We must act on general principles, founded on the anatomy and physiology of the parts concerned.

Up to the time of the establishment of the true action of the spinal marrow and of the reflex system by Dr. Marshall Hall, of their application to obstetrics by the late Dr. Tyler Smith, and of the splendid dissections and demonstrations of the uterine supply of nerves by Dr. Robert Lee, many of the phenomena of parturition were inexplicable, or their explanation was contradictory. The observations about to be made are founded on their teachings.

The uterus is a muscle of the involuntary class, of a non-striated character, the fibres of which, in the pains of labour, after remaining in a state of contraction for a brief period, relax; as is invariably the case in non-striated muscle, it being incapable of sustained effort, says Dr. Leishman. It has a peristaltic action of its own. It is connected with all the nerves from the medulla oblongata to the sacrum—cerebral, spinal, and sympathetic. The uterine group includes the nerves of the ovaria, Fallopian tubes, uterus, vagina, and the external parts of generation. Hence its sympathies and synergies are innumerable; they include affections of the head, breasts, stomach, suprarenal capsules, bladder, rectum, os and cervix uteri, and of the external parts; and may be direct or reflex—mainly reflex. "Thus, in parturition, the uterus may be excited in a reflex form by irritation of the mammary incident excitator nerves, the pubic and abdominal branches of the intercostals, the rectal, the gastric division of the pneumogastric, the ovarian nerves, and also by the nerves of the vagina and the os and cervix uteri. These act through the medium of the spinal marrow, the great organ of physical motion." (Dr. Tyler Smith).

It will not be contended, I take it for granted, that the uterus is an isolated organ, having no nervous connections or supply. If any doubt—and there are some who do—let him look at these beautiful plates of the dissections of Dr. Robert Lee. It will be admitted, also, that the vessels and nerves enlarge *pari passu* with the growth of the uterus during pregnancy.

An organ so endowed must have extensive susceptibilities, and be the recipient of a wide range of reflex impressions. Let us take an

* Read before the Reading Pathological Society.