

**On removal of the entire tongue by the Walter Whitehead method : with full details of the operation and after-treatment / by Edward Lund.**

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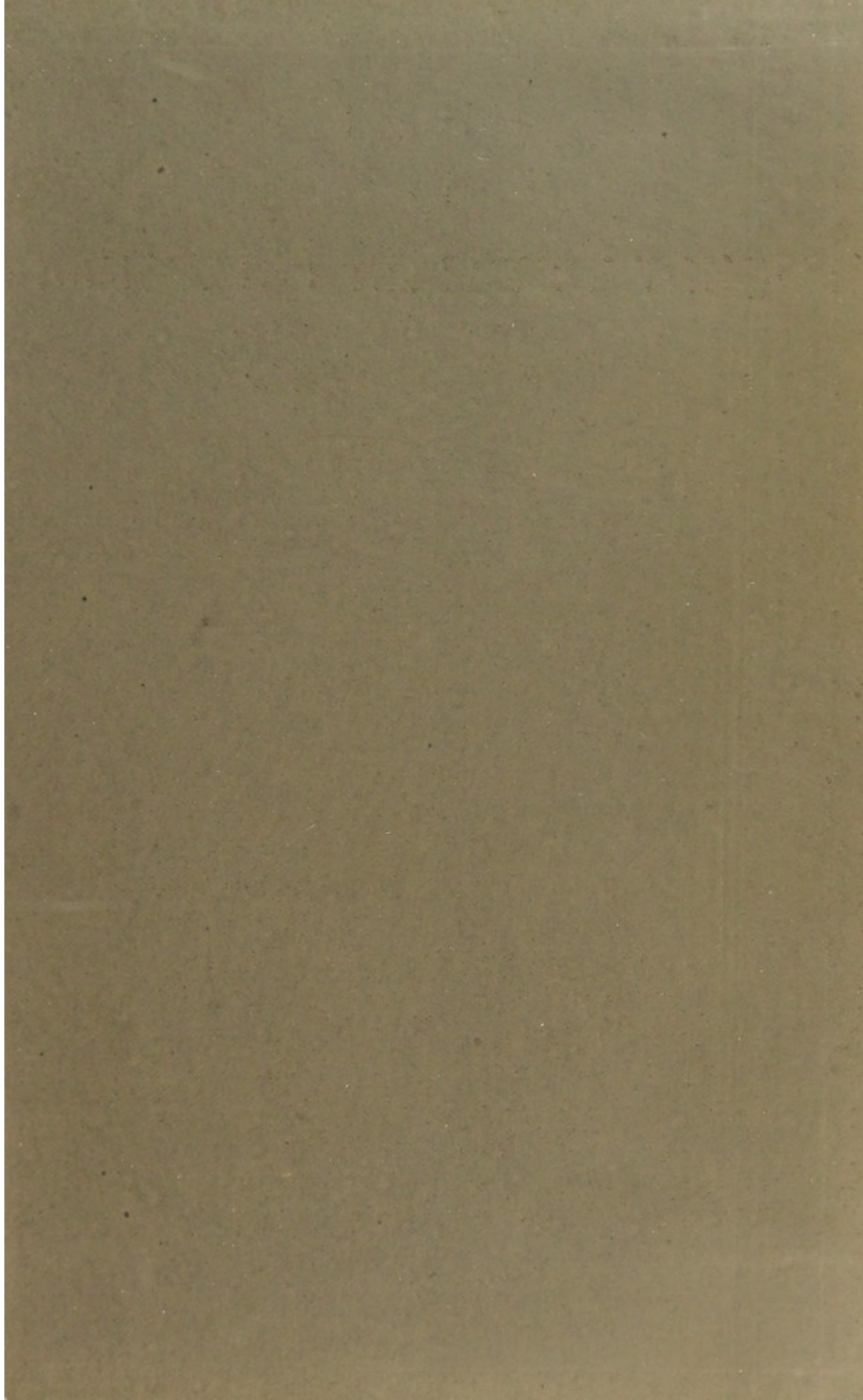
ON

REMOVAL OF THE ENTIRE TONGUE

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with the author's best regards

ON

# Removal of the Entire Tongue

BY THE

WALTER WHITEHEAD METHOD,

WITH FULL DETAILS OF THE OPERATION AND  
AFTER-TREATMENT.

BY

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ETC. ETC.

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The greater portion of this Essay was read before the Medical Society of Owens College at the meeting in May, 1880. It was impossible on that occasion to complete the subject, and I have therefore determined to publish my remarks in this separate form, in the hope of securing for them a more extensive circulation.

22, ST. JOHN STREET,

MANCHESTER,

July, 1880.





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# ON REMOVAL OF THE ENTIRE TONGUE

BY THE

WALTER WHITEHEAD METHOD.

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IN suggesting improvements in the performance of any surgical operation, it is often extremely difficult to prove that what we have to propose is essentially novel.

This preliminary observation is especially applicable to the remarks which are to follow on the operation for the removal of the entire tongue by the Walter Whitehead method.

My friend and colleague, Mr. Walter Whitehead, has, to my knowledge, for more than seven years past been availing himself of every opportunity he could command, for closely observing the progress of that terrible disease, cancer of the tongue, with the object of discovering the best possible means of arresting its advance, or at least of relieving the subjects of it from inevitable distress.

I shall not attempt to enumerate the various diseases of the tongue which may render excision of that organ necessary, but shall confine my remarks to those cases in which it has been determined to remove the tongue, either partially or in its entirety, and then proceed to describe minutely Mr. Whitehead's method. I need not remind my readers that cancer of the tongue—I mean the epithelial form, for true schirrous carcinoma is extremely rare—seems to advance in two ways—either slowly, at first very slowly; or rapidly. In the former case it is that the diagnosis, and therefore the absolute necessity for operation, is so very difficult to determine. All must have seen what we call cases of suspicious disease of the tongue; a slight crack or fissure on its lateral aspect, caused perhaps by contact with a ragged tooth; ulcer of the tongue in a patient with acknowledged specific taint; or general or localised hypertrophy of the papillary structure of the tongue, with, in the immediate neighbourhood, conditions common to true epithelioma, which can after removal be verified microscopically. Icthyosis linguæ, as it has been called, is, for example, just one of those states of the mucous membrane of the tongue in which chronic disease may exist for years, may appear to yield to local and even to be benefited by constitutional treatment, and yet, at last, may culminate in unmistakable and rapidly spreading cancerous disease. Who shall tell at what particular period of its growth this change

commences; and who shall say that unless we make the rule absolute, and proceed to operate in all cases, that ultimately a malignant aspect will not come over the disease with inevitable certainty? When, either from the first, or very shortly after the ulcer or simple abrasion of the tongue has commenced, it progresses rapidly; the pain is excessive, and glandular complications are early formed; the diagnosis on the very element of time is so apparent, that if relief is to be sought at all it must be by abscission, and then the only question that arises is whether operative interference is likely to prove of real benefit? In such cases, no doubt, as in all instances of malignant growth, there is a time, if we could only fix it, in which the heterologous growth is local in its nature. Fed, we may assume, through some more general cause, a vice of growth, an error of nutrition with indefinite tendency to advance, "a riot"—to adopt Mr. Hutchinson's ingenious idea—"is set up among the cells," which enter into open rebellion, undergoing certain changes of form, growing without limit, and refusing to be controlled by the laws of that modelling process by which, in healthy nutrition, new tissues replace old ones with perfect uniformity as to nature, form, and size. When, therefore, this irregularity in cell development in any part is once established, and the rapid proliferation of heterologous tissues is proceeding, we may sometimes arrest it, or check the repetition,

by simply removing all that is so changed, with some healthy surrounding tissue. No doubt we can do this, in simple epithelioma, as it has frequently been done. I know a case of undoubted epithelioma of the lower lip, in which complete abscission was performed fifteen years ago, and no trace of the disease is now visible, nor has any further growth or repetition of growth occurred, although the man is now over seventy years of age, and from that cause somewhat decrepit and feeble in his movements. He has otherwise the appearance of a healthy man, and is entirely free from cancerous disease. This, however, proves little, except the cardinal fact that there is a stage—but, alas, who can define its exact period, or limit its duration!—in which such disease, especially epithelial cancer, is truly and solely a local affection.

Where the diagnosis is indisputable, the total removal of the part affected gives the only chance of benefit. But, it may be asked, how about the advanced cases, where tissues more deeply placed are implicated, and infiltration is proceeding in all of them? Are they in any way to be the subject of operation, or should operation be attempted at all where it is clear that the enemy can only be driven out of the citadel, the outposts being too numerous? In such a case, an operation, limited or extensive, can only be justifiable as a palliative measure. All who have observed the progress of malignant disease of the tongue, and have seen the

great distress of a patient suffering from it, by reason of the continued discharge of saliva and mucus from the mouth, accompanied by intolerable foetor and agonising pain, will bear testimony to the fact that any operation by which some or all of these complications can be avoided is justifiable, even if the ultimate result may not be such as to resist a fatal termination of the disease, and only to give temporary relief, and lessen suffering.

And here the question must arise as to whether the particular part of the organ which is the seat of disease, or the whole tongue, shall be removed. Certainly, where the extent of the disease has been very slight, and the diagnosis correct, I have known the patient, after a partial operation, to go on well, and no return of the disease to occur for many years. I have one such case in which I operated seven years ago, and another two years since; but instances of this kind are not frequent. Malignant disease rarely commences in the middle line of the tongue. It is usually confined to one side, but when the floor of the mouth becomes implicated, we have to deal with a complication which is sure to lessen the chances of success in any attempt at removal. If the mucous membrane under the tongue be the seat of ulceration of an epithelial nature; or still more particularly, if the mucous lining of the mouth reflected from it towards the gums be so affected, submaxillary growths are sure to occur sooner or later, and will greatly complicate

the case, although not necessarily preventing the part being operated on with marked temporary advantage. If the disease be confined to a small isolated spot on the side or tip of the tongue, and the tongue be still free in its movements, not in any way bound down by adhesions or unyielding infiltrations of tissue, the disease not being extensive—say covering not more than a square of  $\frac{3}{4}$  of an inch—such a case might be regarded as favourable for partial removal. For, in spite of the arguments that, as each half of the tongue has a nearly independent vascular supply, the direct inosculation from the vessels being only at the apex, or chiefly at that part, the nervous supply being likewise independent for each half of the tongue—in spite, I say, of this fact, if removal is to be performed at all, it is far safer to take away the whole of the tongue at one operation than to risk the necessity of a repetition of it at a future period, when success may be utterly hopeless in consequence of the greater extension of the disease. It may be said, independently of the danger of the operation for entire removal of the tongue, that to leave the patient absolutely without that organ, or with only the merest rudiments of it, is in itself a fearful mutilation and a source of constant misery. In regard to the effects upon deglutition, vocalization, and the general comfort of patients who have had the entire tongue removed, it is found, nevertheless, that such people are far better off, and suffer less inconvenience, than

those in whom a part of the tongue only has been abscised. In the latter the remainder, by reason of its unsymmetrical form, is badly balanced in the mouth, and seems to be always in the way. It is impossible for any one who has not been in company with such patients, to believe how marvellously well a person can speak, pronouncing nearly all the more difficult articulate sounds, after the whole of the tongue has been removed to its very base. It is said that in countries where the custom once existed of excising the tongue for political and other offences, persons on whom the operation had been badly performed,—only a deformed mass of the tongue remaining,—would ask for removal of the stump, so as to allow of greater freedom of speech, and to enable them when moving amongst their fellows the more easily to escape detection of the terrible punishment they had undergone.

Complete removal is thus the better operation—removal, that is to say, of both sides of the body of the tongue even where disease seems to have invaded only one half, provided the after consequences and dangers are not so great as to induce us to hesitate in adopting such a proceeding.

I will say nothing of the advantages or disadvantages of other operations for the entire removal of the tongue, when compared with that one recommended by Mr. Walter Whitehead. The division of the symphysis of the jaw after Syme's method, the simple *écraseur* of Charrière, and the



electro-galvanic cautery, are all open to objection ; the first from its extent, and the last two from there being a centre of bruised or burned tissue left on the divided surface, which from the moisture of the mucus from the mouth is very apt to undergo septic change and become the focus of auto-pyæmic inoculation and fatal septic pneumonia.

I will assume, therefore, that we have determined in a given case to remove the entire tongue, and that the operation is to be performed according to Mr. Whitehead's method, which in itself, simple as it is, and carefully reduced to a system, must seem to those who have not practised it a very bold one, and from its very nature fraught with imminent danger.

The operation consists in simply excising the tongue by a succession of cuts made with a pair of scissors.

In this, as in all severe operations, it is of great importance that our proceedings should be worked out in a series of well-arranged stages. It is also extremely necessary that every successive step of the operation should be taken deliberately, and without the least halt or hesitation. Here, of course, co-operation, which should ever exist between the operator and his assistant, is most essential. The latter should never wait for instructions from his chief, but knowing well beforehand the course to be pursued, should endeavour to anticipate rather than lag behind for orders.

Before we begin to operate, the patient must be brought under the influence of some suitable anæsthetic. The mixture of ether and chloroform diluted with alcohol—the preparation advocated by the Chloroform Commission instituted by the Royal College of Physicians of London, some years ago—answers admirably. This can be given at first both by the nose and mouth until insensibility has been secured, after which it may be inhaled through the nasal passages alone. The patient should be laid in a semi-recumbent posture opposite to a good light, with such an arrangement of pillows as will fix his head in a convenient position, with the upper part of the chest so raised as to allow the head to fall a little backward, that the interior of the mouth, and especially the floor of it, may be plainly seen and well under command. The operator should place himself on the patient's right side; an assistant on whose services he should feel that he can thoroughly rely standing on the left-hand side; and during the time the chloroform is given by the nasal passages alone, the administrator should keep himself somewhat behind and a little above the level of the patient's head.

The first thing to be done is to secure a thorough opening of the mouth, and steady fixing of it in that condition. This is best accomplished by the use of Mr. Mason's well-known mouth-gag, first employed in operations on the palate under the sanction of the late Sir W. Fergusson. The mouth

being thoroughly expanded, the gag, properly fixed by screw action, must be held steadily by the assistant with one hand, the other being free, in such a position as the operator may determine upon from time to time during the progress of the whole operation. The operator next takes hold of the end of the tongue with a pair of forceps and draws it forwards; then a needle, armed with a strong, well-waxed silk ligature thread, is to be passed through the tongue from below upwards, entering near the *frænum linguæ*, and coming out upon the dorsal surface in the middle line as far back as convenient, or at least to the extent of one-third the length of the tongue. The needle is then drawn back, leaving the loop of silk free on the upper surface of the tongue. The cut ends of the ligature thread are then passed through this loop, and drawn tightly forward; thus a firmer hold is obtained of the front part of the tongue than if we used only a single thread, and there is less probability of the thread cutting through the tissues if they have become softened by disease. The ends of the thread should now be tied together, to form another loop of suitable length, in which the assistant can place the fingers of the hand which is free, and be ready at any moment to drag the tongue forward in the line of its long axis, according as the operator shall direct, pulling it straight out of the mouth, and upwards towards the ceiling of the room.

The operator now takes a pair of scissors as the only cutting instrument required in this operation, and I think an advantage is gained if they are slightly curved, though Mr. Whitehead declares that the straight scissors are the most suitable, as will be presently explained. These scissors should cut very cleanly close to their points, but the extreme ends should be rounded. The first clip of the scissors should divide the *frænum linguæ* deeply down in the floor of the mouth underneath where the ligature has been passed. Then, selecting one side, say first the left and then the right alternately, one blade of the scissors should be pressed beneath the folds of the mucous membrane which runs from the gum to the side of the tongue and conceals some loose cellular tissue. In this free space the end of the scissors can travel onwards, care being taken to keep the instrument somewhat towards the side of the mouth, and rather away from the tongue. This being done to an equal extent on each side, and the tongue well freed to the pillar of the fauces, but still drawn out of the mouth, we may proceed to divide the muscular structure under the tongue exactly in the middle line, exposing the edge of the two *genio-hyoglossal* muscles, and the anterior part of the *hyoglossal* muscles. But here it is important, as soon as this length of the tongue has been set free, that we should not allow the scissors to dip down too much in the direction of the *os hyoides*, but

rather endeavour to carry them by successive cuts horizontally backwards, aiming as it were at the base of the epiglottis.

No doubt Mr. Whitehead is right in what he says, that a perfectly straight pair of scissors is safer to use than a curved pair, for if they are curved on the flat, as the instrument makers call it, and the concavity is held upwards, we find ourselves getting too far into the tongue; and if the concavity is held downwards, each incision carries us, without our noticing it, too deeply down towards the os hyoides, a danger to be avoided. Hence, unless we exercise great care as to the line in which we are cutting, a straight pair of scissors will be less likely to lead us astray than a curved pair, if the same are to be used throughout the entire operation.

Thus far it is possible that very little hæmorrhage may have occurred. I have rarely seen any trouble from the branch of the artery which supplies the frænum; it usually bleeds freely for a minute or two and then stops. It is the same with one or more small branches which will be found on each side of the tongue, just under the mucous membrane, beneath its anterior third; what little hæmorrhage may so result can frequently be arrested by dragging the tongue well forward, which the assistant should continue to do while the section is being made.

It has often occurred to me, when watching this operation, to observe how this steady traction of the

tongue not only arrests the continued flow of blood at this stage of the operation, but, from some cause which I do not quite fully understand—probably from the circumstance that muscular substance prevails so extensively in the tongue—the very small arterial branches, when so divided, rapidly retract beneath the fibres of the divided muscles and cease to bleed, or can be made to do so by steady pressure for a minute, with a sponge.

The chief event in the operation is the division of the lingual artery, for when we have arrived at this stage of our proceedings, by successive cuts made with the scissors, the pulsations of the artery may generally be seen, and it is easy to be prepared for the bleeding. The lingual arteries on the sides of the tongue are occasionally of unequal size. Thus, if we have a large artery on the left side, it is very likely to be of smaller calibre on the right. As soon as divided, the operator must be prepared to compress it with his left forefinger, until he secures it with forceps, and either ties or twists it. By reason of the direction of the artery, the way in which it is pulled forward by traction on the tongue, the operator immediately directing the point of his left forefinger to the spot, and the forceps being in his right hand, he can with great facility seize the artery and control the hæmorrhage; assuming that his assistant is perfectly calm, keeps the mouth fully open, the head steady, and the tongue well drawn outwards and upwards,

at one constant angle and direction, such as the operator has already decided upon. While the finger is thus held firmly upon the bleeding spot, the operator should keep in mind the fact that the direction of the trunk of the lingual artery so divided is such that it points directly forwards; as the operator will often find to be the case if the pulsation is vigorous and the artery spurts freely, for the jet of blood is almost sure to strike him on the face as he is looking out for it on removing the pressure. At this moment, just when the finger is relieved from pressing the artery, the mouth of it must be caught hold of with a pair of strong bow forceps of good construction, not caring if a little tissue is drawn up with the artery,—that is to say, not wasting time in attempting to separate it from the other structures. If the forceps act properly they will compress the artery sufficiently to stop the bleeding, and then we may leisurely proceed to tie it, the tongue all the time being held steadily by the assistant exactly in its original position.

In selecting a ligature for this artery, I have long since adopted Mr. Whitehead's suggestion not to use cat-gut, but silk, as more reliable, and less likely to break, particularly that kind of silk ligature thread known as Arnold's wove silk, which in proportion to its size is very strong, and not liable to give way at the critical moment when, in fixing the ligature, the greatest stress is put upon it. No. 3 silk is a

very useful size for this purpose;—the largest I should ever use is No. 7.

The ligature being passed carefully over the end of the bow forceps should be tied firmly, and the forceps removed before the ligature is cut, so as to be quite certain that all is right, and then both ends should be removed in the usual way.

Having divided the lingual artery on one side, some idea may be formed as to where it may be expected on the other.

It does sometimes happen—and Mr. Whitehead assures me it has occurred to himself more than once—that the divided lingual artery on one side, and in two instances on both sides, did not require any ligature, but in some way retracted beneath the muscular structure and ceased to bleed. Or possibly the arterial pressure being reduced by previous loss of blood, or the bleeding being arrested by the formation of clot, no ligature was used, and no secondary hæmorrhage followed.

As soon as we are quite sure that the lingual artery on each side has been divided and made safe by ligature, we proceed with our operation with greater confidence, knowing that the most critical part has been accomplished.

The same plan must still be followed of directing the point of the scissors horizontally backwards, aiming, as it were, at a spot which would correspond to the base of the epiglottis. And now, by alternately clipping the underpart of the body



of the tongue, first on one side and then on the other, till we have arrived so nearly at the centre of it that just in front of the epiglottis we have left a band of tissue, consisting of the thick mucous membrane which surrounds the arrangement of the muciparous follicles in the neighbourhood of the foramen cæcum, we cease to make any more incisions in a longitudinal direction. It will then be evident that a strip of mucous membrane and some sub-mucous tissue have been left uncut, to one end of which the loose divided structures of the tongue are still attached, while the other is just in front of, and from side to side, about the same width as the epiglottis itself. In fact upon its upper surface, in the middle line, will be the glosso-epiglottidean fold.

Now, as a precautionary measure, having the tongue well lifted up to the roof of the mouth and pulled forward before this strip is divided, which is the finishing stroke of the operation, and completes the separation of the tongue, it is well to secure the tissues left in front of the epiglottis, so that the small portion which will remain can be pulled forward in the event of secondary hæmorrhage, or any possible tendency of the epiglottis to be cast backwards and to fall over the opening of the wind-pipe. We therefore take a loaded needle, slightly curved, and pass it from below upwards, guided by the forefinger of the left hand, until it appears on the dorsal surface of the glosso-epiglottidean fold,

a little in front of the epiglottis, in the centre of this strip of tissue, which can be easily drawn forward if all the tissues at the sides have been thoroughly divided. Then this loop of ligature thread being pulled out and the needle withdrawn, it is left either as a single or double thread, long enough to hang out from the mouth at both ends, and these are tied together and knotted so as to form a long loop.

I am particular in mentioning this because, unlike the ligature thread put into the apex of the tongue at the commencement of the operation, which has to be fixed by a loop upon itself, this ligature attached to the mucous membrane and remaining tissue in front of the epiglottis should be left as a single loop, so that when the time comes for removing it one or two days afterwards it can be taken away easily, and not be buried in the tissues of the part. All that now remains to be done in order to finish the operation is to divide the band of tissue in front of this last ligature, and the entire tongue will be free and can be removed from the cavity of the mouth. One single cut of the scissors will usually do this, of course taking care that the ligature last put in is not divided by the scissors.

If by any chance the stump of the tongue should fall back upon the larynx at the moment of division by means of this ligature, we can immediately correct the misadventure by drawing the epiglottis forward. In fact it will be evident to those who have followed

the details of the operation, that as far as preserving the patency of the larynx is concerned, the tongue is held during the whole operation in a forward direction, so that every facility is given for the entrance and exit of the air; and by inclining the head somewhat to either side as may be required, whatever blood runs down the throat will be more likely to pass by the sides of the epiglottis than directly into the trachea.

In this way the operation will be completed, and the gag may be removed from the mouth, having first drawn forward with one hand the strap-like piece of mucous membrane in front of the epiglottis, held by the ligature, and by gentle pressure with a small sponge on the floor of the mouth for a minute or two, we can see whether any hæmorrhage we may have to contend with is of the nature of a general oozing, or from a single vessel, which may require ligature or torsion.

I have assumed that the operation has been performed on a subject in whom the ulcerative disease beginning at the tongue has not advanced to the floor of the mouth. If it has done so to a slight degree, we must proceed, after the tongue has been removed, to hook up the diseased tissues with a tenaculum or other suitable instrument, and snip away with the scissors as much as it may be needful or prudent to remove.

I have purposely left the one great question of hæmorrhage in this operation to the last, in order

that I might speak of it more independently. It is obvious that we must be prepared for bleeding, which may even be very profuse.

The parts within the mouth are very vascular—the smaller vessels on each side blend freely with one another, and the tongue itself has an intercurrent circulation at the tip to which I have already referred—so that no sooner do we clip the first fold of mucous membrane than a pool of blood is poured out from some little artery in the frænum or near to it; a small arterial jet will instantly arise, and the moment this happens the operator will realise the one great difficulty which must not be lost sight of in this particular operation. It is this—the tongue lies on the floor of the mouth, or at least the larger part of it remains there, however much at first we may try to draw it out; and around this part, limiting the floor, is the prominence of the alveolar ridge, which curls round in its horse-shoe form to give figure to the mouth. Now in this shallow cup-like cavity the blood collects with great rapidity until the space is full, simply because by the projection of the line of the lower teeth, &c., it cannot flow away, but must accumulate to a certain depth, and in so doing it instantly covers the bleeding spot or spots which we seek to close. And this is exactly what occurs at every stage of the operation in reference to the bleeding, unless perhaps at the moment when the lingual artery is divided, which, in spite of its size, is really more accessible than

the smaller branches, because when divided its orifice is more conspicuous and faces the operator, and the stream of blood issuing from it is directed straight towards him.

I may here remark that with regard to the general question of hæmorrhage and its effects in surgical operations and the means for its prevention, we have to consider two conditions—the quantity of blood lost, and the mode in which it escapes. As to actual quantity, and the number of ounces of blood lost from the beginning to the end of any operation, the state of the patient, as far as vital powers, action of the heart, and nerve influence are concerned, must ever be taken into account. It is just possible that if a person who to start with is in rude health, thoroughly robust and strong, and who has from accident to undergo some capital primary operation, loses blood in its performance to an amount which to those unaccustomed to such cases might seem excessive, the loss may really be of service in moderating inflammatory reaction after the operation.

We may suppose such a case where a considerable portion of the body is abruptly lopped off, the whole of one lower limb—a sixth of the entire body—as in high amputation of the thigh for injury. But this differs widely from the case of a patient who, previous to the operation, has been unfortunately the subject of wasting disease or of organic mischief in the liver or the kidneys. Here the actual quantity

of blood lost, irrespective of the mode or rate at which it escapes from the system, is the chief consideration.

I can remember full well when very young, in some of the first operations at which I was to assist, and afterwards performed myself in private practice, how anxious I felt that nothing should go wrong—above all things imbued with the popular fear that the patient might die there and then from loss of blood which I had not the ability to arrest. The only way in which I could nerve myself to proceed in many cases was this—I said to myself, having seen in those days many cases of blood-letting—“Well, how much blood can this man bear to lose and not die right out? Can he bear the loss of a pint?” I had often seen 8, 12, even 16 ounces of blood drawn from the arm in venesection, and I therefore readily concluded this might happen without extreme danger in the approaching operation. And even if blood were so lost while my operation was going on to a greater amount than a quicker operator would have allowed, I kept on consoling myself with the reflection—“Well, never mind, he has not lost a pint yet—he’ll do,”—or such a thought as this. And even to this day, all things being equal, as one of my colleagues knows very well, we often whisper to each other in a severe and tedious operation in a region where the bleeding is profuse—“We have not yet got to the ‘*regulation pint*,’ but very nearly so. Take care.”

Again, independently of mere quantity, the mode of loss is of great importance. A small amount lost suddenly by the division of a large artery, and flowing out in a full stream, will drain the system, and lower the heart's action so rapidly that great danger will arise from alarming or even fatal syncope. And lastly, while the blood is being lost, quite apart from its actual amount, it may do harm in operations in the mouth and near to the air-passages, such as the one we are now considering, by the blood trickling downwards into the trachea, or overflowing the opening of the rima glottidis, and thus instantly causing danger by obstructing breathing.

I will now proceed to consider this last source of danger. The probability that blood may flow so rapidly from the incisions in the front of the mouth to the back part of it as to flood the posterior fauces, enter the rima glottidis, or suddenly cover it over and stop respiration, is a source of danger which must ever be present to the mind of the operator on such occasions, and it is with the object of being prepared for such an untoward event that, before undertaking certain operations upon the mouth, tracheotomy or laryngotomy is performed as a preliminary operation, and a tube safely lodged in the trachea before any bleeding can occur. But in this operation of Mr. Whitehead's, if it is conducted slowly—if each cut is made deliberately, watching the effect as we proceed—if mere oozing of blood is met by steady pressure with sponges, of which an

abundance should always be ready, cleansed and prepared in quick succession by a couple of assistants told off for that special purpose—I mean small pieces of sponge properly fixed to forceps or holders made for them—it is wonderful how little blood will be lost, and how little confusion or disorder will occur in the operation.

In the oozing-form of hæmorrhage much may be done by pressure on the spot which bleeds, or by steady traction on the tongue, which seems, as I have already hinted, to tend in some way to control the more rapid entrance of fresh supplies of blood into its substance by elongating and narrowing the arterial canals through which it is supplied with blood. If the bleeding is seen to come from the mouth of a divided artery—if there is a spurt or jet of blood, however small the artery may be, the forceps—always ready, so that the operator with his right hand can find them in the instant—must be employed, regardless of whether or not muscular tissue, or much cellular tissue, is also included in their grasp, and the vessel tied or twisted. All this time the position of the head is a matter of great moment, for except when we are cutting through the central portion of the tongue and are dealing with purely muscular tissue in which the blood-vessels are very small and not numerous, the head of the patient ought to be inclined to one side and not be allowed to fall straight backwards. As the operator makes his incisions, first on one side, then on the



other, he should turn the head over to the side not operated on. He should do this himself, the assistant watching his movements with attention, knowing exactly his object,—viz., to direct the flow of blood towards the more dependent side where it may accumulate in the supplementary cavity of the mouth between the cheek and the line of the teeth; and here, if not removed by sponges or by the operator's fingers when the blood has coagulated, it may run slowly down the throat by the sides of the epiglottis, not over it.

Of course the operator and his assistant, and all who aid in this operation, must have their wits about them, and be ready to act in concert for one common object if need be; and in this operation, just as in that for cleft palate, where the bleeding is sometimes very sudden and profuse, it is needful, to save the patient from impending suffocation, to roll him quickly over on to his face, with the head hanging over the edge of the table, so that all the blood may be got out of the mouth, and the larynx be left free and dry.

I have never yet had to use the actual cautery, or the thermo-cautery, in this operation to stay the bleeding, but I have thus far always had it ready, and close at hand, as a *dernier resort*, if other means should fail.

Very rarely have I known, in this operation, secondary hæmorrhage to go on after reaction. It seems that with the exception of the divided lingual

arteries, the other branches are so small that by their inherent contractility, and enclosure between interlacing muscular fibres, they soon cease to bleed.

If, in spite of all our care, oozing of blood should continue after the entire completion of the operation, and it is not possible to detect any special point from which the bleeding comes, so as to control it by ligature, I have found the oozing quite manageable by introducing into the mouth a piece of sponge, dipped in iced water, the piece being of such a size as to fill the cavity left in the floor of the mouth by the removal of the tongue, and which is bounded, as I have already described, by the sides of the lower jaw. Then, placing two fingers of one hand over the sponge, spreading them out somewhat so as to distribute the pressure, the thumb being held under the chin, opposite the fingers, such a diffused and general pressure can be exerted on the bleeding surface that, after a very short time, all such oozing will cease.

It was customary with us, after the early operations at which I had the pleasure of assisting Mr. Whitehead, to place ice in the mouth to stop the bleeding. This is not now our rule, but rather the exception, inasmuch as a piece of ice put into the mouth and allowed to melt there, is often found troublesome, and likely to produce coughing or disturbed breathing, by slipping too much towards the back of the mouth; but if the patient can retain it,

and it seems to be comfortable to him, we put some small particles into a thin muslin bag, tied up with a string which lies outside, while the bag of ice rests on the floor of the mouth. The greatest improvement, however, which I think Mr. Whitehead has lately made in the after-management of cases operated upon by his method, is, where the patient will consent to it, to persuade him not to open his mouth after the operation, or to open it as little as possible, so as to avoid the entrance of cold air. Thus it is that although after this operation, just as the patient has been recovering from the effects of chloroform, he has uttered one or two words most distinctly, such as "Yes;" "No pain;" as soon as he is conscious he should be discouraged from making any attempt to speak for three or four days, or even for a week, and be invited to communicate his wants and thoughts by means of a slate; not the old-fashioned, common, greasy slate, but a porcelain slate with lead pencil.

Another improvement, which I am satisfied is a very great one, is to feed the patient for at least three days, and even longer if possible, with nutritive enemata administered through the rectum. An egg and an ounce of brandy, with four ounces of beef tea, given every four or six hours, have acted most beneficially in cases which I have treated; and nothing whatever, not even a drop of water, has been put into the mouth for many hours. After a couple of days, an attempt at swallowing may be

made with fluids, such as very thin arrowroot gruel, cold, or perhaps iced ; then after this, milk and beef tea, with other simple nutritive fluids, the greatest care being taken that until nature has advanced considerably in the formation of the cicatricial tissue, which is to be the future floor of the mouth, nothing like bread or other rough material which might irritate the surface shall be taken. To procure sleep, or should there be pain, hypodermic injections of morphia seem in every way most suitable. They should be given periodically at stated intervals of twelve, eight, or six hours, in anticipation of restlessness.

This, then, is an operation which has been reduced to its most simple form by the energy and perseverance of Mr. Whitehead ; for in this, as in so many other instances, what we design to do is always in its early stages complex, and in its advanced stages simple. We get more and more convinced of the value of the principle which we desire to work out, and relying upon this, we are enabled to cast away those guides and helps to which we had recourse at first ; and so it has been in this operation, which I have watched, growing up as it were, from a principle fully worked out by Mr. Whitehead, until the complex has become simple, and he has cast off or has found by experience that he can dispense with many of the precautions and details upon which at first he placed very much reliance.

I can only urge those who desire to practise this operation, to think it out well before they begin, to arrange the various stages of it with the greatest precision, and having once commenced, on no account to deviate from the line of action upon which they have determined.

As to the ultimate results, the chief point to mention is the wonderful way in which the voice is preserved in these cases, and also the way in which the patients are enabled to swallow food. I have certainly noticed that many months after this operation there is a tendency for the anterior pillars of the fauces to become approximated at their base, by reason of the absence of the intervening structure of the tongue, so that, looking into the mouth of a person from whom the tongue has been removed for twelve or eighteen months, the passage from mouth to pharynx is almost circular in form and much smaller than it would be in its natural state. I am not aware that this occasions any particular difficulty in swallowing, beyond, perhaps, the necessity for using softer food and smaller quantities of it than could be passed from the mouth to the pharynx in a healthy state.

There is yet another difficulty with which patients after complete recovery have to contend, and to which my attention was first directed by Mr. Ewart, who has performed this operation on the entire tongue. It is that in mastication they no longer have the trowel-action of the tongue by

which to cast the food towards the cheek as often as it has been forced between the teeth towards the centre of the mouth. More than this, they miss the tongue as a means of swallowing, because they have no longer an inclined plane down which the bolus of food moistened by the saliva and rendered slippery can roll into the pharynx, or perhaps be hastened onward in the same direction by a tilting movement of the tongue; and so it is that patients who have lost the tongue are compelled when swallowing semi-solid food to throw the head suddenly backwards so as to pitch the mass into the pharynx, and this, no doubt, is a difficulty and annoyance; but I think I have seen in some cases which I have watched, that this difficulty rather diminishes than increases with time. But as a compensation to this affliction we have this common result,—that, after removal of the entire tongue, in a large number of cases, the sensation of taste and the power to discriminate certain special flavours is perfectly preserved and in some cases even improved. It is for the physiologist to say how this is occasioned; it would seem as if the means by which such impressions are received were more largely spread over the interior of the mouth and the hard palate than is generally supposed.

I have noticed that patients who have been thus operated on are rather more apt for some time afterwards to be subject to bronchial attacks, and congestive affections of the larynx, than they

otherwise might be, as if the body of the tongue, lying in the mouth, does in some way help to warm the air which passes from mouth to larynx. All that we can do, therefore, is what I have advised should be done immediately after the operation, that is, urge the patient to keep his mouth closed, and to breathe entirely through the nostrils, remembering that the nasal passages are the proper respirators for warming the air.

Where the operation for the entire removal of the tongue has been performed as a palliative measure, with the sole object of relieving suffering and distress, we must estimate at its true worth the advent of such complications as enlargement of the submaxillary and cervical glands, which so often occur after a longer or shorter interval. This always goes to prove that the disease should have been treated at an earlier stage, and that the only chance of averting such consequences is past. If we converse with patients from whom the entire tongue has been removed, and particularly if we ask them to pronounce in succession the letters of the alphabet, we soon perceive where their difficulty lies; it is in such letters as t, d, m, n. But with the other letters, and in words generally, I can declare that on more than one occasion, on seeing a patient after an interval of some weeks, who had undergone this operation, when I had almost forgotten—not recognising the person for a moment—the exact operation which had been performed, I

have thought for an instant that he was suffering from common sore throat, on account of his voice having the peculiar guttural sound which we hear in persons afflicted with ordinary catarrhal tonsillitis. With this exception only could we say the power of vocalization was seriously damaged.

As to any claims which Mr. Whitehead might prefer to the credit of having originated this particular method of removing the entire tongue, or to which he might be justly entitled for so doing, they can only rest on the general principle of combination—the special mode of arranging the successive steps of the operation in a certain definite way so as to secure a certain result. No doubt many surgeons have fixed the tongue by a double looped thread inserted into its apex, to give complete command over it in all its positions and to help to drag it forward. Possibly the scissors may have been used as the chief instrument employed in excising the tongue, although I doubt very much if any surgeon before Mr. Whitehead's time ever removed an entire tongue, from first to last, with scissors only. Possibly similar details have occurred to others, or have been practised by them, more or less completely, in this particular operation; but what I claim for Mr. Whitehead is, the general arrangement and system which he advocates. The successive stages of the operation which he insists upon must be passed through in a certain positive order to ensure the safety of the patient and the success of the operation.



I have sought in vain, I must confess, in general surgical works and also in those specially devoted to operative surgery, to find an account of any operation for the removal of the entire tongue so simple in all its details as that designed by Mr. Walter Whitehead.

I now seek to bring it before the notice of operating surgeons, in the hope that the results which have attended its performance may induce others to avail themselves of its advantages.



