examination was made. If the fæces were removed before going to bed (the pruritus occurred more at night) the irritation did not occur. Remembering your plan of treatment with administration of small doses of aloes, I gave them, but without any success. On inquiry, I found that Mr. R.'s bowels were moved with great regularity every morning, and that the motion was not a formed one—at all events, not the last portion of it. Upon this I reasoned that Mr. R.'s failure to entirely empty the bowel was due to the want of solidity of the motion not giving the bowel anything to contract upon. I therefore ordered him occasional doses of lime water to be taken sufficiently often to cause a formed motion. The result was very satisfactory. The bowel contracted on and expelled the solid motion completely. I think, in our desire to keep the bowels regular, we overlook the disadvantages of fluid instead of a solid motion."

Before concluding this lecture, I will mention a plan which I have found of very great service either in cases of cardiac disease, in fevers, or in conditions of extreme weakness where the feebleness of the heart made it very advisable that the patient should use as little exertion as possible. It frequently happens that patients strongly object to use a bedpan, and assert, sometimes with a considerable amount of truth, that they are unable to empty the bowels satisfactorily in the recumbent posture. A great deal of the risk connected with the use of a commode arises from the fact that when they use it they generally have to get out of bed and into it again. In these cases I adopt a plan, which I suppose many others have used also, but which I have never seen described. It is to have a strong platform made of rough wood, of such a height that the commode, when placed upon it, is level with the bed. A large, strong packing box, sawn to the proper height, may answer, or, if this is not at hand, any carpenter can put together a rough but strong construction of the kind needed. If nothing else is at hand, the drawer of a wardrobe turned upside down will do, but it must be supported from below by books or pillows piled up within it, so as to prevent the bottom of it from breaking through, as usually it is not strong enough to support the weight. The commode being pushed close to the bedside, the patient has simply to slew himself round upon it. The body is raised, and the legs are allowed to hang down. After the bowels have been evacuated, he is rolled round on his side into bed. During the whole process no change is ever made in the level of the patient, the only alteration being in the relative position of the trunk and legs with reference to his pelvis. Perhaps some of the new devices for raising the patient bodily from the bed might do better than this, but generally they are not at hand, and the plan which I have mentioned can always be followed, as some kind of platform sufficiently strong to serve the purpose can be made with boards, boxes, or footstools in every house.

In this lecture I have not attempted to go over anything like the whole field which its title would cover, because I found this to be impossible in the time at my disposal. I have, therefore, attempted to deal only with such points as have more of a practical than a theoretical interest. In concluding it, I thank you most sincerely, Mr. President and gentlemen, for the great honour you have done me in asking me to deliver this lecture, and to beg you to forgive the deficiencies in it, of which no one is more conscious than myself.

THE FOUR YEARS' CURRICULUM IN AMERICA.—In addition to the University of Pennsylvania, which, as already mentioned, now stands pledged to a four years' curriculum, other American schools have adopted the same enlightened policy. The authorities of the Medical School of Harvard University have passed a resolution that, in the case of all students entering on or after September, 1892, the regular course necessary to obtain the M.D. degree shall be four years. The Kansas City Medical College has recently decided to make a four years' curriculum, "with three full courses at college," compulsory.

LADY LUCY HICKS-BEACH opened, on June 10th, at South Grove, Highgate, a home for children in connection with the Santa Claus Society. The home is intended chiefly for cases of hip and spinal diseases, and for those children who, though otherwise well enough to go to a convalescent home, require slight surgical treatment and nursing.

LECTURES ON GOÏTRE; ITS PATHOLOGY, DIAGNOSIS, AND SURGICAL TREATMENT.

Delivered at the Royal College of Surgeons of England.

By JAMES BERRY, B.S., F.R.C.S.,

Professor of Surgery and Pathology, Royal College of Surgeons; Surgeon to the Royal Free Hospital and to the Alexandra Hospital for Children with Hip Disease.

LECTURE II.

Parenchymatous Goitre, Treatment of.—Internal Remedies—External Applications—Injection, Dangers of—Seton—Ligation of Thyroid Arteries—Division of Isthmus—Extirpation Total; Partial—Methods of Performing Extirpation—Skin Incision—Treatment of Veins, Muscles, Capsule, Arteries, Isthmus—Aseptic Treatment of Wound—Importance of not Irrigating—Suture—After-treatment—Mikulicz's Resection—Kocher's Resection—Comparison of—Advantages of Each—Results—Resection of Isthmus.

[It was stated that this lecture would be devoted to the treatment of parenchymatous goitre. After some remarks upon internal remedies and external applications suitable for this variety of goitre, the subject of injection was discussed.]

The object which is aimed at in the injection of a parenchymatous goitre is to cause sufficient inflammation to obliterate some of the minute vesicles of the gland. Possibly also there is some direct solvent action upon the colloid contents of the vesicles which may promote absorption. It is obvious therefore that parenchymatous and cystic goitres are more readily amenable to treatment by injection than the harder and more solid forms.

The materials that have been used for injection are very numerous. That which occupies the foremost rank is undoubtedly iodine. Alcohol, arsenical solutions, and those of perchloride of iron, osmic acid, iodoform, and others, have been recommended, but probably none of them are superior to iodine. The best directions that I know of for the performance of the injection of iodine are those given by Dr. Felix Semon;¹ they are too well known to require further mention. That the directions given by him are excellent, there can I think be but little doubt, and anyone who wishes to treat a goitre by injection of iodine cannot do better than follow them. It is certain that in a large proportion of cases a successful result ensues, but there is equally little doubt that very often the treatment is unsuccessful. A large number of cases have been recorded in which various complications, even death itself, have followed the operation. The injection may, and probably does, at first produce increased swelling of the gland; this may cause dyspnoea or aggravate any that may be already present. The injection may cause suppuration, which in its turn may lead to death. Many such cases have been reported to me; most of them have not been published. In these the evil results were due to inflammation and suppuration in the neck, and death occurred after several days, weeks, or months. A considerable number of cases have, however, been recorded in which death ensued much more speedily, before suppuration had had time to manifest itself.

Dr. Rose,² formerly of Zürich, says that he himself knows of not less than six instances in which surgeons have lost healthy patients from injecting iodine into a goitre, death occurring either upon the operating table or within a few hours after the injection. Dr. Seitz,³ in a monograph upon death from goitre, mentions the following cases:

The first is that of a woman under the care of Dr. Schwalbe; the injection of ten drops of tincture of iodine into a small goitre caused, after a few minutes, numbness, and then paralysis of the left arm and leg, partial loss of speech, slight

¹ Heath's *Dictionary of Surgery*, Art. Disease of Thyroid Gland.

² Der Kropftod und die Radicalcur der Kröpfe, *Arch. f. klin. Chir.* Bd. xxii.

³ Der Kropftod durch Stimmbandlähmung, *Arch. f. klin. Chir.*, xxix, 1.

facial paralysis, general convulsions, and death at the end of twenty hours.

Another case is that of a young woman whose goitre, after an injection of iodine, rapidly became greatly swollen, and in three days she was dead. In the third case the patient, immediately after the injection, complained of pain in the right eye. In a few minutes the right upper and lower eyelids became cedematous, the patient began to sway about in her chair, then became unable to speak, lost consciousness, and died eight hours afterwards.

In 1884 Dr. Krieg¹ related to the Medical Society of Stuttgart a case in which sudden death had followed the injection of two drops of tincture of iodine into a goitre.

These cases show pretty clearly that injection of iodine is an operation by no means devoid of danger, even when performed carefully, and when only a small quantity of fluid is employed.

A method of treatment formerly much in vogue, but now happily becoming obsolete, is the introduction of a seton. This is passed through the substance of the gland, and left *in situ* for days or weeks. Usually the goitre shrinks in size, and may become permanently cured. The method is obviously open to two objections. First, there is considerable danger of transfixing some large vein and causing serious or fatal hæmorrhage. Secondly, there is very serious risk of setting up inflammation in the goitre and in the cellular tissues of the neck; this in its turn is very liable to lead to pyæmia. A case illustrating the latter objection has recently been communicated to me by a surgeon under whose care the patient was. A young man had a goitre, probably parenchymatous in nature, into which a seton was inserted on account of the dyspnoea from which the patient was suffering. Suppuration in the mediastinum and neck quickly ensued; necrosis of several rings of the trachea took place, and the patient died. The seton is probably more efficacious in the case of a cystic goitre than in that of a parenchymatous one. In the former case the fluid would drain away by the side of the seton. The method is, however, in my opinion, too dangerous to warrant its recommendation for any kind of goitre.

Ligature of the thyroid arteries has been recommended and performed many times, in the hope that by cutting off the supply of blood the size of the goitre might be diminished. [Some of the earlier advocates of the operation were here mentioned and reference made to the twenty-one cases collected by Günther.] Recently the operation has been revived by Wölfler, Billroth, and others, who recommend that not only the superior but also the inferior thyroid arteries should be tied. By this means the blood supply to the gland is cut off far more effectually than could possibly be the case after ligature of the superior alone, which are considerably smaller than the inferior.

Ligature of the superior thyroid arteries was recommended largely on the ground that it is a simple operation and tolerably easy to perform. The same argument can, however, hardly be urged in favour of ligature of the inferior thyroid arteries. From their deep situation—lying as they do upon the vertebral column at the back of the goitre—and from their close proximity to the sympathetic nerve, it is evident that the operation is one of much difficulty, in fact it may be much more difficult than removal of a goitre.

The most valuable information upon the subject of the simultaneous ligature of both superior and inferior thyroid is to be found in a recent paper by Rydygier, of Cracow.² He publishes sixteen cases in which he had performed the operation. In the first he tied the superior and inferior thyroid arteries on the right side of the body only. In all the other cases the four arteries were tied at one operation. All the wounds, with one exception, were treated without drainage. The results were excellent in all cases except two; one of these was that in which the arteries of the right side only had been tied; in this case only slight diminution occurred in the size of the goitre, which was a parenchymatous one. The other case was one in which after operation one lobe only of the gland diminished in size, and it was then discovered that the opposite lobe contained a cyst. This was subsequently enucleated and the patient made a good recovery. In

one case only did troublesome hæmorrhage occur, but the patient made a good recovery and the goitre diminished considerably in size. Rydygier discusses the question whether it is enough to tie the arteries on one side of the gland only, and expresses himself strongly in favour of the simultaneous ligature of all four arteries. Whether the operation can lead to the subsequent occurrence of cachexia strumipriva is a point upon which a definite answer can scarcely as yet be given. The patients had not been watched for a sufficient length of time—most of them for a few months only after the operation.

The cases that are most suitable for this mode of treatment are undoubtedly the early cases of parenchymatous enlargement. Cases of cystic, fibrous, or fibro-adenomatous goitre are obviously less likely to derive benefit from it. The so-called vascular variety, if it exist at all, is the one in which the best results might be expected from the operation.

[The subject of division of the thyroid isthmus³ was next discussed. A short history of the operation was given, and twenty cases, mostly unpublished, that had been collected from various sources were mentioned. In four of these death had occurred; in eight the dyspnoea was more or less completely relieved; in some cases the swelling and the dyspnoea had returned a few months after the operation. The "atrophy" of the lateral lobes that often follows the operation was mentioned, and an explanation offered. Two questions—the mode in which the relief from the dyspnoea is effected, and the permanency or otherwise of the diminution in size of the goitre, and with it the relief from the dyspnoea—were then discussed at some length. Finally, the conclusions were as follows: That division of the thyroid isthmus may relieve dyspnoea mechanically by allowing the two halves of the goitre to separate, but that it more often does so by draining the gland of its colloid secretion. That the relief afforded may be permanent, but that frequently the goitre reappears when the wound has healed, and the secretion is again pent up in the gland. That in many cases in which very urgent dyspnoea is present, a mere division of the isthmus will not relieve the dyspnoea sufficiently quickly, and it is necessary to do some further operation, either tracheotomy, or, much better, removal of some considerable portion of the goitre.]

I come now to the last, but not the least, important method of treating parenchymatous goitre, namely, extirpation of a portion of the gland. I propose to describe briefly the various operations that may be performed for the removal of parenchymatous goitre, illustrating the subject by operations that I have myself performed, that I have seen performed by other surgeons, and that have been recorded in surgical literature. It must be remembered that I am now speaking of parenchymatous goitres only, and not including cysts or solid tumours of the gland. But I have already pointed out that the various forms of goitre run very much one into another. Small cysts and solid tumours are often found in otherwise parenchymatous goitres; so it must be understood that in using this term I mean goitres which are in the main parenchymatous, which consist of a fairly uniform, bilateral enlargement.

1. *Total Extirpation* is an operation which is not now to be recommended, on account of the grave after-results which have been shown to follow, and of which more will be said in the next lecture. Its performance differs in no way from the proceeding next to be described, except in that both halves of the gland are removed.

2. *Partial Extirpation.* A. *Extirpation of one Lobe.*—[The choice of an anæsthetic and the position of the patient during the operation were briefly discussed. Stress was laid upon the importance of ascertaining before the operation the position in which the patient can breathe most comfortably, and of having the head held in that position by an assistant throughout the operation in order to diminish the risk of the trachea, which is often greatly narrowed, becoming kinked and occluded. The great importance of having the skin thoroughly aseptic was mentioned.]

Many varieties of skin incision have been employed. The choice depends largely upon the size and shape of the goitre.

¹ Med. Corr. Bl. d. Württ. aerztl. Landesver., Stuttg., 1884, liv. p. 145.

² Wien. med. Wochenschr., 1888, xxxviii, 1633; and Centralt. f. Chir., Leipzig, 1889, xvi, 241.

³ This subject has already been more fully discussed in a paper read by me at Birmingham in February, 1890. See *Birmingham Med. Review*, June, 1890.

The four chief varieties are—1, the vertical; 2, the oblique; 3, the angular or curved; 4, the transverse. The last has recently been introduced by Kocher on the ground that it coincides with the natural folds of the skin, and thus renders the scar less conspicuous. It is not generally employed, as it renders the operation much more difficult, and the advantage of it is not great. I have practised all these incisions except the last. The vertical incision is most suitable for small goitres situated near the middle of the neck. The oblique is that which I have most often used, and consider the best for nearly all cases. I have only once employed the angular; it gives a little more room than the others, and may occasionally be required for very large goitres. But in two operations of my own in which large goitres, each weighing more than a pound, were removed, I found that the single oblique incision was sufficient.

The infra-hyoid muscles are often much thinned and spread out over the surface of the goitre, and on more than one occasion I have seen these mistaken for the proper capsule of the goitre. Care should be taken, whenever possible, to draw them outwards and not inwards, in order to avoid injuring the nerves which enter their outer borders. If these nerves be divided the muscles atrophy, and afterwards cause an unsightly hollow in the neck. For these reasons it has been recommended that the muscles should be divided when necessary at their upper ends near the hyoid bone, and thrown outwards; they can then afterwards be reunited without much harm having been done to them. Most of my own operations having been done upon large goitres or goitres producing much dyspnoea, I have not usually thought it prudent to spend time over a comparatively unimportant point like this, but have just cut the muscles where it was most convenient to do so.

[The capsule of the gland and the network of large veins immediately beneath it were next described, and the importance of keeping outside the capsule to avoid hæmorrhage was insisted upon. The position of the superior thyroid artery and the superior, middle, inferior, and accessory thyroid veins was explained, and it was recommended that all these vessels should be carefully isolated just outside the capsule, and tied before being divided. The advantage of tying the superior thyroid artery high up before it gives off a large branch often found running down the back of the gland was mentioned. In one of the lecturer's cases some difficulty had been experienced in securing this artery because the tumour was very large, reaching nearly to the lower jaw, and the patient's head could not be extended much for fear of increasing the dyspnoea; the artery had to be tied, therefore, at the bottom of a rather deep hollow.]

In dissecting towards the outer border of the goitre, great care should be taken to avoid wounding the internal jugular vein, which is frequently expanded over the side of the tumour, and may easily be wounded unless caution be used. It frequently lies in front of, or even internal to, the carotid artery, and the pulsation of this vessel is consequently, in these cases, not always a safe guide to the position of the vein.

The superior thyroid artery and all veins having now been tied, the tumour is if possible to be lifted out of its bed and turned over towards the opposite side. Search should then be made for the inferior thyroid artery, the largest artery supplying the gland. [The two chief methods of dealing with this artery, by tying the branches close to the gland, or by tying the main trunk at some little distance from it, were then discussed; the close relation of the artery to the recurrent laryngeal nerve and the danger of wounding the latter were mentioned, and evidence adduced to show that the exact position of the nerve was not constant; sometimes it lay in front of the artery, sometimes behind it, and often between its branches. The anatomical arrangement of the fascia at the back of the gland was described, and it was pointed out how this had often led, during operations for goitre, to an unexpected wound of the trachea. The treatment of the isthmus was then described, and it was recommended that this should be divided by knife or scissors, if possible after the rest of the lobe had been isolated. When the tumour, however, was fixed, it was considered better to divide the isthmus at an earlier stage of the operation. The use of one ligature for the whole isthmus was deprecated, and preference expressed for the practice of tying the vessels separately.] The goitre

having been separated from all its connections is now removed. Any bleeding that is going on—and there is usually little or none—must be arrested by ligature or torsion.

With regard to irrigation of the wound, it cannot be too strongly urged that, except in rare cases, this should not be done. Upon this point Kocher, Niehans, and all who have obtained the very best results, express themselves strongly. It is aseptic and not antiseptic treatment that is desired in the removal of goitre. The wound produced by the operation is a perfectly clean one, and does not require any further cleansing beyond what is afforded by laying in it a clean sponge that has been wrung out of very weak sublimate solution. Washing out the wound with solutions of carbolic acid or other antiseptics does no good, and certainly may cause damage to the nerves and other delicate tissues exposed. I ought perhaps to explain that during the operation very little of the wound need be exposed at any one time. While the operator is working at one part of it, his assistant should take care to cover the rest of it with sponges. This not only keeps the wound clean, but also checks hæmorrhage. In my own operations I have never washed out the wound with any antiseptic lotion, and have never had any suppuration except in one case, in which a few drops of pus formed about ten days afterwards, when nearly all the wound had healed by first intention. In some of Niehans's earlier cases, in which he did irrigate the wound, he found that hoarseness was a symptom present for several days after the operation. This disappeared when he abandoned the practice of washing out the wound. This transient hoarseness was undoubtedly due to the deleterious effect of the solution upon the recurrent nerves. The wound having been wiped and dried by means of a sponge should now be sewn up. My own practice is to leave a sponge in the wound until all the deep sutures have been inserted, just as is usually done in ovariectomy. The sponge is withdrawn just before the sutures are tied, and then pressure is immediately made and kept up by the assistant by means of a sponge applied outside. I think this small point is worthy of mention, since it tends to prevent blood from accumulating within the wound, and so impeding primary union, which is all-important. The form of deep suture that I usually employ has been described elsewhere by me.⁷

[The question of drainage was then discussed, and it was stated that in fifty cases of excision of goitre performed by Niehans at Berne from May, 1887, to March, 1889, drainage was employed in two cases only. The dressing of the wound was then briefly described, and it was recommended that above the first layer of dressing one or more large sponges should be placed in order to keep up elastic pressure for the first day or two. The bandages should be applied so as to fix head, neck, and shoulders immovably, and the patient placed in bed in a nearly sitting position; this position favours drainage when necessary, and is also more comfortable for the patient. Further, stress was laid upon the advisability of impressing upon the patient, before the operation, the importance of his keeping absolutely still for the first three days afterwards.]

A certain amount of dysphagia is usually present for the first few days, but soon passes off. In some cases the dressings have been left undisturbed for three days, and then drainage tube, sponges, and stitches were removed all at once. In my later operations, however, I have preferred to change the dressings on the first day after the operation, taking away the drainage tube, the deep stitches, and some or all of the sponges. The superficial stitches I remove on the third or fourth day, when the wound is quite healed. I generally allow the patient to get up on to a sofa on the fourth or fifth day, and at the end of a week all dressings may usually be discontinued.

I shall now describe briefly a case in which one-half of a large bilateral goitre was removed by an operation performed conjointly by Dr. Edward Jessop and myself. The goitre was not a parenchymatous one, but as the operation was conducted in the same manner as that for removal of one lobe of a parenchymatous goitre, the description is not out of place here.

⁷ See a paper by Dr. Edward Jessop and myself in vol. xxv of *St. Bartholomew's Hospital Reports*, 1889.

CASE I.* *Large Bilateral Goitre, much Dyspnœa: Removal of Left Lobe: Healing by Primary Union: Complete Recovery.*—J. W., aged 27. He had had a goitre as long as he could remember, but it had not given him any trouble until seven years before he came under our observation. In the last year it had grown considerably, and for seven months he had been quite unable to do any work on account of the dyspnœa from which he suffered. This was so great that he was in constant dread of suffocation; he was unable to lie down, and had to sleep sitting nearly upright in bed. He had a good deal of dysphagia, and complained of pain in the neck, probably due to the size and weight of the tumour. (See Fig. 3.)

Fig. 3.—J. W. before operation.

On April 15th, 1888, the left half of the goitre was removed. A single oblique incision was made, the muscles were reflected, the superior thyroid artery and thyroid veins were isolated, tied, and then divided, care being taken not to open the capsule. The tumour was then turned over, and the branches of the inferior thyroid artery tied close to the tumour. Care was taken to avoid the recurrent nerve, which was not even seen. The isthmus was divided last of all. The wound was dressed in the manner already described. I did not myself see the patient again after the operation, the after-treatment being carried out by Dr. Jessop. The subsequent progress of the case was thoroughly satisfactory. On the morning after the operation the temperature was 100°, but subsequently it was never above normal. The drainage tube and stitches were removed on the third day, when the wound was practically healed. On the fourth day the patient got up, and after the eighth day all dressings were discontinued. The condition on the 12th day after operation is shown in Fig. 4. The relief from the symptoms was most marked. Since the operation he has been able to do hard manual labour without any trouble, and when I last heard of him, eighteen months after the operation, his health was excellent, and the relief from his symptoms had been permanent. The tumour after removal weighed 18 ounces.

I have entered at some length into the details of the opera-

tion of extirpation of goitre, and have described many points that may perhaps seem almost trivial. But I cannot help thinking that it is largely by attention to small details that success is to be attained. When watching the practice of Swiss surgeons, nothing struck me so much as the extreme attention paid by them to every minute detail of their operations, and I think it is to this that they owe the truly marvellous results which, as I shall point out in the next lecture, some of them have attained in their operations for goitre.

The second method of removing parenchymatous goitre that I shall now briefly describe is:

B. *Mikulicz's Resection.*—This name has been given to an

Fig. 4.—The same, twelve days after removal of the left half of the goitre.

operation which is particularly suitable for cases of parenchymatous goitre. The object of it is to remove the chief part of one or both lateral lobes and to avoid all risk of wounding the recurrent laryngeal nerves. At the same time enough thyroid tissue is left behind to carry on the function of the gland. The lateral lobe is first isolated as far as possible in the ordinary manner, the vessels being isolated, tied, and then divided. Then that portion of the tumour which is in contact with the front and sides of the trachea is freed by means of scissors, care being taken not to go too far back and thus injure the recurrent nerve. Eventually the whole tumour is attached only to the side of the trachea and œsophagus just where the inferior thyroid artery enters and where it is in contact with the nerve. Upon the pedicle thus obtained a row of catgut ligatures is put and the rest of the tumour then cut away. A lump of gland about as large as a chestnut is thus left behind, in the angle between the trachea and œsophagus. Union takes place by first intention and the patient is well in a few days.

Professor Kocher has described two operations similar to that of Mikulicz and to which he has given the names of resection-enucleation and resection-extirpation, or simply resection. Resection-enucleation is performed by Kocher as follows: He first isolates the lateral lobe in the usual manner, as in extirpation. Then the isthmus is cut through vertically and the vessels at its upper and lower borders are

* For further details of this case see *St. Bart. Hosp. Reports*, vol. xxv.

tied. "Then with blunt instruments or with scissors and knife the glandular capsule is separated from the inner surface of the tumour until the posterior surface has been reached outside the region of the recurrent nerve. This spot must be measured accurately, since the nerve is sometimes drawn out of its normal groove between the trachea and œsophagus and is bent over the posterior surface of the tumour." [A specimen illustrating this point was shown.] "The glandular capsule is then again cut vertically. It is especially important that the section on the inner side should be made well above the level of the cricoid cartilage so as to avoid any possibility of wounding the recurrent nerve." The above description applies to the operation as performed for a more or less circumscribed tumour. In the next lecture I shall have more to say about such tumours and their treatment by enucleation. When there is no such tumour but the whole gland is more or less diseased, as in parenchymatous goitre, then no separation of the capsule is made, but the section is carried directly backwards through the gland. This is resection-exstirpation.

Comparing Kocher's with Mikulicz's operation it will be seen that both agree in leaving intact that portion of the gland that is nearest to the recurrent nerve. But the former surgeon avoids separating the gland from the surface of the trachea, and especially refrains from tying up masses of thyroid tissue—a practice which he, quite rightly I think, strongly condemns. He says that, not only does it tend to prevent that primary union which is so important, but that the application of the ligatures is apt to endanger the safety of the nerve. This may occur even when the greatest care is taken. With reference to this point Kocher says that formerly, when he had had less experience in removing goitres, he had sometimes, when attempting to remove one, been obliged, on account of bleeding or dyspnoea, to tie the pedicle in one or more masses, in order to cut short the operation. But he had noticed tolerably often that hoarseness from paralysis of the vocal cord was produced at the moment of applying the ligature.

The chief advantages of resection are: (1) That it enables the operator to remove, when necessary, both lobes of a goitre and yet leave behind sufficient gland tissue to prevent the supervention of cachexia strumipriva. (2) By leaving untouched that portion of gland which covers the recurrent nerve it lessens the risk of injuring the latter. When compared with intraglandular enucleation it has the advantages that (3) it avoids the severe hæmorrhage that often occurs in the separation of the tumour from its capsule, and that (4) the capsule of functionally useless gland tissue is not left in the wound. Thus the very deep sutures necessary to bring the sides of this capsule into contact to secure primary union may be avoided.

Details of the results of Mikulicz's operation have been published in a recent paper by Trzebicki.⁹ He records twenty-three cases. The patients were nearly all young subjects. In all cases dyspnoea was present; in many it was very severe. One case proved fatal from recurrent hæmorrhage; in one tracheotomy had to be performed, but union by second intention, nevertheless, took place without trouble; in one other case the wound healed in the same manner. In the remaining twenty cases, with the exception of two in which a little superficial suppuration took place, healing by first intention was perfect. [Further details of the cases and of the results obtained were then given.] The dyspnoea in all cases disappeared almost immediately after the operation, and, so far as is known, did not return. In no case was there any report of a return of the goitre in that part of the gland that was left behind, although many of the cases were examined personally, and in many others information upon this point was obtained from the local doctors. In no case did any impairment of general health (cachexia strumipriva or tetany) follow the operation. Of the fourteen patients on whom the operation was performed on both sides, twelve are known to have remained in good health.

The following case is one in which I performed a modification of Mikulicz's operation:

CASE II. Parenchymatous Goitre; Dyspnoea; Modified Mikulicz's Operation; Primary Union; Complete Recovery.—A. H., aged 15, kindly sent to me by Dr. Lewis Jones. For four

years she had had a parenchymatous goitre which produced considerable stridor and dyspnoea. After a prolonged but ineffectual course of medical treatment, an operation was performed similar to that of Mikulicz, but differing from it in that the isthmus was not divided, and that no portion of the gland was tied *en masse*. Practically the whole of the left lobe was removed with the exception of a small lump in the dangerous region near the larynx. The patient made a rapid recovery; the highest temperature after the operation was 99°. From the seventh day after the operation all dressings were discontinued, the wound having healed by first intention throughout. On the thirteenth day the patient went home quite well, and entirely relieved of her symptoms.

The last method of removing parenchymatous goitre is:

c. Resection of the Isthmus.—About this it is not, however, necessary to say much more, since the operation is very similar to division of the isthmus already described. Instead, however, of merely dividing the isthmus after the ligatures have been applied on either side, the intervening portion of the gland is cut away. I cannot say, however, that I have myself any great liking for the operation. In my opinion it does not usually remove enough of the goitre to relieve the dyspnoea permanently, and the operation is by no means devoid of risk. I have already pointed out some of the objections to mere division of the isthmus, and some of these hold good also for the larger operation of resection of the isthmus. In connection with this subject, I will describe the following case.

CASE III. Parenchymatous Goitre; Severe Dyspnoea; Removal of Isthmus and the Lower Part of each Lateral Lobe; Complete Recovery.—P. T., aged 18. For eighteen months she had had a parenchymatous goitre which produced loud stridor and great dyspnoea, and quite prevented her from following any occupation. Medical treatment had been employed without any beneficial result. In September, 1889, I performed an operation in some respects like resection of the isthmus, but differing from it in that the lower half of each lateral lobe as well as the isthmus, were removed. No ligatures were applied to the gland *en masse*. On the tenth day the patient was allowed to get up, but convalescence was subsequently delayed for a few days by a slight amount of suppuration at one corner of the wound. She went home at the end of a month, completely relieved of all her symptoms, and has remained perfectly well and quite free from dyspnoea ever since. This is the only case in which I have had any suppuration after removal of a goitre, and in it the amount was very slight.

PURE CULTIVATION OF THE LEPROSY BACILLUS.

By A. A. KANTHACK, F.R.C.S.,

AND

SURGEON-MAJOR A. BARCLAY, M.B.,

Members of the Leprosy Commission.

IN our previous article we expressed the hope that it might be possible to find out the conditions under which our bacillus, which we ventured to consider to be the true bacillus of leprosy, would acquire a resistance against acids, such as the bacillus of tuberculosis possesses. There seems to be no doubt that the characteristic reaction of the leprosy and the tubercle bacillus depends on certain chemical changes. The experience we had with our own cultivations only confirmed this idea. For here we have a bacillus which at one time reacts typically according to the Koch-Ehrlich method of staining, but on continuing to grow it on agar-agar it soon loses its resisting power against acids almost completely. If transferred to gelatine and bouillon it is found that bacilli taken from certain regions of the nutrient medium retain the fuchsin well after being passed through hydrochloric acid. It is also noticed that the bacilli which are taken from a "mucoid" layer of the bouillon or gelatine react best.

At the time we published our first communication we expressed a certain amount of disappointment, seeing that we were unable to obtain uniform results. For in the absence of animal experiments the staining reaction can be the only criterion. But now we have also succeeded in finding out the conditions under which our bacillus will resist the de-

⁹ R. Trzebicki, *Arch. f. Klin. Chir.*, 1890, XXXVII, 408