part of the service. Whether the services of the senior or hospital staff should be whole- or part-time would require to be considered. Personally, I think they should be permitted to undertake consultative obstetric practice.

(b) *The Outdoor or Domestic Part of the Service.*—Now, on the basis of the outdoor department of the Glasgow Maternity Hospital and the figures of births in Glasgow in 1922, Mr. Jones, secretary to the Public Health Department, has very kindly supplied me with an approximate estimate of the number of obstetric specialists Glasgow would require for a maternity or obstetric service such as I suggest.

"City of Glasgow (1922)."

"Total births ...	29,493
Of which medically attended—	
By doctors at home ...	8,288
By doctors in institutions ...	3,025
	11,313
Leaving births non-medically attended ...	18,180
Of which attended by—	
Maternity Hospital outdoor nurses ...	3,678
Other institutional nurses ...	661
Certified midwives ...	13,682
Others ...	159

The proportion of births medically attended is equal to 38.4 per cent., and non-medically attended 61.6 per cent.

"Assuming that the services of a medical man will be called in, as at present, the problem is to ascertain what proportion of the 18,180 births non-medically attended will require medical assistance.

"The Maternity Hospital report shows that for the year 1922, out of a total of 3,757 births attended by the outdoor nursing staff, 454, or 12 per cent., were classified as 'abnormal.' These abnormal cases were attended by a doctor, two of whom were able to overtake the whole work.

"Assuming further that the proportion of abnormal cases exhibited among the Maternity Hospital outdoor cases will apply to the total of 18,180 non-medically attended births, then the relative number would work out at 2,179.

"If, therefore, two whole-time doctors are able to overtake 454 cases, five doctors should be able to overtake the total work. It is understood the outdoor medical assistants attached to the Maternity Hospital work alternate turns of twenty-four hours each. It is unlikely that a permanent staff would be prepared to do this, and in order to make provision for day and night duty, holidays, sickness, etc., it would probably be necessary almost to double the estimated number. Of course, whatever total number is determined upon would be inclusive of the two at present engaged by the Maternity Hospital.

"As shown above, 13,682 births were attended during the year 1922 by certified midwives. During the year these midwives issued 3,120 emergency calls for medical assistance. This is equal to 23 per cent., compared with the Maternity Hospital 12 per cent. Midwives, however, are required by the rules to call for doctors in a variety of circumstances which, under the Maternity Hospital classification, are probably not regarded as abnormal.

"Midwives would continue to make these calls, and probably it should be provided that this work should be undertaken by the proposed permanent staff. This makes it necessary to provide adequate numbers, but the ten suggested above might be regarded as a sufficient provision to undertake the whole work.

"Medical fees on midwives' emergency calls during the year 1922 amounted to £2,040, and this sum would be available towards meeting staff salaries."

I am inclined to think that Mr. Jones's estimate of ten obstetric specialists is possibly too generous, but if some of the industrial centres in the immediate vicinity of Glasgow were included it would probably be very near the mark. These obstetric specialists would naturally be responsible for ante-natal and post-natal work in connexion with the various centres to which they would be allocated. Each of them should have a specially trained midwife to act as an assistant. To my mind one of the strongest arguments in favour of this service is that the obstetric specialists would be constantly supervising and instructing the midwives.

As already stated, the rural problem is more difficult, but a very large proportion of the rural population could be served by obstetric specialists attached to the health departments of particular centres. There would remain, however, in the outlying parts of the country a number of individuals who could only be treated with extreme difficulty by an obstetric specialist from the nearest centre. But if all primiparae and any multiparae in whom there is the slightest suspicion of a difficult delivery were taken

into the nearest district hospital, this particular objection to an obstetric service because of unsatisfactory rural conditions would be largely overcome. Surely, if a very large proportion of women would be benefited by a maternity service, and only comparatively few could not avail themselves of it, it is advisable to do what is best for the greater number.

Nor would the cost be very great. In fact, on balance a saving would probably be effected, for about 50 per cent. of gynaecological affections are the result of infection, injuries, etc., during parturition. The cost of such cases to general and special hospitals is considerable, and would naturally be very greatly lessened by the establishment of an efficient obstetric service.

C. PUERPERIUM.

Time permits of only a word or two regarding the complications of the puerperium. These are for the most part the result of infection and injury during parturition, and are therefore preventable, as already detailed. There are, however, two special disturbances which, although of a minor character and never fatal, are responsible for a very considerable percentage of the gynaecological ailments encountered in general practice. They are subinvolution, or defective involution of the puerperal uterus, and backward displacement of the uterus. Subinvolution is a sequel of infection and retention of membranes, while backward displacement can be prevented by the wearing of a well fitted vaginal support for a month or two.

You see, therefore, how much preventive medicine can accomplish in the field of obstetrics if the care of the expectant mother is undertaken early in pregnancy, if the prospective complications of parturition are recognized and corrected as far as possible, if institutional treatment is made adequate, and if parturients in their own homes are looked after by efficient midwives whose work is supervised by obstetric specialists available at all times in case of necessity.

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DIVERTICULA OF THE OESOPHAGUS.*

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DIVERTICULA of the oesophagus are a somewhat uncommon cause of dysphagia, but the more general use of radiological examination in all lesions of the oesophagus has shown us that they are not as rare as was formerly supposed. They provide us with difficult problems as regards their etiology and surgical treatment, while they present a clinical picture distinctive enough to be well worthy of study.

It will be convenient first to describe briefly three illustrative cases, and then to deal in general terms with the problems that arise.

CASE I.

A man, aged 58, a textile machine worker, was admitted to the Manchester Royal Infirmary under my care on August 1st, 1924. He first noticed something wrong with his throat seven years before, when he was troubled with a choking sensation associated with difficulty in swallowing. The trouble was at first intermittent, but had grown much worse of late, and he had lost 14 lb. in the last five months. Soon after swallowing his food he would choke and bring part, but not all of it, back. Occasionally he would bring up, unaltered, some articles, such as peas, which he had swallowed twenty-four hours before. Long after a meal he was troubled by a constant inclination to swallow, and frequently he noticed a gurgling noise in his throat.

On admission the patient was considerably emaciated, but in

* Part of a post-graduate lecture delivered at the Manchester Royal Infirmary.

fairly good health otherwise. Examination of the neck revealed a fullness on either side in the lower part, but more pronounced on the left side. On palpating the neck a gurgling sensation could be felt and some food regurgitated into the mouth. X-ray examination showed a well marked pouch at the junction of the pharynx and the oesophagus, on the posterior wall (Figs. 1 and 2), projecting down between the spine behind and the oesophagus in front, and causing considerable pressure on the oesophagus. The pouch was rinsed out frequently with boric lotion for some days before operation.

Operation.

On August 6th, under chloroform and ether anaesthesia, an incision was made on the left side of the neck along the anterior border of the sterno-mastoid, extending from the upper border of the thyroid cartilage to the sterno-clavicular joint. The sterno-mastoid and the carotid sheath were retracted laterally, and the thyroid gland and trachea drawn medially after division of the middle thyroid vein. The pouch was now easily separated from the lax connective tissue around it, and drawn up into the wound. The neck of the pouch was fairly wide, though narrower than its fundus. The wall of the sac was thick and fleshy, and felt not unlike a normal stomach on palpation. A large oesophageal bougie was passed in order to help in defining the neck of the sac. Some resistance was noticed as this bougie entered the upper end of the oesophagus immediately below the neck of the sac.

With the bougie *in situ*, two pairs of Schoemaker's colectomy forceps were applied to the neck of the sac transversely and the pouch removed by cutting between them with a knife. The divided mucosa on the stump was sterilized with pure carbolic, and a continuous Cushing suture of fine catgut inserted over the forceps with a curved needle. On removal of the forceps the suture was drawn tight, inverting the edges. The same suture was then brought back as a second layer covering in the first, after the manner of a continuous Lembert suture. Yet another row of invaginating catgut suture was superimposed, and the wound closed with a tube-drain to the site of the excision.

For the first twenty-four hours rectal saline was given, with no fluid by the mouth. For the next three days sterile water and brandy were allowed by the mouth, and then a fluid diet until the end of the tenth day. The tube was removed on the third day. There was only a trifling serous discharge from it, and by the seventh day the wound was completely dry and remained so. The patient has had no further difficulty in swallowing; he has put on weight, and remains in good health. Fig. 3 shows a radiogram taken after the operation.

CASE II.

A man, aged 63, was admitted to hospital on October 16th, 1924. He had been troubled with intermittent difficulty in swallowing solid food for two years, but for the past five weeks the trouble had been much more severe. During this latter period he had been able to swallow fluids only with the greatest difficulty, and could not manage any solid food at all. Nearly everything that he swallowed would regurgitate in about five minutes. He had lost 1½ stone during the past five weeks, and had only passed three small constipated motions during that period, while the amount of urine had been scanty.

History and Condition on Admission.

The patient had typhoid fever twenty years ago, and syphilis two years ago for which he was treated by his private doctor. The dysphagia commenced before he contracted syphilis.

The patient when admitted was in a very weak and emaciated condition. There was no swelling or gurgling to be detected in the neck, but x-ray examination showed a typical oesophageal pouch (see Fig. 4) in the usual position. The Wassermann reaction was positive. The sac was prepared for operation as in the previous case by washing out with boric lotion.

Operation.

On October 20th intratracheal ether was given by Dr. Pinson. Primary excision of the sac was carried out through a vertical incision on the left side of the neck, as in Case I, but on account of the patient's poor condition a Senn's gastrostomy was performed in addition.

The patient was fed entirely through the gastrostomy tube for the first ten days. The drainage tube was removed from the neck on the sixth day, and, except for a trifling serous discharge from the tube track for three days after this, the wound healed by first intention. The gastrostomy tube was removed on the tenth day and the gastric fistula closed almost immediately. He began to take solid food on the fourteenth day, and has swallowed without difficulty since, and regained his normal weight.

CASE III.

A man, aged 52, gave the following account of the history of his trouble:

"About five or six years ago I began to notice that particles of food swallowed the day before returned to my mouth. There was no heaving or straining; they simply seemed to appear from nowhere. This went on for a year or two, and as it caused me no pain and little inconvenience I took little notice of it. In 1922

it became much worse. Bigger quantities of food began to return, and I became subject to a very unpleasant choking cough. This attacked me more particularly when in bed, and lasted sometimes half an hour, sometimes with short intervals throughout the night. I found that I was unable to dispose of food such as beefsteak, no matter how long I chewed it. Thinking that imperfect mastication might be the cause, I had all my teeth extracted, and artificial teeth put in. There was no improvement, and as my general health was suffering, I consulted by doctor, who suggested that I might have a pouch in my gullet. A temporary improvement in the symptoms led to some further delay, but finally the trouble became worse and worse. I might get almost to the end of a meal, and then a sip of water or tea or any other fluid upset everything, and I had to rush from the room and choke and cough until I had evacuated a good portion of the food which I had swallowed. I simply had no control. The position had now become intolerable, and at my doctor's suggestion an x-ray photograph was taken, which confirmed his suspicion."

The patient's previous health had been good in all other respects. He was in fairly good condition and had not lost weight appreciably. Whenever he coughed a diffuse bulge could be seen on the left side of the neck from the clavicle to the level of the hyoid bone. No gurgling was elicited on palpating the neck. X-ray examination (Figs. 5 and 6) showed a large pouch at the upper end of the oesophagus extending down into the superior mediastinum.

Operation.

On December 12th, 1924, intratracheal ether was given by Dr. K. B. Pinson. Primary excision of the sac was carried out from the left side of the neck as in the other two cases. The wall of the sac consisted of thick mucous membrane covered by a thin outer fibrous covering. The neck of the pouch was closed as in the other cases and the wound sutured, with a small tube leading to the line of suture.

The patient made an uneventful recovery. Rectal saline was given for the first forty-eight hours, and nothing by the mouth. For the second forty-eight hours, as the salines were not well retained, sterile water was given by the mouth, and after this dilute Benger's food. The tube was removed on the fifth day. The discharge from it had been negligible, and the wound was soundly healed before the tenth day, when soft solid food was allowed. The operation has resulted in complete relief from his symptoms.

ETIOLOGY.

The malady of which these three cases are typical examples occurs usually in elderly men. The point at which the pouch originates is constant. It is on the posterior wall of the pharynx, at a relatively weak spot between the transverse and oblique fibres of the crico-pharyngeus muscle. The pouch is therefore, strictly speaking, pharyngeal, but I have followed the usual custom in calling it oesophageal. The initial cause of the herniation of mucosa remains something of a mystery. There is no evidence of congenital origin; and we can only assume that for some unknown reason the circular muscle fibres at the upper end of the oesophagus fail to relax in the process of deglutition. Increase of intrapharyngeal tension inevitably results, and the mucosa bulges at the spot where it has least muscular support. When once the pouch has reached a certain size a vicious circle results. To the spasm of the upper oesophageal sphincter is added the mechanical pressure of the distended pouch, which, held forward by the unyielding vertebral bodies behind it, presses upon and occludes the oesophagus in front. It is an interesting point that, according to Dürr,¹ half the cases of oesophageal pouch are associated with goitre. Von Hofmeister,² in a series of 9 cases, removed a retrosternal goitre in 5 at the same time as he extirpated the pouch. The frequent association with this type of goitre, which is notoriously liable to cause pressure on the oesophagus, suggests that sometimes a goitre is the cause of the increased intrapharyngeal pressure which leads to the herniation of mucosa. In one of my cases the difficulty in passing an oesophageal bougie during the operation pointed definitely to a spasmodic stricture of the upper circular fibres of the oesophagus. Rare cases of pouch formation above a fibrous stricture have also been recorded. I conclude, therefore, that before a pouch can form there must be obstruction below the pharynx, due either to spasm of the upper oesophageal sphincter, to retrosternal goitre, or occasionally to organic stricture.

DIAGNOSIS.

The occurrence of dysphagia in an elderly man naturally arouses a suspicion of that common and disastrous lesion

FIG. 1.—Case I. Antero-posterior view of pouch.

FIG. 2.—Case I. Lateral view of pouch.

FIG. 3.—Case I. After operation.

FIG. 4.—Case II. Antero-posterior view of pouch.

FIG. 5.—Case III. Antero-posterior view of pouch.

FIG. 6.—Case III. Lateral view of pouch.

epithelioma of the oesophagus. The dysphagia caused by a pouch differs from that met with in malignant stricture in the intermissions in its early stage, the regurgitation of food in bulk some long time after a meal, and the attacks of characteristic choking and coughing with which this regurgitation is often associated. In the later stages a fullness of the neck, with gurgling and ejection of food on pressure over the sac, may make the diagnosis clear. The only certain diagnostic method, however, consists in an x-ray photograph after a bismuth meal, and it is surely unnecessary to stress the point that this should be a routine procedure in every case of dysphagia.

TREATMENT.

Whatever its origin, the oesophageal pouch when well established offers a grave mechanical obstruction to deglutition. It cannot be denied that only surgery can restore these patients to normal health, and except in the rare cases in which there is a certain tolerance of the pouch, and a trick of successful swallowing is acquired, operation should be advised. On that all surgeons are agreed. Differences of opinion have arisen, however, as to what is the best and safest surgical procedure to adopt. The most obvious method of primary resection of the sac and suture of its neck has acquired a somewhat sinister reputation in certain quarters on account of the risk of leakage, with consequent surrounding sepsis in the cellular planes of the neck, and even suppurative mediastinitis. It was on account of these dangers that Goldmann³ introduced a two-stage operation, isolating the sac at the first stage and ligating the neck with silk, so as to cause necrosis of the sac. Ten days later the mummified sac is extirpated with the thermo-cautery, and though a temporary fistula often results there appears to be little danger of fatal cellulitis. Wilkie and Hartley,⁴ while admitting that the one-stage operation is ideal, recommend, on account of its danger in feeble and elderly patients, a modification of Goldmann's two-stage operation. At the second stage they perform a submucous resection of the sac, leaving the outer fibrous coat, or tunica propria, *in situ*. They consider that a temporary fistula is to be expected in about 50 per cent. of the cases. W. Hill⁵ and Fritz König,⁶ in order to avoid altogether the risks associated with the removal of the sac, advise its isolation and suspension in an upward direction by suturing it either to the hyoid bone or to the upper part of the omohyoid muscle. The method of inversion of the sac, or invagination into the pharynx, has also been suggested, but it is by no means free from risk of causing asphyxia, and by the best opinions it stands condemned.

What, then, may we consider to be the operation of choice? While a small sac in an enfeebled patient may be dealt with satisfactorily by suspension to the region of the hyoid bone, I believe that the operation of choice is primary excision and suture. There are, however, certain precautions necessary if grave danger is to be avoided. The sac must be rendered as sterile as possible by frequently washing out with a mild antiseptic, and it must be emptied before operation. When the sac is isolated a large bougie should be passed into the oesophagus, and kept there until suture is complete. The suture of the neck of the sac must be carried out with the most extreme accuracy and care, after the technique usually adopted in closing the duodenal stump in a Polya gastrectomy. In this last detail lies the crux of the operation, and I believe it should only be attempted by those who have served a long apprenticeship to the technique of gastro-intestinal surgery. The anaesthetic should be either local infiltration with novocain or intratracheal ether. The wound should always be drained for the first few days. The after-care demands rest from deglutition for some days, and in emaciated patients, who need something more than rectal saline, a gastrostomy performed at the same time as the excision affords the readiest means of securing it, and is a very real safeguard against the danger of leakage.

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RADIATION TREATMENT IN EXOPHTHALMIC GOITRE.*

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It is very difficult to assess the value of any form of treatment for diseases such as exophthalmic goitre in which there is much variation in severity and tendency to natural cure or relapse, and in which some cases pursue an even or mildly fluctuating course for years, while others are so acute that their course may be measured in days or even hours.

Different views as to suitable treatment must depend largely on the average type of case seen. Generally speaking surgeons and radiologists see worse cases than physicians or general practitioners. To take extremes, how different must be the opinion regarding the general severity of the disease held by Sir William Hale-White, who found on an analysis of a large series of cases that 50 per cent. were cured by rest and medical measures (with only a slight tendency to relapse), compared with the opinion of Crotti as to its severity, for Crotti has performed thyroidectomy, and often thymectomy in addition, "in every case that has come his way."

The radiological view as to treatment, now based on thousands of treated cases, may be put thus: Of those patients who are not cured by medical measures only a small percentage cannot be relieved by radiation, while a large percentage are cured.

My own experience with x-ray treatment has been 168 cases, from which, unfortunately, 37 must be excluded owing to insufficient "follow-up." (It would be very useful if our hospitals would establish "follow-up departments" like those established recently in a few American hospitals.) Twenty-four cases are also excluded, as they are now under treatment, all improving. Of the 107 remaining, 88 showed marked improvement, a percentage (82) similar to some of the results reported by other radiologists. The number of males was 11. There were four acute cases, and all these did very well, reacting promptly; one was back to work in a month. Of those who had only begun treatment, or who did not respond promptly, six were operated on, and of these six two died of the operation. Slight improvement was noted in seven cases. In six only of those who had six or more treatments, and were followed up, was there no sign of improvement; several of these had pronounced nervous symptoms and their home conditions were unsatisfactory.

The x-ray techniques advised are very various. On the one hand, there is a small repeated dose method. Thus Fischer gives ten small doses within three weeks, then a three weeks' pause; then ten small doses as before, and a three weeks' pause; then ten again, and a three months' pause; then ten again if necessary—thirty to fifty radiations in all. On the other hand, Nordentoft and Blume have given single large doses, repeated only once to thrice if necessary. In many of their 100 cases reported a single treatment sufficed for cure. The first of these extremes—many small doses—is very troublesome to the patient; the second appears to me to be risky, as an undesirable or even dangerous reaction might be produced. A single massive radium dose has been followed by acute exacerbation, with a fatal result; and with a non-malignant condition no risk is justifiable that can be avoided.

I have not employed any of these extreme dosage systems, but have used various techniques: first, a small weekly dose method, increasing the interval gradually, then a larger suberythematous dose repeated three or four weekly, and lately I have used a method of attempting to half-"saturate" the thyroid with cumulative doses in the first month or two, then, as progress is established, the intervals have been gradually increased to months. In this way a number of patients recently have been restored

* A contribution to the discussion of the combined Sections of Medicine, Surgery, Therapeutics, and Electro-Therapeutics, Royal Society of Medicine, March 8th, 1926. See BRITISH MEDICAL JOURNAL, March 27th, p. 572.