and allowed to remain on the diseased part sufficiently long to destroy the tissues to the requisite depth. Phagedænic sores, treated in this way, have been known subsequently to present a healthy surface, and to heal without further trouble.

Serpiginous sores are often too extensive to be conveniently treated in this way. A modification of the plan may then be adopted. The outer edge of the sore may be alone destroyed, so that the diseased part may be completely surrounded by an artificial line of demarcation. This will sometimes prevent the extension of the affection. It will often happen that the edges of serpiginous sores are undermined, and if the cautery be then applied to the edges alone of the skin, it may not reach to the circumference of the disease. It is safe, under such circumstances, to destroy the skin deeply two or three lines from its detached margin.

The ordinary suppurating venereal sore, if not in its origin destroyed by caustic, will generally run its course of five or six weeks' duration, and heal of its own accord, without leaving any injurious effects either in the lymphatic or in the patient's general system.

It may be well, however, to use various means to accelerate the healing of a suppurating sore, and such means are sometimes necessary.

So long as the sore has the specific characters of ulcerating deeply, with clearly defined vertical edges, it is well to continue the use of some mild caustic, such as a solution of nitrate of silver. When granulations spring up and the base appears healthy, it matters little what applications be used, provided the part be kept scrupulously clean.

The ulcer may assume the characters and appearances of ordinary lesions elsewhere situated; e.g., it may be indolent, irritable, or inflamed, or, by granulating too redundantly, impede the cicatrization. Such symptoms are to be met by the same measures as would ordinarily be used.

If a chancre threaten to slough, it is best to dry the parts and apply nitric acid, afterwards using a lotion of potassio-tartrate of iron. With a solution of that salt applied to the sore, and the administration of the same drug internally, the phagedænic action will almost always alter its character.

Sometimes a large amount of inflammation, with great pain, attends the local progress of the disease. In such cases, the administration of opium is of great advantage.

EXCISION OF THE THYROID GLAND.*

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EXCISION of the thyroid gland appears to date back to the time of Albucasis. While it enjoyed a temporary reputation as an operation in the end of the last century, and in the beginning of the present, among some surgeons of repute upon the Continent, it appears to have been received with much less confidence in our own country.

In fact, on turning to one of the most recent, as it is one of the most representative, works upon modern surgery emanating from the southern metropolis, we find the learned author introducing his notice of this procedure in the following terms:—"Few surgeons believe that the entire thyroid gland has ever been successfully extirpated, although cases are so related (*sic*) by Desault, Roux, Gooch, Vogel, Theden, Hedenus, and others."

The late Mr. Liston, in his *Elements of Surgery* (page 469), speaks scarcely more encouragingly of such proceedings. "Extirpation of such growths", he says, "has been repeatedly attempted; but the patients, almost without exception, have perished from hæmorrhage under the hands of the knives. The immense supply of blood afforded to the gland in the healthy state must be kept in mind, as also the enlargement of the vessels proportioned to the increase of the part. . . . In short, the operation is attended with such risks, with so absolute a certainty almost of a fatal result, as not to be warranted under any circumstances, far less for removal of deformity only."

The late Mr. Syme, in the last edition of his *Principles of Surgery*, seems equally opposed to this operation (page 302), when he writes:—"The deep situation, muscular coverings, firm connections, and the large blood-vessels of bronchocele, forbid excision; and the attempts which have been made with this view afford a sufficient warning against their repetition by the fatal issue which has almost invariably, and often immediately, followed them."

Boyer speaks even more decidedly (vol. vii, page 82): "A last measure, an extreme one, proposed for the cure of goitre, is its extirpation. This operation, recommended by Celsus and various others since his

time, has been undertaken, and has succeeded in some very exceptional cases where the tumour has been small and confined to one part only of the thyroid gland; but where the extirpation of a voluminous goitre, including the whole gland, has been attempted, the patients have died of hæmorrhage; or, should the operator have been successful in controlling the bleeding during the operation, the patients have died within two days from the disturbance of system occasioned by a tedious and very painful operation. Thus extirpation of the thyroid gland is one of those operations forbidden by prudence, reason, and experience." But, while these views, so decidedly condemnatory of operative interference, were held, we find that, from time to time, exceptional cases occurred in which the features of the tumour or the circumstances of the case were sufficient to lead to a transgression of such prudential judgments. Mr. Liston operated in this way more than once. In his *Practical Surgery*, he figures the external appearance of a case in which he operated after preliminary strangulation of the entire deep attachments of the mass. Mr. Syme, in speaking of this operation of Mr. Liston's, says (page 303): "I once adopted this method."

In assisting others, I twice witnessed very alarming hæmorrhage where partial extirpation of the organ was adopted. In one case, where the late Mr. Syme was the operator, the case was one of hæmatocele of the thyroid, in which tapping the sac, and injecting it with iodine, had been practised previously. The sac almost immediately thereafter refilled and pulsed strongly, and, on the ensuing day, while the pressure threatened to interfere seriously with respiration, copious bleeding occurred again and again from the gaping puncture made by the trocar. In these circumstances, Mr. Syme laid open the sac, and, failing to arrest the bleeding which poured out from the edges and interior of the opened sac, he attempted to cut away as much of the tissue of the enlarged gland as he could detach from the surrounding parts. But, as this failed to afford any relief to the continued rapid loss of blood, the cavity was stuffed with sponges, and the edges of the incision stitched together to maintain them in position. These measures failed to restrain the bleeding, and the patient died in our hands. In the second case, Professor Spence successfully extirpated a tumour of the isthmus of the thyroid, but with great freedom of active hæmorrhage attending upon the division of the vascular connections of the tumour.

The hæmorrhage which attended upon these two operations was certainly such as might be regarded as quite confirmatory of the unfavourable opinions expressed in most quarters in regard to the operation of extirpation of the thyroid gland, and assuredly fitted to deter one from any attempt at its repetition.

The first case which came under my own care, in which it seemed desirable to effect extirpation of a portion of the thyroid, occurred in my practice in May 1871. The case was one of a young lady, who for many years had been affected with a tumour of the neck. It was centrally situated, prominent, of the size of a China orange, moving with the trachea corresponding to its upper part, of a solid and elastic consistence. It was very disfiguring, and steadily increasing in size, and especially so within a recent period antecedent to her coming under my care. Recognising its thyroïdal nature, I advised its removal by operation. I hoped, in operating, to find it easily enucleated, as it had made its way through the interval between the sterno-hyoid and thyroid muscles, and had no lateral extension over the carotid sheaths. The early steps of the operation were easily and rapidly completed. They consisted of a linear incision in the mesial line over the centre of the tumour, which, after division of the fascia, afforded a ready access to the tumour; and, by a few touches of the knife aided by the fingers, the whole prominent part of the tumour was exposed. But no sooner were the lateral attachments of the tumour severed upon the one side, than the blood gushed in a copious stream both from beneath the sterno-thyroid muscles and also from the margin of the tumour itself. The vascular connections, which had retracted, were after some trouble secured with a ligature of silk passed beneath the central mass of the tumour, and tied so as to occasion constriction of the mass, and staunch all further flow. To escape from further trouble from bleeding before dividing the lateral attachments of the tumour upon the opposite side, I passed preliminary ligatures beneath the superior and inferior thyroid vessels, and, having tied these ligatures, I completed the operation without further loss of blood. The patient, in spite of the loss of blood, made a rapid recovery. The effects of this method of controlling the circulation in connection with the thyroid gland led to my conceiving the idea of mediate deligation of the thyroids as a preliminary step in the operation of extirpation of a bronchocele.

I had not long to wait for an opportunity of putting my plan to the test of actual practice; for, in the course of the same month (May 1871), a patient was admitted to my care in the Royal Infirmary affected with a multilobular cystic goitre. She had previously been under treatment, when a single cyst, of which the tumour then seemed

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to consist, had been tapped and injected with iodine. This plan of treatment had apparently checked the progress of the disease, but again it had enlarged, and, at the time of her admission, the swelling was of the size of two fists. The patient had further become anæmic, and affected with exophthalmos to a slight degree.

In operating in this case, I followed the same method as in the first instance just narrated, so far as opening the fascia between the muscles in the middle line. But, instead of opening the fascial sheath of the tumour, I pushed the parts aside, so as to carry my forefinger and thumb over the margin of the tumour at its upper and right corner, and felt for the situation where the superior thyroid passed upon the tumour. Recognising these vascular connections, I introduced an aneurism needle beneath them. In this manner, I was able to withdraw a ligature beneath the right superior vascular connections of the goitre. The needle was similarly carried beneath the posterior surface of the right inferior corner of the gland, so as to include all the right inferior thyroidal connections, and a ligature similarly withdrawn beneath them. The same process was repeated upon the left side, a ligature being carried beneath the left superior and inferior thyroidal connections. These four ligatures included not only the arteries and their corresponding veins, but the delicate fascial sheath which surrounds them, and, passing along them, forms the fascial investment or fascial capsule of the tumour. The ligatures were then tied separately, so as to secure the vessels as far from the tumour as possible. The fascial sheath of the tumour having been now divided in the mesial line, the attachments were cut through with scissors, and the tumour turned out of its bed by stripping away the fascial capsule with the fingers. After the tumour had thus been enucleated entire, one of the ligatures partially slipped, owing to its having been unduly strained as a means of keeping the soft parts separate. A gush of blood took place into the cavity; but this was at once checked by the pressure of a sponge until another ligature was carried round the vascular connections of the tumour corresponding to the bleeding part; when this was tied, all further bleeding ceased. The wound was closed by sutures, except at the lower angle, where a large drainage tube was inserted to secure the evacuation of all blood, serum, or other discharge, during the healing of the wound. The dressings were retained in position by means of a cravat composed of a muslin handkerchief folded upon a piece of buckram, after the manner of an old-fashioned stock. The skin, which at first hung loose and flaccid, had in two days so adapted itself to the parts beneath as to show no signs of redundancy. The wound, with the exception of the point where a ligature hung out, was healed in a fortnight.

The second case, one of multiple cystic goitre, was operated on in the Chalmers' Hospital in the autumn of 1871. It presented no peculiarities in contrast with the case just narrated. In it, catgut ligatures were used instead of silk, and were cut short after the removal of the tumour was completed. Here the healing process was completed in three weeks, and the patient, who had been sent to my charge by Dr. Howden of Montrose, returned to her duties as an asylum attendant. In this case, the anæmia and exophthalmos, which were present on admission, markedly diminished after the operation.

The third case was that of an Irishwoman, also affected with multiple cystic goitre. She was admitted to Chalmers' Hospital in the early part of 1872. The operation was performed in exactly the same manner as in the last mentioned cases, and was followed by equally favourable results.

The fourth case, a patient from Leith, was admitted to the Royal Infirmary in February 1872. This was also a case of multiple cystic goitre. It had grown steadily for twenty-three years, having commenced at the period of puberty. It was of the size of a large fist; it pulsated distinctly, and was accompanied by anæmia and exophthalmos. The operation was performed on March 1st, 1872, in precisely the same manner as already detailed. An anomalous aneurismal condition presented itself after the healing process was complete, in the situation of the right superior thyroid. When first remarked, six weeks after the operation, it was about the size of a hazel-nut; but it gradually increased until it became as large as a small walnut. It then presented all the characters of an aneurism with a venous communication, manifesting the peculiar rattling thrill and the *bruit de diable*. After continuing for about three weeks, it then disappeared gradually, no treatment beyond rest in bed having been employed.

In addition to these, I have operated successfully upon two other cases, and with a fatal result in one case. In this fatal case, the tumour, of very large size, was adherent to the trachea. After the preliminary application of ligatures and the division of the vascular attachments upon the right and left sides had been effected, on turning the tumour to one side, a large vein, lying posteriorly in the groove between the trachea and the œsophagus, was unfortunately wounded.

The pressure of the sponge applied to arrest its bleeding, together with the drag upon the trachea when the tumour was turned to one side, interrupting the respiration, led me to attempt to separate the attachments of the tumour from the trachea rapidly by means of the knife in a deep wound, from which bleeding was still going on. The thin and soft posterior wall of the trachea thus turned outwards was unfortunately wounded; and, before relief could be afforded by opening the trachea and introducing a tracheotomy-tube below the level of the tumour, so much blood had been sucked into the air-passages as to determine a fatal result in the course of the evening.

So far as I am aware, this method of extirpating the bronchocele is an original one. Mediate ligature of the thyroid arteries has, I am aware, been proposed and employed by Moreau, Desault, Bruynghausen, Mayor, Walker, Coates, Earle, Green, Blizard, Cooper, Brodie, and others, as a means of curing, or at least arresting, the growth of the tumour, though its practical employment was not found to be attended by such results as to lead to general adoption; but the combination of preliminary ligature of the thyroid with extirpation of a goitre is, so far as I have been able to discover, an operation which had not been practised previously to 1871.

In operating for excision of a goitre according to this method, I should recommend attention to the following particulars.

1. The external incision should be very free, extending from the larynx to the notch of the sternum, if the tumour be large and spread widely in a lateral direction.
2. The vessels, arterial and venous, in the early steps of the operation, should be secured as they are divided, to avoid any obscuration of the parts through oozing going on.
3. The fascia should be as freely opened as the skin; and, if the tumour be a large one, more space may be gained by a transverse division of the soft parts as far as the margins of the sterno-mastoid muscles on each side.
4. The delicate investing fascial sheath of the thyroid should be left undivided until the mediate ligature of the vessels included in their fine cellular sheath has been effected. This sheathing fascia or cellular capsule of the thyroid gland is only a prolongation of the sheath of the thyroidal vessels. If the capsule be opened, then, in pushing aside the soft parts to disclose the outline of the tumour, this delicate sheath is apt to glide off the surface of the gland; and, should this occur, the gland may readily be detached from the vessels even with comparatively gentle handling, and thus copious hæmorrhage difficult of restraint may be occasioned.
5. After the mediate ligature of the thyroidal vessels in their sheathing cellular envelope, the cellular capsule of the thyroid gland should now be opened by scratching through its tissue in the middle line, and the attachments which still retain the goitre in its position carefully divided by means of blunt-pointed scissors curved on the flat. There should be no tearing away of the gland, no pushing parts aside with any roughness of manipulation.
6. Should bleeding occur from any of the vascular attachments of the tumour after its separation, it must be remembered that it must occur from within the cellular sheath of the vessels, and find its way thence into the cavity consisting of the investing fascial capsule; and, therefore, if the vessels are to be tied, they should be secured *en masse* along with their cellular sheath. Without this sheath, furthermore, these enlarged thyroidal vessels will be found so fragile as to risk being cut by the ligature, while any attempt to reach the bleeding mouths within the fascial capsule will be balked by the infiltration of this cellular envelope of the vessels by a coagulum.

In connection with this operation, it is of exceeding interest to read Mr. Allan Burns's remarks in his work upon the *Surgical Anatomy of the Head and Neck*, written in the beginning of the present century, upon the anatomy of these parts as deduced from an examination of the body of a subject who suffered from goitre (page 199-201). "It is proper to know that every tumour is originally contained in a capsule of fascia, provided the swelling arise from enlargement of any glandular organ, and also that the adhesion of the one to the other is in indolent tumours for a considerable length of time slight. . . . Indeed, the union between the capsule and the gland was so slight, that I found no difficulty whatever in insinuating my fingers between the cyst and the gland, and detaching the one from the other till I reached the thyroid artery, round which I could most easily have passed a ligature. With the gentlest effort with the finger, I separated the tumour all round, and, in succession, touched the four arteries, and brought into view the trachea and gullet. When in this way I had ascertained the practicability of extirpating this tumour, I made an incision into its substance, and found that it presented precisely the appearances belonging to a bronchocele.

"It has been proved, from the inspection of the connections of the en-

larged thyroid gland in this body, that it might with a possible advantage have been removed by operation. Although this would have been practicable in this instance, still in others the tumour may be so situated, and may have formed such adhesions, as to preclude any attempt at extirpation. The respiration and swallowing may be both much impaired, and every remedy may have been tried and failed. Under such circumstances, is it necessary to leave the patient to die a miserable and lingering death? or is there any expedient which may reasonably be employed to protract life, and to render existence more comfortable? Such an expedient is within our reach. The dissection of this case proves its practicability. There it has been mentioned that the upper thyroid artery was greatly enlarged; that it was even nearly equal in size to the carotid; and also that it lay very near to the surface. Its coverings were few and thin; the pulsations of the artery were strong and distinct. Placed as that vessel almost always is, no one would have experienced difficulty in reaching it. The pulsation itself would be a guide, which would conduct us easily and safely to the vessel. No nerve of any importance would come in the way; no muscle would require to be displaced; no depth of substance to be divided; no intricate dissection to be performed. A small incision would expose that vessel on which the tumour in great measure depended for its support. It would be easy to carry a ligature round it to intercept the flow of blood to the gland; and, till the other vessels enlarged, the tumour would have more slowly increased in size; not only so, but it will sometimes be actually reduced and life protracted. A surgeon who would decline extirpating a large bronchocele would have little dread in tying the thyroid artery. Not a thyroid artery as in health, small, indistinct in its pulsation, and requiring, consequently, a more intricate dissection to expose it, but an artery too large to be missed. I would not, however, rest the question regarding the propriety of this procedure on conjecture, nor would I appeal to the healthy or morbid connections of the vessel alone to prove that it may be safely tied, when the operation has actually been performed on the living subject, and, in so far as concerns the tumour, with a favourable result, though we must regret that the patient died. . . . The patient died; yet this does not militate against the repetition of the experiment; the same might have happened from merely opening a vein, and, in the confined air of an unhealthy hospital, has actually happened. A tumour which, before its nutrient arteries were tied, was so large that it would have been folly to have attempted its excision, may, by depriving it of the circulation along the two upper thyroid arteries, be so reduced as to allow the operation to be performed, provided its connections do not prohibit us from interfering. It is not, therefore, the immediate effect on the disease which we are to look to in tying the arteries; we are to anticipate the command which it may ultimately give us over the tumour; and consequently, when the swelling, although very large, has not formed adhesion to the large cervical vessels and nerves, we are to urge the expediency of tying its nutrient arteries as a prelude to other proceedings. We shall not, however, in bronchocele, have occasion often to extirpate the thyroid gland, neither shall we require in many cases to tie the thyroid arteries."

Again, a little further on, Mr. Allan Burns remarks: "In extirpating this gland, an incision of an elliptical shape, if the tumour be large, or if the integuments be diseased, is to be made over it with the long diameter directed from above to below. The surface of the swelling is next to be uncovered by dissecting back the integuments on both sides. The finger is to be insinuated between the skin and the muscles, pushing it upwards and backwards till it comes in contact with the thyroid artery, round which a ligature is to be passed with a blunt needle. In a similar manner, the other superior thyroid artery and the two inferior vessels are to be secured when the whole gland is to be removed. By these ligatures, we cut off the circulation into the tumour, and consequently are left at liberty to finish the operation by cutting the vessels nearer to the morbid parts than when the threads have been applied, and by dividing the sterno-hyoid and thyroid muscles above and below the tumour, which is afterwards to be detached from the trachea and gullet by cautious working with the fingers. In this way, we may remove one or both lobes of the thyroid gland; but the operation is difficult, tedious, and not without danger. . . . To those who are accustomed to do everything with the knife, the extirpation of the thyroid gland must appear a formidable operation; but, to one who knows when to use the scalpel, and when to substitute the fingers, the removal of the thyroid gland, although hazardous, does not appear impracticable. 'Wilmer (*Cases in Surgery*, page 243), in his essay on *Bronchocele*, says: 'When we reflect upon the situation of the thyroid gland, and consider its numerous arteries, which increase in diameter in proportion to the enlargement of the part, we shall not be surprised at the difficulties that must attend its extirpation in a diseased state, and the danger there ever must be of incurring a fatal hæmorrhage.' These are

the notions entertained by all who reprobate this operation; but they are founded upon a mistake in anatomy. A diseased thyroid gland really derives all its blood from four arteries; if, therefore, the surgeon push at once to these and secure them, he will, in detaching the morbid parts, have nothing further to dread from bleeding arteries. By venous hæmorrhage, he may still be incommoded; but it will easily be checked. When, however, he employs the knife and trusts to tying the arteries after he has divided them, he will unquestionably experience all the difficulty, and the patient will run all the hazard that Gooch's did. The life of the patient will be saved only by having a succession of persons to keep a constant pressure upon the bleeding vessels day and night for near a week with their fingers upon proper compresses, after the operator has been repeatedly disappointed in the use of the needle and ligature" (page 232).

THE SANITATION OF HOUSES, ESPECIALLY IN THE MATTER OF DRAINAGE.*

By W. EASSIE, C.E.

THE evils induced by improper systems of drainage, etc., will be best observed by instancing the cases of houses which have from time to time been added to, until they have passed from the chrysalis or cottage condition to that of the winged mansion. When such cases occur, it will be found that the residences will have passed through all the applied gradations of sanitary knowledge. One will be able to trace there the first rude awakening up of the inmates, when something has been found wrong with the patrimonial cesspool in the kitchen, when perhaps it has filled up, choked the tributary drains, and even raised the paving-stones out of their places. When this happened in a village or hamlet, all that the united talent of the place could apparently suggest was merely a more or less partial emptying of the offensive receptacle, and the cleaning out of the drains leading from sink and closet. And, when this had occurred several times, or when the sides caved in, and the contents of the cesspool began to interfere with the economy of the sink or the working of the closet, the fiat would be issued for the excavation of a new dumb-well close by, and for the diversion of the drains to its mouth. The old cesspool was then duly covered with a stone, without being emptied. Very rarely, indeed, were these places cleaned out; the reason, doubtless, being that a disturbance of the deposits would render the absence of the family a matter of absolute necessity, owing to the overwhelming stench. Handy disinfectants for the use of soilmen were then unknown. It was, no doubt, also found cheaper to provide a paving-stone, and cover up the effete matter out of sight. And it is just the same in towns and cities. Only last week, I laid bare in the basement of a house in the West End of London three cesspools, which had been dug in most brotherly proximity, and abandoned in rotation as they filled up with ordure and filth. More than four cart-loads of night-soil were removed, and the bulk of it could not have been disturbed, I am sure, for half a century. Nor would this valuable kitchen-garden stuff, we will call it, have seen daylight now, and been carted to some spoil-bank, where will perhaps stand a future row of houses, had not the rats formed runs in the vicinity of the pits, and allowed horrible smells to invade the house by way of a long forgotten brick drain.

The reason why these ancient nuisances are found inside houses in towns and cities is not necessarily because the residences were built in rows or terraces, with but little external accommodation; for the same practice held good in country houses, where space was no object. It was rather owing to the absence of a proper flushing supply, and the improbability that the slops from the kitchen would suffice to carry away the more solid wastes outside the walls of the house. Indeed, they would be certain to be insufficient; for, at the time when these cesspools were excavated, only brick-built drains were used, generally laid with uneven bed, and through the open or perished joints of which, too, most of the fluids percolated.

The plan (Fig. 1) gives the earliest appearance of the basement of a house with which I have lately had to do, and I propose to follow its history up to the present time. At first, it must have been drained in some such manner as indicated by the dotted black lines, and I have drawn the cesspools in the kitchen, K. That cesspools are somewhere there I strongly diagnose. In a similar manner, the stables and coach-house, S, were once drained into the cesspool shown by the black spot between the stalls, because I have already discovered that one. Fortunately, the soil was of an impervious nature, or the whole basement would have been sodden throughout, and the well at W poisoned.

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